P.O. Box 233, Richmond, ME 04357 www.fomb.org

Testimony in Support of LD 697

Resolve, to Study the Effects of 5G Technology on Bird, Bee and Insect Populations and the Effects of Long-term Exposure on Children (as amended by the sponsor).

Ed Friedman, Chair, Friends of Merrymeeting Bay (FOMB) 3/7/2023 before the EUT Committee

Senator Lawrence, Representative Zeigler & members of the Committee,

I'm Ed Friedman, chairman of Friends of Merrymeeting Bay speaking in support of this Resolve as amended by Representative Quint, (a) **Resolve, to Study the Effects of 5G and other Non-ionizing Radio Frequency Radiation Emitting Technology on Bird, Bee, Insect and other Wildlife Populations and the Effects of Long-term Exposure on Children.**

This Resolve is about educating Mainers and ultimately if successful, making this information easily available to the public. I've been doing environmental work for over 50 years and have worked on toxics issues for at least 40. With my extensive background in the environmental sciences, I've come to believe that worldwide ubiquitously increasing levels of ambient and acute radiofrequency radiation (RFR) emissions, largely from wireless technologies, represent the most significant toxics issue of our time.

Think about it. All living things are beings of frequency. We are composed largely of spinning protons and electrons-electrically charged sub-atomic particles that literally hold us together and have taken billions of years to evolve their delicate balance. The really odd thing would be if relatively recent man-made RFR whether thermal or non-thermal, did not affect us biologically. And in fact it does. Even at relatively low levels, non-ionizing or non-thermal RFR can cause subtle and acute adverse effects, not only to people but to wildlife and vegetation. Biological potency of low level RFR, the subject of this Resolve, is borne out by its frequency and power-specific therapeutic uses including ultrasound, transcranial magnetic stimulation, cancer treatments, MRI's, electrosurgery and to aid in limb regeneration.

While biological effects of anthropogenic RFR have been known for over 75 years, most western countries have taken a physics-based regulatory approach proposed and developed by industry. If it doesn't burn you or directly break DNA, all is good. Many eastern and central European countries on the other hand recognized early on, adverse biological effects at very low RFR levels and regulate exposures accordingly.

Despite the growth in wireless technologies, our FCC, by no means a health or environmental agency, continues to use hopelessly outdated science (going back to the 1950's) as the basis for its exposure guidelines. In a now 2 year old case regarding these limits (EHT et al v. FCC), the D.C. Circuit court ruling remanded in part to the FCC stating the agency:

> "must in particular, (i) provide a reasoned explanation for its decision to retain its testing procedures for determining whether cell phones and other portable electronic devices comply with its guidelines, (ii) address the impacts of RF radiation on children, the health implications of long-term exposure to RF radiation, the ubiquity of wireless devices, and other technological developments that have occurred since the Commission last updated its guidelines, and (iii) address the impacts of RF radiation on the environment. To be clear, we take no position in the scientific debate regarding the health and environmental effects of RF radiation—we merely conclude that the Commission's cursory analysis of material record evidence was insufficient as a matter of law."

In 2019, the New Hampshire Legislature passed legislation (HB522) creating a commission to explore the health and environmental impacts of wireless radiation, included the effects of 5G technology. The legislation was passed by both houses of the New Hampshire Legislator and was signed by the Governor. The commission that resulted from the legislation met for over a year and submitted its final report in November of 2020. This excellent final NH report provides a great jumping off spot for Maine's efforts as proposed by this Resolve. Since publication of the NH study, quite a bit more science and policy in the field of low level RFR has occurred and should be included in our efforts.

For the sake of all Maine residents and our wonderful environment I urge you vote "Ought to Pass as Amended" on LD 697.

Thank you.

Friends of Merrymeeting Bay (FOMB) utilizes research, education, advocacy, and land conservation to preserve, protect, and improve the unique ecosystems of Merrymeeting Bay and Gulf of Maine.

How to Protect Your Family

Choose wired over wireless

- Get a corded landline phone and forward cell phones to it.
- Use corded plug-in (non-wireless) connections for printer, mouse, internet, gaming, and routers, etc.—with all wireless functions OFF.

Safeguard sleep

- Stop use of and power off computers, tablets and phones one hour (or longer) before bedtime.
- Do not sleep with a cell phone, tablet or laptop.

Maximize distance from self and others

- Radiation decreases as you move away from the source.
- Locate devices away from laps, bras and pockets, as the radiation can damage sperm and may be linked to breast cancer.
- Use air tube headset or use speaker phone at maximum distance from head and body.

Protect children

- Children are particularly vulnerable and should not use cell phones except in an emergency.
- If children are using a phone or other device for work or play, select all 3 of the following settings to turn off the radiation from cell phones and wireless devices: Airplane mode ON, and Wi-Fi OFF, and Bluetooth OFF.
- Don't use a mobile device while a child is on your lap or in your arms.

Power off in vehicles

- Mobile devices distract drivers, emit more intense radiation during travel, and metal surroundings create radiation hot-zones.

more & news
EHTrust.org

www.mainecoalitiontostopsmartmeters.org

Doctors' Advice to Patients & Families

Wireless & Health: Simple Precautions Make Sense

This pamphlet reviews precautionary advice by Doctors and governments to reduce exposure to wireless radiation.

ENVIRONMENTAL HEALTH TRUST

Brought to you by: Physicians, biomedical scientists, and neurosurgeons—including Charles Teo, MD; Martha Herbert, MD, PhD; Anthony B. Miller, MD; Süleyman Kaplan, PhD; Annie J. Sasco, MD, PhD; Stephen T. Sinatra, MD; Dr. Erica Mallery-Blythe, BMBS; Devra Lee Davis, PhD, MPH

Wireless Radiation Exposures

Wireless devices—such as tablets, laptops, game consoles, baby monitors, and wifi routers—all emit the same type of wireless microwave radiation as cell phones. Children, pregnant women, and men hoping to father healthy children are more vulnerable to this exposure.

The Child Brain and Skull Absorb up to Ten Times More Invisible Wireless Radiation than the Adult

(Gandhi et al., 2012)

Cell phone radiation absorbed into brain, skull, and eyes of 6-year-old

(Fernandez et al., 2015)

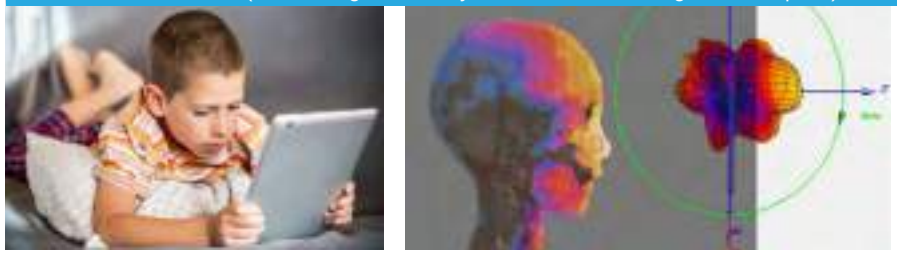
New anatomically based research shows radiation absorption.

Increased Cancer Risk

Wireless radiofrequency radiation was classified as a Class 2B "Possible Human Carcinogen" by the World Health Organization's International Agency for Research on Cancer in 2011. Evidence *has increased* since 2011, indicating that cell phone and wireless radiation should be classified as a "probable carcinogen" because of increased brain cancer (Davis et al., 2015).

Those exposed at younger ages show up to eight times more brain cancer risk.

Radiation Absorption from Tablet into a 6-Year-Old's Brain
(in this image: white & yellow areas are the highest absorption)



Federal University of Rio Grande do Sul, UFRGS Ferreira and de Salles (2015)

Wireless Exposure Damages Brains

Odaci et al., Brain Research, 2008

Animals prenatally exposed to cell phone radiation develop damaged and fewer brain cells.

How Wireless Impacts Children's Health

Accumulating research shows that wireless microwave radiation affects fetal brain development, the immune system and reproductive function. *Even very low doses* of wireless radiation affect brain metabolism and electrical activity.

Yale University researchers found that when pregnant mice were exposed to radiation from a simulated operating phone, their offspring had impaired memory, increased hyperactivity and altered brains. Several research studies show wireless impairs brain development at various ages.

The Reproductive System

Numerous studies indicate that wireless exposures decrease sperm quantity and quality (including altered DNA) and damage testes and ovaries.

Testes Damaged by Wi-Fi Equipment Radiation

Long-term Wi-Fi exposure decreases testes volume

(Dasdag et al., 2015)

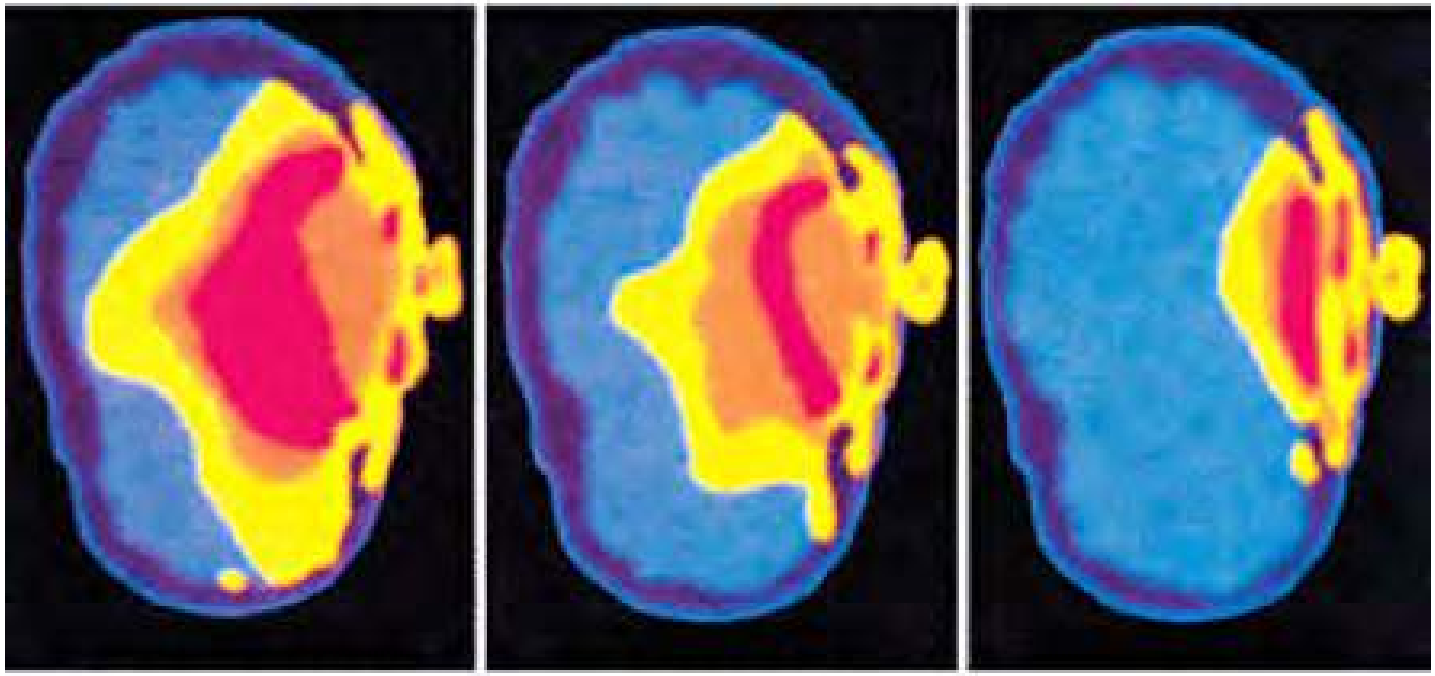
Government Protections Worldwide

Over 20 countries—including France, Belgium, Israel and the European Union—have taken policy actions to "reduce exposure to children," addressing cell phones, laptops, cell towers and Wi-Fi in schools in order to protect public health.

detailed references available at **EHTrust.org**

Microwave Cellphone Effects

Absorption in the Brain According to Age



5 Year Old | 10 Year Old | Adult

Image courtesy of Dr. Om Gandhi, University of Utah, 1996, IEEE Publication

Maine Coalition to STOP "Smart" Meters

center for safer wireless

Are your symptoms caused by your wireless devices?

Common symptoms of Microwave Sickness/Electro-Senstivity

Brain
Headaches
Insomnia/Sleep Problems
Dizziness
Difficulty Concentrating
Memory Problems
Brain Fog
Fatigue

Ears
Tinnitus
Humming
Sharp Pain
Noise Sensitivity

Skin
Skin Rash
Itching
Burning
Facial Flushing

Mood
Irritability
Depression

Eye
Pressure In/Behind Eyes
Eye Twitching
Deteiorating Vision
Vision Disturbances
Cataract

Heart
Palpitations
Arrhythmia
Chest Pain/Pressure
Difficulty Breathing
Low/High Blood Pressure

Other
Adrenal Problems
Digestive Problems
Weight Loss/Gain
Tingling
Dehydration
Hair Loss
Flu Like Symptms

More information at
www.WeAreTheEvidence.org

We Are The Evidence
Wireless Technology Injured Advocacy Group

Microwave Sickness is likely the most immediate and widespread manifestation of the adverse health effects from radiation emitted from wireless devices and infrastructure. At least 10% of the population has already developed symptoms. The rates are likely higher.

POLLINATORS AT RISK

The Honey Bee says:

STOP5G

5th Generation Wireless Technology

Headline News

The harmful effects of EMFs on nature are scientifically based and have been under-reported for over a decade. Here are *just a few* facts most people would like to know.

- **Technology is quite literally destroying nature. . .** with electromagnetic radiation from power lines and cell towers. . . 5G could increase threat. ***Newsweek*, 2018**
- **180 scientists and doctors from 35 countries have** signed a recommendation for a **5G moratorium**.
- **5G increases body temperature of insects**. ***Pro Natura*, 2019**
- **A $30 million US National Toxicology Program (NTP)** study in 2018 found "clear evidence" that cell phone radiation is **linked to cancer**.
- . . . **unprecedented exposure interferes with the natural functioning** of humans, animals, and plants.
  Dr. Ulrich Warnke: Bees and Mankind: Destroying Nature by 'Electrosmog', 2009
- "**Birds disappearing mysteriously. . . bees under threat.** . . . increasing evidence EMF pollution such as cell towers, cell phones, cordless phones and wifi is a factor."
  Dr. Andrew Goldsworthy, 2009 The Birds, the Bees and EMF Pollution
- **EMFs can cause cancer.**
  (Hardell and Carlberg, 2018) (Soffritti, 2016) (Peleg, 2018)
- **Electromagnetic Fields A 'Credible Threat' To Wildlife**
  Joel M. Moskowitz, Ph.D., Principia Scientific International, 2018

Impact on Birds and Bees

- "Due to electromagnetic smog, honeybees are often unable to return to their hives (Harst et al., 2006; Favre, 2011; Sharma & Kumar 2010; Sahib, 2011), the resulting massive loss of workers then leads to a colony collapse (e.g. Harst et al. 2006; Sharma and Kumar 2010), which is why electromagnetic radiation has been suggested as one potential cause of colony collapse disorder (CCD) (e.g. Warnke 2009; Sahib 2011)" Journal of Insect Conservation (Lázaro et al, 2016)
- Radiation impacts on wild birds documented nest abandonment, plumage deterioration and death. Lab studies of chick embryos documented heart attacks and death. (Al Manville PhD USFWS, 2016)
- EMFs evoke aversive behavior, developmental anomalies and mortality in studied animal groups. (Ministry of Environment & Forests Report 2011 P6)

Take Action!

1. Contact your local, state and US. representatives and tell them to stop 5G.
2. Reduce wireless use, see safety tips **here**.
3. Find letter templates, view and download fliers to hand out, post and learn more.

EMF
Safety Network
www.emfsafetynetwork.org

Reduce EMFs to Protect Animals, Plants and Humans!

Flyer by: AgencyForEarth.com

"OUR TECH ADDICTION IS COOKING THE PLANET."
NEW SCIENTIST 2019

How Technology Contributes to Climate Change

What is the combined warming effect from the billions of man-made electromagnetic radiation (EMR) transmitters: cell towers, smart meters, wi-fi, smart phones, plus cloud services and data centers? Recent reports (see below) serve as a warning that it's time to reduce our technology use to better protect our planet, people and our environment.

Headline News and Scientific Reports

- **Our phones and gadgets are endangering the planet.** "The energy used in our digital consumption is set to have a bigger impact on global warming than the entire aviation industry." The Guardian 2018 Greenpeace report
- **Tsunami of data**
  Internet, video and smart devices could use one fifth of all global electricity by 2025.
  Total Consumer Power Consumption Forecast
  Climate Home News 2017
- **The Cloud Begins With Coal**
  ". . . the average iPhone requires more power per year than the average refrigerator."
  Grist 2013 Digital Power Group
- **Climate Change and Technology**
  "The information technology sector is one of the largest consumers of global energy and contributors to greenhouse emissions."
  Forbes 2019
- **Why We Need a Speed Limit for the Internet.**
  "A wired connection is the most energy efficient method to access the network."
  Post Carbon Institute 2015
- **"Digital sobriety can halt tech-fueled warming."**
  The Shift Project 2017
- **NASA probes find man-made bubble from radio communications shrouding the earth** NASA 2017
- **Electromagnetic Radiation as Possible Explanation for Climate Change**
  "Human generated electromagnetic radiation may contribute to global warming by diverting KELEA (kinetic energy limiting electrostatic attraction) from its presumed association with cosmic rays and thereby affecting natural function of cloud formation and climate stability." Project Censored 2017
  Atmospheric and Climate Sciences 2016
- **The wireless cloud is an energy monster**
  "Access to cloud services will have the same carbon footprint as adding 4.9 million cars to the roads" The Conversation 2013
  Centre for Energy Efficient Telecommunications
- **Planetary electromagnetic pollution: it is time to assess its impact.**
  The Lancet-Planetary Health 2018
- **Technology is destroying nature**
  . . . with electromagnetic radiation from power lines and cell towers . . . 5G could increase threat. Newsweek 2018

Items in **BLUE** are links to the science.

Take Action!

1. Reduce cell and wireless use.
2. Oppose 5G technology.
3. Call for studies on EMR climate effects.

www.fomb.org
Friends of Merrymeeting Bay

EMF
Safety Network
www.emfsafetynetwork.org

Flyer by: AgencyForEarth.com

Do's and Don'ts for Safe Technology

ENVIRONMENTAL HEALTH TRUST

Technology	Do's	Don'ts
Cell Phones	• Use a speakerphone or airtube headset. • Turn the power off if you need to put a phone in your pocket. • Choose a wired phone when you can, especially for long calls. • Set Airplane mode ON with WiFi OFF more often. • Power off Cell Phones in a car, a bus, train, airplane, elevator.	• When using the phone, never touch your head or body with the phone. • Don't use a cell phone when the network signal is weak, because then the radiation from the phone is higher. • Don't carry a cell phone in your bra. Don't carry a cell phone in any clothing pocket. • Don't sleep with a cell phone or tablet or any wireless electronics near your head.
Home Phones	• Get a Corded Phone for your home. • Keep your landline. • Run lines into all the rooms where you need a phone. • Use a wired VOIP system.	• Do not use a cordless home phone. The DECT phone bases constantly emit microwave radiation. Many people have these bases directly beside their beds, and this is a significant source of microwave radiation to be removed from sleep areas.
Printers	• Use cords to connect to them. • If must use a WiFi printer: set the WiFi function to its lowest setting. • Purchase a non-WiFi printer.	• Don't place a wireless printer in your office near your workspace. Wireless printers constantly emit microwave radiation and should not be located near our bodies per the manufacturer's instructions.
Tablets and Laptops	• Use Tablets and Laptops with ethernet connections. Set the WiFi to OFF and the Airplane/Flight mode to ON. Download applications so that kids can use the Tablet with the WiFi off.	• Don't use wireless enabled laptops if ethernet is available. Don't use laptops on your lap. Don't forget to turn the wifi connection off when you are not using it.
Internet Routers	• Get Fully Wired (cords/cables) System. Many internet providers allow you to manage the WiFi power signal online and you can simply turn the WiFi off through the internet. Non-wireless modems can be requested and ethernet cords can be used at home.	• Don't leave your WiFi Router on all the time. • If you must keep your WiFi router, always power it off at least at bedtime and during the day when it is not in use. If there is no on-off switch, simply unplug it from the electrical outlet. • Don't use boosters or Wi-Fi access points which add significant microwave radiation into the home.

Do's and Don'ts for Safe Technology

ENVIRONMENTAL HEALTH TRUST

Technology	Do's	Don'ts
Mouse	• Buy a corded computer mouse.	• Don't use a wireless mouse.
Fitness Body-Worn Devices	• "Smart" Watches, fitness counter bracelets, WiFi glasses etc. • Do opt for non-wireless devices or devices where the antennae can be turned off.	• Do not wear these devices on your body or your wrist or head.
Game Consoles	• Get gaming consoles and controllers that connect by cords/cables. Limit play time on wireless computer games and unplug the power to the console when not in use.	• Don't use wireless gaming devices. If wired are unavailable, when not playing then power off the base. (Even when you are not using the consoles they emit radiation.)
Other Wireless Devices	• Buy devices that connect by cords/cables. If they have wireless capability, be sure you can turn those emission features OFF.	• Don't use Bluetooth, wireless speakers or any other wireless electronic accessories. • Don't use wireless digital baby monitors, virtual assistants, drones or thermostats etc.
Smart Meters	• Contact your electric company to replace your wireless "smart" meter with an analogue "legacy" meter. In some states there are free opt outs. In other states you must pay or there is not an option yet. Join your state's citizen group working on this issue.	• Talk to your neighbors so they can switch out their meters reducing the RF in your area. Don't put your bed against the wall with a smartmeter on the other side.
Electronics	• Sleep without nearby electromagnetic field generating devices. Get a battery powered alarm clock.	• Store and use phone chargers, extension cords and electrical devices away from sleeping areas. Sleep in rooms that are not near electricity meters (yours and your neighbors').

The Unwanted Handshake: Even when you are not actively using a mobile device, when Airplane mode is not on and when WiFi is not set to off, the invisible connection is open and wireless devices like tablets and cell phones continue to emit bursts of microwave radiation (unless the mobile device is powered off). This is called a handshake, for example, a cell phone sends out the microwave signals to tell the cell tower the phone is nearby. The concept is as if the phone is saying to the network,"If anyone wants to call or text me, here's where to send it." When a cell phone is traveling in a vehicle, then the phone also handshakes with each new cell tower it passes saying, "Here I am, glad to meet you, come find me anytime." In the same way, the wireless devices in your home each send a radiation "handshake" of sorts to your home router. The only way to stop these radiation emissions is to turn the wireless features OFF.

Learn more at **EHTrust.org**

State of New Hampshire

GENERAL COURT

CONCORD

MEMORANDUM

DATE:	**November 1, 2020**
TO:	**Honorable Christopher T. Sununu, Governor** **Honorable Stephen J. Shurtleff, Speaker of the House** **Honorable Donna Soucy, President of the Senate** **Honorable Paul C. Smith, House Clerk** **Honorable Tammy L. Wright, Senate Clerk** **Michael York, State Librarian**
FROM:	**Representative Patrick Abrami, Chair**
SUBJECT:	**Final Report on Commission to Study the Environmental and Health Effects of Evolving 5G Technology (RSA 12-K:12-14, HB 522, Ch. 260, Laws of 2019)**

Pursuant to RSA 12-K:14, III, enclosed please find the Final Report of the Commission to Study the Environmental and Health Effects of Evolving 5G Technology.

If you have any questions or comments regarding this report, please do not hesitate to contact me.

I would like to thank those members of the commission who were instrumental in this study. I would also like to acknowledge all those who testified before the commission and assisted the commission in our study.

Enclosures

cc: Members of the Commission

Final Report of the

Commission to Study
The Environmental and Health Effects of
Evolving 5G Technology

(HB 522, Chapter 260, Laws of 2019, RSA 12-K:12–14)

Membership

Name	Organization/Representing
Rep. Patrick Abrami (Chair)	NH House of Representatives
Rep. Kenneth Wells	NH House of Representatives
Rep. Gary Woods	NH House of Representatives
Sen. James Gray	NH Senate
Sen. Tom Sherman	NH Senate
Denise Ricciardi	Public
Brandon Garod, Esq.	Attorney General's Office
Carol Miller	Department of Business and Economic Affairs
David Juvet	Business and Industry Association
Kent Chamberlin, PhD	University of New Hampshire
Bethanne Cooley	CTIA – wireless communications industry
Michele Roberge	Department of Health and Human Services
Paul Héroux, PhD	McGill University Medicine

November 1, 2020

Members of the Commission to Study the Environmental and Health Effects of Evolving 5G technology agree to the filing of this final report by the Chairman. This action should not be construed in any way as an adoption of any position by any Commission member or state agency or organization they represent on the underlying issue of the deployment of 5G technology.

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INTRODUCTION

Commission Responsibilities and Evolving Role

The Commission to Study the Environmental and Health Effects of Evolving 5G Technology came about from the passage and signing into law of HB 522. The Legislature, after hearing testimony of potential health risks and the political ramifications of small cell antennae being deployed on the public rights-of-way throughout New Hampshire, agreed that a Commission be formed to take a deeper look at this evolving technology. For the record, 5G stands for the 5th Generation of wireless communication. This technology utilizes frequencies in the millimeter wave range of the electromagnetic spectrum. See Appendix A for a chart showing this spectrum.

What the Commission learned early on in its work is that you cannot talk about 5G without talking about the earlier generations 3G and 4G. Then the Commission embraced the concept of the Internet of Things (IoT) which is a world in which all electronic devices communicate via electromagnetic waves. This led to discussion of routers and other internal technologies. The devices receiving and sending signals via electromagnetic waves also became part of the discussion. So as the presentations and discussions went on, the Commission concluded that all things emitting radio frequency (RF) radiation needed to be considered together because of the interaction of all these waves. We also discovered early on that 5G means something different to each of the major cellular companies ranging from how 5G antennae interact with other generation antennae to whether small cell towers in the public right-of-way will be needed. The conclusion by many experts is that 5G is a marketing concept centered around speed of data transmission using many different engineering strategies.

At the heart of the discussion was the research as to whether non-ionizing radiation causes biological effects on humans as well as other living organisms, either animal or plant. No one argues that ionizing radiation from the high energy and frequency ultraviolet, x-ray, and gamma ray end of the electromagnetic spectrum are a danger to all living things. Of concern to the Commission, and internationally, are the electromagnetic waves in the microwave range of energy and frequency. There is mounting evidence that DNA damage can occur from

radiation outside of the ionizing part of the spectrum.[1, 2, 3, 4] The Commission heard arguments on both sides of this issue with many now saying there are findings showing biological effects in this range. This argument gets amplified as millimeter waves within the microwave range are beginning to be utilized.

Then the Commission was presented with varying facts about the Federal Communication Commission (FCC) having total say over this issue as granted to it by Congress in the Telecommunication Act of 1996. In brief, this Act says, among many other things, that the siting of any antennae cannot be denied due to health concerns. Many on the Commission are concerned that this Act did not contemplate small cell towers being located on the public rights-of-way in front of people's homes. In addition, the FCC, using the science that they receive from other agencies and scientific/engineering associations, has set the allowable power intensity that can be emitted from these antennae. Testimony shows these limits are set well above many other industrialized nations. There are concerns by many Washington, DC watchers that the FCC is a captive agency whose Commission members come from the industry they are overseeing. These are the realities that can only be altered by Congressional action. As a New Hampshire Commission, as we moved through the Commission process, many of the members concluded we could first encourage our federal delegation to enact changes and second, assuming the federal realities cannot be changed, recommend protective measures that will stay within the current federal framework.

As far as the FCC and federal agencies, we made several attempts to have them testify before the Commission. The Commission was disappointed that they did not reply to these requests, because we thought it important for completeness of our work to hear from these agencies. When the agencies did not reply, we asked several agencies to answer very specific written questions. Instead of answering

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[1] Aitken RJ, Bennetts LE, Sawyer D, Wiklendt AM, King BV. "Impact of radio frequency electromagnetic radiation on DNA integrity in the male germline." *Inter J Androl* 28:171-179, 2005, https://pubmed.ncbi.nlm.nih.gov/15910543/

[2] Akdag MZ, Dasdag S, Canturk F, Karabulut D, Caner Y, Adalier N. "Does prolonged radiofrequency radiation emitted from Wi-Fi devices induce in various tissues of rats?" *J Chem Neuroanat,* 75(Pt B):116-122, 2016, https://pubmed.ncbi.nlm.nih.gov/26775760/.

[3] Akdag M, Dasdag S, Canturk F, Akdag MZ. "Exposure to non-ionizing electromagnetic fields emitted from mobile phones induced DNA damage in human ear canal hair follicle cells." *Electromagn Biol Med*. 37(2):66-75, 2018.

[4] Al-Serori H, Ferk F, Kundi M, Bileck A, Gerner C, Mišík M, Nersesyan A, Waldherr M, Murbach M, Lah TT, Herold-Mende C, Collins AR, Knasmüller S. "Mobile phone specific electromagnetic fields induce transient DNA damage and nucleotide excision repair in serum-deprived human glioblastoma cells." *PLoS One*. 13(4):e0193677, 2018.

our specific questions, the responses directed Commission members to certain locations on websites for what turned out to be more general information on topics of public interest. The communications with these agencies are contained in Appendix B.

Summary of Commission Meetings

The Commission met a total of 13 times over a period from September 2019 to October 2020. Unfortunately, due to the Covid-19 pandemic, all activity at the NH State House came to a halt from mid-March to mid-June this year. This meant that the Commission missed four meetings and thus heard from fewer experts on this topic than planned. It is important to stress that the Chair was planning to call additional witnesses from the scientific community as well as the telecommunication industry. When we resumed meeting, starting with one on July 1, all remaining meetings were conducted via Zoom. After our July 24th meeting, a work group consisting of seven members was formed to start formulating recommendations for the full Commission to consider. This work group met approximately every other week through the finalization of this report at the end of October. The table below summarizes the full Commission meeting dates and who the main speakers were.

#	Date	Major Topics and/or Guest Speakers
1	9/16/19	Organizational meeting
2	10/10/19	Electromagnetic Spectrum Physics Presentation Dr. Kent Chamberlin, Chair of UNH Electrical and Computer Engineering Department Presentation on Biological Effects of RF radiation Dr. Paul Heroux, Professor of Toxicology, McGill University
3	10/31/19	National Toxicology Program Study on RF-Radiation Michael Wyde, PhD Framing the Issue Video Frank Clegg, Former Microsoft Canada President
4	11/21/19	Non-Existence of RF-Radiation Biological Effects Argument Eric Swanson, PhD, University of Pittsburgh.
5	12/13/19	Reinventing Wires and 5G in Colorado Tim Schoechle, PhD, Colorado State University

6	1/10/20	Studies Showing RF-Radiation Biological Effects Devra Davis, PhD, MPH, Founder/President Environmental Health Trust (EHT) The Landscape Nationally and Internationally Surrounding RF-Radiation, Theodora Scarato, Executive Director EHT
7	2/14/20	What is 5G and What Do We Know About the Health Effects of 5G David Carpenter, MD, Director, Institute for Health and the Environment, University of Albany
COVID-19 NH STATE HOUSE CLOSURE		
8	7/1/20	13 Objections To 5G/4G Herman Kelting, PhD, Retired Las Vegas, NV
9	7/24/20	Around the table discussion of where we are and next steps. Established a work group to formulate recommendations.
10	8/31/20	Presentation of work group recommendations and discussion. Discussed that a minority report would be required.
11	9/22/20	Discussion and voting on first half of recommendations
12	10/8/20	Discussion and voting on second half of recommendations
13	10/27/20	Review and vote on final report.

There are extensive minutes of all of these meetings that are included at the end of this report in Appendix O. In addition, the Commission has maintained a webpage on which is posted the various documents and links to information that it has collected during the course of its study, including many of the presentations provided during the meetings.

Questions Posed in HB 522

There were eight questions asked in the legislation creating the Commission. Research by the Commission has resulted in lengthy answers with supporting credits. With that we are showing the questions asked in the body of this report only, with the answer to each question shown in Appendix C. The questions are as follows:

1. Why does the insurance industry recognize wireless radiation as a leading risk and has placed exclusions in their policies not covering damages by the pathological properties of electromagnetic radiation?
2. Why do cell phone manufacturers have in the legal section within the device saying keep the phone at least 5mm from the body?
3. Why have 1,000s of peer-reviewed studies, including the recently published U.S Toxicology Program 16-year $30 million study, that are showing a wide

range of statistically significant DNA damage, brain and heart tumors, infertility, and so many other ailments, been ignored by the Federal Communication Commission (FCC)?

4. Why are the FCC-sanctioned guidelines for public exposure to wireless radiation based only on the thermal effect on the temperature of the skin and do not account for the non-thermal, non-ionizing, biological effects of wireless radiation?
5. Why are the FCC radiofrequency exposure limits set for the United States 100 times higher than countries like Russia, China, Italy, Switzerland, and most of Eastern Europe?
6. Why did the World Health Organization (WHO) signify that wireless radiation is a Group B Possibly Carcinogenic to Humans category, a group that includes lead, thalidomide, and others, and why are some experts who sat on the Who committee in 2011 now calling for it to be placed in the Group 1, which are known carcinogens, and why is such information being ignored by the FCC?
7. Why have more than 220 of the world's leading scientists signed an appeal to the WHO and the United Nations to protect public health from wireless radiation and nothing has been done?
8. Why have the cumulative biological damaging effects of ever-growing numbers of pulse signals riding on the electromagnetic sine waves not been explored, especially as the world embraces the Internet of Things, meaning all devices being connected by electromagnetic waves, and the exploration of the number of such pulse signals that will be created by implementation of 5G technology?

The answers to these questions have been embraced by the majority of the members of the Commission.

SUMMARY AND OBSERVATIONS

House Bill 522 established "a Commission to study the environmental and health effects of evolving 5G technology." The Commission that was convened as a result of this legislation is comprised of thirteen members with backgrounds that include physics, engineering electromagnetics, epidemiology, biostatistics, occupational health, toxicology, medicine, public health policy, business, and law. The Commission also has representation from the telecommunications industry. The Commission began its work on September 16, 2019 and submitted this report on November 1, 2020.

The Commission recognizes that cellular and wireless communications is very important to the citizens of New Hampshire. The rollout of wireless services and new products in the industry can be key to enhancing public safety, economic opportunity, and healthcare. Regardless of the evidence presented and the risks associated with RF electromagnetic field effects, business and residents alike want 100% coverage and seamless connectivity. The majority of the Commission believes that some balance can be struck to achieve the benefits of technology without jeopardizing the health of our citizens.

To become acquainted with the issues relevant to 5G radiation exposure and health, the Commission heard from ten recognized experts in the fields of physics, epidemiology, toxicology, and public policy. All but the presenter representing the Telecommunications Industry (the transcript of that presentation can be found in the Commission's minutes of Nov 21st) acknowledged the large body of peer-reviewed research that shows that the type of RF-radiation generated by wireless devices can have a deleterious effect on humans, especially children, as well as animals, insects, and vegetation (see Appendix D).

The Commission was unable to meet for four months due to the shutdown of the NH State House caused by COVID-19. While this loss of time did limit the number of presenters that could be accommodated, the majority of the Commission did not believe that additional presenters were necessary because the information provided by the ten experts was deemed sufficient.

5G is moving forward because of its potential benefits and because of assurances by federal regulatory agencies that 5G technology is not harmful. However, those

assurances have themselves come into question because of the thousands of peer-reviewed studies documenting deleterious health effects associated with cellphone radiation exposure. Most of the federal regulatory agencies' radiation exposure limits were established in the mid-1990s before the studies were carried out, so they did not take those studies into account when setting exposure limits. In addition, the initial exposure limits were developed at a time before wireless devices, and the radiation associated with them, became ubiquitous. Not only are wireless devices far more prevalent than in the past, but these radiating devices are typically carried in direct, or near direct, contact with peoples' bodies. Further, the total radiation exposure for individuals is compounded by the radiation from nearby sources, including others' devices, cell towers, wireless routers, Bluetooth devices, etc. Because of the large number of radiating devices in today's environments, exposure for people is many times greater than when radiation thresholds were established, and the nature of today's radiation (high-data-rate signals) has been shown to be more harmful than the lower-data-rate signals that were prevalent before.

The significant disconnect between the regulatory agencies' pronouncements that cellphone radiation is safe and the findings of thousands of scientific studies was one of the major issues that the Commission sought to address. The Commission is not alone in wrestling with this issue as many others (see Appendix E) have challenged the radiation thresholds specified. It is to be noted that the only country with higher radiation thresholds than the U.S. is Japan (see Appendix F), and a large number of independent scientists have concluded that the thresholds for Japan and the U.S. are unsafe.

A likely explanation as to why regulatory agencies have opted to ignore the body of scientific evidence demonstrating the negative impact of cellphone radiation is that those agencies are "captured" (see Harvard University publication entitled, "Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates" linked in Appendix G). This report documents how the leadership roles in some agencies (the FCC in particular) are filled by individuals with strong industry ties and hence are more focused on industry interests than the health of citizens. As is shown in other sections of this report, federal legislation uses policy set by the regulatory agencies to wrest control of wireless facility placement from individuals, cities, and states. Consequently, some of the Commission's recommendations call for a

reassessment of the makeup and policies of federal regulatory agencies. Current policies in place by federal regulatory agencies (such as section 704 of the Telecommunications Act of 1996) are tailored to prevent local objections to cell tower siting that are based upon health or environmental concerns, and this leaves citizens with little legal recourse regarding equipment placement.

Industry projects that over 800,000 small cell towers[5] will be necessary to implement 5G. Many are being erected in the public rights-of-way in New Hampshire neighborhoods and mounted on new poles, streetlights, and utility poles directly in front of homes. However, because of the rules currently in place, individuals and municipalities cannot use health or environmental concerns as a reason to object.

The majority of the Commission has endorsed the 15 recommendations presented in this report. These recommendations are not in prioritized order, and each should be given equal consideration. The objective of those recommendations is to bring about greater awareness of cell phone, wireless and 5G radiation health effects and to provide guidance to officials on steps and policies that can reduce public exposure. We also recommend partnering with our federal delegation to facilitate the reevaluation of radiation exposure guidelines and policies by federal agencies (i.e., the FCC, FDA, NASA, NOAA, FAA, EPA, etc.) to protect people, wildlife, and the environment from harmful levels of radiation.

Since the Commission could not reach full agreement on all that is contained in this report, the minority of the Commission has been given the opportunity to express its opinion as provided in the Minority Report.

[5] The number of projected cell towers for 5G was taken from the CTIA website: "There are 154,000 cell towers today. To meet growing mobile data demands and win the Race to 5G Accenture projects we will need to install hundreds of thousands of small cells in the next few years. S&P Global Market Intelligence projects more than 800,000 small cells deployed by 2026."

RECOMMENDATIONS

The Commission has heard from many experts on both sides of the argument concerning the health and environmental effects of 5G and RF-radiation in general; reviewed countless study reports; attempted to get direct answers to our specific questions from the FCC and other federal agencies to no avail; has become aware of a number of lawsuits against the FCC for not accounting for biological effects in the setting of their standards; is still not certain why the standards for acceptable RF-radiation are set so much higher in the United States than other industrialized nations; is concerned that the modulation of frequencies and the combined effect of "the soup" of RF-waves surrounding us today, which will likely increase with time; is aware that there is much research showing potential health risks and understands that much more research is required; is cognizant that our country historically has been beset by examples of products being declared safe only later to be proven unsafe; and is very aware that the World Health Organization and the whole insurance industry are hedging their bets against RF-radiation because of potential harm. Given these considerations, the majority of the Commission yields to the precautionary principle in formulating many of these recommendations. These recommendations cover a broad range of topics. One topic given much consideration had to do with liability from potential harm caused by small cell antennae placed on the public rights-of-way. A majority of the Commission could not agree upon a recommendation surrounding this topic.

RECOMMENDATION 1- Propose a resolution of the House to the US Congress and Executive Branch to require the Federal Communication Commission (FCC) to commission an independent review of the current radiofrequency (RF) standards of the electromagnetic radiation in the 300MHz to 300GHz microwave spectrum as well as a health study to assess and recommend mitigation for the health risks associated with the use of cellular communications and data transmittal. The Telecommunications Act of 1996 was adopted before the health risks and biological effects of RF-radiation to the human body were fully known to the scientific community as well as the public. The majority of the Commission believes that the FCC has not exercised due diligence in its mission to manage the electromagnetic environment by not setting exposure limits that protect against health effects. They have failed to support technical means and investigations aimed at reducing human exposures to electromagnetic radiation (EMR) in

telecommunications systems and optimize wireless modulations to reduce biological and health impacts. Commissioned research should study the health effects and should be conducted by an independent research organization with standards which have been mutually agreed to by all the stakeholders. The FCC shall then ensure that the findings and recommendations are adequately disseminated to the public.

RECOMMENDATION 2- Require that the most appropriate agency (agencies) of the State of New Hampshire include links on its (their) website(s) that contain information and warnings about RF-radiation from all sources, but specifically from 5G small cells deployed on public rights-of-way as well as showing the proper use of cell phones to minimize exposure to RF-radiation, with adequate funding granted by the Legislature. In addition, public service announcements on radio, television, print media, and internet should periodically appear, warning of the health risks associated with radiation exposure. Of significant importance are warnings concerning the newborn and young as well as pregnant women. Even without further study, there is evidence that the public should be warned of the potential dangers of RF-radiation and be told simple steps to lessen the risks of unnecessary exposure. Appendix H shows an example of a simple RF-radiation warning.

The website must provide an option for visitors to register their opinions about current FCC exposure guidelines. In particular, this registry should provide a convenient and formal mechanism for New Hampshire municipalities and residents to weigh in concerning the 1996 Telecommunications Act Section 704 that disallows using radiation-related health concerns as a reason to challenge cell phone tower siting. The primary use for the data collected on this registry will be to gauge the level of interest about RF-radiation exposure on the part of New Hampshire citizens.

RECOMMENDATION 3- Require every pole or other structure in the public rights-of-way that holds a 5G antenna be labeled indicating RF-radiation being emitted above. This label should be at eye level and legible from nine feet away. In the view of the Commission, the State of New Hampshire has the right to warn the public of potential harm of 5G antennae deployed in the public rights-of-way. Large cell towers all currently have fencing around them at their base to protect the public. This will not be the case with small cell towers or any pole with an

antenna on top in the public right-of-way. These public rights-of-way are the jurisdiction of our municipalities and not of the Federal Government. The Telecommunication Act of 1996 did not contemplate antennae being placed on the public rights-of way of municipalities. Thus, the State of New Hampshire has the right to warn the public by requiring the owners of these antennae to inform the public of potential harm from RF-radiation. See Appendix I for an example symbol.

RECOMMENDATION 4- Schools and public libraries should migrate from RF wireless connections for computers, laptops, pads, and other devices, to hard-wired or optical connections within a five-year period starting when funding becomes available. There is strong evidence that the younger the child the more susceptible they are to the negative impacts of RF-radiation. Hard-wired connections or optical wireless do not subject children to RF-radiation. The Commission is aware that school districts and public libraries have invested much in wireless infrastructure and that a movement to radiation-less connections would require additional investment of resources.

New optical networking solutions for the classroom and office spaces (such as LiFi) offer faster, healthier, and more secure connections than RF-based WiFi. This technology utilizes visible light, which organisms can withstand without any harm at far higher intensity levels (such as direct sunlight) than is required for data transmission. Such optical data transmission using visible light offers gigabit speed, as well as plug-and-play replacement of current RF WiFi routers. The optical wireless system can be incorporated in an upgrade to cost-efficient LED room lighting which can save schools and public libraries significant energy dollars.

The hard-wiring and/or optical projects should be completed within five years from when the federal funding (e.g., through the FCC's E-Rate program for telecommunications and IT in schools and public libraries) is procured.

RECOMMENDATION 5- Signal strength measurements must be collected at all wireless facilities as part of the commissioning process and as mandated by state or municipal ordinances. Measurements are also to be collected when changes are made to the system that might affect its radiation, such as changes in the software controlling it. Signal strength is to be assessed under worst-case

conditions in regions surrounding the tower that either are occupied or are accessible to the public, and the results of the data collection effort is to be made available to the public via a website. In the event that the measured power for a wireless facility exceeds radiation thresholds, the municipality is empowered to immediately have the facility taken offline. The measurements are to be carried out by an independent contractor and the cost of the measurements will be borne by the site installer. It is recognized that theoretical calculations show that existing FCC guidelines will be met by standard cell tower configurations. However, there are cases where the radiation from towers can be focused by buildings, terrain, and beamforming antennas, causing signal levels to be considerably higher than would be expected in theoretical calculations unless those effects are taken into account. Collecting field measurements provide the only valid approach for determining whether exposure guidelines have been met. It is to be noted that some municipalities (e.g., the town of Burlington, MA [1]) have ordinances requiring measurements at cell towers.

Federal law and NH law grant to municipalities the power to enact zoning rules regulating the placement of personal wireless service facilities within the geographic boundaries of the municipalities. Municipalities should be proactive in this area and, through the exercise of zoning power, establish where, how, and a process for compliance with existing FCC guidelines for signal strength in the surrounding coverage area. Municipalities should establish a hierarchy of siting values and compliance acknowledgements so that the siting most favored by the municipality is the easiest siting for the wireless applicant to obtain and, conversely, the siting which is least desirable should be the most difficult siting for the applicant to obtain. The zoning ordinance should lay out the compliance requirement as part of the zoning approval.

[1] Burlington, MA zoning Bylaw Wireless Facilities section 8.4.6.2 - “Annual RF emissions monitoring is required for all sites by an independent RF engineer to be hired with Planning Board approval and at the applicant’s expense. Test results will be submitted to the Town as soon as available, and not later than the close of the calendar year. Annual testing of electromagnetic emission shall be required to ensure continual compliance with the FCC regulations.”

Recommendation 6- Establish new protocols for performing signal strength measurements in areas around wireless facilities to better evaluate signal characteristics known to be deleterious to human health as has been documented through peer-reviewed research efforts. Those new protocols are to take into account the impulsive nature of high-data-rate radiation that a growing body of evidence shows as having a significantly greater negative impact on human health than does continuous radiation. The protocols will also enable the summative effects of multiple radiation sources to be measured. Contemporary approaches to performing signal level measurements do not provide a means to evaluate signal impulsiveness or the contribution of multiple radiation sources because of equipment limitations. The measurement protocols proposed will employ wideband equipment that is currently available but is not typically used to measure compliance with radiation safety limits. References that address the deleterious effects of impulsive radiation on organisms are given in Appendix J. The development of the proposed protocols should be funded by the appropriate federal agency (e.g., NSF, NIH, FCC, etc.) and should be facilitated by New Hampshire's federal delegation.

RECOMMENDATION 7- Require that any new wireless antennae located on a state or municipal right-of-way or on private property be set back from residences, businesses, and schools. This should be enforceable by the municipality during the permitting process unless the owners of residences, businesses, or school districts waive this restriction. Local public rights-of-way are under the jurisdiction of municipalities, and the Commission feels that municipalities should uphold the rights of individuals impacted by antennae. The Commission also supports the right of property owners to manage decisions on non-essential devices being placed in front of their property.

The Commission believes that it is important to prioritize citizen safety, particularly as 5G is an upgrade, rather than the provision of wireless service to unserved areas. Additional rationale for this recommendation is shown in Appendix K.

RECOMMENDATION 8- Upgrade the educational offerings by the NH Office of Professional Licensure and Certification (OPLC) for home inspectors to include RF intensity measurements. Home inspectors currently operate as private contractors who may be hired by citizens or enterprises to measure such things as

radon, to collect water quality samples, or search for mold or insect damage. Home inspectors routinely supply test results to both their clients and government entities.

The majority of the Commission believes the public has the right to discover, on a voluntary basis, the RF power intensity related to radio frequencies at a property which they will be purchasing or renting before the transaction is closed. Also, the proprietors of publicly accessible venues may wish to reassure the public about the RF power intensity within their establishments, by posting the data collected by a state-approved inspector. In addition, such testing should be paid for by the party requesting it and the testing itself should be performed by a professional who owns or rents the test equipment and has met the state requirements for training of home inspectors regarding RF measurements.

The majority of the Commission proposes that home inspectors be offered training by NH OPLC on how to measure on-site peak and 24-hour average RF intensities. Measurements of frequencies and intensities will be performed using low-cost equipment (such as GQ-390 meters). [Description of existing home inspector training offered for radon, mold, etc. may be seen at https://oplc.nh.gov/home-inspectors/index.htm]

RECOMMENDATION 9- The State of New Hampshire should begin an effort to measure RF intensities within frequency ranges throughout the state, with the aim of developing and refining a continually updated map of RF exposure levels across the state using data submitted by state-trained home inspectors. The data should be collected in such a way as to identify geographic areas of notably high RF exposure, places where RF signal for wireless communication is inadequate (dead spots), and places where RF is unusually low (white spots) sought by people who wish to minimize their RF exposure. One possible use of this data will be buyers/renters of property or the public, in general, using benchmark values to make comparisons and make their own decisions based on their comfort level with RF exposure. After a while, an extensive New Hampshire RF database will exist to provide useful maps and data for future public health investigations. Appendix L outlines in more detail the technical aspects of this recommendation.

RECOMMENDATION 10- Strongly recommend all new cell phones and all other wireless devices sold come equipped with updated software that can stop the phone from radiating when positioned against the body. The Commission has been made aware that cell phones contain proximity sensors that will allow a cell phone to only radiate signals when a certain distance from the body, for example, held in the fingers or placed on a table. This does not change the functionality of the device, only the way it is used, specifically not held against the head or body. Implementation is a software update in the cell phone, as these phones already have a proximity detector to turn off the screen and soft keys when an obstacle is present. With this change, the screen and the RF circuit are automatically turned off. This removes the problems of brain cancers (glioblastomas and acoustic neuromas) and the issue of SAR limits for the industry. See Appendix M for more detailed references to the science behind this recommendation. Cell phones should come set with this inhibition, with instructions in the manual on how to disable it. There should be a soft button on the unit to easily re-enable the radiation inhibition, for example if the unit is handed to a child. In all cases, it should be easier to enable the restriction than to disable it. Cellular phones marketed specifically for children should stop radiating when positioned against the body under all circumstances. The installation of such proximity sensors is also encouraged in laptops and tablets.

RECOMMENDATION 11- Promote and adopt a statewide position that would strongly encourage moving forward with the deployment of fiber optic cable connectivity, internal wired connections, and optical wireless to serve all commercial and public properties statewide. The majority of the Commission believes that fiber optic transmission is the infrastructure of the future. When compared, RF wireless transmission lacks fiber optic characteristics: speed, security, and signal reliability while avoiding biological effects on humans and the environment.

The State should encourage partnerships between towns to make this happen and encourage our federal delegation to support grant money to assist with such deployments when it comes to funding fiber optic cable deployment, especially in rural locations.

RECOMMENDATION 12- Further basic science studies are needed in conjunction with the medical community outlining the characteristics of expressed clinical symptoms related to radio frequency radiation exposure. Further studies are just beginning to explore the quantum mechanical mechanisms which are the fundamental basis for understanding the biological changes occurring during the interaction of radio frequency radiation and molecules. These mechanisms can affect cells, tissues, and whole organs, as well as accumulate over time.

The majority of the Commission feels the medical community is in the ideal position to clarify the clinical presentation of symptoms precipitated by the exposure to radio frequency radiation consistent with the Americans with Disabilities Act (ADA) which identifies such a disability. The medical community can also help delineate appropriate protections and protocols for affected individuals.

All of these endeavors (basic science, clinical assessment, epidemiological studies) must be completely independent and outside of commercial influence.

RECOMMENDATION 13- Recommend the use of exposure warning signs to be posted in commercial and public buildings. In addition, encourage commercial and public buildings, especially healthcare facilities, to establish RF-radiation free zones where employees and visitors can seek refuge from the effects of wireless RF emissions. Many NH citizens report sensitivity to electromagnetic radiation emitted from devices used in the delivery of in-building cellular and fixed wireless services. A majority of the Commission suggests that owners of commercial and public buildings, especially healthcare facilities, voluntarily place signage at entrances concerning RF-levels and RF-free zones within these structures so those entering the building are aware.

RECOMMENDATION 14- The State of New Hampshire should engage agencies with appropriate scientific expertise, including ecological knowledge, to develop RF-radiation safety limits that will protect the trees, plants, birds, insects, and pollinators. The majority of the Commission understands that current federal safety limits were made with the intention of only protecting humans from short term effects, but not protecting flora or fauna from harm. The State of New Hampshire needs to ensure our natural environment and wildlife are protected by effective safety standards. Tree limbs, birds, and pollinators will be closer than

humans to 5G cell antennae and associated 4G densified infrastructure. In fact, the wireless radiation from cell antennae is very high in a plume surrounding the antennae. It could exceed FCC limits for several feet in this area, yet this is the exact area where leaves of trees, birds, and pollinators live. Thus, they may have higher exposures being in direct line of sight of wireless RF beams. When pollinators are impacted so are all forms of vegetation that depend on them for reproduction. Research on this issue is shown in Appendix N.

RECOMMENDATION 15- The State of New Hampshire should engage our Federal Delegation to legislate that under the National Environmental Policy Act (NEPA) the FCC do an environmental impact statement as to the effect on New Hampshire and the country as a whole from the expansion of RF wireless technologies. Concern comes from the FCC projection that there will be numerous low orbit satellites and 5G small cell antennae, plus many additional macro towers required for these networks to function. The majority of the Commission is concerned that any new large-scale project that will densify antennae networks to this extent truly requires an environmental impact study. The NEPA statute requires that the agency consider environmental concerns in its decision-making process. NH should be provided documentation of such considerations. Until there is Federal action, NH should take the initiative to protect its environment.

MINORITY REPORT

The following members, being unable to agree with the majority of the Commission, endorse this Minority Report:

Senator James Gray, David Juvet, and Bethanne Cooley

Contrary to the position taken in the Recommendations section, the science related to radiofrequencies, wireless devices, and health is well studied and well known: The consensus of the U.S. and international scientific community is that there are no known adverse health risks from the levels of RF energy emitted at the frequencies used by wireless devices (including cellphones) and facilities (including small cells). Some of those who presented to the NH 5G Commission have sought to sow confusion, but the facts demonstrate otherwise.[6] *First*, when setting limits for the RF emissions of wireless devices, the Federal Communications Commission ("FCC") intentionally provided a significant safety margin—50 times below the threshold at which adverse effects have been observed in laboratory animals.[7] And in its 2019 order, the FCC assessed the available science, including studies related to the safety of 5G networks, and based on the relevant scientific research, concluded that wireless devices and small cells are safe when they adhere to the FCC's current RF exposure limits, as required by law. *Second*, numerous, independent analyses of peer-reviewed studies conducted over several decades by national and international organizations conclude that there are no known health risks to humans from RF

[6] Commission discussions indicated that the Commission was comprised of many individuals who had preconceived opinions about the safety of RF devices and wireless technology in general. Due to many factors, experts in favor of wireless technology were cut short in participating. For example, an additional expert in favor of wireless technology was offered as a speaker during the summer and the Commission indicated no additional experts would be permitted. However, after that request was denied, an "expert" opposed to RF devices and wireless technology spoke at a subcommittee meeting of the majority. In addition, the Commission heard only a portion of expert Eric Swanson's testimony and failed to consider in a balanced fashion the well-developed reviews of the science from the U.S. and international health and safety organizations. Thus, in this report we have cited those authorities even though the Commission did not include them as part of the formal record.

[7] The threshold for adverse effects was set at the level at which heating caused a "disruption of observable behavior" in animals. *See Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields*, First Report and Order, Further Notice of Proposed Rulemaking, and Notice of Inquiry, 28 FCC Rcd. 3498, 3582 ¶ 236 (2013) ("FCC NOI") ("exposure limits are set at a level on the order of 50 times below the level at which adverse biological effects have been observed in laboratory animals as a result of tissue heating resulting from RF exposure"); IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz, IEEE Std C95.1-2019, Annex B Sec. B.5.3.3 and Annex C Sec. C.2.1 (2019) ("Typically, the effect observed has been a decreased rate of responding or decreased reaction time.").

energy emitted by wireless devices and infrastructure. Thus, the scientific consensus as evaluated by experts, international standard-setting bodies, and federal health and safety agencies is that wireless devices and base stations at the FCC's RF exposure levels is safe.

Given the scientific consensus, it is our opinion that the Recommendations exceed what a reasonable response should be to the evidence on this issue. This Minority Report purposely chose not to highlight each recommendation but instead highlights findings from federal agencies, including the FCC and the Food and Drug Administration (FDA), studies conducted by leading international and national health organizations, the IEEE and the scientific community at-large. It will also note the federal preemption issues associated with the Recommendations. Given the scientific consensus, it is our opinion that the Recommendations have no basis in scientific fact, are irresponsible, and will subject the state and any localities implementing these Recommendations to needless and expensive challenges that will drain time and resources from more important and credible priorities.

THE FCC SAFETY REGULATIONS

FCC limits govern RF energy from antennas used in all wireless devices including cellular transmissions from cellphones, cell towers, and 5G small cells. The FCC based these limits on recommendations from the scientific community and expert non-government organizations; the FCC limits currently cover frequencies from 100 kHz to 100 GHz, including the "millimeter wave" or "mmW" frequencies.[8] These guidelines—based on internationally-recognized scientific organizations—set limits for the maximum amount of RF exposure from wireless devices and include a significant margin of safety.[9] Specifically, the FCC has set its limit for a consumer device's Specific Absorption Rate—the measurement for RF emissions for consumer devices such as cellphones—"at a level on the order of *50 times below* the level at which adverse biological effects have been observed in laboratory animals."[10] The agency explained that this 50-fold factor can well

[8] NPRM, 34 FCC Rcd at 11742 ¶ 120.

[9] Testimony of Christopher C. Davis, Professor of Electrical and Computer Engineering, University of Maryland, *Hearing on S.B. 637 and S.B. 894 Before the Mich. H. Comm. on Energy Policy*, 2018 Leg., 99th Sess., at 4:17 (May 29, 2018) ("Professor Davis Testimony"), http://www.house.mi.gov/SharedVideo/PlayVideoArchive.html?video=ENER-052918-2.mp4.

[10] FCC NOI at ¶236 (emphasis added).

accommodate a variety of variables such as different physical characteristics and individual sensitivities—and even the potential for exposures to occur in excess of [FCC] limits without posing a health hazard to humans."[11] In reality, wireless devices and antennas typically operate well under FCC thresholds.[12]

Further, all wireless devices sold in the U.S. must go through a rigorous approval process to ensure they meet the science-based guidelines set by the FCC.[13] The FCC's testing regime requires cellphones to be tested under "the *most severe, worst-case (and highest power) operating conditions for all the frequency bands* used in the USA for that cell phone" to ensure that they meet the limits under everyday (non-worst-case) conditions.[14] The FDA stands in full support of the adequacy of the FCC's standards. The Director of the FDA's Center for Devices and Radiological Health wrote in 2018: "[B]ased on our ongoing evaluation of this issue and taking into account all available scientific evidence we have received, ***we have not found sufficient evidence that there are adverse health effects in humans caused by exposures at or under the current radiofrequency energy exposure limits.***"[15]

HEALTH ORGANIZATIONS AND FDA STUDIES

International health organizations have also studied the effects of RF exposure and determined that there is no risk from RF emissions from modern wireless device usage. The World Health Organization ("WHO") concludes "[c]onsidering the very low exposure levels and research results collected to date, there is no

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[11] *Id.*; *see also Targeted Changes to the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields*, Resolution of Notice of Inquiry, Second Report and Order, Notice of Proposed Rulemaking, and Memorandum Opinion and Order, 34 FCC Rcd 11687, 11696 ¶14 (2019) ("Order") ("[O]ur existing exposure limits are set with a large safety margin, well below the threshold for unacceptable rises in human tissue temperature.").

[12] *See* Professor Davis Testimony (6:00-7:45) (discussing the 50-fold safety factor and typical emissions from small cells); Christopher C. Davis, Professor of Electrical and Computer Engineering, University of Maryland, *Hearing on S.B. 637 and S.B. 894 Before the Mich. H. Comm. on Energy Policy*, 2018 Leg., 99th Sess., Written Testimony at 2 (May 29, 2018), http://www.wirelesshealthfacts.com/wp-content/uploads/2019/06/Davis-Testimony.pdf (observing that "RF exposure levels from wireless base stations are invariably far below the FCC limits").

[13] *See generally* 47 C.F.R. § 1.1307; *id*. part 2 Subpart J; Order, 34 FCC Rcd at 11697-742 ¶¶ 17-118.

[14] FCC, Consumer Guides, Health, Safety and Emergencies, *Specific Absorption Rate (SAR) for Cell Phones: What It Means for You* (emphasis in original), https://www.fcc.gov/consumers/guides/specific-absorption-rate-sar-cell-phones-what-it-means-you (last updated Oct. 15, 2019).

[15] News Release, FDA, *Statement from Jeffrey Shuren, M.D., J.D., director of the FDA's Center for Devices and Radiological Health on the recent National Toxicology Program draft report on radiofrequency energy exposure* (Feb. 2, 2018) ("Shuren Statement"), https://www.fda.gov/news-events/press-announcements/statement-jeffrey-shuren-md-jd-director-fdas-center-devices-and-radiological-health-recent-national.

convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects."[16] The WHO has also concluded that "research has not been able to provide support for a causal relationship between exposure to electromagnetic fields and self-reported symptoms, or 'electromagnetic hypersensitivity'".[17] Likewise, both the United Kingdom Health Protection Agency Independent Advisory Group on Non-Ionizing Radiation and Swedish Council for Working Life and Social Research agree that RF exposure below guideline levels consistent with FCC limits do not cause health effects.[18]

The majority also justifies its recommendations by referencing "the problems of brain cancers (glioblastomas and acoustic neuromas) and the issue of specific absorption rate (SAR) limits for the industry." Some have raised questions with respect to cancer and tumors, but experts in cancer have repeatedly found no link between mobile devices and cancer. For example, the National Cancer Institute reported that: "although many studies have examined the potential health effects of non-ionizing radiation from radar, microwave ovens, cell phones, and other sources, there is currently no consistent evidence that non-ionizing radiation increases cancer risk in humans."[19] Likewise, the American Cancer Society explained that the "RF waves given off by cell phone towers don't have enough energy to damage DNA directly or to heat body tissues. Because of this, it's not clear how cell phone towers might be able to cause cancer."[20]

Earlier this year, the FDA released a large-scale review of published literature to

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[16] WHO, *Electromagnetic fields and public health: Base stations and wireless technologies*, Backgrounder (May 2006), https://www.who.int/peh-emf/publications/facts/fs304/en/.

[17] WHO, *Electromagnetic fields and public health: mobile phones*, Backgrounder (Oct. 8, 2014) ("*WHO Mobile Phones Fact Sheet*"), https://www.who.int/news-room/fact-sheets/detail/electromagnetic-fields-and-public-health-mobile-phones.

[18] *See* Health Protection Agency Independent Advisory Group on Non-Ionizing Radiation, *Health Effects from Radiofrequency Electromagnetic Fields* (RCE-20), at 3 (Apr. 2012), https://webarchive.nationalarchives.gov.uk/20140722075005/http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1317133827077 ("The evidence suggests that RF field exposure below guideline levels does not cause acute symptoms in humans, and that people, including those who report being sensitive to RF fields, cannot detect the presence of RF fields."); Anders Ahlbom, et al., Radiofrequency Electromagnetic Fields and Risk of Disease and Ill Health: Research during the last ten years, Swedish Council for Working Life and Social Research, at 6 (2012), https://forte.se/app/uploads/sites/2/2015/11/10-y-rf-report.pdf ("Extensive research for more than a decade … has found no evidence for health risks below current exposure guidelines.").

[19] National Cancer Institute, *Cell Phones and Cancer Risk*, (Jan. 9, 2019) https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/cell-phones-fact-sheet.

[20] American Cancer Society, Cell Phone Towers (emphasis omitted) ("*ACS Cell Phone Towers*"), https://www.cancer.org/cancer/cancer-causes/radiation-exposure/cellular-phone-towers.html (last visited October 7, 2020).

"assess any possible causal relationship between [RF energy] exposure and the formation of tumors."[21] After examining approximately 125 animal studies and 70 epidemiological studies, the FDA stated that "there are no quantifiable adverse health effects in humans caused by exposures at or under the current cell phone exposure limits."[22] As Dr. Jeffrey Shuren, Director of the FDA's Center for Devices and Radiological Health, observed in 2018: "Even with frequent daily use by the vast majority of adults, we have not seen an increase in events like brain tumors."[23] Courts too, after hearing extensive testimony, have determined that there is "no sufficiently reliable and relevant scientific evidence in support of either general or specific causation" that cellphone use caused the plaintiff's brain cancer.[24] Dr. Otis Brawley, chief medical officer of the American Cancer Society, explained that "[t]he incidence of brain tumors in human beings has been flat for the last 40 years. … That is the absolute most important scientific fact."[25]

THE SCIENCE AROUND EXPOSURES FROM 5G TECHNOLOGY

The majority has expressed concern with exposures from 5G technology using millimeter wave ("mmW") bands and on the proliferation of small cell network architecture, and whether there are studies demonstrating that 5G does not create risks to human health.

Although 5G represents a new frontier for wireless communications, mmW frequencies do not. mmW frequencies are well understood by the international scientific community. The Institute of Electrical and Electronics Engineers ("IEEE") has assembled a list of dozens and dozens of studies on mmW frequencies. The IEEE's RF exposure standards over the last thirty years have cited 85 different mmW studies, the earliest was published in 1976 and the most recent in 2018.[26]

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[21] FDA, *Review of Published Literature between 2008 and 2018 of Relevance to Radiofrequency Radiation and Cancer*, at 4 (Feb. 2020), https://www.fda.gov/media/135043/download.
[22] *Id.* at 5.
[23] Shuren Statement.
[24] *Newman v. Motorola, Inc.*, 218 F. Supp. 2d 769 (D. MD 2002), *aff'd per curiam Newman v. Motorola, Inc.*, 78 Fed.Appx. 292 (4th Cir. 2003); *see also Murray v. Motorola, Inc.*, Memorandum Opinion and Order on Expert Witness Admissibility, Case No. 2002 CA 001371 A (Aug. 8, 2014).
[25] Lauran Neergaard & Seth Borenstein, *Cross talk: Federal agencies clash on cellphone cancer risk*, Associated Press (Nov. 1, 2018), https://apnews.com/4da5f1cdfd774af29143ff3f5ccffa0b; *see also* IEEE Std C95.1-2019 at 16 n.8 ("The preponderance of epidemiologic evidence does not provide a sufficient basis for concluding that adult brain cancer is positively associated with mobile telephone use and, by implication, with RF exposures.").
[26] CTIA, Resources, *Millimeter Wave Studies Cited by IEEE*, http://www.wirelesshealthfacts.com/wp-content/uploads/2020/01/Millimeter-Wave-Studies.pdf (last visited October 7, 2020).

Common equipment such as "airport scanners, automotive collision avoidance systems and perimeter surveillance radar security systems" all use mmW technology.[27]

Acting responsibly, scientists and engineers continue to research RF exposure, including RF exposure with 5G technology. IEEE's Committee on Man and Radiation just completed a comprehensive review of 5G systems concluding that, based on the evidence to date, "the likelihood of yet unknown health hazards at exposure levels within current limits to be very low, if they exist at all."[28] The authors explained that "one can expect that exposures from 5G networks will not differ greatly from those associated with present generation networks" because, like "previous generations of cellular systems: [5G must] provide a signal that is strong enough to be useful within a given cell but not so strong as to cause interference to users in nearby cells."[29] In other words, 5G base stations are limited in their power because of the potential for those emissions to cause interference with other base stations.

The American Cancer Society explained that "[w]hile [5G] RF waves are higher frequency (higher energy) than those used by older generations, they are still forms of non-ionizing radiation, so they still lack the ability to directly damage DNA."[30] Further, "these higher frequency RF waves are less able to penetrate the body than lower frequency waves, so in theory they might be less likely to have any potential health effects."[31]

5G will also take advantage of small cell network architecture, which results in more base stations operating at *lower* power levels. A recent overview of exposure from small cells determined that such "[f]ixed small cell wireless communication installations … that operate in compliance with the regulations of the FCC will produce RF exposures well within the recommended exposure limits of the FCC, ICNIRP [International Commission on Non-Ionizing Radiation Protection], and IEEE."[32] Further, "[r]esearch to date does not provide a reliable

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[27] Joan Conrow, *Three reasons why 5G is unlikely to cause harm*, Cornell Alliance for Science, (June 26, 2020), https://allianceforscience.cornell.edu/blog/2020/06/three-reasons-why-5g-is-unlikely-to-cause-harm/.
[28] *Id*.
[29] *Id.*
[30] *ACS Cell Phone Towers*
[31] *Id.*
[32] William H. Bailey, *Wireless 5G Radiofrequency Technology: An Overview of Small Cell Exposures, Standards and*

scientific basis to conclude that the operation of these facilities will cause or contribute to adverse health effects in the population."[33]

In March 2020, ICNIRP released updated, modernized guidelines that expressly cover the new frequencies that 5G will use. Announcing their release, ICNIRP Chairman, Dr. Eric van Rongen, advised that "[t]he most important thing for people to remember is that 5G technologies will not be able to cause harm when these new guidelines are adhered to."[34] The FCC's rules are also designed to protect health and safety, and prevent harm. Indeed, the FCC notes that "the possibility that a member of the general public could be exposed to RF levels in excess of the FCC guidelines is extremely remote."[35]

FEDERAL PREEMPTION

The majority makes several recommendations related to mandated warnings, labeling, compliance regulations, and zoning requirements based on health and safety concerns. These recommendations are not warranted based on the science discussed above, but are also not viable because federal law preempts state and local action that conflicts with the FCC's determination that compliant devices and equipment are safe. Congress determined that the FCC should be the "central[] authority" for regulating communications in the U.S.[36] This charge includes the regulation of "the kind of apparatus to be used" for wireless radio communications and "the emissions" that such equipment may produce.[37] The FCC promulgated its RF exposure rules to ensure that they protect human health nationwide as technology evolves, relying on sound scientific research of government and other expert organizations.

The FCC acted in its role as, in the words of the Supreme Court, the "exclusive"

Science, at 7, Exponent (Apr. 2020), http://www.wirelesshealthfacts.com/wp-content/uploads/2020/04/Bailey-5G-Whitepaper-4-15-20.pdf.

[33] *Id.*

[34] Media Release, International Commission on Non-Ionizing Radiation Protection, *New Guidelines Released by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)*, at 2 (Mar. 11, 2020), https://www.icnirp.org/cms/upload/presentations/ICNIRP_Media_Release_110320.pdf.

[35] FCC Consumer Guide, *Human Exposure to Radio Frequency Fields: Guidelines for Cellular Antenna Sites*, at 2 (Oct. 15, 2019), https://www.fcc.gov/sites/default/files/human_exposure_to_radio_frequency_fields_-_guidelines_for_cellular_antenna_sites.pdf.

[36] 47 U.S.C. § 151.

[37] *Id*. § 303(e).

arbiter in the "technical matters" of radio,[38] which includes control for any environmental effects, including, among other things, RF emissions.[39] For example, the FCC recognized that "very high levels of RF radiation can be harmful due to the ability of RF energy to heat biological tissue rapidly."[40] Accordingly, the FCC's rules *limit* RF exposure to humans "from *all* transmitting facilities, operations, and devices it regulates."[41]

By way of background, the FCC first adopted RF exposure rules in the 1980s and has updated its rules in response to new scientific evidence.[42] In 1996, Congress reaffirmed the FCC's authority to set standards on RF emissions to provide "adequate safeguards of the public health."[43] The FCC updated its RF exposure rules and relied on sound scientific research of government and other expert organizations. In particular, the FCC synthesized "submissions from the Environmental Protection Agency ("EPA"), the Food and Drug Administration ("FDA"), the Occupational Safety and Health Administration ("OSHA"), and the National Institute for Occupational Safety and Health ("NIOSH")."[44] Several courts have examined and affirmed the FCC's process to develop its RF exposure limits.[45] The Third Circuit observed that "the FCC is well positioned to solicit expert opinions and marshal the scientific data to ensure its standards both protect the public and provide for an efficient wireless network."[46] And courts have confirmed that the agency has done so. For example, the D.C. Circuit upheld the

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[38] *Head v. New Mexico Bd. of Exam'rs in Optometry*, 374 U.S. 424, 430 n.6 (1963) (observing that the "Commission's jurisdiction over technical matters … is clearly exclusive").

[39] *Robbins v. New Cingular Wireless LLC*, 854 F.3d 315, 319-20 (6th Cir. 2017) (noting that Congress "delegate[ed] the task of setting RF emission levels to the FCC"). Of course, government entities can and have participated in the notice-and-comment aspect of the FCC's rulemaking. *See, e.g.*, City of Boston, Massachusetts, ET Docket No. 19-226 (filed June 17, 2020).

[40] FCC, RF Safety FAQ, *What Biological Effects Can Be Caused By RF Energy*?, https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety#Q5 (last visited October 7, 2020).

[41] Letter from Thomas M. Johnson, Jr., General Counsel, FCC, to Joseph H. Hunt, Assistant Attorney General, DOJ, N.D. Cal. No. C 19-05322 WHA, at 3 (Apr. 13, 2020) (citing 47 C.F.R. §§ 1.1307, 1.1310, 2.1091, 2.1093) (emphasis added), https://docs.fcc.gov/public/attachments/DOC-363717A1.pdf.

[42] Letter from Thomas M. Johnson, Jr. General Counsel, FCC, to Joseph H. Hunt, Assistant Attorney General, DOJ, N.D. Cal. No. 3:15-cv-02529 EMC, at 3-5 (June 22, 2020) (examining the adoption and evolution of the Commission's RF exposure rules).

[43] *Id.* at 4-5 (quoting H.R. Rep. No. 204, 104th Cong., 1st Sess. Pt. 1, at 94 (1995)).

[44] *Cellular Phone Taskforce v. FCC*, 205 F.3d 82, 88 (2d Cir. 2000).

[45] *See, e.g.*, *id*. at 89 (rejecting an APA challenge to the FCC's RF emissions decisions in the 1996 and 1997 proceedings).

[46] *Farina v. Nokia Inc.*, 625 F.3d 97, 126 (3d Cir. 2010); *see also id.* at 129 (confirming the Commission's expertise to select an appropriate standard for RF limits).

agency's reliance on the views of expert agencies.[47]

Every court since 2005 that has addressed this issue has held that federal law preempts state action that challenges the safety of wireless devices including zoning decisions based on safety concerns. The Telecommunications Act itself has an express preemption provision that prohibits state or local regulation of cellular equipment based on alleged health effects.[48] Courts have also struck down state law regulation of RF emissions from cell phones based on alleged health effects as impliedly preempted by the FCC's regulation.[49] And most recently, a United States District Court in the Ninth Circuit held that federal law preempts the City of Berkeley's Ordinance requiring warnings at the point of sale.[50] Preemption, therefore, would invalidate many of the Recommendations, which if adopted, would subject the state and localities to expensive challenges and litigation, and almost certain defeat.

The minority does not oppose individuals or communities who want to convert to technology that better suits their needs, so long as those decisions do not conflict with the FCC's goal of the rapid deployment of wireless technology. We also do not oppose communities providing individuals with information about how to reduce their exposure to RF emissions, consistent with what the FCC already does. While individuals should have access to equipment to measure the levels in apartments they are contemplating renting or homes they want to purchase, testing should not be mandated. Access to the testing or the equipment to conduct the test could be provided by various groups such as home inspectors, real estate agents and the county cooperative extension. Similarly, we do not agree to establishing a State funded oversight group or state funding of the measurement equipment. Nor do we believe, as a practical matter, that any of

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[47] *EMR Network v. FCC*, 391 F.3d 269, 272-73 (D.C. Cir. 2004).

[48] 47 U.S.C. § 332(c)(7)(b)(iv); *See, e.g.*, *Cellular Phone Taskforce*, 205 F.3d at 96 (interpreting the TCA to preempt a state and local government's power to regulate the placement, construction and modification of personal wireless services facilities on the basis of health effects of RF emissions); *Santa Fe Alliance for Public Health and Safety v. City of Santa Fe, N.M.*, 2020 WL 2198120, at *7 (D.N.M. May 6, 2020) (noting the TCA explicitly preempts states and local governments from considering environmental effects of RF emissions in siting decisions).

[49] *Farina*, 625 F. 3d at 129 ("there is no indication . . . that either Congress or the FCC traditionally viewed state regulation of RF emissions as a necessary complement to federal regulation"); *Murray v. Motorola, Inc.*, 982 A.2d 764, 777–778 (D.C. 2009) ("insofar as Plaintiffs' claims rest on allegations about the inadequacy of the FCC's RF radiation standard or about the safety of their FCC-certified cell phones, the claims are preempted under the doctrine of conflict preemption.").

[50] *CTIA – The Wireless Association v. City of Berkeley*, No. 15-cv-02529-EMC, 2020 WL 5576135 (N.D. Cal. Sept. 17, 2020) (holding the Berkeley Ordinance "overwarns and stands as an obstacle to the accomplishment of balancing federal objectives by the FCC.").

the Recommendations have any chance of receiving funding.

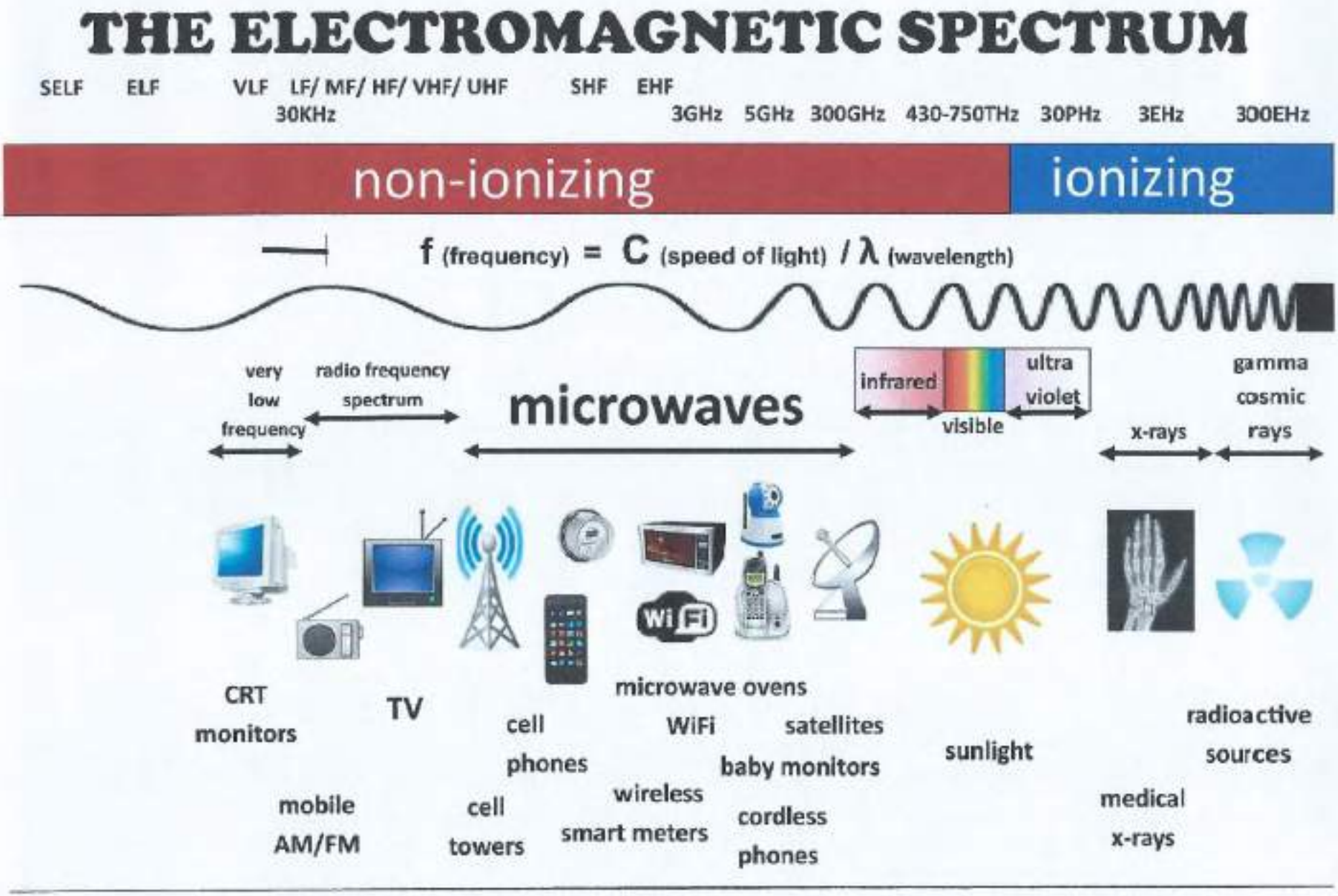
The minority feels strongly that the full body of literature of the science on wireless technology was ignored. Furthermore, the Commission neglected to carry out its mandate to study "…the advantages and risks associated with 5G technology."[51] Had this been done, the Commission would have been made aware of the significant economic and societal benefits that 5G is predicted to provide.[52] The minority has strong concerns that should the majority's conclusions regarding 5G safety – despite their complete odds with the overwhelmingly majority of verified scientific evidence – lead to the enactment of any of the majority's recommendations, the citizens of New Hampshire would be deprived of the enormous benefits of wireless innovation in a time when wireless connectivity could not be more important.

[51] See HB 522: http://gencourt.state.nh.us/bill_Status/billText.aspx?sy=2019&id=267&txtFormat=pdf&v=current (last visited October 14, 2020).

[52] Accenture predicts deploying the next generation of high-speed 5G wireless networks could create up to three million jobs and add approximately $500 billion to U.S. GDP through direct and indirect potential benefits, https://newsroom.accenture.com/content/1101/files/Accenture_5G-Municipalities-Become-Smart-Cities.pdf (last visited October 14, 2020).

APPENDICES

Appendix A *Electromagnetic Spectrum*



Appendix B

Correspondence with federal agencies

Correspondence between Councilwoman Denise Ricciardi, a member of the New Hampshire Commission on 5G, and Dr. Barrington and Dr. Hoover of the National Cancer Institute

Begin forwarded message:

From: NCI Information < nciinfo@nih.gov >
Date: July 30, 2020 at 2:51:16 PM EDT
To: New Bedford Councilmember Denise Ricciardi of the New Hampshire 5G Commission
Subject: Important questions that need to be answered.
Reply-To: "NCI Information" < nciinfo@nih.gov >
Subject: Important questions that need to be answered.

Response By Email (NCI Agent) (07/30/2020 11:51 AM)

Dear Ms. Ricciardi:

I received your follow-up inquiry requesting an answer to each question listed in your email. Please see below:

Councilmember Denise Ricciardi - Question 1. What is the National Cancer Institute opinion on the safety of 5G, 4G and cell towers? If you have one, please share your scientific documentation.

Response from the National Cancer Institute:

> As a Federal research agency, the NCI is not involved in the regulation of radiofrequency telecommunications infrastructure and devices, nor do we make recommendations for policies related to this technology. The Food and Drug Administration (FDA) and the Federal Communications Commission (FCC) are the responsible federal agencies with authority to issue opinions on the safety of these exposures. Rather, NCI gathers and reviews published findings of well-conducted studies with a focus on cancer in humans in the medical literature and makes summaries available on its website and fact sheets.
>
> According to the FCC certain agencies in the Federal Government have been involved in monitoring, researching or regulating issues related to human exposure to radiofrequency radiation. These agencies include the FDA, the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safe and Health (NIOSH), the National Telecommunications and Information Administration (NTIA) and the Department of Defense (DOD).

Councilmember Denise Ricciardi - Question 2. Has NCI staff done a systematic research review of the research on wireless radiation?

Response from the National Cancer Institute:

> Experts at the NCI review the research on radiofrequency radiation and other types of non-ionizing radiation electromagnetic fields (EMFs) in order to maintain our fact sheets on these topics. Other federal agencies have the responsibility to formally review the research on these exposures, specifically the FDA and FCC.

Councilmember Denise Ricciardi - Question 3. What is the NCI opinion on the safety of cell phones? If you have one, please share your scientific documentation.

Response from the National Cancer Institute:

> The FDA and FCC are the responsible federal agencies with authority to issue opinions on the safety of these exposures. As a Federal research agency, the NCI is not involved in the regulation of radiofrequency telecommunications infrastructure and devices, nor do we make recommendations for policies related to this technology.
>
> The NCI gathers and reviews published findings of well-conducted studies in the medical literature on cell phones and cancer risk. The NCI fact sheet " Cell Phones and Cancer Risk" outlines the available evidence from human and animal studies regarding cancer risk and cell/mobile telephones. It includes references and the citations are at the bottom of the document.

Councilmember Denise Ricciardi - Question 4. Does the NCI recommend that parents teach their children to reduce exposure to cell phone radiation? Does the NCI think it is not necessary to take precautions and that information on reducing exposure is only for "concerned" people? Or does the NCI recommend all parents educate their children to reduce exposure and that they themselves reduce exposure to their children?

Response from the National Cancer Institute:

> As noted above, the NCI does not make recommendations or issue guidelines. The fact sheet "Cell Phones and Cancer Risk" does include information from the FDA about ways cell phone users—children, teenagers or adults—can reduce their exposure to radiofrequency radiation. The FDA suggests that cell phone users reserve the use of cell phones for shorter conversations or for times when a landline phone is not available; and use a device with hands-free technology, such as wired headsets, which place more distance between the phone and the head of the user.

Councilmember Denise Ricciardi - Question 5. Did the NCI review in a systematic way the research on impacts of wireless and cell towers to trees and plants? If not, what agency is responsible for ensuring wireless signals are safe for trees and plants?

Response from the National Cancer Institute:

> The NCI is not charged with researching the impact of wireless technology and cell towers on trees and plants. NCI is not aware of any Federal agency mandated to

ensure wireless signals are safe for trees and plants.

Councilmember Denise Ricciardi - Question 6. Did the NCI review in a systematic way the research on cell towers and how wireless antennas impact birds. If not, what agency is responsible for ensuring wireless signals are safe for birds?

Response from the National Cancer Institute:

> The NCI is not charged with researching the impact of wireless technology and cell towers on birds. The NCI is not aware of any Federal agency mandated to ensure wireless signals are safe birds.

Councilmember Denise Ricciardi - Question 7. Did the NCI review in a systematic way the research on impact to bees and insects. If not, what agency is responsible for ensuring wireless signals are safe for insects and bees?

Response from the National Cancer Institute:

> The NCI is not charged with researching the impact of wireless technology on bees and other insects. The NCI is not aware of any Federal agency mandated to ensure wireless signals are safe for bees and other insects.

Councilmember Denise Ricciardi - Question 8. Does the NCI only focus on cancer as a health effect?

Response from the National Cancer Institute:

> Yes. In addition, by law, U.S. population-based cancer registries must collect information on benign brain tumors and the NCI fact sheet "Cell Phones and Cancer Risks" describes findings for meningioma, acoustic neuroma and other benign brain and central nervous system tumors.

Councilmember Denise Ricciardi - Question 9. The NCI does not present the findings of the NTP as "clear evidence of cancer" but simply states of the findings that "The primary outcomes observed were a small number of cancers of Schwann cells in the heart and non-cancerous changes (hyperplasia>) in the same tissues for male rats, but not female rats, nor in mice overall." Why doesn't the NCI present the findings of DNA damage on their webpage as it is published and was found in rats and mice. In addition cardiomyopathy was found. Why isn't this presented on the NCI webpage?

Response from the National Cancer Institute:

> The focus of the fact sheet "Cell Phones and Cancer Risk" is limited to cancer risk. As you noted, the fact sheet provided an overview of the primary outcomes found in the National Toxicology Program (NTP) study. These findings are reported on the NTP website A link to this information was included in the fact sheet for those who wish to know more about the NTP study.

Councilmember Denise Ricciardi - Question 10. The FDA disagrees with the National Toxicology Program findings of clear evidence of cancer. What is the NCI position on the determination of "clear evidence"?

Response from the National Cancer Institute:

> The NCI does not comment on the cancer evaluation criteria of other organizations or how researchers use these definitions in their analysis. You may find useful a critical evaluation of the NTP study that was conducted by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

Councilmember Denise Ricciardi - Question 11. Is there evidence that heating can cause cancer? That elevated temperatures can induce cancer?

Response from the National Cancer Institute:

> There is no current evidence that elevated temperatures or heating is a risk factor for cancer.

Councilmember Denise Ricciardi - Question 12. Has the NCI reviewed in a systematic way the research on impacts to the nervous system?

Response from the National Cancer Institute:

> The NCI fact sheet on "Cell Phones and Cancer Risk" provides a summary review of most epidemiologic studies of cell phone use and brain and other central nervous system tumors. Most of the studies are case-control studies. Details are provided on the three most impactful studies, including the 13-country, case-control Interphone study, the large national Danish cohort study, and the Million Women United Kingdom cohort study.

Councilmember Denise Ricciardi - Question 13. Does the NCI believe the current limits protect the public, children, pregnant women and medically vulnerable from health effects after long term exposure. Please provide documentation for each group, children, pregnant women and medically vulnerable that shows research ensuring safety.

Response from the National Cancer Institute:

> The NCI does not regulate issues related to human exposure to radiofrequency radiation.

Councilmember Denise Ricciardi - Question 14. We know that the NCI is aware that cell phones can violate FCC SAR limits at body contact on high power. The FDA has written that because there is a safety factor. What is the safety factor for the SAR the FDA relies on? Do you know?

Response from the National Cancer Institute:

> The FDA shares regulatory responsibilities for cell phones with the FCC. The FCC certifies wireless devices, and all phones that are sold in the United States must comply with FCC guidelines on radiofrequency exposure. The FDA also has the authority to take action if cell phones are shown to emit radiofrequency energy at a level that is hazardous to the user.
>
> In addition, the FDA is responsible for protecting the public from harmful radiation

emissions from consumer products such as microwave ovens, televisions, and computer monitors. You may wish to contact the FDA's Center for Devices and Radiological Health's Office of Compliance at 301–594–4654, for information about SAR guidelines used in cell phones.

Councilmember Denise Ricciardi - Question 15. Will the NCI be taking action to inform the public about this? If not, please explain why not.

Response from the National Cancer Institute:

NCI staff are committed to regularly reviewing the published findings of well-conducted studies on cancer and making them available on a timely basis to the public through our online fact sheets. As noted above, the NCI continues to make this information available on its website Cancer.gov , the Institute's primary resource in informing the public about cancer research. The NCI gathers and reviews published findings of well-conducted studies in the medical literature on cell phones and cancer risk. The NCI fact sheet "Cell Phones and Cancer Risk" outlines the available evidence from human and animal studies regarding cancer risk and cell/mobile telephones. As also noted above, the NCI has conducted a review of the research on radiofrequency radiation

and other types of non-ionizing radiation electromagnetic fields (EMFs), available in the fact sheet

"Electromagnetic Fields and Cancer." NCI will continue to update these factsheets as new relevant studies are published in the peer-reviewed literature.

Our sister agencies, the FDA as well as the FCC, retain responsibility for reviewing guidance on safety concerns and informing the public if those circumstances change.

Councilmember Denise Ricciardi - Question 16. What actions specifically is the NCI doing now in regards to 5G and cell phone radiation in terms of research review?

Response from the National Cancer Institute:

As noted above, the NCI regularly reviews the published findings of studies on cancer and makes them available to the public.

Additionally, given the multi-year latency of brain tumors and most other solid tumors and the need to carefully consider the optimal study design, it would be premature to begin development of a protocol for studying the relation between 5G exposures and cancer risk before 5G systems are implemented. We are in close communication with other epidemiologists and dosimetrists working on radiofrequency exposures and cancer risks. We continue to carefully monitor research in this area.

Councilmember Denise Ricciardi - Question 17. Does the NCI evaluate the safety of 5G cell antennas? If so how? If not, what health agency is ensuring that 5G cell antennas are safe for people, wildlife and trees.

Response from the National Cancer Institute:

The FCC is responsible for developing guidelines for human exposure to

radiofrequency electromagnetic fields, which includes antennas.

Councilmember Denise Ricciardi - Question 18. Cell phones and wireless devices emit several types of nonionizing radiation in addition to radiofrequency radiation. For example the devices emit magnetic fields and when a pregnant woman holds a laptop on her lap the measured fields can be high even into the baby. What agency ensures safety related to extremely low frequency (ELF-EMF) electromagnetic fields- also nonionizing? Currently we have no federal limit, no federal guidelines and confirmed associations with cancer and many other health effects. Kaiser Permanente researchers have published several studies linking pregnant women's exposure to magnetic field electromagnetic fields to not only increased miscarriage and but also increased ADHD , obesity and asthma in the woman's prenatally exposed children. A recent large-scale stud y again found associations with cancer. Where is the NCI presentation of this research for the public?

Response from the National Cancer Institute:

> As noted above, the FDA is responsible for protecting the public from radiation emissions from consumer products such as microwave ovens, televisions, and computer monitors. You may wish to contact the FDA's Center for Devices and Radiological Health's Office of Compliance at 301–594–4654, for information about research on this topic.
>
> Our sister institute, National Institute of Child Health and Human Development (NICHD) another part of the NIH, investigates human development throughout the entire life process, with a focus on understanding disabilities and important events that occur during pregnancy. You may wish contact to the NICHD for information about radiofrequency radiation exposure and human development. NICHD can be contacted by email at NICHDInformationResourceCenter@mail.nih.gov <mailto: NICHDInformationResourceCenter@ma il.nih.gov >.
>
> NCI staff are committed to regularly reviewing the published findings of well-conducted studies on cancer and making them available on a timely basis to the public through our online fact sheets.

Councilmember Denise Ricciardi - Question 19. Will the NCI be sharing and recommending how to reduce ELF- EMF Exposure? Please clarify which US agency has jurisdiction over ELF-EMF exposures? Please clarify which US agency has authority to set limits for ELF-EMF exposures? As far as we know there is no limit in the USA for this type of exposure.

Response from the National Cancer Institute:

> According to the fact sheet "Electromagnetic Fields and Cancer" sources of ELF-EMFs include power lines, electrical wiring, and electrical appliances such as shavers, hair dryers, and electric blankets.
>
> As noted above, the NCI is not responsible for setting limits for ELF-EMF or any other exposure. Manufacturers of electronic radiation emitting products sold in the United States are responsible for compliance with the Federal Food, Drug and Cosmetic Act (FD&C Act), Chapter V

Subchapter C - Electronic Product Radiation Control.

The U.S. Congress created the National Institute of Environmental Health Sciences' (NIEHS) EMF Research and Public Information Dissemination (RAPID) Program in 1992 to study whether exposure to EMFs produced by the generation, transmission, or use of electric power posed a risk to human health. Although this program has ended, the NIEHS continues to study EMFs. For more information, please see the NIEHS website.

Councilmember Denise Ricciardi - Question 20. Who are the NCI staff who have expertise on this issue at the NCI? What NCI staff is in the Interagency workgroup and where can we access the minutes and work of this group?

Response from the National Cancer Institute:

The content on the NCI's website Cancer.gov related to this topic is authored and maintained by NCI staff. The information on this site is science-based, authoritative, and up to date. Medical experts, cancer researchers, and editors review the content before it is published to the website.

Within the NCI, several research divisions conduct or fund extramural research to discover the genetic and environmental determinants of cancer and new approaches to cancer prevention, including the impacts of ionizing and nonionizing radiation. Epidemiologists also monitor cancer incidence trends for potentially relevant malignancies using U.S.-based cancer registries such as the North American Association of Central Cancer Registries and the Surveillance, Epidemiology, and End Results Program, and periodically review the scientific peer-reviewed literature in this area.

If you are compiling a list of EMF experts to contact, it is important to note that NCI scientists receive many requests for interviews or for advice with projects. All such inquiries should be directed to the NCI Office of Communications and Public Liaison through the NCI contact page< mailto:https//www.cancer.gov/contact> ; found on Cancer.gov.

Councilmember Denise Ricciardi - Question 21. The FCC decided not to update their limits on wireless but the NCI did not submit an opinion to the FCC. Why not?

Response from the National Cancer Institute:

As noted above, the NCI does not make recommendations for policies on wireless technology.

Councilmember Denise Ricciardi - Question 22. Will the NCI be submitting an opinion to the FCC about the higher frequencies to be used in 5G?

Response from the National Cancer Institute:

As noted above, the NCI does not make recommendations for policies on wireless technology.

Councilmember Denise Ricciardi - Question 23. The American Cancer Society funded research by Yale that found cancer after cell phone radiation exposure. See it here Thyroid Cancer, Genetic Variations, and Cell Phones Linked in New Yale School of Public Health Study What is the NCI opinion?

Response from the National Cancer Institute:

> NCI staff are committed to regularly reviewing the published findings of well-conducted studies on cancer and making them available on a timely basis to the public through our online fact sheets.

Councilmember Denise Ricciardi Question 24. Will you be updating your webpage with information on thyroid cancer and on genetic susceptibility as found by the Yale study?

Response from the National Cancer Institute:

> Response from the National Cancer Institute: NCI staff are committed to regularly reviewing the published findings of well-conducted studies on cancer and making them available on a timely basis to the public through our online fact sheets.
>
> Sincerely yours,
> Bill Robinson
> Office of Communications and Public Liaison National Cancer Institute

Customer By CSS Email (Denise Ricciardi) (07/19/2020 06:55 AM)

Hello,

You did not satisfy the commission. We requested you answer each question point by point. Not a paragraph that does NOT properly answer the questions.

Please go back and answer the questions number one provide the answer number two provide the answer and so on. Please expedite this request, it is urgent for commission.

Thank you,

Denise Ricciardi

Subject: Important questions that need to be answered.

Response By Email (NCI Agent) (07/16/2020 11:39 AM)

Dear Ms. Ricciardi:

Your email to Dr. Amy Berrington and Dr. Robert Hoover of the National Cancer Institute (NCI) regarding 5G has been forwarded to this office for reply. In your email, you asked questions about the status of research of the health and environmental effects of 5G (fifth-generation) wireless network technology on people and the natural world and which Federal agencies regulate this technology. We can offer information that you may find useful.

The NCI, part of the National Institutes of Health, is the Federal government's principal agency for cancer research and training. Part of the NCI's mission includes gathering and disseminating information about cancer, including risk factors, to the public and medical community through its website, fact sheets, and the NCI's Cancer Information Service (CIS). The fact sheets "Cell Phones and Cancer Risk" and "Electromagnetic Fields and Cancer" outline the available evidence from human and animal studies regarding cancer risk and cellular/mobile telephones and low- to medium-frequency electromagnetic fields.

The National Toxicology Program (NTP) investigated the health effects in animals exposed to radiofrequency (RF) radiation modulations used in 2G and 3G cell phones. According to the lead toxicologist of the studies, Michael Wyde, Ph.D., "5G is an emerging technology that hasn't really been defined yet. From what we currently understand, it likely differs dramatically from what we studied." This comment can be found in the NIH news release about the NTP final reports.

The NCI is committed to reviewing published findings of well-conducted studies in the medical literature and making them available to the public. Sometimes the results of a research study can yield inconsistent and even unanticipated results. Nonetheless, in this way, hypotheses are thoroughly evaluated.

As a Federal research agency, the NCI does not regulate RF electromagnetic field (EMF) exposure or establish guidelines. Within the Federal government, the U.S. Federal Communications Commission (FCC) authorizes or licenses most RF telecommunications services, facilities, and devices used by the public, industry and state and local governmental organizations. The FCC is required by the National Environmental Policy Act of 1969, among other things, to evaluate the effect of EMF emissions from FCC-regulated transmitters on the quality of the human environment. This includes cell phones and towers. The FCC Policy on Human Exposure web page includes links to several organizations that have recommendations for human exposure to EMF.

In addition, the U.S. Food and Drug Administration (FDA) shares regulatory responsibilities for cell phones with the FCC. Although cell phones can be sold without FDA clearance or approval, the agency monitors the effects the phones have on health. The FDA has the authority to take action if cell phones are shown to emit RF energy at a level that is hazardous to the user. The FDA recently provided an updated assessment of the current limits of RF energy based on the currently available scientific evidence (see Letter from the FDA to the FCC on Radiofrequency Exposure).

Sincerely yours,

Bill Robinson

Office of Communications and Public
Liaison National Cancer Institute

Customer By CSS Email (Denise Ricciardi) (07/10/2020 07:25 AM)

Hello,

I serve in New Hampshire on a health study commission. We need these questions answered each one, one by one.

Questions to Dr. Barrington and Dr. Hoover of the National Cancer Institute

1. What is the National Cancer Institute opinion on the safety of 5G, 4G and cell towers? If you have one please share your scientific documentation.

2. Has NCI staff done a systematic research review of the research on wireless radiation?

3. What is the NCI opinion on the safety of cell phones? If you have one please share your scientific documentation.

4. Does the NCI recommend that parents teach their children to reduce exposure to cell phone radiation? Does the NCI think it is not necessary to take precautions and that information on reducing exposure is only for "concerned" people? Or does the NCI recommend all parents educate their children to reduce exposure and that they themselves reduce exposure to their children?

5. Did the NCI review in a systematic way the research on impacts of wireless and cell towers to trees and plants? If not what agency is responsible for ensuring wireless signals are safe for trees and plants? 6.Did the NCI review in a systematic way the research on cell towers and how wireless antennas impact birds. If not, what agency is responsible for ensuring wireless signals are safe for birds?

7. Did the NCI review in a systematic way the research on impact to bees and insects. If not, what agency is responsible for ensuring wireless signals are safe for insects and bees?

8. Does the NCI only focus on cancer as a health effect?

9. The NCI does not present the findings of the NTP as “clear evidence of cancer” but simply states of the findings that” The primary outcomes observed were a small number of cancers of Schwann cells in the heart and non-cancerous changes (hyperplasia>) in the same tissues for male rats, but not female rats, nor in mice overall.” Why doesn’t the NCI present the findings of DNA damage on their webpage as it is published and was found in rats and mice. In addition cardiomyopathy was found. Why isn’t this presented on the NCI webpage?

10. The FDA disagrees with the National Toxicology Program findings of clear evidence of cancer. What is the NCI position on the determination of “clear evidence”?

11. Is there evidence that heating can cause cancer? That elevated temperatures can induce cancer?

12. Has the NCI reviewed in a systematic way the research on impacts to the nervous system?

13. Does the NCI believe the current limits protect the public, children, pregnant women and

medically vulnerable from health effects after long term exposure. Please provide documentation for each group, children, pregnant women and medically vulnerable that shows research ensuring safety.

14. We know that the NCI is aware that cell phones can violate FCC SAR limits at body contact on high power. The FDA has written that because there is a safety factor. What is the safety factor for the SAR the FDA relies on? Do you know?

15. Will the NCI be taking action to inform the public about this? If not, please explain why not.

16. What actions specifically is the NCI doing now in regards to 5G and cell phone radiation in terms of research review?

17. Does the NCI evaluate the safety of 5G cell antennas? If so how? If not, what health agency is ensuring that 5G cell antennas are safe for people, wildlife and trees.

18. Cell phones and wireless devices emit several types of non ionizing radiation in addition to radiofrequency radiation. For example the devices emit magnetic fields and when a pregnant woman holds a laptop on her lap the measured fields can be high even into the baby. What agency ensures safety related to extremely low frequency (ELF-EMF) electromagnetic fields- also non ionizing? Currently we have no federal limit, no federal guidelines and confirmed associations with cancer and many other health effects. Kaiser Permanente researchers have published several studies linking pregnant women's exposure to magnetic field electromagnetic fields to not only increased miscarriage and but also increased ADHD, obesity and asthma in the woman's prenatally exposed children. A recent large scale study again found associations with cancer. Where is the NCI presentation of this research for the public?

19. Will the NCI be sharing and recommending how to reduce ELF- EMF Exposure? Please clarify which US agency has jurisdiction over ELF-EMF exposures? Please clarify which US agency has authority to set limits for ELF-EMF exposures? As far as we know there is no limit in the USA for this type of exposure.

20. Who are the NCI staff who have expertise on this issue at the NCI? What NCI staff is in the Interagency workgroup and where can we access the minutes and work of this group?

21. The FCC decided not to update their limits on wireless but the NCI did not submit an opinion to the FCC. Why not?

22. Will the NCI be submitting an opinion to the FCC about the higher frequencies to be used in 5G.

23. The American Cancer Society funded research by Yale that found thyroid cancer after cell phone radiation exposure. See it here: https://medicine.yale.edu/news-article/22332/ https://protect-us.mimecast.com/s/K3TvCmZnOMf1oANt4 What is the NCI opinion?

24. Will you be updating your webpage with information on thyroid cancer and on genetic susceptibility as found by the Yale study?

Thank you for your cooperation.
Denise Riccciardi

Letters between Councilwoman Denise Ricciardi, a member of the New Hampshire Commission on 5G, and Dr. Shuren of the FDA

Note: The FDA did not answer the questions as asked and did not respond to the request to testify to the Commission

- June 23, 2020 Denise Ricciardi writes the FDA a detailed list of questions regarding their statements about cell phone radiation.
- Jul 15, 2020 FDA writes Denise Ricciardi a short two paragraphs that does not answer the questions.
- July 15, 2020 Denise Ricciardi writes back to the FDA stating that her questions are not answered.
- No additional answers have been provided by the FDA.
- March 2, 2020: The FDA also did not respond to the March 2020 request to testify to the 5G Commission.

July 15, 2020 Denise Ricciardi to the FDA

Hello,

This does not answer our specific numbered questions. Please go back and revisit the questions as requested.

Thank you,

Denise Ricciardi

On Jul 15, 2020, at 5:31 PM, Meister, Karen G < Karen.Meister@fda.hhs.gov > wrote:

July 15, 2020 Letter from FDA to Councilwoman Denise Ricciardi of the New Hampshire Commission on 5G

On Jul 15, 2020, at 5:31 PM, Meister, Karen G

Karen.Meister@fda.hhs.gov > wrote:

Dear Ms. Ricciardi,

Thank you for contacting the Food & Drug Administration (FDA) with your concerns regarding exposure to non-ionizing electromagnetic energy. Your inquiry was forwarded to the Intergovernmental Affairs (IGA) team in the Office of the Commissioner. We understand that you are a member of New Hampshire's "Commission to Study the Environmental and Health Effects of Evolving 5G Technology," and that you are gathering information.

As you may know, FDA shares regulatory responsibilities for cell phones with the Federal

Communications Commission (FCC). Under the law, FDA is responsible for, among other things: consulting with other federal agencies on techniques and programs for testing and evaluating electronic product radiation and collecting, analyzing, and making available scientific information on the nature and extent of the hazards and control of electronic product radiation. FDA's website provides information about cell phones, including the Agency's current assessment on the safety of exposure to non-ionizing electromagnetic fields. See https://www.fda.gov/radiation-emitting-products/home-business-and-entertainment-products/cell-phones The website includes an update to the scientific evidence evaluated by FDA (see https:// www.fda.gov/radiation-emitting-products/cell-phones/scientific-evidence-cell-phone-safety, as well as suggestions for those that may still be concerned about non-ionizing energy exposure (see https://www.fda.gov/radiation-emitting-products/cell-phones/reducing-radio-frequency-exposure-cell-phones).

FDA's doctors, scientists and engineers continually monitor the scientific studies and public health data for evidence that radio frequency energy from cell phones could cause adverse health effects. FDA also works with national and international health agencies to ensure the weight of scientific evidence is appropriately evaluated.

We hope this information is helpful to answer your questions. Best regards.

Karen Meister, J.D.
Acting Director, Intergovernmental Affairs
Senior Advisor, Office of Legislation
Office of the Commissioner/OPPLIA
U.S. Food and Drug Administration
(301) 796-8916 office
(240) 494-6228 (work cell)

From: "Shuren, Jeff" < Jeff.Shuren@fda.hhs.gov >
Date: June 24, 2020 at 4:28:49 PM EDT
To: Denise Ricciardi
Cc: OC Ombudsman < Ombuds@OC.FDA.GOV >, Patrick Abrami < abrami.nhrep@gmail.com >
Subject: RE: Important questions NEED to be answered for N.H. 5G health task commission

Thank you for reaching out to me. I have forwarded your questions to the FDA's Intergovernmental Affairs Staff who handles inquiries from State and local governments. I have included Karen Meister, their Acting Director, on this email, as well.

Best regards, Jeff

----Original Message
From: Denise Ricciardi
Sent: Tuesday, June 23, 2020 10:38 PM
To: Shuren, Jeff < Jeff.Shuren@fda.hhs.gov <mailto: Jeff.Shuren@fda.hhs.gov >>
Cc: OC Ombudsman < Ombuds@OC.FDA.GOV <mailto: Ombuds@OC.FDA.GOV >>;
Patrick Abrami < abrami.nhrep@gmail.com <mailto: abrami.nhrep@gmail.com >>

Subject: Important questions NEED to be answered for N.H. 5G health task commission

Dear Dr. Shuren,

We would appreciate an answer to these questions regarding cell phone radiation. If you could number them one by one it would help with clarity of your response.

Regarding the FDAs report "Review of Published Literature between 2008 and 2018 of Relevance to Radiofrequency Radiation and Cancer"

1. Why did the FDA only focus on cancer as a health effect?

2. The FDA said of the National Toxicology Program findings that the FDA was unsure if the tumors were a causal effect or if these results were "due to weakening of the immune response due to animal stress from cyclic heating and thermoregulation." Does the FDA think that cancer could be an effect of whole body heating, that cancer is a thermally induced effect? If so, what other studies show that heating causes cancer?

3. Did the FDA review in a systematic way the research on impacts to the nervous system?

4. At the Commission, a study on how millimeter waves interact with insects was discussed. Did the FDA review in a systematic way the research on impact to bees, insects and pollinators?

5. Did the FDA review in a systematic way the research on impact to trees and plants?

6. Did the FDA review in a systematic way the research on impact to birds.

7. If the FDA did not investigate impacts to insects or trees, what US agencies have done so?

8. The FDA website page Scientific Evidence for Cell Phone Safety has a section entitled "No New implications for 5G". Does the FDA believe that 5g is safe or that 5G has the same health issues as 3 and 4G? What is the FDA opinion on the safety of wireless?

9. What is the FDA opinion on FCC limits in terms of long term health effects. Does the FDA believe the current limits protect the public, children, pregnant women and medically vulnerable from health effects after long term exposure.

10. The FDA is aware that cell phone can violate FCC SAR limits at body contact on high power. The FDA has written that because there is a safety factor. What is the safety factor for the SAR the FDA relies on. At what SAR level above FCC limits will the FDA intervene?

11. What actions specifically is the FDA doing now in regards to 5G and cell phone radiation in terms of research review? How often will the FDA be releasing reports?

12. Will the FDA be evaluating the safety of 5G cell antennas? If so how? If not, what health agency is ensuring that 5G cell antennas are safe for people, wildlife and trees.

13. Cell phones and wireless devices emit several types of non ionizing radiation in addition to radiofrequency radiation. For example the devices emit magnetic fields and when a pregnant woman holds a laptop on her lap the measured fields can be high even into the baby. What agency ensures safety related to extremely low frequency (ELF-EMF)

electromagnetic fields- also non ionizing? Currently we have no federal limit, no federal guidelines and confirmed associations with cancer and many other health effects. Kaiser Permanente researchers have published several studies linking pregnant women's exposure to magnetic field electromagnetic fields to not only increased miscarriage and but also increased ADHD , obesity and asthma in the woman's prenatally exposed children. A recent large-scale study again found associations with cancer. Please clarify which US agency has jurisdiction over ELF-EMF exposures?

14. Will the FDA be initiating any research studies on 5G and health effects?

We as a health study commission on 5G take these duties very seriously. We are unbiased and we are seeking all answers and facts. We are requiring your answers to the above questions.

Thank you,
Denise Ricciardi
Committee Member appointed by Governor Sununu.

Additional Emails related to the questions:
From: "Meister, Karen G" < Karen.Meister@fda.hhs.gov >

Date: July 14, 2020 at 2:12:10 PM EDT To: Denise Ricciardi

Subject: FW: Important [External]

Hi Ms. Ricciardi-

We apologize for not responding sooner. Dr. Shuren forwarded your inquiry to our office because the Intergovernmental Affairs staff in the Office of the Commissioner handles inquiries from state and local governments like yours. We hope to get you a response very shortly. Thank you for your patience.

Karen
Karen Meister, J.D.
Acting Director, Intergovernmental Affairs
Senior Advisor, Office of Legislation
Office of the Commissioner/OPPLIA
U.S. Food and Drug Administration
(301) 796-8916 office
(240) 494-6228 (work cell)
(703) 201-6952 (personal cell- I will call you back on work phone)

Original Message
From: Denise Ricciardi
Sent: Tuesday, July 14, 2020 9:08 AM
To: Shuren, Jeff < Jeff.Shuren@fda.hhs.gov >
Cc: Patrick Abrami
Subject: Important

We have received no answers for our questions for the 5G health study commission in New Hampshire. Please advise!

Original Message
From: Denise Ricciardi
To: CDRHSpeakerLiaison@fda.hhs.gov < CDRHSpeakerLiaison@fda.hhs.gov >; jeff.shurren@fda.hhs.govlyndsay.lloud.hhs.gov <jeff.shurren@fda.hhs.govlyndsay.lloud.hhs.gov >
Cc: Patrick.Abrami@
Subject: Study commission HB522 New Hampshire
Sent: Wed, Mar 4, 2020 2:43 pm

Good afternoon,

Governor Sununu in the State of New Hampshire has tasked a group of us to study the health effects of the 5G rollout.

We are composed of a wide variety of talents. Including Physicians, toxicologists, scientists, epidemiologists, physicists, engineers, the telecom industry and more.

We have been meeting since last October and have had many experts provide testimony.

To complete our findings in an unbiased fashion. It is essential to have a qualified member of the FDA and the FCC present to our commission.

We are making history in New Hampshire. Many other States are watching. Our results will have a profound effect.

When can we count on your participation on such an important issue.

Thank you,
Denise Ricciardi

Appendix C

Answers to the specific questions posed by HB 522

1. Why does the insurance industry recognize wireless radiation as a leading risk and has placed exclusions in their policies not covering damages caused by the pathological properties of electromagnetic radiation?

As shared with the Commission, insurers rank 5G, wireless, and electromagnetic radiation as high risk based on their white papers which compare the risk to asbestos where it may take decades to know the full extent of health impacts.

Scarato shared a 2019 report by Swiss Re Institute[53] which classifies 5G mobile networks as an "off-the-leash" "HIGH" risk, meaning a high-impact emerging risk that will affect property and casualty claims in more than three years' time. The Swiss Re report states on page 29:

> To allow for a functional network coverage and increased capacity overall, more antennas will be needed, including acceptance of higher levels of electromagnetic radiation. In some jurisdictions, the rise of threshold values will require legal adaptation. Existing concerns regarding potential negative health effects from electromagnetic fields (EMF) are only likely to increase. An uptick in liability claims could be a potential long-term consequence.
>
> Potential impacts:
>
> - Cyber exposures are significantly increased with 5G, as attacks become faster and higher in volume. This increases the challenge of defense.
> - Growing concerns of the health implications of 5G may lead to political friction and delay of implementation, and to liability claims. The introductions of 3G and 4G faced similar challenges.

[53] Swiss Re Institute, New Emerging Risk Insights, 2019

- Information security and national sovereignty concerns might delay implementation of 5G further, increasing uncertainty for planning authorities, investors, tech companies and insurers.
- Heated international dispute over 5G contractors and potential for espionage or sabotage could affect international cooperation, and impact financial markets negatively.
- As the biological effects of EMF in general and 5G in particular are still being debated, potential claims for health impairments may come with a long latency.

A Business Insurance analysis[54] also examined mass tort exposures that may have the potential to cause major difficulties for commercial policyholders and their insurers. It includes workers' overexposure to radio frequency waves from rooftop wireless transmitters as a potential future claim and states that research "has shown biological effects from lower-level 'nonthermal' exposure, and people exposed at lower levels have reported headache, dizziness, nausea, mood disorders, mental slowing, and memory loss." Most insurance plans do not cover electromagnetic fields (EMF) and they have "electromagnetic field exclusions."

For example the California State University Risk Management Authority (CSURMA) Self Insured Program states:

> We will not pay for loss or damage caused by or resulting from any of the following:
> …
> Artificially generated electrical, magnetic or electromagnetic energy that damages, disturbs, disrupts or otherwise interferes with any: (1) Electrical or electronic wire, device, appliance, system or network; or (2) Device, appliance, system or network utilizing cellular or satellite technology. But if fire results, we will pay for the loss or damage caused by that fire if the fire would be covered under this coverage form. For the purpose of this exclusion, electrical, magnetic or electromagnetic energy includes but is not limited to: (1) Electrical current, including arcing; (2) Electrical charge produced or conducted

[54] BusinessInsurance.com, "The Next Asbestos: Five emerging risks that could shift the liability landscape," May 13, 2011.

> by a magnetic or electromagnetic field; (3) Pulse of electromagnetic energy; or (4) Electromagnetic waves or microwaves.

Even AT&T Mobile Insurance[55] excludes loss from pollutants. Their policy states, "Pollutants" means: Any solid, liquid, gaseous, or thermal irritant or contaminant including smoke, vapor, soot, fumes, acid, alkalis, chemicals, artificially produced electric fields, magnetic field, electromagnetic field, sound waves, microwaves, and all artificially produced ionizing or non- ionizing radiation and waste."

Crown Castle states in their 2020 Annual Report:

> If radio frequency emissions from wireless handsets or equipment on our communications infrastructure are demonstrated to cause negative health effects, potential future claims could adversely affect our operations, costs or revenues.
>
> The potential connection between radio frequency emissions and certain negative health effects, including some forms of cancer, has been the subject of substantial study by the scientific community in recent years. We cannot guarantee that claims relating to radio frequency emissions will not arise in the future or that the results of such studies will not be adverse to us.
>
> Public perception of possible health risks associated with cellular or other wireless connectivity services may slow or diminish the growth of wireless companies, which may in turn slow or diminish our growth. In particular, negative public perception of, and regulations regarding, these perceived health risks may slow or diminish the market acceptance of wireless services. If a connection between radio frequency emissions and possible negative health effects were established, our operations, costs, or revenues may be materially and adversely affected. We currently do not maintain any significant insurance with respect to these matters.

[55] AT&T Mobile Insurance Policy, 2014, p. 4

Wireless companies from AT&T[56] to Nokia to T-Mobile to Verizon Wireless have issued similar warnings[57] to their own shareholders.

Contained in Vodafone's 2018 Annual Report are the following statements: "What is the risk? Electro-magnetic signals emitted by mobile devices and base stations may be found to pose health risks, with potential impacts including: changes to national legislation, a reduction in mobile phone usage or litigation" and "EMF health related risks - EMF found to pose health risks causing reduction in mobile usage or litigation." The report also included EMF is a "Principal Risk" rated as high in the graphic on pages 38 – 39.

Additional Insurance Reports that Rank Wireless and Electromagnetic Fields as "High Risk"

- 2016 Austrian Accident Insurance Institute (AUVA) ATHEM Report 2 "Investigation of athermal effects of electromagnetic fields in mobile communications."
- 2014 Swiss Re SONAR Report: New emerging risk insights.
- 2013 AM Best Briefing, Emerging Technologies Pose Significant Risks with Possible Long-Tail Losses.
- 2011 Business Insurance White Paper, "The Next Asbestos: Five emerging risks that could shift the liability landscape."
- 2011 Austrian Accident Insurance Institute (AUVA) ATHEM Report 1, Investigation of athermal effects of electromagnetic fields in mobile radio areas in German
- 2010 Lloyd's of London Report on Electromagnetic Fields
- 2009 Austrian Accident Insurance Institute Report on Health Risks from Cell Phone Radiation "Nonthermal Effects of Electromagnetic Radiation in the Cell Phone Frequency Range."
- 2011 Business Insurance Article "Geisel, Roseanne White. "Insurers exclude risks associated with electromagnetic radiation."

[56] AT&T 2016 Annual Report
[57] EHTrust.org, "Corporate Company Investor Warnings In Annual Reports 10k Filings Cell Phone Radiation Risks."

2. Why do cell phone manufacturers have in the legal section within the device saying keep the phone at least 5mm from the body?

5G will have multiple antennas for 5G as well as 4G, Wi-Fi, Bluetooth, and other technology. All of these antennas emit wireless radiation. Even if you are not on the phone, it has continuous emissions.

Phones are premarket tested for cell phone radiation exposures with a separation distance from the phone and the body phantom. This legal section states the exact separation distance the manufacturers used when testing the phone for compliance. As the 2012 GAO Report "Exposure and Testing Requirements for Mobile Phones Should Be Reassessed" states, "The specific minimum separation distance from the body is determined by the manufacturer. In addition, the U.S. government does not perform independent cell phone compliance testing, allowing each manufacturer to submit their own SAR testing results to the FCC."

If phones are used in positions closer than this manufacturer's stated distance, the cell phone user could potentially receive excessive cell phone radiation SAR levels which violate the FCC regulatory limits. Several reports in the US and internationally have confirmed that when phones are tested at body contact, the measured SAR will exceed FCC limits.[58, 59, 60, 61] Theodora Scarato presented this information to the Commission including an analysis by Professor Om Gandhi which examined data from 450 cell phone models from the French government agency, ANFR, the national radiation assessment bureau, indicating that phones can emit 11 times over the US FCC limit and 3 times over European/ICNIRP limits.

FCC Does Not Require Body Contact Tests for Cell Phone Radiation

As stated in the 2012 GAO report, "Some consumers may use mobile phones against the body, which FCC does not currently test, and could result in RF energy exposure higher than the FCC limit." The GAO report also directed the FCC to review their cell phone testing protocol because they found these protocols could

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[58] Gandhi, O. P. (2019). "Microwave Emissions From Cell Phones Exceed Safety Limits in Europe and the US When Touching the Body." *IEEE Access*, 7, 47050-47052. doi:10.1109/access.2019.2906017

[59] Gandhi, Om P., and Gang Kang. "Inaccuracies of a plastic" pinna" SAM for SAR testing of cellular telephones against IEEE and ICNIRP safety guidelines." *IEEE Transactions on Microwave Theory and Techniques* 52.8 (2004).

[60] Gandhi, Om P. "Yes the children are more exposed to radiofrequency energy from mobile telephones than adults." *IEEE Access* 3 (2015): 985-988.

[61] Kang, Gang, and Om P. Gandhi. "SARs for pocket-mounted mobile telephones at 835 and 1900 MHz." *Physics in Medicine and Biology* 47.23 (2002): 4301.

allow for consumers to receive SAR levels that possibly exceed the "on the body" exposure guidelines.

Cell phone manufacturers are not required by the FCC to test cell phones for cell phone radiation compliance in positions which mimic direct contact between the phone and the body. In the USA, manufacturers can set distances of up to 25 mm when they perform SAR radiation testing for their phones and they are still within the law.

In contrast, in Europe the law has changed to ensure phones are tested at least at 5 mm and no more. This happened after France ANFR released radiation measurements for hundreds of cell phones tested independently by the government of France. The ANFR found the radiation levels were so high that most tested phones exceeded European cell phone radiation limits, showing radiation levels up to three times higher than the limits! ANFR has posted the information on their website.

Several phone models have been taken off the European market or software updated to reduce the radiofrequency radiation. The first withdrawal of cell phones from the market due to cell phone radiation levels dates back to April 2018, with the 100,000 Hapi 30 phones marketed by Orange, followed by the Neffos X1 TP902 (May 2018), the Echo Horizon Lite (Oct 2019), and the announcement on May 20 of the withdrawal of the Razer Phone 2 devices.

After the release of the ANFR tests that found phones violated limits in body contact positions, a new European Directive 2014/35/UE called RED, applicable from June 2016, changed the regulations so that now all phones in the European Union are SAR tested at a distance no greater than 5 mm.

Furthermore, the French ministries of Health, Ecology and Economy issued a joint press release on October 25, 2019[62] announcing France will ask the European Commission to further strengthen the SAR tests requirements to be carried out in a body contact position of 0mm from the body phantom. This would ensure that tests mimic the way people use cell phones today, touching the body.

[62] Buzyn A. "The Government is taking action to limit exposure to the emissions of certain mobile phones and to better inform the public." *Ministère Des Solidarités Et De La Santé*. Published 2019. Accessed July 8, 2020.

FCC SAR Limits

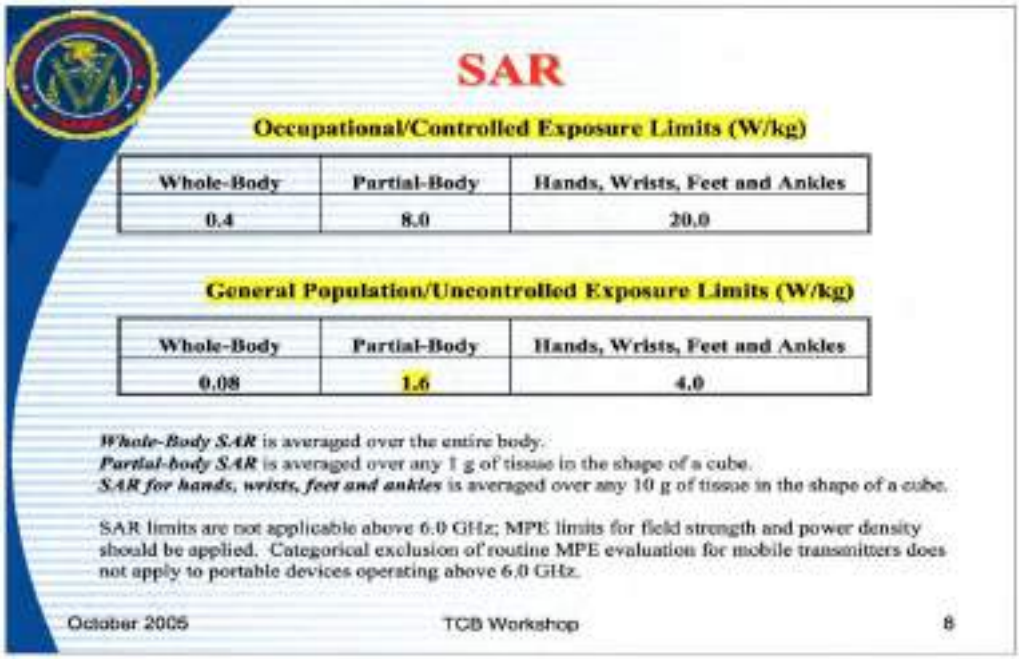
The FCC regulates RF energy emitted from FCC-regulated transmitters and has implemented a certification program to ensure that all mobile phones and wireless devices sold in the United States comply with the agency's limit on RF radiation exposure.

Before a cell phone model is permitted to go on the market for sale, its manufacturer performs Specific Absorption Rate (SAR) tests to evaluate the radiation levels. SAR values are expressed in terms of watts per kilogram (W/kg) and are intended to measure the amount of cell phone radiofrequency radiation absorbed by the body when using a wireless device.

Cell Phone Radiation SAR Limits in the USA

The FCC and Health Canada limit for cell phone radiation exposure to the public from cellular telephones is a SAR level of 1.6 watts per kilogram averaged over 1 gram of tissue. For extremities such as the wrists, ankles, hands, ears, and feet, the allowable SAR limit is much higher and is 4.0 W/kg averaged over 10 grams of tissue.[63]

Image from FCC Presentation[64]



SAR

Occupational/Controlled Exposure Limits (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

General Population/Uncontrolled Exposure Limits (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body.
Partial-body SAR is averaged over any 1 g of tissue in the shape of a cube.
SAR for hands, wrists, feet and ankles is averaged over any 10 g of tissue in the shape of a cube.

SAR limits are not applicable above 6.0 GHz; MPE limits for field strength and power density should be applied. Categorical exclusion of routine MPE evaluation for mobile transmitters does not apply to portable devices operating above 6.0 GHz.

October 2005 TCB Workshop 8

[63] Radio Frequency Safety | Federal Communications Commission. Accessed July 8, 2020.
[64] https://transition.fcc.gov/oet/ea/presentations/files/oct05/RF_Exposure_Concepts_Support_KC.pdf

There also is an occupational SAR limit for cell phones, allowing much higher exposures. The US FCC occupational limit is a SAR level of 8 watts per kilogram averaged over 1 gram of tissue. For extremities such as the wrists, ankles, hands, ears, and feet, the allowable SAR limit is much higher and is 10.0 W/kg averaged over 10 grams of tissue.

According to the FCC[65] the "occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure."

Thus, the manufacturer's recommended distance for cell phones is a defined number of millimeters. The specific distances for each phone varies and can be found in the cell phone's instruction/user manual. Furthermore, the recommended distance for wireless laptops, Wi-Fi routers, smart security systems, smart speakers and printers is generally 20 centimeters (approximately 8 inches) as stated in the user manual. The FCC states that "mobile devices are transmitters designed to be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons."

The CTIA has argued that "there is no reliable evidence proving that current testing protocols fail to ensure compliance with RF standards." This is stated in the CTIA submission to the US Federal Communications Commission regarding the FCC Proceeding on Human Exposures to Radiofrequency Radiation. CTIA also stated, "a zero-measuring requirement would not accurately mimic real usage or increase safety."

The French data release refutes these CTIA and FCC statements because they found SAR levels were in violation of limits when phones were tested in body contact positions at highest power levels.

[65] Chan K. *Overview of RF Exposure Overview of RF Exposure Concepts and Requirements Concepts and Requirements*. http://grouper.ieee.org/groups/scc34/sc2/wg1/appr_memo.html. Accessed July 8, 2020.

Examples of the Manufacturer's Instructions

Here are some examples of the radiofrequency statement for phones as well as other wireless devices people use every day.

Samsung Health and Safety Information	"Body-worn operations are restricted to belt-clips, holsters or similar accessories that have no metallic component in the assembly and must provide at least 1.5cm separation between the device and the user's body."
iPhone 11 Pro Max	"During testing, iPhone radios are set to their highest transmission levels and placed in positions that simulate uses against the head, with no separation, and when worn or carried against the torso of the body, with 5mm separation."
Nokia 8110 4G Phone (2019 Manual)	"This device meets RF exposure guidelines when used against the head or when positioned at least 5/8 inch (1.5 centimetres) away from the body. When a carry case, belt clip or other form of device holder is used for body-worn operation, it should not contain metal and should provide at least the above stated separation distance from the body."
Safety & regulatory information (Pixel & Pixel XL 2016)	"Body worn operation: Pixel complies with radio frequency specifications when used near your ear or at a distance of 0.4 in (1.0 cm) from your body. Pixel XL complies with radio frequency specifications when used near your ear or at a distance of 0.4 in (1.0 cm) from your body. Ensure that the device accessories, such as a device case and device holster, are not composed of metal components. Keep the device away from your body to meet the distance requirement."
Samsung 3G Laptop Manual	"Usage precautions during 3G connection: Keep safe distance from pregnant women's stomach or from lower stomach of teenagers. Body worn operation: Important safety information regarding radiofrequency radiation (RF) exposure. To ensure compliance with RF exposure guidelines the Notebook PC must be used with a minimum of 20.8 cm antenna separation from the body."

Owlcam Manual with RF Instructions	"Caution exposure to radiofrequency radiation, to comply with FCC RF exposure compliance requirements for mobile configurations, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons."
PlayStation 3	"This equipment complies with FCC/IC radiation exposure limits set forth for uncontrolled equipment and meets the FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET65 and RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment should be installed and operated with at least 20 cm (8 in) and more between the radiator and person's body (excluding extremities: hands, wrists, feet and legs)."
Amazon Echo	"Information Regarding Exposure to Radio Frequency Energy…This device should be installed and operated with a minimum distance of 20cm between the radiator and your body. The remote control meets the RF exposure requirement of low power devices under portable operation. Nevertheless, it is advised to use the Products in such a manner that minimizes the potential for human contact during normal operation."
Panasonic DECT Home Cordless Phone	"FCC RF Exposure Warning: To comply with FCC RF exposure requirements, the base unit must be installed and operated 20 cm (8 inches) or more between the product and all person's body."
HP Printer	"In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm (8 inches) during normal operation."
Apple Watch	"During testing, Apple Watch radios are set to their highest transmission levels and placed in positions that simulate use against the head, with 10mm separation, and on the wrist, with no separation. When placing Apple Watch near your face, keep at least 10mm of separation to ensure exposure levels remain at or below the as-tested levels."

Apple iPod Touch	"During testing, iPod radios are set to their highest transmission levels and placed in positions that simulate use near the body, with 5mm separation. To reduce exposure to RF energy, use the supplied headphones or other similar accessories. Carry iPod at least 5mm away from your body to ensure exposure levels remain at or below the as-tested levels."
Nokia 8110 4G Phone (2019 Manual)	"This device meets RF exposure guidelines when used against the head or when positioned at least 5/8 inch (1.5 centimetres) away from the body. When a carry case, belt clip or other form of device holder is used for body-worn operation, it should not contain metal and should provide at least the above stated separation distance from the body."

Apple Has Changed Their Text and No Longer Clearly Instructs Users to Keep the Phone at a Distance But Does Share the Test Distance

In 2015 the Apple iPhone 6 manual had the following statement, "Carry iPhone at least 5mm away from your body to ensure exposure levels remain at or below the as-tested levels." While this sentence was still on their website on March 2, 2017, it was removed by November 9, 2017. Similarly, the iPhone 7 was released in 2016, along with the same online instructions to carry it "5 mm away from your body" which disappeared from the Apple website by November 9, 2017.

Apple's website still includes information that cell phones are tested with a separation distance. However, the text is absent of clear instructions to consumers. Years ago, iPhone 3 filings to the FCC stated "iPhone's SAR measurement may exceed the FCC exposure guidelines for body-worn operation if positioned less than 15 mm (5/8 inch) from the body (e.g. when carrying iPhone in your pocket)." Apple clearly stated, "When using iPhone near your body for voice calls or for wireless data transmission over a cellular network, keep iPhone at least 15 mm (5/8 inch) away from the body."

Investigations Find Cell Phones Violate Cell Phone Regulatory Limits When the Phone is Tested at Body Contact

Chicago Tribune Cell Phone Radiation Tests
Tests paid for by the Tribune and conducted according to federal guidelines at an accredited lab, produced a surprising result: Radiofrequency radiation exposure from the iPhone 7 — one of the most popular smartphones ever sold — measured over the legal safety limit and more than double what Apple reported to federal regulators from its own testing. These tests measured radio frequency radiation SAR levels at 2mm from the body. Chicago Tribune Cell Phone Test Report

During Commission proceedings the CTIA countered that the FCC tested the phones the Chicago Tribune had reported to exceed SAR levels and released a report that found them to not to violate SAR limits. However, if you go to the FCC report on SAR measurements it shows that the FCC used a separation distance (on page 9)[66]. The Chicago Tribune report specifically investigated phones at a distance of 2mm from the body. The FCC Report did not replicate the Chicago Tribune tests at 2mm but instead used the manufacturers separation distances which vary from 5 mm to 15mm.

Canadian Broadcasting Corporation
A 2017 investigation by the Canadian Broadcasting Corporation found radiation levels higher than government standards after they tested popular cell phones in a US FCC certified laboratory.

French ANFR
Professor Om Gandhi, one of the engineers who developed radiofrequency limits years ago, published an analysis of the data from 450 cell phone models from the French government agency, ANFR, the national radiation assessment bureau, indicating that phones can emit 11 times over the US FCC limit and 3 times over European/ICNIRP limits.

3. Why have 1,000s of peer-reviewed studies, including the recently published U.S. Toxicology Program 16-year $30 million study, that are showing a wide range of statistically significant DNA damage, brain and heart tumors,

[66] FCC. *Results of Tests on Cell Phone RF Exposure Compliance*.; 2019. Accessed July 8, 2020.

infertility, and so many other ailments, been ignored by the Federal Communication Commission (FCC)?

There has not been a scientific review of the research by a US agency for more than two decades.

Just recently in December 2019, the FCC determined that there was no need to review the radiofrequency limits. The FCC based this decision largely on a letter by the FDA. In the spring of 2020, the FDA released a research review, but it was not a systematic full evaluation of health effects, but instead only focused on cancer and criticized studies that found effects. FDA has not done experimental research on impacts to humans, birds, bees, trees, and wildlife. The FDA review does not systematically evaluate RF levels and impacts to birds, bees, and trees.

Most importantly, as the FCC states, there are no federally developed safety limits[67] and there is no US health agency developing such safety limits in the US.

There is not a single health/safety/environmental agency investigating, researching or monitoring impacts to birds, bees, trees, and wildlife. In addition, regulatory limits for exposure to radiofrequency radiation have never been developed for birds, bees, trees, and wildlife. This is why the US Department of the Interior sent a letter to the National Telecommunications and Information Administration in 2014[68] reviewing several research studies showing harm to birds and concluding that "the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today."

A now retired US Fish and Wildlife Service wildlife biologist and former lead on telecommunications impacts, Dr. Albert Manville, has written to the FCC on impacts to birds and higher frequencies to be used in 5G and authored numerous publications detailing research showing harm to birds.[69, 70, 71] "Now as a private

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[67] Wireless Devices and Health Concerns | Federal Communications Commission. Accessed July 8, 2020.
[68] Washington DC, Veenendaal ME. Department of Interior Letter. *United States Department of the Interior OFFICE OF THE SECRETARY*.
[69] ECFS Filing Detail. https://www.fcc.gov/ecfs/filing/1060315601199. Accessed July 8, 2020.
[70] Albert M. Manville Ph.D. Former U.S. Fish and Wildlife Service Senior Biologist. "Memorandum on the Bird and Wildlife Impacts of Non-ionizing Radiation." *Environmental Health Trust*. Accessed July 8, 2020.
[71] Manville AM. "Collisions, Electrocutions, and Next Step : Bird Strikes And Electrocutions At Power Lines,

wildlife consultant and part-time adjunct professor for Johns Hopkins University, I also continue to study the impacts of radiation on human health, welfare and safety, including impacts from millimeter-wide radiation frequencies on humans from 5G. The race to implement 5G and the push by FCC to approve the related 5G license frequencies to industry are very troubling and downright dangerous."

He has testified[72] about the impacts of cell towers on birds that "the entire thermal model and all FCC categorical exclusions for all the devices we see today, rests on the incorrect assumption that low-level nonionizing nonthermal radiation cannot cause DNA breaks because it is so low power. The evidence to the contrary is clear and growing laboratory animals and wildlife."

Most recently Manville wrote the FDA regarding the FDA statements of "safety" in regards to cell phone radiation that, "as a certified wildlife biologist and Ph.D. environmental scientist who has studied the impacts of radiation on migratory birds, other wildlife, and humans since the late 1990s, the statement credited to the FDA is preposterous, without any scientific credibility, and at a minimum deserves a retraction by the FDA. There currently are well over 500 scientific, peer-reviewed papers addressing impacts of non-ionizing, non-thermal radiation on laboratory animals — many of the studies directly applicable to human health and safety."[73]

In addition, no "safe" level has been scientifically determined for long term impacts for children or pregnant women. While they are "designed" to address children, the reality is that no such research existed at the time of the limit development that actually considered children's unique vulnerability which includes their developing brain and immune system. The EPA clarified that current FCC limits do not account for long term exposures[74] in 2002 stating, "Federal health and safety agencies have not yet developed policies concerning possible risk from long term, nonthermal exposures." Current FCC human exposure limits "are thermally based, and do not apply to chronic, nonthermal exposure situations" and adequate scientific evaluations of the full impact on sensitive

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Communication Towers, And Wind Turbines: State Of The Art And State Of The Science - Next Steps Toward Mitigation."; 2002.

[72] Manville AM. IPCWB. Declaration of: Albert M. Manville, II, PhD, C.W.B.. Published 2018. Accessed July 8, 2020.

[73] Statement From Dr. Albert Manville On The FDA Report On Cell Phone Radiation. *Environmental Health Trust*. Accessed July 8, 2020.

[74] Washington DC. *United States Environmental Protection Agency*. 2002 http://www.epagov. Accessed July 8, 2020.

populations such as children, pregnant women, and the elderly has yet to be completed.

Background on US FCC Radiofrequency Human Exposure Limits
The FCC is not a health and safety agency and in fact never developed health based federal safety standards as we have with other environmental exposures.

Although there used to be a robust research effort in the United States in the '60s, '70s, and '80s, it was defunded. In fact, the US EPA was tasked to develop proper safety standards and was in process of developing two tiered guidelines on both thermal and biological effects in the mid-nineties. However, funding was cut and in 1996 the EPA was fully defunded from work on electromagnetic radiation. Then the FCC promulgated limits for human exposure to radiofrequency radiation based on the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers, Inc. (IEEE) – ANSI/IEEE C95.1-1992 guidelines and the National Council on Radiation Protection and Measurements (NCRP) NCRP Report 1986. The limits have remained largely unchanged since 1996.

In 2008 the National Academy of Sciences National Research Council Report "The Identification of Research Needs Relating to Potential Biological or Adverse Health Effects of Wireless Communications Devices" documented critical research gaps and called for the need to increase understanding of any adverse effects of long term chronic exposure to RF/microwave energy on children and pregnant women.

In 2008 the Congressional hearing "Health Effects of Cell Phone Use" of the US House Oversight and Government Reform Subcommittee on Domestic Policy had testimony from several experts including David Carpenter, Ronald B. Herberman M.D., Robert Hoover, Darrell Issa, and Julius P. Knapp II.[75]

In 2009 a Senate Appropriations Subcommittee held a hearing on the "Health Effects of Cell Phone Use" and had testimony from several experts including John Bucher, Devra L. Davis, Thomas "Tom" Harkin, Dariusz Leszczynski, Olga Naidenko, and Siegal Sadetzki.[76]

[75] 2008 Congressional Hearing: Health Effects of Cell Phone Use
[76] 2009 Hearing link to transcript

A 2012 report by the Government Accountability Office "Exposure and Testing Requirements for Mobile Phones Should Be Reassessed" urged the FCC to "formally reassess and, if appropriate, change its current RF energy (microwave) exposure limit and mobile phone testing requirements related to likely usage configurations, particularly when phones are held against the body" because without such a reassessment, the "FCC cannot ensure it is using a limit that reflects the latest research on RF energy exposure." The report stated that the FCC RF limits adopted in 1996 did not reflect the way people use their phones, particularly when phones are held against and touching the body. The report led the FCC to launch an official inquiry[77] in 2013 to explore whether it should modify its radiofrequency exposure standards. The FCC noted, "we specifically seek comment as to whether our current limits are appropriate as they relate to device use by children." The FCC docket asked these important questions: Are US cell phone and cell tower radiation limits safe for humans? Do children need special protections? Should companies change the way they test the radiation from phones because phones are tested with a separation distance between the phone and the body? The FCC received over a thousand submissions.[78]

In 2019, the FCC issued a report and order[79] that closed the inquiry. It stated, "First, we resolve a Notice of Inquiry that sought public input on, among other issues, whether the Commission should amend its existing RF emission exposure limits. After reviewing the extensive record submitted in response to that inquiry, we find no appropriate basis for and thus decline to propose amendments to our existing limits at this time. We take to heart the findings of the Food & Drug Administration (FDA), an expert agency regarding the health impacts of consumer products, that "the weight of scientific evidence has not linked cell phones with any health problems."

Scientists are calling for the FDA to retract their report that is now used as proof of safety. Due to the fact that the FDA later in 2020 released a report criticizing studies that found harm and provided no research demonstrating safety, several expert scientists wrote to the FDA.

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[77] Review of RF Exposure Policies | Federal Communications Commission
[78] ECFS filings results. Accessed July 8, 2020.
[79] FCC. *FCC 19-126*. https://www.fda.gov/Radiation. Accessed July 8, 2020.

"I find it shocking that the FDA would casually dismiss the carcinogenicity findings from the National Toxicology Program (NTP) studies on cell phone radiation in experimental animals, when it was the FDA that requested those studies in the first place 'to provide the basis to assess the risk to human health,' and when an expert peer-review panel carefully reviewed the design and conduct of those studies and then concluded that the results provided "clear evidence of carcinogenic activity," stated Ronald Melnick PhD who led the design of the $30M NTP study. Melnick sent a letter to the FDA documenting the scientific inaccuracies in their review.

"When I worked as a wildlife biologist for the U.S. Fish & Wildlife Service for 17 years, I collaborated with the late Dr. Ted Litovitz in 2000. Dr. Litovitz and his colleagues studied the impacts of low-level, non-thermal radiation from the standard 915 MHz cell phone frequency on chicken embryos. In their laboratory studies, control/non-treated embryos suffered no effects, but some of the treated/irradiated embryos died — at levels as low as 1/10,000 the normal level of cell phone radiation exposure to humans. This was an eye-opener!" stated Albert M. Manville, II, Ph.D.; retired Senior Wildlife Biologist, Division of Migratory Bird Management, U.S. Fish & Wildlife Service, Washington.

"The FDA review omits an evaluation of the science on wireless radiation impacts to trees and wildlife. Electromagnetic radiation is a form of environmental pollution which may hurt wildlife. I have co-published research entitled "Radiofrequency radiation injures trees around mobile phone base stations" finding harm to trees near base stations (cell antennas) in a long term field monitoring study in two cities, " stated biologist Alfonso Balmori, BSc who sent a statement to the FDA.

Letters which have been sent to the FDA include:

- Letter calling for a retraction signed by several scientists.
- Ronald Melnick PhD's letter to the FDA on the National Toxicology Program study
- Albert Manville PhD, retired Senior Wildlife Biologist, Division of Migratory Bird Management, U.S. Fish & Wildlife Service, Wash. DC HQ Office (17 years); Senior Lecturer, Johns Hopkins University

- Prof. Tom Butler of the University College in Cork, Ireland's letter to the FDA
- Igor Belyaev, PhD, Dr. Sc. Head, Department of Radiobiology of the Cancer Research Institute, Biomedical Research Center of the Slovak Academy of Science letter to the FDA
- Paul Heroux PhD, McGill University
- Alfonso Balmori, BSc statement to the FDA
- Additional Statements by Experts

The FCC is considered a Captured Agency with Undue Influence by Telecom
Several experts who provided testimony to the Commission detailing how several FCC Commissioners have industry ties. Several cited the Harvard Press Book "Captured Agency: How the Federal Communications Commission is Dominated by the Industries it Presumably Regulates" by Norm Alster which documents the financial ties between the FCC, Congress and industry and how wireless companies have bought "inordinate access to—and power over—a major US regulatory agency." The investigation puts forward that there is a "revolving door" between industry and regulators, meaning that persons are moving from positions in the wireless industry to positions in government and vice versa. In addition, the book documents the large financial Investment by telecommunications companies into public relations efforts, designing and publishing contradictory science, pushing for minimal regulation, lobbying via "non-profit" associations, and "hyper aggressive legal action and research bullying."

Examples of the revolving door at the Federal Communications Commission include:

- Tom Wheeler: In 2013, President Obama appointed Tom Wheeler to head the FCC. Wheeler, a fundraiser for Obama in the 2008 election, was a lobbyist and head of the Cellular Telecommunications and Internet Association (CTIA). As head of the wireless industry, Wheeler was accused of suppressing science. A 2003 inductee into the Wireless Hall of Fame (yes, there is such a thing), Wheeler laid the groundwork for 5G, pushing through regulations to strip local authority.

- Ajit Pai: In 2017, President Trump appointed Ajit Pai, a former Verizon Lawyer to head the FCC. Pai had already been a member of the commission, having been appointed by President Obama in 2011 — upon the recommendation of Senate Majority Leader Mitch McConnell — to fill a "Republican" seat on the five-member board.
- Brendan Carr: FCC Commissioner Brendan Carr was appointed by President Trump. He too is a former lawyer for Wiley Rein and helped sue the San Francisco over the city's cell phone ordinance. Carr's wife is the staff director for the U.S. House Ways and Means Committee's Oversight Subcommittee.
- Former FCC chairman Julius Genachowski is now a managing director of the U.S. buyout team at Carlyle Group. The team's focus is on acquisitions and growth investments in global technology, media, and telecom, including Internet and mobile.
- Meredith Attwell Baker: Former FCC Commissioner Meredith Attwell Baker is now head of the CTIA - The Wireless Association. She is a former lead lobbyist for Comcast.
- Michael Powell: Former FCC commissioner Michael Powell is now president & CEO of NCTA - The Internet & Television Association.
- Bruce Romano: Former legal chief in the FCC's Office of Engineering and Technology. Bruce Romano is now at the law firm of Wiley Rein, representing the CTIA.
- Thomas M. Johnson, Jr.: Thomas M. Johnson, Jr. is general counsel of the FCC appointed by Ajit Pai and previously worked for the law firm Gibson, Dunn & Crutcher LLP which represented the CTIA - The Wireless Association who sued the City of Berkeley in federal court, seeking to topple the city's recently enacted cell phone right to know ordinance mandating disclosure of possible radiation hazards associated with use of cellphones.

In addition, published research has documented conflicts of interest in the experts that governments refer to.

- The International Journal of Oncology published "World Health Organization, radiofrequency radiation and health – a hard nut to crack

(Review)"[80] in 2017 detailing conflicts of interest with ICNIRP and the WHO EMF Project, both started with industry support.

- The American Journal of Industrial Medicine published "Secret ties to industry and conflicting interests in cancer research"[81] in 2006 about industry funding of studies such as the Danish Cohort cell phone studies that are often put forward as showing no harm.
- Molecular and Clinical Oncology published "Appeals that matter or not on a moratorium on the deployment of the fifth generation, 5G, for microwave radiation"[82] in 2020 details how ICNIRP is referred to as "a private German non-governmental organization. ICNIRP [that] relies on the evaluation only of thermal (heating) effects from RF radiation, thereby excluding a large body of published science demonstrating the detrimental effects caused by non-thermal radiation."

4. Why are the FCC-sanctioned guidelines for public exposure to wireless radiation based only on the thermal effect on the temperature of the skin and do not account for the non-thermal, non-ionizing, biological effects of wireless radiation?

In 1996, just as the EPA was set to release their Phase 1 of safety limits, the EPA's RFR efforts were defunded, halting all EPA research. That year the FCC adopted RFR exposure limits based largely on limits developed by industry/military connected groups (ANSI/IEEE C95.1-1992 and NCRP's 1986 Report).

These FCC limits are only based on protecting against heating (thermal) effects from short-term exposures. They do not account for non-thermal biological effects or the effects of long-term, chronic exposures. Furthermore, adequate scientific data on children's unique vulnerability to RFR was not available at that time. The US still has no federally developed safety limits, and there has been no systematic review of the scientific research to develop safety limits that adequately protect the public from long-term exposures.

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[80] Hardell L. "World health organization, radiofrequency radiation and health - A hard nut to crack (Review)." *Int J Oncol*. 2017;51(2):405-413. doi:10.3892/ijo.2017.4046

[81] Hardell L, Walker MJ, Walhjalt B, Friedman LS, Richter ED. "Secret Ties to Industry and Conflicting Interests in Cancer Research." *Am J Ind Med*. 2006. doi:10.1002/ajim.20357

[82] Hardell L, Nyberg R. "Appeals that matter or not on a moratorium on the deployment of the fifth generation, 5G, for microwave radiation." *Mol Clin Oncol*. 2020;12(3):247-257. doi:10.3892/mco.2020.1984

Due to the lack of evaluation for long term safety and research that linked neurological impacts in firefighters to cell antenna exposure, the International Association of Fire Fighters has long opposed[83] cell antennas on fire stations stating that, "fire department facilities, where fire fighters and emergency response personnel live and work are not the proper place for a technology which could endanger their health and safety. The only reasonable and responsible course is to conduct a study of the highest scientific merit and integrity on the RF/MW radiation health effects to our membership and, in the interim, oppose the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until it is proven that such sitings are not hazardous to the health of our members." The International Association of Fire Fighters passed a resolution[84] that they oppose cell towers on fire stations in 2004 and it remains in effect today.

5. Why are the FCC radiofrequency exposure limits set for the United States 100 times higher than countries like Russia, China, Italy, Switzerland, and most of Eastern Europe?

The following countries have cell tower network radiofrequency radiation limits (maximum permissible limits) below ICNIRP and FCC limits: Belarus, Bulgaria, China, Lithuania, Poland, Russia, Belgium, Chile, Greece, India, Israel, Italy, Liechtenstein and Switzerland.[85] [86] [87] [88] [89]

The exposure guidelines developed by the FCC and International Commission on Non-Ionizing Radiation Protection (ICNIRP) were principally designed to protect against adverse thermal effects and were largely based on studies of short-term exposures to animals at high power levels. However, countries such as India,

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[83] Cell Tower Radiation Health Effects - IAFF. https://www.iaff.org/cell-tower-radiation/. Accessed July 8, 2020.
[84] https://ecfsapi.fcc.gov/file/109281319517547/20-Attachment%2020-%20Firefighters%20Inter%20Resolution%20Against%20Cell%20Towers.pdf
[85] https://apps.who.int/gho/data/node.main.EMFLIMITSPUBLICRADIOFREQUENCY?lang=en
[86] Wu T, Rappaport TS, Collins CM. "Safe for Generations to Come." *IEEE Microw Mag*. 2015;16(2):65-84. doi:10.1109/MMM.2014.2377587
[87] Chiang, Huai. "Rationale for Setting EMF Exposure Standards." Zhejiang University School of Medicine, Microwave Lab, China, as referenced by Wu 2015
[88] "Comparison of international policies on electromagnetic fields (power frequency and radiofrequency fields)." Rianne Stam, National Institute for Public Health and the Environment
[89] Mary Redmayne (2016). "International policy and advisory response regarding children's exposure to radio frequency electromagnetic fields (RF-EMF)." *Electromagnetic Biology and Medicine*, 35:2, 176-185, DOI: 10.3109/15368378.2015.1038832

China and Russia have much lower limits and are considered "science based." [90] They are well below any thermally significant levels to address their own countries research indicating adverse non-thermal health effects.

- USSR and Russian standards were based on many areas of research including impacts to the nervous system and immune system as documented in the "Scientific basis for the Soviet and Russian radiofrequency standards for the general public." Their exposure limits are set based on protecting against possible biological consequences which is different than limits by the FCC and ICNIRP, which bases their limits on the lowest RF exposure that causes any "established" adverse health effect. Russia limits consider children to be more sensitive to EMFs and in need of "special consideration when developing exposure limits." According to the ICNIRP, the following health hazards are likely to be faced in the near future by children who use mobile phones: disruption of memory, decline in attention, diminished learning and cognitive abilities, increased irritability, sleep problems, increase in sensitivity to stress, and increased epileptic readiness. For these reasons, special recommendations on child safety from mobile phones have been incorporated into the current Russian mobile phone standard.[91]
- China's cell tower limits are based on science showing effects which include behavioral, neurological, reproductive abnormalities, and DNA damage.[92]
- India dropped their RF limits by 1/10th of ICNIRP after a 2010 Government Report documented the majority of research studies found adverse effects to wildlife, birds and bees.[93] An August 2012 Advisory by the Ministry of the Environment and Forests refers to the "negative effects" and makes a series of recommendations to the government.[94] The findings of the report were later published in the journal Biology and Medicine which concludes that, "based on current available literature, it is justified to conclude that RF-EMF radiation exposure can change neurotransmitter functions, blood-brain barrier, morphology, electrophysiology, cellular metabolism, calcium

[90] Wu T, Rappaport TS, Collins CM. "Safe for Generations to Come." *IEEE Microw Mag*. 2015;16(2):65-84. doi:10.1109/MMM.2014.2377587
[91] "Scientific basis for the Soviet and Russian radiofrequency standards for the general public."
[92] Prof. Dr. Huai Chiang. "Rationale for Setting EMF Exposure Standards." Accessed July 8, 2020.
[93] "Report on Possible Impacts of Communication Towers on Wildlife Including Birds and Bees." Ministry of Environment and Forest, Government of India, 2010.
[94] Government of India Ministry of Environment and Forests Office. "Advisory on the use of Mobile Towers to minimize their impact on Wildlife including Birds and Bees." 2012

efflux, and gene and protein expression in certain types of cells even at lower intensities".[95]

Many European countries have RF limits much lower than ICNIRP as part of their precautionary approach to decision-making. In 2011 the Parliamentary Assembly of the Council of Europe issued Resolution 1815: "The Potential Dangers of Electromagnetic Fields and Their Effect on the Environment",[96] a call to European governments to "take all reasonable measures" to reduce exposure to electromagnetic fields "particularly the exposure to children and young people who seem to be most at risk from head tumors." The Resolution calls for member states to:

- Implement "information campaigns about the risk of biological effects on the environment and human health, especially targeting children and young people of reproductive age."
- "For children in general, and particularly in schools and classrooms, give preference to wired Internet connections, and strictly regulate the use of mobile phones by schoolchildren on school premises."

Resolution 1815 specifically states that governments "Reconsider the scientific basis for the present standards on exposure to electromagnetic fields set by the International Commission on Non-Ionizing Radiation Protection, which have serious limitations, and apply ALARA principles, covering both thermal effects and the athermic or biological effects of electromagnetic emissions or radiation."

6. Why did the World Health Organization (WHO) signify that wireless radiation is a Group B Possibly Carcinogenic to Humans category, a group that includes lead, thalidomide, and others, and why are some experts who sat on the WHO committee in 2011 now calling for it to be placed in the Group 1, which are known carcinogens, and why is such information being ignored by the FCC?

In 2011 wireless radiofrequency radiation was classified as a "Possible Human Carcinogen" by the International Agency for Research on Cancer (IARC) of the WHO based on research that found an increased risk for glioma, a malignant type

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[95] Sivani S, Sudarsanam D. "Impacts of Radio-Frequency Electromagnetic Field (RF-EMF) from Cell Phone Towers and Wireless Devices on Biosystem and Ecosystem - a Review." *Biology and Medicine* Vol 4.; 2012. www.biolmedonline.com. Accessed July 8, 2020.

[96] Resolution 1815: *"The Potential Dangers of Electromagnetic Fields and Their Effect on the Environment."*

of brain cancer, associated with wireless phone use.[97] The WHO/IARC Class 2B classification includes wireless radiation from any transmitting source including cellphones, baby monitors, tablets, cell towers, radar, other Wi-Fi, etc. The classification applies to RF-EMF in the range of 30 KHz to 300 GHz emitted from any equipment- not just cell phones. This fact is detailed in the Lancet's published statement and in the related press release in 2011.

Precautions for cell phones were recommended by then IARC Director Christopher Wild in the WHO/IARC press release for the Class 2B Carcinogen classification with quotes from Wild as stating, "Given the potential consequences for public health of this classification and findings, it is important that additional research be conducted into the long-term, heavy use of mobile phones. Pending the availability of such information, it is important to take pragmatic measures to reduce exposure such as hands-free devices or texting."

After the 2011 classification, the WHO/IARC issued a monograph documenting all the research underpinning the 2011 classification.[98]

The 2013 published monograph also references children's higher exposures as compared to adults and states, "the average exposure from use of the same mobile phone is higher by a factor of 2 in a child's brain and higher by a factor of 10 in the bone marrow of the skull."

The reason that scientists are calling for a change to the classification is that since the 2011 classification, the evidence for adverse effects in the published research has increased. Cancer is only one of the issues that have been investigated. Here are some of the studies often mentioned by scientists:

- The National Toxicology Program studies on cell phone radiation in animals found clear evidence of carcinogenic activity, in male rats and DNA damage in the frontal cortex of the brain in male mice, the blood cells of female mice, and the hippocampus of male rats.
- The multicenter case-control study Coureau et al. 2014 found statistically significant positive association between brain tumors and cell phone use in the heaviest cell phone users when considering life-long cumulative duration.

[97] IARC classifies Radiofrequency Electromagnetic Fields as possibly carcinogenic to humans
[98] Monograph on Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields.

- An animal study Lerchl 2015 replicated a previous study that found at very low levels, radiofrequency can promote tumors.
- Falcioni et al. 2018 found a statistically significant increase in the incidence of heart Schwannomas in male rats exposed to radiofrequency radiation at levels below FCC limits.
- Yale research funded by the American Cancer Society[99] found thyroid cancer associated with cell phone use in people with genetic susceptibility.
- Additional Yale research[100] found prenatal radiofrequency radiation exposure led to higher hyperactivity, poorer memory, and altered brain function in mice,[101] corroborating prior published research findings of altered brain development after exposure.
- A 2018 study[102] looking at hundreds of adolescents found memory damage in the brain receiving some of the higher radiofrequency cell phone radiation exposures.
- A 2015 review study[103] found among 93 of 100 currently available peer-reviewed studies dealing with oxidative effects of low-intensity RFR, confirmation that RFR induces oxidative effects in biological systems.

The evaluation by some scientists that wireless is carcinogenic due to this increased body of published research can be found in Hardell and Carlberg 2017 and Miller et al. 2018.

Several scientists who were members of the WHO IARC 2011 monograph classification have publicly stated that the evidence on the carcinogenicity of RF has increased and that the classification of "possible carcinogen" is outdated and should be upgraded based on increased evidence of adverse effects.

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[99] Jiajun Luo et al. "Genetic susceptibility may modify the association between cell phone use and thyroid cancer: A population-based case-control study in Connecticut." *Environmental Research* (2019).
[100] Aldad, T., Gan, G., Gao, X., & Taylor, H. (2012). "Fetal Radiofrequency Radiation Exposure From 800-1900 Mhz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice." *Scientific Reports*, *2*(1). https://doi.org/10.1038/srep00312
[101] Cell phone use in pregnancy may cause behavioral disorders in offspring
[102] Foerster, M., Thielens, A., Joseph, W., Eeftens, M., & Röösli, M. (2018). "A Prospective Cohort Study of Adolescents' Memory Performance and Individual Brain Dose of Microwave Radiation from Wireless Communication." *Environmental Health Perspectives*, *126*(7), 077007. https://doi.org/10.1289/ehp2427
[103] Yakymenko, I., Tsybulin, O., Sidorik, E., Henshel, D., Kyrylenko, O., & Kyrylenko, S. (2015). "Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation." *Electromagnetic Biology and Medicine*, *35*(2), 186-202.

- Dr. Lennart Hardell in Case-control study of the association between malignant brain tumours diagnosed between 2007 and 2009 and mobile and cordless phone use: "This study confirmed previous results of an association between mobile and cordless phone use and malignant brain tumours. These findings provide support for the hypothesis that RF-EMFs play a role both in the initiation and promotion stages of carcinogenesis."
- Dr. Chris Portier: "A careful review of the scientific literature demonstrates there are potentially dangerous effects from RF," stated Portier, a recently retired CDC Director, Center for Environmental Health and the Agency for Toxic Substances and Disease Registry in his official call for invoking the precautionary principle with wireless radiation in a 2015 conference. See also a poster presentation he penned for the conference here.
- Dr. Igor Belyaev: "There are many publications showing health effects of radiofrequency radiations. Approximately half of all published papers show such effects." (National Press Club, 2012. He has published findings of adverse effects in several publications.)
- Dariusz Leszczynski, WHO IARC expert, former Finnish government researcher stated in 2015 "The IARC-WHO classification of cell phone radiation is misrepresented by the industry. Classification of cell phone radiation as 'a possible carcinogen to humans' means that there are enough studies indicating that it might cause cancer and that we urgently need more research to clarify this issue. The strongest evidence that it might be causing cancer comes from three epidemiological studies. In 2011, only two sets of studies were available – EU's Interphone study and a series of studies from Lennart Hardell's group in Sweden. Recently, CERENAT study from France published in 2014, similarly indicated that persons using cell phones for more than ten years and for half hour per day are at a higher risk for developing brain cancer. In fact now the evidence is sufficient to consider cell phone radiation as a probable carcinogen – Group 2A in IARC's scale of carcinogenicity."
- Ronald Melnick, retired NTP staff scientist has written extensively on this topic and states in Health Physics 2020, "The NTP studies show that the assumption that RF radiation is incapable of causing cancer or other adverse health effects other than by tissue heating is wrong."

- Anthony B. Miller, who served as an editorial reviewer of the IARC monograph, has also written that if an IARC panel were to review the science at this point they would conclude that it should be reclassified as category 1, a human carcinogen.

In 2019, an advisory group of the International Agency for Research on Cancer (IARC) of the World Health Organization, consisting of 29 scientists from 18 countries, released new recommendations to reassess as a "high priority" the cancer risks of radiofrequency radiation between 2020–2024. The recommendations were published in The Lancet Oncology on April 18, 2019.

7. Why have more than 220 of the world's leading scientists signed an appeal to the WHO and the United Nations to protect public health from wireless radiation and nothing has been done?

Over 393 scientists and doctors from 35 countries have signed on to a declaration called the 5G Appeal,[104] sent to officials of the European Commission, calling for a moratorium on the increase of cell antennas for planned 5G expansion because "5G will substantially increase exposure to radiofrequency electromagnetic fields (RF-EMF) on top of the 2G, 3G, 4G, Wi-Fi, etc. for telecommunications already in place. RF-EMF has been proven to be harmful for humans and the environment."

In addition, the 5G Appeal references the 2015 Scientistic Appeal to the United Nations published in the European Journal of Oncology[105] now signed by 253 scientists who have published research on electromagnetic radiation which states that, "numerous recent scientific publications have shown that EMF affects living organisms at levels well below most international and national guidelines. Effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of the reproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being in humans. Damage goes well beyond the human race, as there is growing evidence of harmful effects to both plant and animal life."

[104] The 5G appeal – 5G Appeal 5G Appeal. Accessed July 8, 2020.
[105] EMFscientist.org - International EMF Scientist Appeal. Accessed July 8, 2020.

Why has nothing been done?
The Scientific Appeal states that "the various agencies setting safety standards have failed to impose sufficient guidelines to protect the general public, particularly children who are more vulnerable to the effects of EMF." The International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines do not cover long-term exposure and low-intensity effects, yet they are used by many governments as safety limits. The EMF scientists contend that the ICNIRP guidelines are insufficient to protect public health.

Dr. Lennart Hardell published a paper entitled, "Appeals that matter or not on a moratorium on the deployment of the fifth generation, 5G, for microwave radiation" explaining how ICNIRP is a private German non-governmental organization of 13 people that "relies on the evaluation only of thermal (heating) effects from RF radiation, thereby excluding a large body of published science demonstrating the detrimental effects caused by non-thermal radiation." He contends that ICNIRP has disregarded research and that their safety guidelines are obsolete and protect the industry, not health. Hardell describes the communications between decision makers and the scientists and concludes that "the majority of decision makers are scientifically uninformed on health risks from RF radiation." In addition, they seem to be uninterested in being informed by scientists representing the majority of the scientific community, i.e., those scientists who are concerned about the increasing evidence or even proof of harmful health effects below the ICNIRP guidelines (www.emfscientist.org). Instead, they rely on evaluations with inborn errors of conflicts, such as ICNIRP.

8. Why have the cumulative biological damaging effects of ever-growing numbers of pulse signals riding on the back of the electromagnetic sine waves not been explored, especially as the world embraces the Internet of Things, meaning all devices being connected by electromagnetic waves, and the exploration of the number of such pulse signals that will be created by implementation of 5G technology?

There are extensive data gaps regarding human exposure to wireless devices and the complexity of the waves we are exposed to. Most studies have not adequately explored all of these characteristics but instead only focus on power density.

"Adverse Health Effects of 5G Mobile Networking Technology Under Real Life Conditions"[106] published in Toxicology Letters states "the typical incoming EMF signal for many/most laboratory tests performed in the past consisted of single carrier wave frequency; the lower frequency superimposed signal containing the information was not always included. This omission may be important. As Panagopoulos states: "It is important to note that except for the RF/microwave carrier frequency, Extremely Low Frequencies - ELFs (0–3000 Hz) are always present in all telecommunication EMFs in the form of pulsing and modulation. There is significant evidence indicating that the effects of telecommunication EMFs on living organisms are mainly due to the included ELFs…. While ~50 % of the studies employing simulated exposures do not find any effects, studies employing real-life exposures from commercially available devices display an almost 100% consistency in showing adverse effects" (Panagopoulos, 2019). These effects may be exacerbated further with 5 G: "with every new generation of telecommunication devices…..the amount of information transmitted each moment…..is increased, resulting in higher variability and complexity of the signals with the living cells/ organisms even more unable to adapt" (Panagopoulos, 2019)."

This is an area that requires adequate research before deployment.

[106] Kostoff RN, Heroux P, Aschner M, Tsatsakis A. "Adverse health effects of 5G mobile networking technology under real-life conditions." *Toxicol Lett*. 2020;323:35-40. doi:10.1016/j.toxlet.2020.01.020

Appendix D

Sampling of Scientific Studies Pertaining to Cellphone Radiation

CANCER

2018 U.S. National Toxicology Program (NTP) & Italian Study Confirm Cell Phones Cause Cancer

- See the NTP website which indicates radiofrequency radiation is associated with "Clear evidence of tumors" -- the highest warning they can issue: https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones/index.html?utm_source=direct&utm_medium=prod&utm_campaign=ntpgolinks&utm_term=cellphone
- In the following article, study designer and former NTP Senior Scientist Ronald L. Melnick, PhD., counters with facts the industry spin intended to downplay the NTP study findings:

  https://www.sciencedirect.com/science/article/pii/S0013935118304973?via=ihub
- In January 2020 the National Institutes of Environmental Health (NIEHS) published the following article from NTP scientist Michael Wyde, Ph.D., confirming brain, heart and adrenal tumors and that more research is underway to understand the impact of adding 5G millimeter waves to the existing exposures from 2G, 3G and 4G radiation: https://factor.niehs.nih.gov/2020/1/community-impact/5g-technology/index.htm
- See study findings by the Ramazzini Intstitute study in Italy, which corroborates the NTP study findings: https://www.sciencedirect.com/science/article/pii/S0013935118300367?via%3Dihub
- Longtime World Health Organization advisor Anthony B. Miller, M.D., and other experts, confirm radiofrequency (RF) radiation from any source now fully meets the World Health Organization criteria to be classified as a "Group 1 carcinogenic to humans" agent: https://www.sciencedirect.com/science/article/pii/S0013935118303475?via%3Dihub

- BioMed Research International published a peer-reviewed study by Michael Carlberg, MSc, and Lennart Hardell, M.D., Ph.D. concluding "RF radiation should be regarded as a human carcinogen causing glioma." https://www.hindawi.com/journals/bmri/2017/9218486/
- In 2018 IEEE Microwave Magazine published, "Clear Evidence of Cell Phone RF Radiation Cancer Risk" by Dr. James Lin: https://ieeexplore.ieee.org/document/8425056/?part=1

  Dr. Lin's article is also available in full here: http://www.avaate.org/IMG/pdf/lin_2018.pdf

INFERTILITY

- Dr. Martin Pall's 2018 paper, "5G: Great risk for EU, U.S. and International Health! Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them" indicates much of the damage from wireless radiation is cumulative and some becomes irreversible.

  His paper includes 16 scientific reviews (each referencing multiple individual peer-reviewed published studies) which include a wide variety of changes leading to lowered male fertility, lowered female fertility, increased spontaneous abortion, lowered levels of estrogen, progesterone and testosterone, and lowered libido.

  The European Academy of Environmental Medicine provides Dr. Pall's paper here: https://europaem.eu/attachments/article/131/2018-04_EU-EMF2018-5US.pdf
- See the 2018 paper, "Radiations and male fertility": https://rbej.biomedcentral.com/articles/10.1186/s12958-018-0431-1
- See also abstracts for eight review papers and links to 40+ studies as collected by Dr. Joel Moskowitz: https://www.saferemr.com/2015/09/effect-of-mobile-phones-on-sperm.html

- These studies address male fertility issues and wi-fi:
  http://www.ncbi.nlm.nih.gov/pubmed/22112647
  http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3778601/
  https://www.ncbi.nlm.nih.gov/pubmed/28967061
- A 2017 study, "Temporal trends in sperm count: a systematic review and meta-regression analysis" shows sperm counts dropping dramatically**:**
  https://academic.oup.com/humupd/article/doi/10.1093/humupd/dmx022/4035689/Temporal-trends-in-sperm-count-a-systematic-review
- Kaiser Permanente scientists completed a study that concluded non-ionizing radiation more than doubles the risk of miscarriage:
  https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5727515/
- The EPA provides an understanding of how DNA mutations from radiation affect what we pass on to our offspring genetically:
  http://www.epa.gov/radiation/understand/health_effects.html
- The following link provides an audio track from a 2013 conference led by leading U.S. experts in, “Cell Phones & WiFi – Are Children, Fetuses and Fertility at Risk?”
  http://electromagnetichealth.org/electromagnetic-health-blog/summary-and-audio/
- Barrie Trower, PhD, “WiFi Report – Humanity At The Brink,” September 2013, shows how wi-fi exposure now will affect fertility in the future:
  http://www.geoengineeringwatch.org/barrie-trower-wifi-report-humanity-at-the-brink/
- A quick search of the National Institutes for Health (NIH) PubMed database on "emf fertility" returns a multitude of other studies from around the world:
  http://www.ncbi.nlm.nih.gov/m/pubmed/?term=emf+fertility

ELECTROMAGNETIC SENSITIVITY

While adverse effects of long-term exposure to wi-fi radiation, like cancer, infertility and DNA damage may not surface in some for years, there are many who suffer immediate effects when exposed to wireless radiation. Health care providers are now learning to diagnose and treat environmentally induced electromagnetic sensitivity, or ES, also known as microwave sickness. Training for doctors, nurses, first responders and others will be proved in the continuing medical education (CME) accredited EMF Medical Conference 2021, https://emfconference2021.com/.

Those who suffer from ES can feel the radiation hitting various biological systems when they encounter cell towers, small cell antennas, routers, access points, cordless phones, smart meters, laptops, iPads, tablets, baby monitors, fluorescent lights or any other devices pulsing signal. Patients experience a myriad of immediate or latent symptoms that may include pain, tightening in the chest or skull, altered heartbeat, tinnitus or ringing in the ears, headaches, nosebleeds, insomnia, fatigue, diminished concentration, cognitive impairment, poor memory, behavioral issues, anxiety, depression, anger, suicidal ideation and more. Symptoms can disappear or diminish over time when exposure to electromagnetic fields (EMFs) is eliminated.

Following is a sampling of the science and actions being taken by the medical community, followed by recognition of ES by the Americans with Disabilities Act:

- Dominique Belpomme and Philippe Irigaray: "Electrohypersensitivity as a Newly Identified and Characterized Neurologic Pathological Disorder: How to Diagnose, Treat, and Prevent It," *Int J Mol Sci*. 2020 Mar; 21(6): 1915.
- "Electromagnetic Field Sensitivity," *Journal of Bioelectricity*: Vol 10, No 1-2.
- Replication of heart rate variability provocation study
- McCarty DE *et al*, (December 2011) "Electromagnetic hypersensitivity: evidence for a novel neurological syndrome," *Int J Neurosci.* 2011 Dec;121(12):670-6. Epub 2011 Sep 5 [View Author's abstract conclusions] [View on Pubmed]
- Nishimura T *et al*, (March 2011) "A 1-uT extremely low-frequency electromagnetic field vs. sham control for mild-to-moderate hypertension:

a double-blind, randomized study," *Hypertens Res.* 2011 Mar;34(3):372-7. Epub 2011 Jan 20 [View Author's abstract conclusions] [View on Pubmed]

- See other EHS papers at Physicians for Safe Technology: https://mdsafetech.org/science/es-science/
- The United States Access Board's IEQ Indoor Environmental Quality Project indicates electromagnetic sensitivities may be considered disabilities under the ADA: https://www.access-board.gov/research/completed-research/indoor-environmental-quality/introduction
- The Access Board recommends the following accommodations: https://www.access-board.gov/research/completed-research/indoor-environmental-quality/recommendations-for-accommodations
- Job Accommodation Network (JAN) is one of several services provided by the U.S. Department of Labor's Office of Disability Employment Policy (ODEP). JAN offers the following Accommodation Ideas for Electromagnetic Sensitivity: http://askjan.org/soar/other/electrical.html

VULNERABILITY OF CHILDREN

- Bioelectromagnetics expert Dr. Om Ghandi published in IEEE Access, "Yes the Children Are More Exposed to Radiofrequency Energy From Mobile Telephones Than Adults": http://ieeexplore.ieee.org/document/7131429/?reload=true&arnumber=7131429&contentType=Journals%20%26%20Magazines
- Pall, M. L. (2016). "Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression." *Journal of Chemical Neuroanatomy*, 75(Pt B), 43–51. https://doi.org/10.1016/j.jchemneu.2015.08.001
- Warnke, U., & Hensinger, P. (2013). "Increasing incidence of burnout due to magnetic and electromagnetic fields of cell phone networks and other wireless communication technologies." (Original: Steigende „Burn-out"-Inzidenz durch technisch erzeugte magnesche und elektromagnesche Felder des Mobil- und Kommunikaonsfunks, Umwelt·medizin·gesellschaft, 26(1), 31-38. http://avaate.org/IMG/pdf/warnke_hensinger_umg_1_2013_engl_df.pdf

- Martha Herbert, PhD, MD, a leading neuroscientist and autism expert, "Findings in Autism (ASD) Consistent with Electromagnetic Fields (EMF) and Radiofrequency Radiation (RFR)": https://bioinitiative.org/wp-content/uploads/pdfs/sec20_2012_Findings_in_Autism.pdf
- Dr. Toril Jelter, pediatrician and general practitioner, discusses EMF, Autism and Child Behavior in an 8-minute video. She prescribes a two-week trial with limited wi-fi exposure and patients often have remarkable results in just a few days: https://www.youtube.com/watch?v=O3iRrVQPDBk
- Hugh Taylor, MD, Yale University discusses ADHD symptoms seen in mice exposed to cell phone radiation: http://vimeo.com/73806192
- Studies have found adverse effects on offspring from prenatal exposure to wireless radiation: http://www.saferemr.com/2014/06/joint-statement-on-pregnancy-and.html
- Dr. Toril Jelter, pediatrician and general practitioner, discusses EMF, Autism and Child Behavior in an 8-minute video. She prescribes a two-week trial with limited wi-fi exposure and patients often have remarkable results in just a few days: https://www.youtube.com/watch?v=O3iRrVQPDBk
- Barrie Trower, a former physicist with the British Royal Navy and expert in radiation, explains in the following two-part lecture the dangers of using wi-fi radiation. He is particularly concerned for the welfare of children and fetuses: http://www.youtube.com/watch?v=5xgJmeQaQmc http://www.youtube.com/watch?v=UhcuSEHVOSM
- The American Academy of Environmental Medicine has issued an *Open Letter to the Superintendents* imploring them to protect our children.
- The American Academy of Pediatrics (AAP), representing 60,000 pediatricians, in December 2012 urged Congress to protect children from the dangers of wi-fi. "It is essential that any new standards for cell phones or other wireless devices be based on protecting the youngest and most vulnerable populations to ensure they are safeguarded through their

lifetimes." The full letter is published here: http://www.electrosmogprevention.org/cell-phone-safety-campaign/american-academy-of-pediatrics-supports-rf-protection/

In addition to the biological effects of radiation on children, science is showing excessive screen time is causing addiction, impairing our children's ability to function and is degrading family and social relationships. Here is a sampling of books that bring forth the science and safe technology solutions:

- Dr. Nicholas Kardaras, addiction expert, has clinically worked with more than a thousand teens. He published the book *Glow Kids* which shows how screen addiction is hijacking our kids and offers strategies to break the trance.
- Dr. Catherine Steiner-Adair offers *The Big Disconnect*, which takes one through technology's impact at each stage of child development. Basically, the left side of the brain where math and science are housed is still developing on point. The right side, however, is not in many children. This is where a child's ability to show empathy, employ coping strategies, make eye contact, and self-sooth are housed. In humans, we need regular human contact and deep meaningful interactions with loved ones and teachers to develop these properly. Children also need unstructured time for imaginative play to develop deep parts of our brains. Although well-intended parents think providing their children with technology will give them a leg up, the research is proving otherwise as we begin to see scores dropping after upping technology time, and behavioral and mental health issues are escalating.
- In *Reset Your Child's Brain*, Dr. Victoria Dunkley explains the myriad ways in which children can be harmed by electronic screen syndrome (ESS). Biologically, electronic screen exposure can cause a chronic fight or flight response, and hit the same opiate receptors in the brain as drugs and alcohol causing addiction. Children with attention issues and those with autism are at higher risk of addiction. If not given appropriate time to rest and regenerate, children begin to suffer chronically. Common symptoms are irritability, depression and mood swings. As ESS progresses, mood disregulation may combine with aggression causing some to be diagnosed with bi-polar disease. Others may develop obsessive-compulsive behavior, nightmares, panic attacks, tics, seizures, etc., as the effects take hold on the brain. Dr. Dunkley demonstrates how freedom from electronic screens can

change the brain and alleviate or significantly reduce many of these symptoms. She offers a four-week plan to reverse the effects of ESS. See also her article in Psychology Today.

- Paula Healy steps us through the psychological and neurological impact of screentime in this 37 minute talk, *How our Digital Obsession is Dumbing us Down*: https://www.youtube.com/watch?v=OM_lFijB9rA&feature=youtu.be
- Dr. Marilyn Wedge explains how screens are impairing development in *"Virtual Autism" May Explain Explosive Rise in ASD Diagnoses*:
- https://www.madinamerica.com/2017/08/virtual-autism-explain-rising-asd-diagnoses/?fbclid=IwAR0K7A5j36mbGDKdNdafUBPG0TNdHcC9hj4Id_tKJZx6GSf_pcZExVIgJZs

Additionally, Silicon Valley executives limit their own children's access to technology while promoting it to others' children:

- Apple's Steve Jobs and other technology executives limited their own children's technology exposure: *http://www.nytimes.com/2014/09/11/fashion/steve-jobs-apple-was-a-low-tech-parent.html?smid=fb-share&_r=1*
- The Digital Gap Between Rich and Poor Kids Is Not What We Expected: America's public schools are still promoting devices with screens — even offering digital-only preschools. The rich are banning screens from class altogether. https://www.nytimes.com/2018/10/26/style/digital-divide-screens-schools.html?action=click&module=RelatedLinks&pgtype=Article
- A Dark Consensus About Screens and Kids Begins to Emerge in Silicon Valley: "I am convinced the devil lives in our phones." https://www.nytimes.com/2018/10/26/style/phones-children-silicon-valley.html?action=click&contentCollection=undefined&contentPlacement=4&module=stream_unit&pgtype=collection&region=stream&rref=collection%2Fbyline%2Fnellie-bowles&version=latest
- Silicon Valley Nannies Are Phone Police for Kids: Child care contracts now demand that nannies hide phones, tablets, computers and TVs from their charges. https://www.nytimes.com/2018/10/26/style/silicon-valley-nannies.html

Appendix E

Challenges to the Radiation Exposure Standards
Set by U.S. Regulatory Agencies

Organizations Recommending Reducing Wireless Radiation Thresholds

5G Appeal to the European Union by Hundreds of Scientists

American Academy of Pediatrics – Letters Calling for Updating Radiation Standards

US Doctors and Experts National 5G Resolution

EMF Scientist Appeal

International Society of Doctors for Environment – Appeal for a 5G Standstill

The EMF Call – Protective Limits for Exposure to Electromagnetic Fields

Vienna Medical Association

Scientists Join Canadian Doctor Appeal on 5G

Ontario Doctors Appeal and former Microsoft Canada President

The European Scientific Committee on Health, Environmental and Emerging Risks

Worcester School's Standing Committee consulted with the Massachusetts Department of Epidemiology – Best Practices, Minimizing Exposure to RF

ANSES, France's National Agency for Food, Environmental and Occupational Health Safety – Recommends Moderate Use of Wireless Communication Technologies by Children

ANSES, France's National Agency for Food, Environmental and Occupational Health Safety – Recommends Limiting The Population's Exposure to RF

World Health Organization's International Agency for Research.

New Jersey Education Association – Minimize Health Risks from Electronic Devices

Environment and Human Health, Inc. – Technology, Exposures, Health Effects

Irish Doctors Environmental Association

Bioinitiative Working Group – 2012 Report on Biologically Based Exposure Standards

International Appeal to Stop 5G on Earth and in Space, Scientists (4,503), Engineers (8,036), Medical Doctors (2,593), Nurses (4,177),Psychologists, Psychotherapists and Social Workers(9,663)

German Environmental Organisation "Bund" – Petition to Stop 5G in Hamburg

German Doctors Delegation – Open Letter to Prime Minister Kretschmann

Hippocrates Electrosmog Appeal of Belgium – Over 550 Health Professional Signatures

Pancyprian Medical Association & Cyprus National Committee on the Environment and Child Health – Public Health Dangers from the 5G Network

California Department of Public Health – Reduce Exposure to Radiofrequency From Cell Phones

The BabySafe Project – Health Professionals Warn of Dangers of Wireless Radiation on Pregnancy

Turin Medical Association of Italy – Changes in the Law on Electromagnetic Radiation Needed

Department of Pediatrics at Hadassah Hebrew University Hospital – Statement by Dr. Eitan Kerem

The American Academy of Environmental Medicine – Recommendations, Letter to the FCC

Association for Consumer Protection in Romania

Cleveland Clinic

Swiss Physicians Association of Doctors for Environmental Protection – Apply The Precautionary Principle for Wireless Devices

Swiss Physicians Association of Doctors for Environmental Protection – Preliminary Draft for a Federal Law Protecting Against the Dangers of Non-Ionizing Radiation

African Cancer Organization – Advisory to Keep Children From Mobile Phones

The Cyprus National Committee on Environment and Child Health – Recommendations to Reduce Exposure to Children

Austrian Medical Association – Nicosia Declaration on Health Impacts from EMF and RF Radiation

Austrian Medical Association – Practical Rules to Decrease Wireless EMF Radiation Exposure

Santa Clara County Medical Association Magazine

Connecticut Department of Public Health – Cell Phone Safety Bulletin

Athens Medical Association – Measures to Protect Against Electromagnetic Radiation

Canadian Parliament Standing Committee on Health of the House of Commons

Pittsburgh Cancer Institute

LETTERS TO FDA

- Press releases from scientists challenging radiation limits
- Letter calling for a retraction signed by several scientists.
- Ronald Melnick PhD's letter to the FDA on the National Toxicology Program study
- Albert Manville PhD, retired Senior Wildlife Biologist, Division of Migratory Bird Management, U.S. Fish & Wildlife Service, Wash. DC HQ Office (17 years); Senior Lecturer, Johns Hopkins University
- Prof. Tom Butler of the University College in Cork, Ireland's letter to the FDA

- Igor Belyaev, PhD, Dr. Sc. Head, Department of Radiobiology of the Cancer Research Institute, Biomedical Research Center of the Slovak Academy of Science letter to the FDA
- Paul Heroux PhD, McGill University
- Alfonso Balmori, BSc statement to the FDA

LETTERS AND OFFICIAL BRIEFINGS ON 5G

Briefing on 5G Health Impacts by Dr. Martin Pall: "5G: Great Risk for EU, U.S. and International Health! Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them"

November 19, 2018 – Magda Havas, BSc, PhD, Trent University, Peterborough, Canada – Open Letter: Need to Consider Health Effects Associated with Radio Frequency and Microwave Radiation before Deployment of 5G

November 19, 2018 – Paul Héroux, PhD, Professor of Toxicology and Health Effects of Electromagnetism, McGill University Medicine, Montreal – Open Letter

November 21, 2018 – Yuri Grigoriev, Dr. Sc. Med., Professor, Academician of Russian Academy of Electrotechnical Sciences – Open Letter: From Electromagnetic Smog to Electromagnetic Chaos Evaluating the Hazards of Mobile Communication for Public Health

December 7, 2018 – David O. Carpenter, MD, Director, Institute for Health and the Environment, University at Albany, State University of New York – Open Letter to Ministers and Members of Parliament of the Brussels Capital Region

December 13, 2018 – Olle Johansson, PhD, associate professor / retired from the Karolinska Institute, Stockholm, Sweden, and the Royal Institute of Technology, Stockholm, Sweden – Letter of Concern, addressed to the decision-makers of the City of Brussels

May 15, 2019- Magda Havas, BSc, PhD, Trent University, Peterborough, Canada Affidavit on 5G to Canadian Parliament with non-profit EMF OFF.

LETTERS FROM ORGANIZATIONS AND OTHERS

Letter from Frank Clegg, former President of Microsoft, Canada

Letter from EMF 249 Scientists to Mr. Charles Parkinson/Mrs. Andrea Dudley-Owen President & Vice President of Economic Development, The States of Guernsey, Re: 5G

Letter from Jerry L. Phillips Ph.D. to Mr. Charles Parkinson & Mrs. A Dudley-Owen President & Vice President Of Economic Development, The States of Guernsey, Re: 5G

Letter from Paul Héroux, PhD to The States of Guernsey, Re: 5G

Health Effects of Electromagnetism (Detailed Report) submitted to The States of Guernsey by Paul Héroux, PhD

Letter from Anthony B. Miller, MD, FRCP to Gavin St Pier Esq, Chief Minister, The States of Guernsey, Re: 5G

Letter from Professor Colin Pritchard to The States of Guernsey, Re: 5G

Declaration to European Commission by 180 Scientists Calling for a Moratorium on 5G Cell Antennas, September 13, 2017

National Health Integrated Associates October 29, 2018 Letter to Montgomery County Council

Letter from Dr. Lennart Hardell To Governor Jerry Brown on SB649

Beatrice Alexandra Golomb, MD, PhD Lettter in Opposition to SB649

Letter from Dr. Martin Pall in Opposition to SB649

Attachment to Dr. Pall Letter – 142 Microwave Radiation Review Studies

Letter from Dr. Devra Davis to Chair Aguiar-Curry on SB 649, June 28, 2017

Letter from Dr. Devra Davis to Governor Jerry Brown on SB 649, September 17, 2017

Letter from Dr. Paul Ben Ishai in Opposition to SB 649, September 08, 2017

Letter from Dr. Cindy Russell in opposition to SB 649

Letter from Physicians For Safe Technology in opposition to SB 649

Article from Dr. Cindy Russell on Impacts of 5G Technology, January 2017

Santa Clara Bulletin, pg. 20-23, "A 5G Wireless Future: Will It Give Us a Smart Nation or Contribute to An Unhealthy One?" by Cindy Russell, January 2017

Letter from Dr. Joel Moskowitz To Governor Jerry Brown on SB 649

Beatrice Alexandra Golomb, MD, PhD Letter in Opposition to SB 649

Letter from Dr. Sam Milhelm

Letter from Dr. John West

Letter from Dr. Hugh Scully to the City of Toronto

Letter from Dr. Stephen Sinatra to Toronto City Councilors in Opposition to Item 26.21

Joint letter from 541 health, environment and justice advocates and organizations to US Senators and Representatives in opposition to bills on 5G and wireless radiation expansion – November 13, 2017

Ellie Marks Letter to Governor Brown SB 649

Letter from the Alliance of Nurses for Health Environments

Letter from Environmental Working Group June 26, 2017

Letter from Environmental Working Group July 26, 2017

8/20 National Institute for Science, Law & Public Policy Letter to Appropriations Committee

8/21 National Institute for Science, Law & Public Policy Letter to Assembly

8/24 National Institute for Science, Law & Public Policy Letter to Governor Brown.

Letter from the Sierra Club, August 15, 2017

Letter from Greenlining Institute, June 27, 2017

Letter from the American Association of Retired Persons (AARP), July 19, 2017

Letter from Law Office of Harry Lehmann "Mass casualties are likely in District 10 from passage of 648", July 6, 2017

Letter from Law Office of Harry Lehmann to State of California, "Liability for Damage From Microwave Radiation Exposure Sustained by Senate Bill 649 Will Be Shifted to California State", July 19, 2017

Letter from Law Office of Harry Lehmann, "SB 649 will disproportionately effect the poor in California", August 24, 2017

Letter from EMF Safety Network and Ecological Options Network, July 06, 2017

Letter by Susan Foster Assembly Appropriations Letter – Fire Station Exemption from SB 649, August 14, 2017

Letter from Susan Foster and Radiation Research Trust in of Opposition of SB 649, June 22, 2017

Scientists For Wired Technology, 5/30/17: front and back

Scientists For Wired Technology 5/31/17:front and back

American Planning Association Opposes SB 649

Berkeley City Council Opposition Letter, April 25, 2017

SCIENTIFIC COMMENTS TO THE FCC

Comments by Ronald M. Powell, PhD, to the FCC on Spectrum Frontiers

Comments by The Berkshire-Litchfield Environmental Council to the FCC on Spectrum Frontiers, July 12, 2016

Comments by Dr. Albert Manville to the FCC on Spectrum Frontiers, July 14, 2016

Comments by Dr. Joel Moskowitz to the FCC on Spectrum Frontiers, July 20, 2016

Comments by Dr. Yael Stein to the FCC on Spectrum Frontiers, July 09, 2016

Comments by Dr. Devra Davis to the FCC on Spectrum Frontiers

Comments by Susan Clarke to the FCC on Spectrum Frontiers, July 14, 2016

Comments by EMF Scientist Appeal Advisors to the FCC on Spectrum Frontiers, June 09, 2017

Letters by Scientists and Doctors on Small Cells and 5G

Appendix F

Wireless Exposure Limits in Different Countries

The exposure limits given below are from the website of Physicians for Safe Technology

Japan	600 microwatts/cm^2
U.S.A.	450 microwatts/cm^2
Canada	450 microwatts/cm^2
Australia	450 microwatts/cm^2
Austria	450 microwatts/cm^2
France	450 microwatts/cm^2
Germany	450 microwatts/cm^2
Hungary	450 microwatts/cm^2
Ireland	450 microwatts/cm^2
Luxembourg	450 microwatts/cm^2
Portugal	450 microwatts/cm^2
Spain	450 microwatts/cm^2
India	45 microwatts/cm^2
China	40 microwatts/cm^2
Russia	10 microwatts/cm^2
Italy	10 microwatts/cm^2
Bulgaria	10 microwatts/cm^2
Poland	10 microwatts/cm^2
Lichtenstein	10 microwatts/cm^2
Switzerland	10 microwatts/cm^2
Belgium	2.4 microwatts/cm^2
Ukraine	2.5 microwatts/cm^2
Cosmic	<0.00000000001 microwatts/cm^2

Appendix G

Captured Agencies and Conflicts of Interest

Alster, Norm, *Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates,* Edmond J. Safra Center for Ethics, Harvard University. The report can be accessed here.

Conflicts of Interest Among Those Who Set Radiation Limits

- In Europe, the public radiation limits are set by the International Committee on Non-Ionizing Radiation Protection (ICNIRP). Investigate Europe, a team of investigative journalists expose that ICNIRP members have extensive conflicts of interest with industry. Dr. Joel Moskowitz chronicles their findings, and additional studies that show ICNIRP scientists are working for industry: *https://www.saferemr.com/2018/07/icnirps-exposure-guidelines-for-radio.html*
- The 98 page report, "*The International Commission on Non-Ionizing Radiation Protection: Conflicts of interest, corporate capture and the push for 5G*" was commissioned, coordinated and published in 2020 by two Members of the European Parliament – Michèle Rivasi and Klaus Buchner: https://www.saferemr.com/2018/07/icnirps-exposure-guidelines-for-radio.html
- Priyanka Bandara, Ph.D., and others in 2020 published *5G Wireless Deployment and Health Risks: Time for a Medical Discussion in Australia and New Zealand* which cites conflicts of interest with industry and current evidence of harm: https://www.researchgate.net/publication/343416307_5G_Wireless_Deployment_and_Health_Risks_Time_for_a_Medical_Discussion_in_Australia_and_New_Zealand

Conflicts of Interest at the World Health Organization

- In 2016 the authors of the BioInitiative Report, which summarizes thousands of peer-reviewed scientific studies showing wireless technology is harmful, submitted a No-Confidence letter to the WHO's EMF program manager because the committee no longer includes appropriate representation from non-industry funded EMF scientific experts:

http://www.bioinitiative.org/bioinitiative-working-group-issues-a-no-confidence-letter-to-the-who-emf-program-manager/.

- The Russian National Committee on Non-Ionizing Radiation Protection issued a similar letter in March 2017.
- Over 250 of the world's leading EMF scientists and biologists have signed **a** formal appeal to the World Health Organization with a clear plan to inform and protect the public from wireless radiation: https://www.emfscientist.org/
- Columbia University's Dr. Martin Blank provides a three-minute introduction to the Appeal that summarizes the issue: https://vimeo.com/123468632
- The head of the WHO's "International EMF Project" has heavy ties to the telecom industry. Further, she does not have EMF scientific or medical credentials and is not listening to the scientists proving electromagnetic fields are hazardous. A former UN employee, Olga Sheean of Canada, submitted a petition to get qualified leadership in place: http://olgasheean.com/who-emf/.
- In 2017, the International Journal of Oncology published a report by Dr. Lennart Hardell explaining the WHO has conflicts of interest with industry and does not plan to take action to protect the public from non-thermal electromagnetic radiation, even though the scientific and epidemiological evidence of harm is well documented: https://www.spandidos-publications.com/10.3892/ijo.2017.4046
- In 2020, the WHO's "International EMF Project" reopened its investigation into Electromagnetic Fields: https://www.who.int/peh-emf/research/rf_ehc_page/en/index1.html

The WHO's "International EMF Project" is composed of those with close ties to industry and is separate from the another WHO group that in 2011 determined EMFs to be Group 2B: Possibly Carcinogenic to Humans. The latter group is the "International Agency for Research on Cancer (IARC)" which has non-industry funded scientific experts in the biological effects of EMFs. It remains to be seen what will come of the investigation launched in 2020: https://ehtrust.org/scientists-call-for-transparency-at-the-world-health-organization-emf-project/

Appendix H

Example of an RF radiation warning

Appendix I

Example of a symbol for use on poles and other structures located in public rights-of way that hold 5G antennae

Appendix J

Deleterious effects of impulsive radiation

While current FCC guidelines for non-ionizing radiation exposure are based upon heating effects, there is a growing body of research showing that the impulsive nature of high-speed data transmission can cause deleterious health effects at considerably lower radiation levels. Three references that document the effect of the impulsive radiation are given below:

[1] Belyaev, I., Dean, A., Eger, H. et al. "EUROPAEM EMF Guideline 2016 for the prevention, diagnosis, and treatment of EMF-related health problems and illnesses." *Rev environ Health.* 2016;31(3):363-397. Doi:10.1515/reveh-2016-0011.

[2] B. W. G. (2012). "Bioinitiative 2012: A Rationale for Biologically-based Exposure Standards for Low-Intensity Electromagnetic Radiation."

[3] McCarty, D. E., Carrubba, S., Chesson, A. L., Frilot, C., Gonzalez-Toledo, E., & Marino, A. A. (2011). "Electromagnetic hypersensitivity: P Evidence for a novel neurological syndrome." *International Journal of Neuroscience*, 121(12), 670-676.

Appendix K

Siting restrictions for wireless antennae

The siting restrictions for cell phone towers already in force in the world were intended to ensure the safety of vulnerable populations, like children and those with illnesses.

India already prohibits placement of cell phone towers near schools or hospitals, and Canada (Standing Committee on Health), as well as many European countries, are looking into similar restrictions.

CALIFORNIA FIREMEN

California firemen are exempted from the forced placement of towers on or adjacent to their stations, because of radiation health concerns.

> "The International Association of Fire Fighters' position on locating cell towers commercial wireless infrastructure on fire department facilities, as adopted by its membership in August 2004, is that the IAFF oppose the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is proven that such sitings are not hazardous to the health of our members."

https://ecfsapi.fcc.gov/file/109281319517547/20-Attachment%2020-%20Firefighters%20Inter%20Resolution%20Against%20Cell%20Towers.pdf

https://vimeo.com/122670207

https://web.archive.org/web/20150403040308/http://www.stopcellphonetowers.com/index.html%20

https://www.youtube.com/watch?v=61h_vuBujw0

http://cbsloc.al/2DNAYA5

https://sanfrancisco.cbslocal.com/2018/01/25/consumerwatch-5g-cellphone-towers-signal-renewed-concerns-over-impacts-on-health)

https://ehtrust.org/wp-content/uploads/HARDELL-14-October-2014_1-1.pdf

This was codified in Government, section 65964.1. (f) as enacted by California's legislation AB 57 in 2015:

> ”Due to the unique duties and infrastructure requirements for the swift and effective deployment of firefighters, this section does not apply to a collocation or siting application for a wireless telecommunications facility where the project is proposed for placement on fire department facilities.“

A similar provision was included in California's SB 649 (2018), “Wireless Telecommunications Facilities” under item 65964.2.:

> “(a) A small cell shall be a permitted use subject only to a permitting process adopted by a city or county pursuant to subdivision (b) if it satisfies the following requirements: ….(3) The small cell is not located on a fire department facility.”

On October 15, 2018, Governor Jerry Brown vetoed SB 649, the so-called small-cell bill, which would have usurped local authority over the siting of telecom equipment.

> To the Members of the California State Senate:
> I am returning Senate Bill 649 without my signature.
>
> This bill establishes a uniform permitting process for small cell wireless equipment and fixes the rates local governments may charge for placement of that equipment on city or county owned property, such as streetlights and traffic signal poles.
>
> There is something of real value in having a process that results in extending this innovative technology rapidly and efficiently. Nevertheless, I believe that the interest which localities have in managing rights of way requires a more balanced solution than the one achieved in this bill.
>
> Sincerely, Edmund G. Brown Jr.

ESTABLISHING SETBACK

To increase wireless data rates, the 5G industry seeks higher frequencies. These frequencies distribute energy in a smaller fraction of the body and need higher field intensities because of (1) poor penetration into structures, (2) absorption of radiation by oxygen and water, (3) shrinking antenna apertures, as well as (4) noise from an increasing number of extraneous sources.

For human users, this means increased power density exposures. In addition, exposures will become more irregular because of beam-forming, as well as originate from multiple sources (Multiple-Input Multiple-Output architecture).

Since there is no epidemiological or animal data, and very few laboratory results using 5G, cautionary setbacks should be established by the municipalities based upon past 3G and 4G systems.

The verdict on animal studies is expressed in reports by (1) the US National Toxicology Program, (2) the Ramazzini Institute, and by older studies by (3) Chou (1992) and (4) Repacholi (1997).

The verdict on epidemiology is expressed in two reports (ELF and RF) from the *International Agency for Research on Cancer* ("possibly carcinogenic"), which Agency is scheduled to review evidence on RF carcinogenicity between now and 2024.

Senator Blumenthal:
https://www.radiationresearch.org/articles/us-senator-blumenthal-raises-concerns-on-5g-wireless-technology-health-risks-at-senate-hearing-youtube/

US National Toxicology Program – Impact of Cell Phones:
https://ntp.niehs.nih.gov/results/areas/cellphones/index.html

Ramazzini Institute – Impact of Base Stations:
https://www.ncbi.nlm.nih.gov/pubmed/29530389

International Agency for Research on Cancer – ELF*:*
https://monographs.iarc.fr/wp-content/uploads/2018/06/mono80.pdf
https://www.iarc.fr/wp-content/uploads/2018/07/pr208_E.pdf

International Agency for Research on Cancer – RF:
https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Non-ionizing-Radiation-Part-2-Radiofrequency-Electromagnetic-Fields-2013
https://www.iarc.fr/wp-content/uploads/2018/07/pr208_E.pdf

Chou, 1992: *https://onlinelibrary.wiley.com/doi/abs/10.1002/bem.2250130605*

Repacholi, 1997: *https://www.ncbi.nlm.nih.gov/pubmed/9146709*

As vulnerable individuals are exposed involuntarily every day in society to RF-radiation, caution should be universally used and set according to the Largest Observed Adverse Effect Distance (LOAED), using the experience from past and current 2G, 3G, and 4G networks. A conservative LOAED should include all observed health effects.

Best engineering practice would therefore apply a set-back requirement for new cellular towers, including 5G micro-towers.

From the 17 documents referred to in this appendix, shown below in historical order, this set-back for all new cell towers should be 500 meters which translates to 1,640 feet.

All of these studies have been given support by a recent animal study from the Ramazzini Institute that links to them, as well as to the US National Toxicology Program result on cell phones.

REFERENCES

Paola **Michelozzi**, Alessandra Capon, Ursula Kirchmayer, Francesco Forastiere, Annibale Biggeri, Alessandra Barca, and Carlo A. Perucci.
"Adult and Childhood Leukemia near a High-Power Radio Station in Rome," Italy. *American Journal of Epidemiology*, Vol. 155, No. 12, (2002) 1096-1103.
Michelozzi et al 2002 describe an increased risk for childhood leukemia at distances up to 6 km from the powerful Vatican Radio transmitters near Cesano, Italy, which led to compensation by decision of Italy's Supreme Court (relative risk of 7 for lymphomas and myeloma, and 5 for non-Hodgkin's lymphoma and leukemia).
https://pubmed.ncbi.nlm.nih.gov/12048223/

R. **Santini**, P. Santini, P. Le Ruz, J. M. Danze, and M. Seignel. "Survey Study of People Living in the Vicinity of Cellular Phone Basestations." *Electromagnetic Biology and Medicine*. Vol. 22, No. 1, pp. 41-49, 2003.
Santini et al 2003 surveyed by questionnaire 530 people living or not in proximity to cellular phone Base Stations (BSs) in France. Eighteen different symptoms (Non-Specific Health Symptoms-NSHS), described as radiofrequency sickness, were studied. Certain complaints are experienced only in the immediate vicinity of BSs (up to 10 m for nausea, loss of appetite, visual disturbances), and others at greater distances from BSs (up to 100 m for irritability, depressive tendencies, lowering of libido, and up to 200 m for headaches, sleep disturbances, feeling of discomfort). In the 200 m to 300 m zone, only the complaint of fatigue is experienced significantly more often when compared with subjects residing at more than 300 m or not exposed (reference group). For seven of the studied symptoms and for the distance up to 300 m, the frequency of reported complaints is significantly higher ($P<0.05$) for women in comparison with men.
https://www.tandfonline.com/doi/abs/10.1081/jbc-120020353

Michael **Kundi**, Hans-Peter Hutter. "Mobile phone base stations—Effects on wellbeing and health." *Pathophysiology* 16 (2009) 123–135.
Kundi and Hutter 2009 comment that studying effects of mobile phone base station signals on health have been discouraged by authoritative bodies like the WHO. As a result, only few investigations of effects of base station exposure on health and wellbeing exist. But two ecological studies of cancer in the vicinity of base stations report both a strong increase of incidence within a radius of 350 and 400 m, respectively. It is suggested that power densities around 500–1000 $\mu W/m^2$ must be exceeded in order to observe an effect.
https://pubmed.ncbi.nlm.nih.gov/19261451/

Vini G. **Khurana**, Lennart Hardell, Joris Everaert, Alicja Bortkiewicz, Michael Carlberg, Mikko Ahonen. "Epidemiological Evidence for a Health Risk from Mobile Phone Base Stations." *International Journal of Occupational and Environmental Health*. July 2010;16:263–267. DOI: 10.1179/107735210799160192.
Khurana et al 2010 provides a review of 10 BS proximity and neurobehavioral effects, and three investigations of cancer. Eight of the 10 studies reported increased prevalence of adverse neurobehavioral symptoms or cancer in populations living at distances < 500 meters from BSs.
https://pubmed.ncbi.nlm.nih.gov/20662418/

Adilza C. **Dode**, Mônica M.D. Leão, Francisco de A.F. Tejo, Antônio C.R. Gomes, Daiana C. Dode, Michael C. Dode, Cristina W. Moreira, Vânia A. Condessa, Cláudia Albinatti, Waleska T. Caiaffa. "Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil." *Science of the Total Environment* 409 (2011) 3649–3665.
Dode et al 2011 provides the most detailed information. Belo Horizonte is the third largest city in Brazil. It was been selected by the Population Crisis Committee of the United Nations (UN, 2007) as the metropolis with the best quality of life in Latin America. Its health system is considered very good, according to the Atlas of Human Development (2000/United Nations Development Program).

In 2011, a 10-year study on cell phone antennas was released by the Municipal Health Department and several local universities. The study was conducted in a broad environmental context, aiming to verify if there is a spatial correlation between the cellular telephony system BS location and the cases of death by neoplasia during the period between 1996 and 2006. Three data banks were used: 1. death by neoplasia documented by the Municipal Health Department; 2. BS documented in ANATEL (Telecommunications National Agency); and 3. census and demographic city population data obtained from official archives provided by IBGE (Brazilian Institute of Geography and Statistics). The results show that approximately 856 BSs were installed through December 2006.

Between 1996 and 2006, 7191 deaths by neoplasia occurred and, within an area of 500 m from the BS, the mortality rate was 34.76 per 10,000 inhabitants. Outside of this area, a decrease in the number of deaths by neoplasia occurred. The greatest accumulated incidence was 5.83 per 1000 in the Central-Southern region and the lowest incidence was 2.05 per 1000 in the Barreiro region. During the environmental monitoring, the largest electric field measured was 12.4 V/m and the smallest was 0.4 V/m. The largest power density was 407,800 µW/m², and the smallest was 400 µW/m².
https://pubmed.ncbi.nlm.nih.gov/21741680/

Ermanno **Affuso,** J. Reid Cummings, Huubinh Le. "Wireless Towers and Home Values: An Alternative Valuation Approach Using a Spatial Econometric Analysis." *Journal of Real Estate Finance and Economics* (2018) 56:653–676. DOI 10.1007/s11146-017-9600-9.

Affuso et al 2018 examines the economic impact on home values. For properties located within 0.72 kilometers of the closest tower, results
reveal significant declines of 2.46% on average, and up to 9.78% for homes within tower visibility range compared to homes outside tower visibility range.
https://link.springer.com/article/10.1007/s11146-017-9600-9

Falcioni L., L. Bua, E. Tibaldi, M. Lauriola, L. De Angelis, F. Gnudi, D. Mandrioli, M. Manservigi, F. Manservisi, I. Manzoli, I. Menghetti, R. Montella, S. Panzacchi, D. Sgargi, V. Strollo, A. Vornoli, F. Belpoggi.
Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission.
Environmental Research 165 (2018) 496–503.
Falcioni et al 2018 conclude: the Ramazzini Institute findings on far field exposure to RFR are consistent with and reinforce the results of the NTP study on near field exposure, as both reported an increase in the incidence of tumors of the brain and heart in RFR-exposed Sprague-Dawley rats. These tumors are of the same histotype of those observed in some epidemiological studies on cell phone users. These experimental studies provide sufficient evidence to call for the reevaluation of IARC conclusions regarding the carcinogenic potential of RFR in humans.
https://www.avaate.org/IMG/pdf/belpoggi-heart-and-brain-tumors-base-station-2018.pdf

J.M. **Pearce**. "Limiting liability with positioning to minimize negative health effects of cellular phone towers." *Environmental Research* 181 (2020) 108845.
Pearce et al 2020 provides the most recent assessment and promotes a 500 m set-back to limit future liabilities of the cell phone industry, based on correlation with headaches, dizziness, depression and other neurobehavioral symptoms, as well as increased cancer risk. It is almost inevitable that such economic impacts will increase in the future.
https://www.sciencedirect.com/science/article/abs/pii/S0013935119306425

Other References

Buchner K et al. (2011): [Modification of clinically important neurotransmitters under the influence of modulated high-frequency fields - A long-term study under true-to-life conditions]. In German. Abstract translation below.

This long-term study over one and a half years shows a significant activation of the 60 participants´ adrenergic systems after the installation of a regional mobile telephone transmitting station in the village of Rimbach (Bavaria).

The values of the stress hormones adrenaline and noradrenaline grow significantly during the first six months after starting the GSM transmitter; the values of the precursor substance dopamine decreases substantially after the beginning of the radiation (Wilcoxon test, p<0,0002). The initial condition is not restored even after one and a half years. Due to the not regulable chronic difficulties of the stress balance, the phenylethylamine (PEA) values drop until the end of the research period (Wilcoxon test, p<0,0001). The effects show a dose effect relation and are situated far under the valid limits for technical high-frequency stress. Chronic dysregulations of the catecholamine system have substantial health relevance and cause health damages in the long run.

Wolf R, Wolf D. "Increased incidence of cancer near a cell-phone transmitter station." *Int J Canc Prev* 2004; 1 (2): 123-128. Publication unavailable online.

Conclusion according to the authors: Of the 622 people of area A, 8 cases of different kinds of cancer were diagnosed in a period of one year (from July 1997 - June 1998). The cancer incidence rate was 129 cases per 10,000 persons per year in area A compared to 16/10,000 in area B and 31/10,000 in the town of Netanya. Relative cancer rates for females were 10.5 for area A, 0.6 for area B and 1 for Netanya. The authors conclude that the study indicates an association between increased incidence of cancer and living in proximity to a mobile phone base station.

Eger H, Hagen KU, Lucas B, Vogel P, Voit H. [Influence of proximity to mobile telephony transmitters on cancer incidence]. Umwelt-Medizin-Gesellschaft 2004; 17 (4): 326-332. In German. Author's conclusion translated below.

320 of 967 residents of Naila have been living in the inner circle at a distance to the next base station of less than 400 m. The results showed an increased risk for malignant tumors for patients living closer than 400 m to the mobile telephony transmitter compared to patients living further away.

In the years 1999 - 2004 the risk for malignant tumors tripled for patients living in the proximity of the mobile telephony transmitter.

Appendix L

Measurement of RF intensities
within frequency ranges throughout state

The majority of the Commission suggests this data include location, frequency ranges, peak, and average power intensities of total combined RF emitted by sources such as 3G, 4G, or 5G cellphone networks, Wi-Fi, smart meters, IOT devices, and similar devices. The data should be collected in such a way as to identify possible areas of notably high RF exposure, places where RF signal for wireless communication is inadequate (dead spots), and places where RF is unusually low (white zones) that are sought by people who wish to minimize their exposure.

RF data collected and mapped should be archived and published on a state website, accompanied by state-wide and regional aggregated averages for both peak and 24-hour integrated microwatts/meter squared intensities. The state should also publish benchmarks for comparison: a few readings from low-intensity underdeveloped areas, and nearby some strong high-intensity sources (base of a tower) for min-max comparison. The Bioinitiative 2012 recommends that human peak exposure not exceed an RF intensity of 1,000 microwatts/meter squared.

One use of this data will be buyers/renters of property or the public in general using these benchmark values to make comparisons and form their own decisions based on their comfort level. After a while, an extensive NH RF database will exist to provide useful maps and data for future public health investigations.

Appendix M

The enabling technology and scientific rationale for automatically stopping cell phones from operating when held against the body

The FCC testing procedure for certification of cell phones aims for a power injection into the head below 1.6 Watts per kilogram of tissue. The accuracy of SAR determinations is not very high (variation between laboratories), and some cellular phones have been found to exceed this limit (https://www.chicagotribune.com/investigations/ct-cell-phone-radiation-testing-20190821-72qgu4nzlfda5kyuhteiieh4da-story.html).

A major problem is that the FCC testing procedure allows the phone to be tested up to 0.98 inches (2.5cm) from the head, at which distance injection of energy into the head is much reduced compared to when held against the head as is done routinely by users. "Small print" instructions already present in many cell phone manuals instruct users to hold cell phones at a distance from the head, in full knowledge that this is not likely to be done.

In France, measurements by the National Frequency Agency (ANFR) revealed that 9 out of 10 mobile phones tested in 2015 under real use conditions (in contact with the body) exceeded the legal limit, leading to extensive recalls (https://www.phonegatealert.org/en/phonegate-scandal-where-are-we-three-years-after-the-alert-was-launched).

We provide here a simple change expected to reduce the number of glioblastomas and other tumors in cell phone users by mandating that cell phones turn off their radiation when held right against the head or body.

IMPLEMENTATION

A reliable method to reduce head exposure to radiation is to configure the phone itself to automatically shut off, protecting the user's brain. Cellular phones already contain a small device called a *proximity sensor* (shown at right is the miniature

Sharp GP2AP002S00F), usually located at the top of the phone. The element on the left of the sensor sends out pulsed infrared which is detected by the element on the right, if the phone is near an object. The image sequence at right shows how a finger turns off the screen.

In present Android devices, the proximity sensor triggers as the user's face is close to the screen, switching off the screen and preventing any errant soft-button presses by the skin as well as saving battery power.

Some Android devices can report the distance to another object in centimeters, whereas others will simply report minimum and maximum values to denote *near* and *far*, respectively. These functions are accessed through *SensorManager* and *Sensor* classes from the Android Application Programming Interface (API).

Similarly, the iPhone proximity sensor (also using infrared) is designed to detect any object near the screen and is used to put the display to sleep when the iPhone is against the head, preventing unintentional display triggering.

Assigning to the user the task of keeping the phone away from the head is not practical. The phone itself should disable its RF emissions if proximity is detected. This means that the user could use the phone away from the head, in his hand, or on a table in front of him. At the cost of a small change in personal habits, this measure would instantly remove high SAR exposures from cell phone usage and would remove the need for sophisticated assessment of exact SAR measurements in close body proximity. Note that this phone adjustment does not prevent alerting the user to incoming calls. But it does prevent the unit from autonomously sending out data when held against the body. A number of applications ("apps") have in recent years contributed to user exposures by radiating data even without user intervention. This automatic data traffic tends to increase and should only be permitted if the device is held away from the body. Essentially, this software adjustment is an automated "Airplane Mode", designed to protect users from radiation.

JUSTIFICATION

For cellular phones, commonly held against the head, prolonged use has led to an increase in a lethal form of brain cancer, glioblastoma, as well as with a more benign tumor, acoustic neuroma, in 9 peer-reviewed studies, including one cohort study.

- Brain Tumours: Rise in Glioblastoma Multiforme Incidence in England 1995–2015 Suggests an Adverse Environmental or Lifestyle Factor. Alasdair Philips, Denis L. Henshaw, Graham Lamburn, and Michael J.O'Carroll. Journal of Environmental and Public Health Volume 2018, Article ID 7910754, (https://doi.org/10.1155/2018/7910754),
- Use of mobile phones and cordless phones is associated with increased risk for glioma and acoustic neuroma. Lennart Hardell, Michael Carlberg, Kjell Hansson Mild. Pathophysiology 20 (2013) 85–110. https://www.sciencedirect.com/science/article/abs/pii/S0928468012001101

Recent studies have also linked cell phone use to cancer.

The US National Toxicology Program,
https://ntp.niehs.nih.gov/results/areas/cellphones/index.html,

the International Agency for Research on Cancer,
https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Non-ionizing-Radiation-Part-2-Radiofrequency-Electromagnetic-Fields-2013**,**

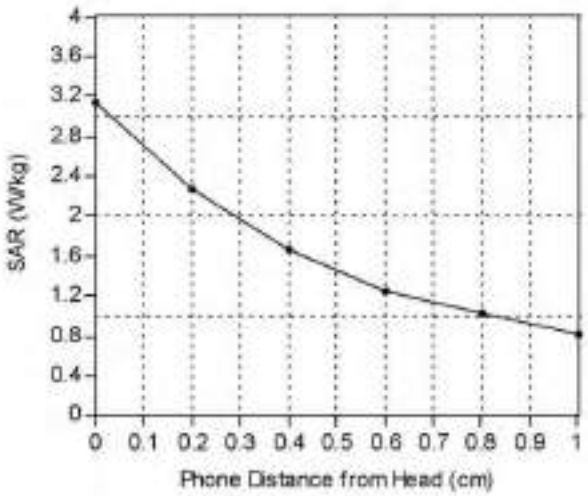
as well as individual large studies by Chou**,**
https://onlinelibrary.wiley.com/doi/abs/10.1002/bem.2250130605,

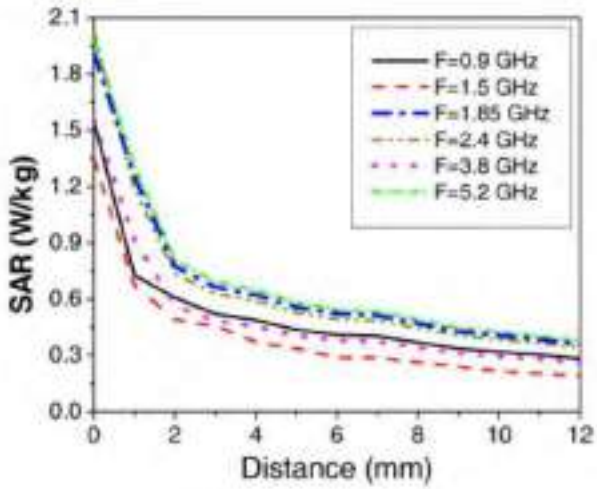
Repacholi,
https://www.ncbi.nlm.nih.gov/pubmed/9146709,

as well as a collective opinion of scientists,
https://bioinitiative.org/.

Engineering analysis indicates that the dose delivered to the brain decreases rapidly as distance between cellular phone and head rises. As shown below, it

decreases by as much as 4 to 5 times, according to two separate analyses, as the phone is moved 1 cm (0.4”) away.





While walkie-talkies of the past were used more distantly from the head, the recent trend has been to reduce the size of cellular phones and to promote a style of use identical to that of the telephone which is pressed against the ear. An unfortunate consequence has been to deliver large doses of EMR to tissues of the nervous system which have been shown to be adversely affected, as stated above.

Without altering the function of cellular phones, it is technically possible to seriously reduce exposure to the brain of users by altering how the phones are held when emitting radiation, specifically by holding them away from the body.

Appendix N

Research on the effects of wireless radiation on trees, plants, birds, insects, pollinators, and wildlife

FCC limits were not developed to protect our flora or fauna. Wireless radiation "safety" limits for trees, plants, birds, insects, pollinators, and wildlife simply do not exist. No US agency nor international authority with expertise in science, biology or safety has ever acted to review research and set safety limits on these non-human species.

The Department of Interior wrote a letter in 2014 detailing several published studies showing impacts of wireless radiofrequency radiation (RFR) to birds. It stated the following:

> There is a growing level of anecdotal evidence linking effects of non-thermal, non-ionizing electromagnetic radiation from communication towers on nesting and roosting wild birds and other wildlife in the U.S.
>
> However, the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today.
>
> … third-party peer-reviewed studies need to be conducted in the U.S. to begin examining the effects from radiation on migratory birds and other trust species.
>
> Study results have documented nest and site abandonment, plumage deterioration, locomotion problems, reduced survivorship, and death (e.g., Balmori 2005, Balmori and Hallberg 2007, and Everaert and Bauwens 2007). Nesting migratory birds and their offspring have apparently been affected by the radiation from cellular phone towers in the 900 and 1800 MHz frequency ranges- 915 MHz is the standard cellular phone frequency used in the United States.
>
> In laboratory studies, T. Litovitz (personal communication) and DiCarloet al. (2002) raised concerns about impacts of low-level, non-thermal electromagnetic radiation from the standard 915 MHz cell phone frequency on domestic chicken embryos- with some lethal results (Manville 2009, 2013a). Radiation at extremely low levels (0.0001 the level emitted by the average digital cellular telephone) caused heart attacks and the deaths of some chicken embryos subjected to hypoxic conditions in the laboratory while controls subjected to hypoxia were unaffected (DiCarlo et al. 2002).

Albert Manville, former senior biologist of the US Fish and Wildlife Service wrote "A BRIEFING MEMORANDUM: What We Know, Can Infer, and Don't Yet Know about Impacts from Thermal and Non-thermal Non-ionizing Radiation to Birds and Other Wildlife" published in Wildlife and Habitat Conservation Solutions, 2014 on the impacts of RFR to birds and bees. India dropped their RF limits by 1/10th after a research review documented the majority of research studies found adverse effects to wildlife, birds and bees.

Regarding bees and pollinators, the study "Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz" published in Scientific Reports found insects (including the Western honeybee) can absorb the higher frequencies that will be used in the 4G/5G rollout, with absorbed power increases up to 370%. The researchers warn, "This could lead to changes in insect behaviour, physiology, and morphology over time…." Research also has found impacts to bees from wireless frequencies including inducing artificial worker piping (Favre, 2011), disrupting navigation abilities (Sainudeen, 2011; Kimmel et al., 2007), reducing colony strength (Harst et al., 2006), and impacts to honey bee physiology (Kumar et al., 2011).

Research on trees has found that trees are harmed by RFR. A 9 year field study (Waldmann-Selsam, C., et al 2016) found significant impacts to trees near cell antennas and an investigation of 700 trees found damage starts on the side of the tree with highest RF. A review on impacts to plants entitled, "Weak radiofrequency radiation exposure from mobile phone radiation on plants" concluded, "a substantial amount of the studies on RF-EMFs from mobile phones show physiological and/or morphological effects." A study on aspen seedings found ambient RF in a Colorado setting were high enough to cause necrotic lesions on the leaves, decrease leader length and leaf area, and suppress fall anthocyanin production (Haggarty, 2010).

The European Scientific Committee on Health, Environmental and Emerging Risks states, "The lack of clear evidence to inform the development of exposure guidelines to 5G technology leaves open the possibility of unintended biological consequences." Several literature reviews warn that non-ionizing EMFs are an "emerging threat" to wildlife (Balmori, 2015, Curachi, 2013, Sivani, 2012).

Research Studies

Waldmann-Selsam, C., et al. "Radiofrequency radiation injures trees around mobile phone base stations." *Science of the Total Environment* 572 (2016): 554-69.

Breunig, Helmut. "Tree Damage Caused By Mobile Phone Base Stations An Observation Guide" (2017).

Sivani, S., Sudarsanam, D. "Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem - a review." *Biology and Medicine,* Volume 4, Issue 4, Pages 202–216, 2012.

Haggerty, Katie. "Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings." *International Journal of Forestry Research,* 2010.836278 (2010).

Halgamuge, M. "Weak radiofrequency radiation exposure from mobile phone radiation on plants." *Electromagnetic Biology and Medicine*, vol. 36, no. 2, 2017, pp. 213-235.

Martin Pall. "Electromagnetic Fields Act Similarly in Plants as in Animals: Probable Activation of Calcium Channels via Their Voltage Sensor." *Current Chemical Biology*, Volume 10, Issue 1, 2016.

Shikha Chandel, et al. "Exposure to 2100 MHz electromagnetic field radiations induces reactive oxygen species generation in Allium cepa roots." *Journal of Microscopy and Ultrastructure,* 5.4 (2017): 225-229.

Halgamuge, M., Skafidas, E., Davis, D. "A meta-analysis of in vitro exposures to weak radiofrequency radiation exposure from mobile phones (1990–2015)." *Environmental Research*, 2020;184:109227. doi:10.1016/J.ENVRES.2020.109227.

Halgamuge, M., Davis, D. "Lessons learned from the application of machine learning to studies on plant response to radio-frequency." *Environmental Research*, 2019. doi:10.1016/j.envres.2019.108634

Gustavino, B., et al. "Exposure to 915 MHz radiation induces micronuclei in Vicia faba root tips." *Mutagenesis* 31.2 (2016): 187-92.

Halgamuge, Malka N., See Kye Yak, and Jacob L. Eberhardt. "Reduced growth of soybean seedlings after exposure to weak microwave radiation from GSM 900 mobile phone and base station." *Bioelectromagnetics* 36.2 (2015): 87-95.

"Tree Damage from Chronic High Frequency Exposure Mobile Telecommunications, Wi-Fi, Radar, Radio Relay Systems, Terrestrial Radio, TV etc" by Dr. Volker Schorpp (2011).

Shepherd et al. "Increased aggression and reduced aversive learning in honey bees exposed to extremely low frequency electromagnetic fields." *PLoS One*, 2019 Oct 10.

Balmori, Alfonso. "Anthropogenic radiofrequency electromagnetic fields as an emerging threat to wildlife orientation." *Science of The Total Environment* 518–519 (2015): 58–60.

Balmori, A. "Electrosmog and species conservation." *Science of the Total Environment*, vol. 496, 2014, pp. 314-6.

Cucurachi, C., et al. "A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF)." *Environment International*, vol. 51, 2013, pp. 116–40.

Kumar, Neelima R., Sonika Sangwan, and Pooja Badotra. "Exposure to cell phone radiations produces biochemical changes in worker honey bees." *Toxicology International*, 18, no. 1, 2011, pp. 70–2.

Favre, Daniel. "Mobile phone induced honeybee worker piping." *Apidologie*, vol. 42, 2011, pp. 270-9.

"Briefing Paper on the Need for Research into the Cumulative Impacts of Communication Towers on Migratory Birds and Other Wildlife in the United States." Division of Migratory Bird Management (DMBM), U.S. Fish & Wildlife Service, 2009.

"The potential dangers of electromagnetic fields and their effect on the environment." Council of Europe Parliamentary Assembly, Resolution 1815, 2011.

Engels, S. et al. "Anthropogenic electromagnetic noise disrupts magnetic compass orientation in a migratory bird." *Nature*, vol. 509, 2014, pp. 353–6.

Balmori A. "Possible Effects of Electromagnetic Fields from Phone Masts on a Population of White Stork (Ciconia ciconia)." *Electromagnetic Biology and Medicine*, vol. 24, no. 2, 2005, pp. 109-19.

Balmori, A. "Mobile phone mast effects on common frog (Rana temporaria) tadpoles." *Electromagnetic Biology and Medicine*, vol. 29, no. 1-2, 2010, pp. 31-5.

Appendix O

Meeting Minutes

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
9/16/19
9:00-10:00 am
LOB 202

Meeting called to order by Rep Abrami at 9:00 am.

In attendance: (9) *(Each member discussed their backgrounds)*
Rep. Patrick Abrami-speaker of the house appointee
Senator Tom Sherman-president of the senate appointee
Rep. Ken Weeks- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Carol Miller-NH Business & Economic Affairs Dept
Denise Ricciardi-public-appointed by the governor
Michelle Roberge-DHHS- Commissioner of DHHS appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee

Excused: (1)
Dr. Paul Peroux- Professor of Toxicology, McGill University- speaker of the house appointee

To be filled: (6)
AG or designee
2 members of the NH High Tech Council
1 member of NH Medical Society, specializing in environmental medicine/electromagnetic radiation
1 member of cell phone/wireless industry
1 member of Business and Industry Association

Agenda: *(attached)*

I. Member introductions and background

II. Election of Chair:
- Rep. Patrick Abrami was nominated by Senator Tom Sherman, seconded by Rep Gary Woods. Vote was unanimous.

III. Guiding Principles: (*see attached and attached HB522*)
- Senator Sherman: committee decorum protocol, ask permission of chair to speak or rebut.

IV. Statement of Purpose and Goals: (*see attached*)
- Rep Abrami: Why do we need state level? Fed is not doing much. States are pushing back against the Federal government as small cells are rolled out in front of homes. Because we cannot see it or feel it, except those who are sensitive, doesn't mean it is

not an issue for health and the environment. A sixth goal was added to communicate conclusions to all federal agencies with jurisdiction and the Office of the President.

V Questions Needing Answers: *(see attached)*

-Senator Gray: We need to look at all radiation, not just 5G. Is it good or bad? Is is frequency? Intensity? How much is too much? Think broadly, not just 5G.

-Senator Sherman: Applying Precautionary Principle is most important. We are not looking for proof positive, but risk. Lack of knowledge does not equal safety. Is there potential harm here? Public health policy is not black and white. The goal is to protect public health.

-Rep Woods: we need a good understanding of baseline ambient level and levels relative to that.

-Kent Chamberlin: Concerns of cybersecurity and military issues and from sources not under U.S. control, not just biological.

- Denise Ricciardi: Health epidemic avoidance, constitutional privacy issues, data collection. Our job is to get to the truth for public health.

-Rep Abrami: Let it take us where it leads us. Root discussion is RF radiation. We cannot talk about 5G without RF in general.

VI List of organizations in which testimony will be requested. (see attached)

-Rep Abrami: There will be no problem bringing in people with tremendous science credentials. I am hoping to get someone in to refute that. We need back and forth discussion. The harder problem will be in getting people to testify rebutting findings. Joel is research resource for the commission.

Discussion:

- Rep Abrami: US National Toxicology findings, WHO, FCC. We need to understand FCC standards and why they only test for thermal effects, ignoring biological effects. We may need to skype people in as we do not have a budget for this
- Senator Sherman: who is making decisions at the FCC? Are they biased? What are their qualifications? Request background on decision makers setting regulations state and fed levels both
- Kent Chamberlin: limits are set very high compared to other countries who do look at biological effects. What can we, as a state do if fed level decision makers aren't qualified to be making those decisions?
- Carol Miller: We should have an industry report for NH. Where are we at for 5G deployment? How can we help mitigate for our constituents?
- Rep Woods: in hearing testimony, has study been repeated? Look beyond credentials of presenter.
- Rep Abrami: Would like to hear from industry on this. And insurance?
  Kent Chamberlin: Can we look at where policies are done because of exposure to radiation?

- Senator Gray: Insurance writes exclusions because it's an issue or may exclude on Rumor?

VII. Meeting frequency, time & length

-every 2-3 weeks, initially.

two hours typically

- next meeting: Thursday, October 10,2019 8:30-10:30
- Kent Chamberlin will do brief presentation on waves.
- will need projector for slides.
- Dr Hercux may present if he is able to be at the next meeting.

VIII. Public comments:

– Jennifer White (Hancock,NH):

1. Jen and her son are RF sensitive. She manages two businesses out of her home. Agree with Senator Gray it is a greater issue than just 5G. However, the issue with 5G is we can no longer have control over the safety of our home/property environment. If that right is taken away, they will both suffer, as their own home will no longer be a safe place.
2. Response to Senator Gray's statement about some radiation is helpful ie. Killing cancer.. Jen's mom had cancer. The radiation did kill that. But she lived 3 years longer but died from Leukemia caused by the radiation to kill the cancer.

-Cherylyn Randolph LeBrun: (Loudon, NH): She has background in public health nursing. Her concern is for children and our future children. Please consider the long term effects on exposure to children who will have a much longer exposure than we have. Autism is a big issue. Please focus on pediatric neurology.

IX. Meeting Adjourned at 10:05 am.

HB 522 - VERSION ADOPTED BY BOTH BODIES

2019 SESSION

19-0261
05/01

HOUSE BILL *522*

AN ACT establishing a commission to study the environmental and health effects of evolving 5G technology.

SPONSORS: Rep. Abrami, Rock 19; Sen. Sherman, Dist 24

COMMITTEE: Science, Technology and Energy

ANALYSIS

This bill establishes a commission to study the environmental and health effects of evolving 5G technology.

- -

Explanation: Matter added to current law appears in ***bold italics.***
Matter removed from current law appears [~~in brackets and struckthrough.~~]
Matter which is either (a) all new or (b) repealed and reenacted appears in regular type.
19-0261
05/01

STATE OF NEW HAMPSHIRE

In the Year of Our Lord Two Thousand Nineteen

AN ACT establishing a commission to study the environmental and health effects of evolving 5G technology.

Be it Enacted by the Senate and House of Representatives in General Court convened:

1 New Subdivision; Commission to Study the Environmental and Health Effects of Evolving 5G Technology. Amend RSA 12-K by inserting after section 11 the following new subdivision:

Commission to Study the Environmental and Health Effects of Evolving 5G Technology

12-K:12 Commission Established. There is established a commission to study the environmental and health effects of evolving 5G technology, which includes the use of earlier generation technologies. Fifth generation, or 5G, wireless technology is intended to greatly increase device capability and connectivity but also may pose significant risks to humans, animals, and the environment due to increased radiofrequency radiation exposure. The purpose of the study is to examine the advantages and risks associated with 5G technology, with a focus on its environmental impact and potential health effects, particularly on children, fetuses, the elderly, and those with existing health compromises.

12-K:13 Membership.

I. The members of the commission shall be as follows:

(a) Three members of the house of representatives, including one member from the house science, technology, and energy committee, and one member from the health, human services and elderly affairs committee, appointed by the speaker of the house of representatives
(b) Two members of the senate, appointed by the president of the senate
(c) A member of the public, appointed by the governor.
(d) The attorney general, or designee
(e) Two members of the New Hampshire High Technology Council, appointed by the council.
(f) One member representing the Business and Industry Association, appointed by the association.
(g) One member of the New Hampshire Medical Society who specializes in environmental medicine and is familiar with electromagnetic radiation, appointed by the society.
(h) One member representing the university system of New Hampshire knowledgeable in radiofrequency radiation, appointed by the chancellor.
(i) One member of the cell phone/wireless technology industry, appointed by the president of the senate.
(j) The commissioner of the department of health and human services, or designee.
(k) One public member with expertise in the biological effects of radiofrequency radiation, appointed by the speaker of the house of representatives
II. Legislative members of the commission shall receive mileage at the legislative rate when attending to the duties of the commission.
III. The members of the commission shall elect a chairperson from among the members. The first meeting of the commission shall be called by the first-named house member. The first meeting of the commission shall be held within 45 days of the effective date of this section. Seven members of the commission shall constitute a quorum.
12-K:14 Duties and Reporting Requirement.
I. The commission shall:
(a) Examine the health and environmental impacts from radiofrequency (RF) radiation emitted from the waves in the 30-300 gigahertz(GHZ) range of the electromagnetic spectrum, which falls somewhere between microwaves and infrared waves, and which are required with the rollout of 5G technology.
(b) Assess the health and environmental impacts of 5G technology, which requires small cell towers to be placed at a distance of 250 meters from each other at telephone pole height from the ground and will operate in conjunction with the 3G and 4G technology infrastructure.
(c) Receive testimony from the scientific community including but not limited to physicists and electrical engineers, the medical community including but not limited to cellular experts and oncologists, the wireless technology industry including but not limited to cell phone businesses and businesses working on the development autonomous vehicles which will rely on 5G technology, as well as other organizations and members of the public with an interest in 5G technology
(d) Consider the following questions and the impact on New Hampshire citizens, municipalities, and state government of:
(1) Why the insurance industry recognizes wireless radiation as a leading risk and has placed exclusions in their policies not covering damages caused by the pathological properties of electromagnetic radiation?
(2) Why do cell phone manufacturers have in the legal section within the device saying keep the phone at least 5mm from the body?
(3) Why have 1,000s of peer-reviewed studies, including the recently published U.S. Toxicology Program 10-year $30 million study, that are showing a wide-range of statistically significant DNA damage, brain and heart tumors, infertility, and so many other ailments, being ignored by the Federal Communication Commission (FCC)?
(4) Why are the FCC-sanctioned guidelines for public exposure to wireless radiation based only on the thermal effect on the temperature of the skin and do not account for the non-thermal non-ionizing, biological effects of wireless radiation?
(5) Why are the FCC radiofrequency exposure limits set for the United States 100 times higher than countries like Russia, China, Italy, Switzerland, and most of Eastern Europe?

(6) Why did the World Health Organization (WHO) signify that wireless radiation is a Group B Possibly Carcinogenic to Humans category, a group that includes lead, thalidomide, and others and why are some experts who sat on the WHO committee in 2011 now calling for it to be placed in the Group 1, which are known carcinogens, and why is such information being ignored by the FCC?
(7) Why have more than 220 of the worlds leading scientists signed an appeal to the WHO and the United Nations to protect public health from wireless radiation and nothing has been done?
(8) Why have the cumulative biological damaging effects of ever-growing numbers of pulse signals riding on the back of the electromagnetic sine waves not been explored especially as the world embraces the Internet of Things, meaning all devices being connected by electromagnetic waves, and the exploration of the number of such pulse signals that will be created by implementation of 5G technology?
II. The commission shall prepare and publish an interim and final report of its findings and recommendations. The reports shall:
(a) Outline the advantages of, and risks associated with, 5G technology running in conjunction with the 3G and 4G technology infrastructure.
(b) Develop a strategy, if deemed necessary, to limit RF radiation exposure from 5G or lesser generation technology relying upon electromagnetic waves
(c) Include a public policy statement on 5G wireless systems, which either declares the technology safe or outlines actions required to protect the health of its citizens and environment
(d) Consider alternatives to 5G technology that will accelerate information flow speeds and volumes without the use of electromagnetic waves that emit high levels of radiation
(e) Provide any recommendations for proposed legislation developed by the commission.
III The commission shall submit the interim report required under paragraph II to the speaker of the house of representatives, the president of the senate, the house clerk, the senate clerk, the governor, and the state library on or before November 1, 2019, and shall submit the final report on or before November 1, 2020
2 Repeal RSA 12-K:12 - 12-K:14 and the subdivision heading preceding RSA 12-K:12, relative to commission to study the environmental and health effects of the evolving 5G technology, are repealed.
3 Effective Date
I Section 2 of this act shall take effect November 1, 2020.
II The remainder of this act shall take effect upon its passage.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
10/10/19
8:30-10:30am
LOB 202

Meeting called to order by Rep Abrami at 8:30am.

In attendance: (13) *(each member discussed their backgrounds)*
Rep. Patrick Abrami-speaker of the house appointee
Senator Tom Sherman-president of the senate appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Carol Miller-NH Business & Economic Affairs Dept.
Denise Ricciardi-public-appointed by the governor
David Juvet-Business and Industry Association
Brandon Garod-AG designee, Asst. AG Consumer Protection
Bethann Cooley-CTIA , trade association for wireless industry and manufacturers
Michelle Roberge-DHHS Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee

Not present (1)
Frank MacMillan ,Jr. MD-NH Medical Society Environmental Medicine

Agenda: *(attached)*

I. Approval of minutes from 9-16-19
-minutes were approved with changes to be made for Rep. Wells name to be corrected and to correct quote attributed to Kent Chamberlin in error.

II. Commission in agreement to broaden out to RF effects beyond just 5G.

III. Dr. Kent Chamberlin Presentation: Electromagnetic Spectrum Physics: *(see attached 6 pages)*

- All information/data is transmitted merely as 1s and 0s.
- Everything is electrical in the data transmission system.
- Data rate= how fast you can send information= bandwidth, etc.
- The higher the data rate, the higher the frequency.

- Frequency is inverse relationship to wavelength. Increase frequency, the shorter the wavelength.
- The data rate can be no faster than half the speed of the oscillator for acoustic transmission. Therefore, data cannot be sent very quickly at low frequencies.
  Two fields are generated: Electric and Magnetic fields in electromagnetic transmission.
- Antenna converts voltage to E/M waves or the reverse.
- Wavelength is distance from peak to peak of the wave. The lower the frequency, the greater the wave length, the larger the antenna needed. Need high frequency, shorten wavelength to have smaller antenna.
  We need high frequency for high data rate for small antenna for mobile devices.
- 2.45 Ghz Industrial scientific Medical band.
- 800 Mhz-2.7 Ghz currently for cell phones same as microwave oven frequency.
- 5G is proposed to be 86 Ghz, significantly higher, close to the invisible spectrum.
- Photon Energy =frequency x Planck's constant= to find energy in photons of the frequency.
- Wave particle duality which is part of quantum physics is important to look at for health effects.

Sherman: why doesn't my cell phone fry my hand like a microwave oven if I put my hand in it?

Chamberlin: 1.5 Kw for a microwave is more watts of power than your cell phone. Power drives the heating. Increased power increases photons but energy remains constant. We need to look at Quantum Physics and photons

Rep Abrami: non ionizing vs ionizing?

Chamberlin: We need to look at photons for that. EMR can be represented as discrete packets of energy called photons. If photon energy is great enough to detach electrons from molecules, you have ionizing radiation or heating, if power is great enough. It is a fuzzy line between ionizing vs non ionizing radiation. You will have heating if thermal radiation from microwaves is strong enough.

Sherman: if visible light is that far along the spectrum, why isn't it damaging?

Chamberlin: We know that it is. You are also exposed to UV rays in light like sun or tanning beds.

Woods: Can it be damaging but non-ionizing?

Wells: yes. an example of an egg frying.

Woods: Proton tunneling- protons go from one side to other of DNA which creates a misread or error. Non-ionizing is in that category because hydrogen bonding can be flipped during proton tunneling. Quantum physics. There is a probability it can go through the energy barrier. Be aware, because there are other mechanisms by which energy levels can be damaging but non-ionizing.

Chamberlin: EMF simulation- if we increased the wavelength and it strikes something like wet wood, some of the energy reflects back like radar. Some of it gets transferred into the wood or object. The wave is getting smaller as it enters because it gives up heat and warms the wood. You get heating from within and you do get heating from the outside.

Sherman: Does impact of reflected wave change the amplitude of the incoming wave?

Chamberlin: Yes. It causes a partial standing wave.

-High frequency supports higher data rates and allows for designs of convenient sized devices.

-Relatively (600 mw to 3 watts) low power of cell devices, supposedly won't cause heating.

- Signal loss increases with increasing frequencies which is why they need to be so close to towers.

-Cell phones adjust power output as needed. Cell works harder if signal is weak or antenna is covered. It will pump more EM energy into the user. (22-45 miles) typical cell power distance ranges.

The closer your cell phone is to your body, the power is significantly greater. What goes through someone's head while talking on cell phone? It uses your head as a ground plane before radiating outside, standing waves and resonances within cavities like sinuses. This isn't good. We need to ask. If it's harmful, what can we do about that?

Sherman: Are you saying that human tissue becomes part of antenna or diffuses power into tissue?

Chamberlin: Yes. Your head acts as antenna or ground plane. It excites current inside your skull and causes heating. Is it significant heating? I don't know.

Abrami: original studies in 1990s studied thermal effects. Studies say potential biological effects. As a Commission, we will be about science, not speculation.

Wells: Besides ionizing or non-ionizing radiation, other photo chemical reactions are at play. For example, vitamin D or Plastic beach balls out in the sun. The red ones fade from photo chemical reactions. It is consequential.

Sherman: Seacoast terrible cell service. Does that mean cellphones work at higher level then Manchester? If that's the case, are we getting more of one kind of EMR from cell tower? Or cell phone?

Chamberlin: If cell tower is far away, will not get constant radiation. However, your cell phone will give off higher radiation because it works harder to find the signal. But, we can choose to have a cell phone off or not radiation constantly.

Cooley: with small cells, your phone battery is not working as hard to find signal and works at lower power

Sherman: what are you getting in exposure from that closer infrastructure?

Chamberlin: which is worse? Short high bursts? Or constant low level doses?

Roberge: On your slide, the higher the red in the brain, the higher the intensity?

Chamberlin: yes.

Denise: Does that explain the rise in brain cancer?

Chamberlin: It's a correlation but is that causation? I don't know that answer. We need to look at epidemiology.

Wells: Brain Cancer and reproductive organs don't require big voltage to affect.

Woods: much of our tissue is ionized and that is a natural state. Your bones don't grow or heal unless you have an ionized state. Biological tissue can operate in an ionized state.

Abrami: Some say it's safe because it's non-ionizing But is that a true statement? That's why I bring that up.

IV. <u>Dr. Paul Heroux Presentation, Biological Effects of RF Radiation</u>: *(see attached 6 pages)*

- Occasionally, we make mistakes in public health with uncertainty. Because we did not recognize accurately the danger, In 2007, we changed chromium 6 from 100 to 5 which is a factor of 20 that we misjudged safety. Workers under the old limits have 35% chance of cancer from exposure. The new limits reduced to 4.5%.

-Risk is a part of life. We cannot have zero risk, Important to realize that legal exposure limits are what is known at the time, for the exposed population, and if there are the alternatives should be part of risk assessment for an agent

-EMR standard came about after second WW. U.S. was the only country to produce a standard because they were the only ones who had that capability. The military was the source of deciding that heat would be the criteria.

- Navy, Air Force, Army EMR enormous importance in time of war .. would need radar to survive. Applications involving military were given high priority at that time.
Colonel George Knauf of USAF and Dr. Herman Schwann, bio-physicist, were those making decisions. At that time, it was perceived as non- patriotic to suggest any ban of use of Emfs because of Cold War with what was considered a nefarious power. People gave green light to military which was understandable at that time.

Debating the danger of microwave: 1960-1990. There was a rift in science at that time.

-Biophysicist, Dr. Herman Schwann, using physics thermal guidelines for heating experiments with short 30 minute exposures. His understanding was limited at that time.
-Biologist Allan Frey used biology based guidelines, microwave hearing, blood-brain barrier leakage and chronic 24x7 exposure. Some researrh was fabricated to discredit his work.

Military point of view: yes there is doubt to risk but people in service get hurt all the time. So we err on side of keeping armed forces with best technology available. Lots of things are acceptable in times of war.

USAF standard from 1960 survived more or less in this form as standard today in the US. Interestingly, USAF was 10mW/cm2; General Electric was 1mW/cm2;Bell labs was .1mW/cm2 and the Soviets .01mW/cm2.

Soviets based their standard on nervous system disturbances, not heating. They provided two standards; a higher standard for their military and much lower standard for domestic applications.

The US did not accept this difference USAF, ANSI, IEEE, FCC...standards still based on heating... as being the only dangerous agent. It's not easy to measure real exposure in high frequency. This limited capabilities for biologists to be part of this process.

1966 Health Standards were ultimately developed by 15 people 10 from military, 1 oil, 1 space, 1 General Dynamic, 1 US Treasury and only 1 from Public Health.

Very heavily biased to applications vs biological affects.. are exposures for fighter pilot in F16 appropriate for children in classrooms today?

In commerce and engineering, people are highly motivated to promote product. If someone says, maybe there is a subtle affect related to your product that you have not investigated, most companies will not have the desire nor resources to do so. This is not a recent story. Adam Smith...warned if merchants have their way, they will act in such a way to promote their product... beware. This has lead in the past to public health issues:

-Air pollution is one of these. Air pollution is visible. However, no one realized it until 1952 when 12,000 people died in four days...and that was what finally motivated people because it was obvious.

-Lead: 1930s. They knew at the time it was toxic and GM could have decided to use ethanol in fuel but they knew it could not be patented and you could not make more money. The company decided to use lead instead. You may not die immediately, but your civilization will be inferior as a result... 15 million US children lost 10 IQ points as a result of that decision.

-We should use alternatives, if they exist for public health.

Today an average of three hours a day are spent on mobile phones, texting and internet access. The cell phone has been an incredible success. Schwann or the Colonel did not anticipate the situation we are in right now. This explosion in constant exposure should have changed the risk assessment today.

-We are being exposed to chronic man made waves in a very short span of time. The reason we adapted to the radiation of light is we have had millions of years to adapt. What is less certain is if we are resistant to other forms of radiation like man made technological radiation.

-RF exposure and Low Frequency exposure: all signals that carry data, function in bursts. Many biological effects we detect, refer to modulation at LOW FREQUENCY (non thermal and non ionizing). This is important.
What evidence do we have that this radiation is biologically active?

*Altered enzyme activity, biochemical changes, Oxidative Stress (ROS), pathological cell changes, neuro behavioral effects, DNA damage, Altered Gene Expression, Brain wave changes. (hundreds of research papers)

- Currently, 44% of the world is living under much lower standards vs. US and much of the western world which have the highest standards allowed.

-How did IEEE react to these facts?

Engineers had the notion that public health people are trying to get grants based on the success on the telecom industry. There was a great deal of suspicion as they used research unfamiliar to them. Public health people, doctors and biologists realized they could not bridge the gap between engineering and health.

Dr. Carpenter designed the Bioinitiative Report to establish a better standard. But this group is lightweight compared to interests of industry. Academics are a loose group with very limited means and the results had very little influence. The situation is starting to change in Europe in particular in allowing the exposure to humans.

What is 5g? What does it mean?

-Slice spectrum into tiny bands changing 12.5 times per second your cell phone can change frequency.
- Time domain multiple access in bursts.

-Space segmentation...instead of broadcasting in every direction use narrow beams, 3-10 degrees in width. Tom Wheeler of FCC said it's a wonderful new idea . .but Russians had in 1981 most sophisticated radar.., already in military long time ago but what is new is beam steering and beam focusing. This results in a lot more radiation and information being broadcast for the Internet of Things. (IOT)

- Noise is important. IOT seems like a great idea but it will be a self-fulfilling prophecy. It will be difficult to extract information from all the noise from all the waves constantly radiating.

-Some people think less penetration in the body will result from 5G...but UV causes skin cancer at penetration of .1mm which is less penetration than 5g.

Abrami: pulsing?

-Amplitude modulation... allowed us to send voice over large areas... modulated with voice of person. When FM came along, this allowed us large amount of stations but you had to allow more power. Then, we changed from analog to digital or data as it can be compressed. Now, it is sent as pulses. Are pulses more negative affect than waves? All indications are that they are more biologically active. The irregularity of the pulse creates a challenge to the organism. The organism is hit vs being pushed. Irregularity of the challenge to organism is important.

-3G/4G cell phones. . we had a lot of exposure to these pulses. These bursts are so useful that this was not taken into account. You do not want your phone to use high frequency all the time so you can save power.

Sherman: The difference between 10Ghz and 50Ghz is less penetration but is there increase in intensity of penetration?

Heroux: Yes.You will have more concentration of energy.

-Caution: Phone industry wants to get rid of SAR because they won't be able to sell them because that concentration will raise the SAR above the limits. They will be illegal. They will say power density should be the new standard All that will do is change the location of the cancer in the body as it will be more concentrated. Regulators are coming from the industry to set standards for their products.

- RF in cars is a public health threat. They will become radiation intensive. Companies are more concerned about "features" in car vs the biological effects.

-IOT is dream of engineers to put RF in anything that you can get information from. But they are also taking information from people without authorization.

-We want the capacity but should a company be able to put that in a product without my authorization or knowledge? It has to be controlled.

Abrami: Can you touch on autonomous vehicles? Colleges have grant money to look at it.

- It is NOT TRUE you need 5g for autonomous vehicles.
-Vision and laser scanning are being done at MIT. You need very rapid scanning but it is being developed.

-Engineers are smart. If we tell them to do it safely, they will.
-You don't need 5g for remote medicine although they will say you do because of low latency.
-In terms of humans, low latency does not mean much. It means a lot in a process in a plant or with robots, but not humans.
-Is it possible to non thermally affect cancer cells? Yes. Dr. Heroux's research
ALL cancer cells react to artificial EMF's.
-Low level radiation, similar to cell phone at low frequency have same or higher power of oxygen that can affect the body. O2 is fuel for body that generates ROS but we need O2. However, fields that produce larger effects like cell phones, we can CHOOSE not to have.
-Organs that need the most oxygen are most affected. Cells die more by necrosis than aptosis.
In 1900s rates of disease and chronic disease very different than what we have now.

Abrami: has your research been replicated? Yes... there are hundreds of research papers to support this.

Cell necrosis vs fibrosis:

Sherman: necrosis (cell death) to fibrosis (scarring)

Tissues most at risk ..are brain, pancreas which has high levels of ROS already, diabetes.

-Non thermal effects... RF changes behavior of cells..... which is why we talk about children and digital RF exposure in their lifetime. There are places now eliminating wifi from schools.

-Pregnant women, infants, children: cells replicate quickly, developing tissues are vulnerable, microwaves penetrate young brains more deeply.

- Reproduction and sperm counts are very serious subject but I do not have time to cover all effects.

-You don't need energy to affect biology, they are already ionized.

- According to Prof Martin Blank: DNA becomes unstable from EMR.

Our bodies are electrical machines...the movement of protons tunneling and effect on ATP synthase, which is one of the most sensitive places in the body result from EMR.

-Importance of cell phones are so great people are not willing to act on risk. We need to find a way to maintain function and minimize the risk

-if you expose brain to EMR; penetration of albumin in brain= egg white which carries toxins so now you have toxins carried into the brain. Alan Frey detected permeation of blood brain barrier. The lesions were occurring have pattern have no connection to simulation by a physicist. It means there is penetration of albumin into the brain. 50% of protein in blood is albumin. It is used to capture toxicants of all sorts so your body is not affected too rapidly. It captures it and releases slowly so you aren't shocked. When albumin goes into brain, it carries all toxins that you carry in body into your brain. It is not a good thing and happens in a very short time.

Ramazzini & NTP studies.... Yes... DNA damage & cancer particularly, in nervous system.

Wells: EMR studies with plants? Yes...There is a lot of literature even with visible light The visible light is not a grave problem because we have evolved over millions of years... tissues can adapt over time. .rapid changes we cannot adapt to.

Abrami: We ran out of time. Dr. Heroux, you may finish your presentation at our next meeting.

Next meeting will be Thursday, Oct 31st at 9 am.

Nov 1st ,first draft report due

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V. Meeting Adjourned at 10:30 am.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
10/31/19
9:00-11:15am
LOB 202

Meeting called to order by Rep Abrami at 9:00 am.

In attendance: (12)
Rep. Patrick Abrami-speaker of the house appointee
Senator Tom Sherman-president of the senate appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
David Juvet-Business and Industry Association
Brandon Garod-AG designee, Asst. AG Consumer Protection
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee

Not present: (2)
Frank MacMillan, Jr. MD-NH Medical Society Environmental Medicine
Carol Miller-NH Business & Economic Affairs Dept.

Agenda: (*attached)*

I. Approval of minutes from 10-10-19:
-minutes were approved with changes to be made for proper spelling of Bethanne Cooley and Michele Roberge.

II. Webex (NIEHS) National Toxicology Program Study Presentation

Presented by Dr. Michael Wyde, toxicologist and Dr. John Bucher senior scientist and former Director of NTP Division, in the Division of the National Toxicology Program at the National Institute of Environmental Health Sciences (NIEHS), which is a part of the National Institute of Health.

- Interagency program (NTP) was established in 1978 with the: National Institute of Environmental Health Sciences, National Institute of Occupational Safety and Health, FDA (National Center for Toxicology Research).

- The NTP's mission is to evaluate agents of public health concern by developing and applying tools of modern toxicology and molecular biology.
- Their scope of work includes: research and testing agents of public concern; conduct literature-analysis activities to identify cancer and non-cancer human health hazards; develop new approaches to better predict how agents affect biological responses and communicate results to multiple stakeholder groups through technical report series, journal publication and the NTP website. (https://ntp.niehs.nih.gov)
- In 1999, the USFDA nominated radiofrequency radiation (RFR) of wireless communication devices to NTP for study.
- At that time, there were 100 million users. Today there are over 310 million Americans and 5 Billion worldwide, exceeding the number of people.
- Biological effects have been reported in cell-based tests and in laboratory animal studies. However, animal studies have not consistently demonstrated increased incidence of tumors at any site associated with exposure to cell phone RFR in lab animals.
- There are challenges and logistical issues associated with RFR study.
- According to FCC, RFR limit is 1.6W/kg. Needed to design a new way to expose to RFR for research. Study focused on 2G and emerging 3G technology at the time.
- Used reverberation chambers as recommended by National Institute of Standards and Technology (NIST): shielded room with RF antenna distributing frequency into the room with uniform exposure. The benefit is that they could control and monitor the exposure.
- Three phase study: 5 day, 28 day and 2 year, alternating on/off for ten minutes at a time and exposed to GSM and CDMA signals for both mice and rats.

NTP Findings:

- NTP's study on cell phone RFR is the most comprehensive assessment of health effects in rats and mice from exposure to 2G and 3G cell phone RFR.
- There was **CLEAR EVIDENCE** that exposure to cell phone RFR caused malignant schwannomas (heart tumors) in male rats.
- There was **SOME EVIDENCE** that exposure to cell phone RFR caused malignant gliomas (brain tumors) and pheochromocytomas (adrenal gland tumors) in male rats in addition to positive findings of DNA damage to hippocampus and equivocal findings in frontal cortex.
- In mice, equivocal evidence of carcinogenic activity in both male and female and positive findings for DNA damage in the brain in males and blood cells in females.
- Positive findings for lower weight babies exposed in utero for rats and at five weeks for mice.
- NTP uses a 4 level scale: no evidence, equivocal evidence, some evidence, clear evidence.

- Final conclusions represent the consensus of NTP and a panel of external scientific experts who peer reviewed the studies at a public meeting on March 26-28, 2018. Two technical reports: TR 595 (2018) and TR 596(2018) Note: these findings should not be directly extrapolated to human cell phone usage because they were done at higher exposure and to the whole body during research.
- NTP Publications published in journals: 2017 in IEEE and in Bioelectromagnetics in 2018.

Goals for further study:

- Address issues raised in peer review and do follow up studies.

-Smaller scale exposure facility and quicker time frame to get data out.

-Use newer technology: 3G and 4G

- 5G uses different modulation schemes and frequencies above 60Ghz which behave differently.

- Evaluate DNA damage, establish biomarkers of exposure and probe biological mechanisms for RFR induced effects.

-What role does DNA damage and repair play?

Questions:

Abrami: Was the level 1.6W/kg in 1999? Is it the same today?

Wyde: Yes. It is based on acute exposure based on tissue heating. NO changes have been made in twenty years to the standard.

Abrami: If current standard is 1.6W/kg, where did damage start at the three levels you tested?

Wyde: Heart tumors were significant at 6W/kg showing clear evidence with some at lower exposures.

Abrami: That is well above the standard of 1.6W/kg and I am assuming phones are lower.

Wyde: Theoretically, 1.6 W/kg is the limit for phone which is what device is allowed not the exposure to people. New evidence is that SAR from phones is actually higher than 1.6W/kg. Part of that is because phones are not supposed to be next to your head.

Chamberlin: Reverberation chamber to have homogeneous 1.6 W/kg exposure, but how does that correlate to holding phone next to your head for a human?

Wyde: You have pin point exposure to the head but we don't have data on what that exposure is to all areas of the body at the same time. This is why we can't directly apply results to humans.

Chamberlin: Frequencies for 5G. You mention 60Ghz but I heard 87-100Ghz which is much higher. That is significant. We also have Beth here from industry.

Wyde: I defer to the expert. I am not aware of any intention to move above 60Ghz.

Cooley: I am not allowed to be privy to future deployment plans as a rep for CTIA. I only have information that the public has because of antitrust laws.

Sherman: When we are in a network of wifi/phones like we are right now, is there a certain level of radiation we are exposed to without even using our cell phone?

Wyde: Yes. That is one of our concerns in an increasingly wireless world. What is our background level of exposure when we are sitting in a room surrounded by people with cell phones or a school with wifi? The way we use devices has changed. It's not just a cell phone. Actual exposures is important, not just what a device emits.

Sherman: So to get to 6W/kg in a human holding a cell phone to their ear, could they get to that level or exceed it? Or is it well beyond any potential exposure a human would have?

Wyde: That exceeds what a device is capable of. But independent studies have looked at that showing it exceeding 1.6W/kg.

Sherman: Does exposure increase with increasing 2G, 3G,4G and 5G capable phones?

Wyde: no. the G means generation. (Woods, Heroux shaking heads…YES it does)

Gray: Does the energy emitted by antenna that is absorbed fall off as a cubed function?

Wyde: No, not cubed but squared.

Gray: Area is two planes, three dimensional is cubed. I would think it would fall between those two planes. I will explain later why I asked the question.

Wyde: That is not our area of expertise.

Chamberlin: I am not sure it's relevant.

Wells: Talking about intensity of field as opposed to photon energy. Photon energy definitely goes up as frequency increases.

Ricciardi: DNA damage was found without a degree of body temperature change which means non thermal effect. The FCC limits say that one degree of body heat is considered thermal heating. So what does that say about the FCC limit? Does that mean that this is harmful?

Bucher: That's one of the things we need to look at in the future. One idea is that there is an inhibition of the repair process. DNA damage happens all the time and is RFR slowing rate of DNA repair? We need to look at that.

Ricciardi: I am still not clear. Your study was designed to test non heating damage. You found damage so doesn't that mean that FCC assumption that only heating can cause damage is incorrect and no longer accurate? Would you agree?

Wyde: A lot of people believe unless you heat tissues, you won't see health effects with RF. This study disproves that as we did not have over heating but we did see damage.

Abrami: Dr. Chamberlin hopefully will bring in someone from IEEE to help us understand how they developed those standards.

Sherman: Was there any way to determine cumulative exposure rather than dose related? Or did you not look at that?

Wyde: We did not look at that when we designed studies.

Woods: Question on the structure of cages? What was it made of? Were they metal? They look like a faraday cage. Where was RF measured?

Wyde: That's a very good question. The chamber is stainless steel. Anything in the chamber was non metal so it did not affect the signal. We did not want to heat anything or cause problems for the animals. NIST took measurements to make sure there was uniformity in the whole space.

Abrami: what is a faraday cage?

Woods: Faraday cage is a metal mesh network that prevents RFR exposure to what is inside.

Woods: Why did you use rats and mice? Why were rats started in utero and mice at five weeks? Any animal is much more sensitive in utero to damage. How much of result was attributed to in utero?

Bucher: Traditionally, all cancer studies use both rats and mice. We only use in utero exposure with rats because it's harder to use hybrid mice in utero. By using both, we get more information than we would normally.

Wyde: Part of the reason for in utero, is it mimics human exposure in utero.

Roberge: Were you able to see the difference where health effects occurred, with regard to various levels, knowing your exposure was above the 1.6W/kg that a device is permitted to emit?

Bucher: We need to backup and understand what we were trying to do. We needed to make sure we did not use thermal limits more than one degree of body temperature that animals could tolerate. Different sized animals absorb different amounts. Rats because they are larger, could only be exposed to lower levels because we saw the largest response on the largest animals. They were affected more with strongest responses to RFR.

Roberge: Are you looking at synergistic effects of multiple frequencies in your future studies? Does that influence exposure?

Wyde: yes that is part of what we are looking at. How are people's exposures going to change with 5G? That's very important as we move forward.

Chamberlin: Are the signals realistic by alternating regular modulation, since it's not realistic compared to the pulsed or bursts we are exposed to now. Cell phones don't radiate continuously. Did you look at that?

Wyde: We tried to create scenarios with spikes and ten minute on and off exposures. We had modulating patterns that would mimic conversation on cell phones. We tried to create relevant exposure scenarios.

Bucher: We used actual GSM and CDMA signals that spike. GSM modulation when signals are sent only 1/8 is the spike. That is what we used.

Abrami: Legislators are being faced with push back on small cell towers with 5G at street level and every 250 meters apart with millimeter waves.

Bucher: We are keeping close eye as 5G emerges.

Heroux: NTP study was designed quite a long time ago. Our situation is that we deploy things and the time to assess health impacts is much larger than rapidly evolving technology.

Sherman: Can you recreate background daily exposure to what we might anticipate by increased number of 5G towers in a neighborhood using this model? I would like to know BEFORE deployment.

Wyde: The technology is not capable of doing that with 5G frequency.

Bucher: Our exposure depends upon how we are positioned with respect to antenna. To study 5G and combine with lower level exposure, is an enormously difficult scenario to recreate.

Wells: For base station towers 250 feet apart, the energy density is 5x higher than a cell tower. The depth of penetration in tissue, the higher the frequency have higher photon energy, the amount of energy being absorbed in a thin layer is significantly higher. Would you agree?

Bucher/Wyde: yes. We would agree. But power levels are lower.

Ricciardi: power levels are lower but it's in close proximity 24 hours a day, which is microwave radiation. Would that not heat tissues over time? If so, would we assume 5G would not be safe?

Wyde: No. Our exposure is a function of distance and power levels and other factors .At this point, we don't' know.

Chamberlin: Your category, Clear Evidence. Can you compare that to relative risk?

Wyde: No. clear evidence is a descriptor we use in our cancer studies. It does not relate to relative risk in the human population.

Chamberlin: Are you using P value of .05 as statistically significant value?

Wyde: We look at .05 as cutoff as statistical significance but often the clear evidence findings have a lower P value.

Sherman: We should get their peer reviewed articles. They may have more data in them.

Chamberlin: It would be nice if they could compare it to smoking or something.

Ricciardi: There is an online library at: https://onlinelibrary.wiley.com They just published new findings in October.

Woods: We need to be cautious because we cannot make one to one correlations with humans when we look at these studies. For example: if aspirin (djoxin) was tested today, it would be banned because it causes cancer in mice and rats. So we need to be careful when looking at these studies. Is there a significant difference between a rat and a mouse?

Sherman: We have to be cautious before we extrapolate to humans but we can't test humans without a long period knowing their cumulative exposure. You can't recreate it because it takes 20 years for people to die before we know anything. Hopefully, we will take as much evidence as we have. Because what we have seen in other industry settings with contaminants, we don't know until a lot of people die. They cannot recreate this in a lab. It's a warning on both sides.

Woods: We have to be able to say, we don't know. Some of the other literature, they were criticized for poor standards.

Ricciardi: Ramazzini Institute studies duplicated that study, using very low standards.

Wells: These are very difficult studies to do. The human body is an antenna. Larger animals are more exposed. Humans are much larger than mice or rats. They are studying critters smaller than the wavelength. When we talk about base stations for 4G transmitting at 100watts but KM away, that is much less than the magnitude of intensity from 10's of meters away of 5G antenna, even if it's only 7 watts. A flaw in this study is that they are treating them as chemical exposures. The room has a uniform feel but when it hits the skin, it's no longer uniform. Penetration depth is important. With 5G that's a very thin piece of tissue getting a lot of penetration. It's difficult to study.

Heroux: Mice and rats are only superficially similar. They are used because they are cheap, easy to handle. We know they are different and provide different information. Toxicologists know about these things. That is why they design a model on how to use animals in these experiments, which is extremely complex.

Cooley: What is on the towers is not line of sight technology. Small cells are. They are not beam forming. We will talk about this at future meetings as well.

Sherman: I have a comment on autonomous vehicles. People claim you need 5G for those. My nephew is one of the lead engineers for the Google vehicle, Waymo and he said the very definition of "autonomous" is autonomous. It does not or should not need wireless or power networks to depend upon. I don't think the ongoing claim that autonomous vehicles need 5G, is true.

Heroux: I agree MIT as well has a car that does not rely on 5G. There are many ways autonomous vehicles can operate using: vision, laser scanning, ultrasound. EMR is not required.

III. General Discussion:

We will hear from Prof. Eric Swanson, U. Pittsburgh provided from Bethanne Cooley at the next meeting: Thursday, November 21st at 8:30am.

Interim report: Agreed upon with correction for non-ionizing statement to reflect properly Ken Chamberlin's opinion from his presentation.

IV. Frank Clegg Video: Framing the Issue:

- Former CEO of Microsoft Canada, 40 years in technology sector.
- Current implementation of wireless is not safe.
-5G is not tested.
-Millimeter waves are used by the military for crowd control.
-We are advocates for safe technology, not, no technology.
-FCC is made up of previous telecom, lawyers and engineers not doctors.
-No oversight provided by FCC. Telecom industry is self-policing.
-1996 Telecom act prevents anyone from suing Telecom for health injury.
- Countries like China, Russia, Italy and Switzerland have safety limits 100x safer for citizens.
- Today we have significant exposure in our homes, schools, work and public spaces.
-Many states and cities are questioning safety, while the Federal Govt and some other states are fast tracking 5G.
-Many health and mental health effects, including permanent DNA damage.
-Individual, state and local rights are being passed over to telecom industry. That is a significant and historic power shift in rights. Telecom has over 500 lobbyists.
-Swiss RE has designated 5G as a significant insurance risk.
-Convinced there are safer alternatives available so we can have technology safely.
- We need to advocate for change to allow industry to become more responsible.
-Most important thing you can do is to get educated and educate your family, friends, co-workers, state, local and school officials. Knowledge is power and your power is in your hands.

Abrami: If anyone has any questions for Frank Clegg, we can contact him to talk with us.

That video encapsulates a lot of the issues we are dealing with here.

V. Dr. Heroux Completion of Presentation of Biological Effect:

-Human evidence: two documents that are very detailed human evidence: ELF (power systems) and RFR(communication). Both classified both high and low as possibly carcinogenic Class 2B. IARC repeats old notion that there is no mechanism that supports this. They are great epidemiologist but not cognizant of other things. Anthony Miller is worried about rollout of 5G because he is seeing an increase in student 15-19 increase 1%/year in lethal brain tumors. He would like IARC to go back to reclassify because IARC said there was a lack of animal studies but there are many studies which was the reason for the Class 2B. How many will they ignore? He would like it classified as a class I carcinogen.

-Another study shows with a cell phone one and off, that glucose metabolism is increased in the brain when cell phone is on. This is not thermal or heat related but it is an effect.

- Also troubling evidence on increasing gray matter changes.

-Hypersensitive: those who feel its impacts. In Finland, there is software to plot a path from where they live to where they want to go to minimize exposure to radiation. This software has been downloaded 200,000 times. These people are very real. Contrary to what a lot of the medical community is telling them, it's not in their mind. They are physical reactions and not everyone has same effect, nor should they. That is typical of medicine. One of the reasons is that many of them have variants in Glutathione enzyme which is a major detoxifier. EHS people have variations in this enzyme 10x higher than non EHS. Genes will not allow them to produce effective versions of glutathione transferase. The next generation will likely be more sensitive if both parents have this variant. You see a lot of people with EHS, who also have multiple chemical sensitivities because they share the same detoxification mechanisms.

- Proton tunneling: basic mechanism of action of EMR on tissues. Ionizing argument is beside the point. Biological systems are ionized. This is relevant. Stability of materials is an illusion. Every molecule of water decomposes and recomposes. PH of pure water is 7. This is based on the mobility of protons. In every living system, mobility of protons is very important.

- - Oxidative phosporylation is arguably the most important process in the body. Science did its work on this very quickly after concerns of EMFs on this process. Essential mechanisms of action were discovered of EMFs but ignored. A group of enzymes from 1-5 synthesize ATP. Protons and electrons have to move through our body. EMFs affect the movement of theses affects function of enzymes. When protons and electrons are free, they are vulnerable to EMR especially ELF components. Within Mitochondria, you have a PH of 1. You have the highest electric field. If you apply EMF to this system, you disrupt the flow of electrons and mainly protons. Entry channel is completely hydrophilic. It has the same structure as ice and the way enzymes work is proton tunneling. Through this, the proton is vulnerable to fields as small as 20 nano-tesla as

confirmed in experiments. This is very vulnerable to EMR. The semiconductor industry has devices that work on the same principle. If you reduce ATP activity, electrons have to jump across distances and are vulnerable. There are 400 publications that talk about these effects on enzymes from EMF. These electrons form ROS (reactive oxygen species) and have a hard time functioning. The jumping of charges from one place to another creates a lot of room to interfere with propagation of electrons that support metabolism of cells. The science behind tunneling mechanism is… If you have a quantum of energy of any frequency, you are going to have a change in probability to jump from one place to another. This happens at levels way below thermal levels of FCC.

At Duke University in 1985, research showed changes the function of mitochondria but he was ignored. Nobody reads science or a paper unless someone needs them. The mechanisms and science are there but they are unknown.

I agree with Frank Clegg. We can get everything we want. You don't to fear you will lose your cellphone or go back to the dark ages. We can do this very well. We know engineers can do this.

Woods: Buran zones are happening at mitochondria level.

Sherman: Can we get the digital link to the slideshow?

Abrami: We have a website now where all info is posted.

Sherman: When you talk about impacts at exposure much less than our limit, does is increase cell death in terms of end organ damage?

Heroux: Biology is an electrical motor. We are electrical. Any field is possibly going to interfere with this.

Heroux: I exposed cells to radiation and see how cells died. It's not to kill them but does it change how they die by being exposed to EMF. If you compare the power of fields in everyday life, their ability to kill cells is higher than oxygen, creating ROS. ELF component of Telecommunication signals is a significant component.

It increases cell death and diverts cells toward necrosis vs apoptosis. The cell doesn't have enough (energy) ATP and it gives up and goes into necrosis. EMF has power to increase ROS leading to chronic diseases with inflammation like Alzheimer's and Diabetes. So why add on to the load we already have with ROS? We can control electric and magnetic exposure. If you ask at a hospital how many Parkinson's, are related to EMF exposure? They say none and claim EHS people don't exist at all. It is a part of chronic illness. I am not saying it's all of it but it is a part. We have just gotten used to these illnesses. If you can decrease diabetes 20% by reducing this effect, you will save a lot of money in medical care if you address this issue.

V. Meeting Adjourned at 11:15 am.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
11/21/19
8:30-10:35am
LOB 202

Meeting called to order by Rep Abrami at 8:30 am.

In attendance: (11)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Brandon Garod-AG designee, Asst. AG Consumer Protection
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Carol Miller-NH Business & Economic Affairs Dept.

Not present: (3)
Frank MacMillan, Jr. MD-NH Medical Society Environmental Medicine
David Juvet-Business and Industry Association
Senator Tom Sherman-president of the senate appointee

Agenda: (*attached)*

I. Approval of minutes from 10-31-19:
-minutes were approved with comment from Rep Woods.

II. Dr. Eric Swanson: University of Pittsburgh, Professor of Physics Presentation
(*Here at the request of CTIA but the opinions are his own)*

- There is a lot of misinformation and misunderstanding out there + fear of the unknown= trouble.
- Fear of the unknown is what links past worries like power lines and radio waves causing cancer cellphones killing honey bees to the current ones about 5G and cellphones.
- Millimeter waves (similar to 5G) are used in Russia therapeutically for over 50 diseases.
- It is not plausible that the same radiation can both cause and cure 50 diseases. It does neither. It does nothing.
- It does not affect living things: and I have two main points.

Ricciardi: Experiments with 5G on bees show that bees are affected. Bees absorbed more with higher frequencies.(Scientific Reports: 2Ghz-120Ghz). This could lead to changes to insect behavior over time. Can you confirm based on scientific evidence that these frequencies are safe for pollinators? What credentials do you have to speak to this?

- Swanson: It's scientifically not plausible that these waves have any effect on ANY living thing. Biochemical response of a bee cell to EMR is the same as a rat cell and a human cell. That is my scientific opinion. It's true that EMR does not do nothing.

- As far as credentials… There are two aspects:
- 1. The radiation itself: we understand perfectly since 1875. There are no questions and no ambiguity. This is where I come from.
- 2. The biological response: it's difficult to measure. It's complex and messy. We can explain it all with general physics terms, not fancy biological terms.

Heroux: The IEEE standard is based on resonance between dimensions of humans and for example (70MHz) frequency of radiation. Frequencies that match the size of the bees, the transfer of power will be increased by a large factor. These parameters have been recognized by engineers, physicists, etc. not just biologists. They fly everywhere, not walk on the sidewalks and are likely to go to areas where power densities are very high. In my opinion, you are not showing much concern for the small pollinators that we need to survive.

Swanson: I disagree with everything you said. If you want I can go into details of why. Resonance is in fact related to size of important bio mechanical mechanisms inside of cells. There is a famous paper by Robert Gadera (sp?) from twenty years ago showing these resonance effects just cannot occur. These are not relevant to biology and cannot occur inside of cells. You said bees are attracted to these things. I would love to see the study saying bees are attracted to radio transmitters. Bees are actually attracted to flowers. It's true they don't walk on sidewalks. Transmitters are built where people live, not bees. That means they are even more removed, not closer.

Woods: I want to clarify your idea that the Bees are like rats and humans. We know if we test djoxin/aspirin today, rats get cancer but people do not. Can you please clarify what you mean that they are the same? That seems to break down there.

Swanson: This is a good point. You have to be careful about comparison and I was talking about the cellular level.

Woods: But chemicals are processed at the cellular level.

Swanson: If you are feeding aspirin to a rat vs to a human and if they normalize for the size, I would expect the response of test subjects to be very similar. But it's not what we are talking about here. Chemical reaction is far more energetic than reactions that are relevant to cellphones. Chemicals are like taking a hammer versus a gently tweaking it, like a cellphone does.

Chamberlin: On the previous slide, you mention exposure in some cases provides positive therapy. You are saying that it can't be both helpful and harmful. I disagree. For example, sunshine is a form of radiation. It is both beneficial like Vitamin D, etc. and harmful like skin cancer, depending upon exposure. I disagree with the premise stated there.

Swanson: You are right. There is room for something like this to happen. Like I said, I don't find this plausible and I have a reason why I don't find it plausible but I will get to that.

Abrami: On your electric towers slide, you said were definitive studies disproving health effects . We are trying to get at is, are there definitive studies RF in general whether it's 3G, 4G or 5G. Right now I don't know of any definitive studies saying whether 5G is good or bad. As a legislative body, we are trying to understand. We are blessed with having people in the room who understand these things. We have to be responsible to our public. If a small cell tower appears in front of their house, they will want to know, where is the definitive study showing its safe?

Swanson: Valid question. But those studies were specific to those towers. I completely respect that as a question.

<u>Electromagnetic Basics:</u>

- Electromagnetic radiation is the best understood phenomenon in the universe.
- It is not nuclear radiation.
- It is completely described by three numbers (intensity, frequency, and polarization) which makes it so well understood and so simple.
- Electromagnetic spectrum is a continuum from zero to infinity.

Ricciardi: Are you saying that you do not believe a potential mechanism exists for non-ionizing radiation to harm us?

Swanson: I will get to that in a minute. Do you mind?

Abrami: Let him cover non ionizing radiation and then ask your question.

<u>Health Effects:</u>

- You are well aware that there are health effects on this spectrum.
- UV radiation is dangerous. It's not good to get too many x rays. There are two scanners at the airport and you should go through the mm wave scanner not the x ray scanner because x rays are dangerous if you expose yourself to too many.
- Gamma rays are very dangerous. They will outright kill you.

- Ionizing radiation is damaging because of how it damages things. Your body responds by producing more melanin. DNA regulates reproduction of cells. You could mess with the reproduction of your cell and you get cancer. You don't want to damage your DNA.
- Shorter wavelength waves carry more energy.
- Visible light is just below UV light. Threshold effect between UV light and visible light. We can be in visible light all day and never get cancer because visible light is lower in energy. It is only a bit lower. There is no gradual tailing off. There is a threshold. This threshold effect between UV light and visible light was explained by Einstein in 1905. He won the Nobel Prize for this. That's called non ionizing radiation.
- There is a threshold 1.77ev and 2.25ev or minimal energy needed.
- The important thing: is that there is a photo electric effect.
- You need ionizing energy to remove an electron off its atom.
- When we talk about non ionizing radiation, there is no cumulative effect and there is no intensity effect and no effect on cancer.
- Ionizing is above the threshold effect. Non- ionizing is below on the spectrum.
- It doesn't matter how far below the threshold. Something could be just below threshold or far below threshold. It doesn't matter. The threshold is only thing that matters.
- Non Ionizing radiation has no known effect on the human body other than heat.
- Heat is just heat and motion of molecules.

Abrami: I understand water vibrates to heat in microwave but you wouldn't put your head in a microwave would you?

Swanson: I actually intend to put my head in a microwave next week.

Abrami: You are pulling my leg now, right?

Swanson: no. I am not going to have it at full power and will probably put my hand in. My point is, it's regular heating and what I will feel is my hand getting warm and then I will take it out. It's just like putting your hand on a radiator.

Wells: If radio frequencies that are non-ionizing have no effect, can you explain how radios work?

Swanson: they have no known health effects on tissue except for heating. EMR is absorbed by your skin. About half of it is reflected by the body. Metals are special because the electrons are mobile. Our electrons are attached to a molecule. They are hard to move except the salty water part of the cell. The signal in the radio just turns into heat.

Ricciardi: Thank you for explaining that. Before I ask my question, I want to understand what you said. It sounds like what you were saying is due to oxidative stress not heating. Did I understand that correctly?

Swanson: No. I didn't say any of those things.

Ricciardi: Well then. Are you saying there is no real potential harm for non-ionizing radiation?

Swanson: To the degree that you don't cook yourself, yes.

Ricciardi: There are several studies and if you can debunk them. I have a copy for you.

Abrami: Dr Swanson, can you address these later for time sake during your section on studies?

Swanson: Yes. I will address generic, not these particular studies later.

Chamberlin: I just want to say it's quite a statement and in preparation for service on this commission, I did a lot of work reading published peer reviewed journals and a lot of them DO say there are biological effects. So I am assuming you will address those.

<u>FCC Regulations:</u>

- I want to clarify misconceptions about the FCC.
- The FCC does not conduct experiments. It sets regulatory limits based on the evaluation of relevant literature made by many nation and international agencies.
- One of these agencies is: IEEE which has a rigorous policy creation process.
- I was very impressed with their methodology for how they come to their decisions.
- They are very thorough. They have various working groups where reports go into a committee called sub- committee four.
- Sub-committee four has 125 members in it. They have a broad swath of expertise.
- They looked at 2,200 papers.
- 5G is just part of the spectrum. It's the 30Ghz part of the spectrum. 5G is new. The physics and biology of 5G is not.
- You don't have to do studies at 5Ghz. Where do you draw the line? The difference between 4G and 5G is essentially meaningless when it comes to the response of humans to this radiation.
- FCC has two primary measures: Thermal behavior. IEEE determines thresholds of watts/kg.
- FCC sets its limit 50x lower than the limit detected on animal studies. Based on that they get the SAR (Specific Absorption Rate which should be less than 1.6w/kg) That is an extremely conservative number. I mentioned a heating pad earlier that is roughly 100w/kg.
- Another method is the MPE (maximum permissible exposure) Effects on humans start at 100x higher than the limit.
- Why are there two standards? BC at higher frequencies like 5G that does not penetrate as far in the body so it's hard to measure so they use MPE.
- 5G is called small cell because they are low power and closer together and about 30 feet high.
- Your exposure is about .4% of the extremely conservative limit if you stand at the base.
- It occurred to me that light is EMR and what would happen if the FCC regulated light? Or the sun? They don't for obvious reasons. We can see light. They expect us to react responsibly.
- For a 100W light bulb six feet away, you are at a quarter of the FCC allowable limit in terms of thermal exposure. Three feet away, you are at the FCC limit.
- If you stand outside in the sun, you are at 1600% of the FCC standard for exposure limit.

- The sun would be outlawed if the FCC regulated it.
- Should we worry about standing under a 5G tower? I would say no.
- Another example is the brain. It is a radio transmitter transmitting at the thermal end of the spectrum far higher in energy than 5G. Your body is 85W machine. The brain is 15W. It uses a lot of energy. The brain weighs about 1 kg. So I estimate an SAR of 15w/kg. So thinking would also be outlawed by the FCC whose limit is 1.6w/kg.
- Let's get to what is does to you. It heats the skin up. The higher the frequency, the less it penetrates the skin and 5G is at the very surface.
- 10W/m2 is the FCC limit. Temperature rise at the surface of the skin. According to this model (The Human Body and MM Wave Wireless Communication Systems accepted2015 IEEE International Conference) which shows a rise in temperature for different energy densities. The SAR limit of 10W/m2 results in about .1 degree temperature rise.
- You would have to climb the 5g pole and hug and wait for your skin to rise .1 degrees.
- It would create more heat just in the energy to climb the pole. It's not magical stuff. It's just heat energy.
- Stepping outside or drinking a cup of coffee, you get a larger rise in temperature than irresponsible behavior of climbing and hugging a 5G pole.

Cooley: When you showed the heights of the various towers and small cells, because there will be 5G on towers as well. Can you speak to the difference of towers at 100-200 ft vs the small cells at 20-50 ft. Can you talk about the exposure based on the higher it is, the exposure decreases? I am making an assumption. If you use an average 150ft tower vs a 40ft small cell.

Swanson: If you are asking what would happen if the tower was 40ft instead of 20, then all of those numbers would go down. If you double the height, you go down by a factor of 4 if you are standing right under it. It's not that clean cut. With a higher tower, you have more powerful equipment. It's the same thing with 5G. If it's a 40ft tower, there will be more powerful equipment on that small cell. You have to take that into account. I am speculating that when engineers design the towers, they figure how to get down to 1/1000th of the FCC limit. According to research I just read, there are countries that measured levels at 1/1000th of the FCC limit. It wouldn't surprise me if it ends up being a wash if you double the height.

Cooley: Please clarify a term you used, lens opacity. What is that?

Swanson: It's the beginnings of cataracts.

Roberge: When was the FCC limit set?

Swanson: This is an ongoing thing. I can partially answer this. I know that the IEEE did this in 1996 and did it again in 2005. I believe the FCC monitors these new standards as they come out .But I don't know that they had an official meeting to incorporate all of that. I believe there is something in the news about reinstating a meeting.

Abrami: Yes. We have a paper on this.

Swanson: I believe you know more than I do about this.

Roberge: When they set this, they were only looking at heat effects on the body. Do you know when they look at this again and will that include other biological effects?

Swanson: I wouldn't quite put it that way. They looked at 2,200 papers. They don't just go, oh this one deals with other effects and throw it into the garbage. They take all of it into account. Of course, the things that you focus on are thermal effects because those are easily measurable. Other effects are random.

Heroux: You describe the review process of the IEEE in glowing terms.

Swanson: Yes. It was glowing. I was very impressed.

Heroux: Were you there?

Swanson: Was I there? No.

Heroux: Are you a member of SC3 or SC4?

Swanson: No.

Heroux: You don't go to IEEE meetings?

Swanson: Nope

Heroux: So in other words, your description of this review process is based on what you were told.

Swanson: That's correct and from what I read. Yes.

Heroux: Ok. I was there. I can tell you that this process is far from impartial. I have personal experienced it and if you want, I can tell you how it happened. At the time, I had designed an instrument that measured pulsed EMF. I was part of an epidemiological study at McGill. It was found that all the underground workers exposed to these fields and smoked, systematically died of lung cancer. …All of them. This was done by Armstrong a biostatistician who is now in London. I was charged with informing IEEE of this. I was a member of SC4. I went when Eleanor Adair was presiding and I unfolded what had happened. Eleanor Adair said we will form a committee and we will look at this. There was a separate meeting. They wanted three members to join the president to study this. I was the one who designed the instrument and the only one at the time who knew of the epidemiological study determining this. At that meeting when they asked for volunteers, I raised my hand. Since only two other people did, I thought I am going to be able to discuss this openly in an IEEE committee. I was never called. This reflects the fact that your selection of the people controlling these committees and the literature that you review is very partial. It's not for some conspiracy but because of the fact that there is a natural tendency to assemble similar opinions in a given location. Are you aware that Eleanor Adair, who was president of SC4 for years and yea, at the time that she was supposed to be a judge on whether non

thermal effects occur, simultaneously published a paper in the open literature promoting the idea that we should heat the people rather than houses.

Abrami: Dr. Heroux, is there a question you want to ask?

Heroux: Yes. The review process is very difficult to control and hard to be impartial. I have lived through these difficulties. When you haven't lived through the process, it's very difficult isn't it? to be entirely certain that it's entirely impartial? Would you agree?

Swanson: That is way too generic for me to agree.

Abrami: We are hoping to hear from IEEE, so we can form our opinion on that.

Swanson: Personally, if I formed a subcommittee I would not want one of the paper's authors on the subcommittee. It would be biased.

Wells: can you give us an idea of the wattage of a 5G transmitter and handset?

Swanson: The handsets will be similar to current handsets that operate around a watt. The 5G transmitters are much smaller than 4G. I ask this question many times and I always get the run around. The reason is because different sites and different manufacturers have different specs. Roughly speaking, it's 10-20 watts for the transmitter.

Wells: The function of 5G is communications so how would you relate data rate to intensity and frequency?

Swanson: Those are good questions. One of the major goals of 5G is to increase data rates. Apparently, everyone wants to watch their videos on their cellphones. That's why this higher frequency is needed. The reason these need to be closer together is higher frequencies have trouble penetrating wet air. The more humid it is, the harder it is to penetrate. So they tend to be closer together, low power, high frequency.

Wells: The power density in w/ square meter. Is that a parameter that affects data rate?

Swanson: Yes. Actually it is. The stronger the signal, the more data you can push through. Dr. Chamberlin can probably address this better.

Chamberlin: I wanted to get clarification on the setting of limits. You mention two ways. One is the IEEE going through publications to find out what other people have established as safe limits. You also mention there was an animal study where you expose some sort of animal to increasing amounts of radiation until you saw a change in their behavior. Then, you use a factor of 50 below. Which is it? Do they use both together?

Swanson: I didn't see a conflict there. Part of what IEEE is doing is looking at animal studies. That's one of the things they look at. That's what the IARC looked at as well, animal studies. So they are looking for any effect.

Abrami: But, isn't it just thermal effects they are looking at?

Swanson: No. they look at everything under the sun. These guys review what scientists look at and the only thing that actually sees something definitive is the thermal effects.

Chamberlin: But these are short term studies and that's my concern.

Swanson: They vary.

Swanson: I touched on it before and I will talk about this again on a famous NTP study later.

Ricciardi: I just wanted to clarify something on the FCC. I have a couple of documents stamped from the federal government in 1985. A letter written from the EPA to the FCC and it says they have done the studies on the heating of tissues and explained to the FCC that they needed to do studies on non thermal effects because it can heat chronically low over time. Heating of tissues vs non heating of tissues and only heating was studied when the EPA wanted to go further. The FCC responded by saying they were taking this out of the hands of the EPA and putting it into the FCC's hands. So we no longer have a health agency representing us doing those studies. The FCC is not a health agency.

Swanson: That's right. They are not. They have a committee and listen to what they tell them. They know what they are talking about.

Ricciardi: I think these scientists that have done peer reviewed studies know what they are talking about. How many peer reviewed studies have you done?

Abrami: we are going to get to the next topic.

<u>Studies:</u>

-Everything I have been telling you is consensus, mainstream science.

-There is no fringe aspect, controversy or conspiracy theories.

-In the internet age, it is possible to find a "respectable" source that says anything, from silly to ludicrous to dangerous. There is the flat earth society, pizzagate, and we all know of black helicopters coming in the night to take us all away. It is important to search out consensus views.

-Statements from National Bodies: FCC, FDA, Cancer Institute, Cancer Society (see slide)

-Statements from International Bodies: European Commission, WHO, Health Canada, UK Health Protection Agency, Swedish Council for Working Life and Social Research, Norwegian Institute for Public Health, Australian Radiation Protection and Nuclear Safety. (see slide)

- The Swedes and Norwegians say this is safe. They are most sensible people in the world.

-Here is the upshot. The rate of glioma, which is a rare brain tumor, has gone down in the US. The rate of cellphone use has increased. There is no correlation at all. That is a very powerful statement.

-There is a difference between doing physics and chemical studies and health and nutritional studies. Health studies are very difficult to do and have them be reliable. There are conflicting claims. I can't tell you how many times I have heard eggs are good for you, then they are bad for you then they are good for you. I don't want to give you the idea that science is useless or these people are dumb. Neither of these is true. It's just difficult to do studies on humans. Humans are not great subjects.

- Amgen tried to reproduce 53 landmark studies on cancer. They were only able to reproduce six of them. Bayer Health was only able to reproduce 25% of 67 studies. It's just really difficult to do this stuff.

- Most cited paper of all time in medicine: Dr. John Ioannidis studying studies. He found that 80% of non-randomized studies turn out to be wrong. There are many reasons for this: study biases (to make splashy result), lack of blinding, difficulty working with human or animal subjects, the rarity of effects being sought (trying to tease up very subtle stuff), the expense of dealing with many test subjects. Example: NTP study

- One important aspect is the problem of Multiple Comparisons:

- For example, I am going to examine a lot of outcomes from smoking. I have to conduct my experiment at a certain level of acuity. That's called a P-value. Industry standard for P-value is 5%. The P-value is the probability of observing the effect seen, or greater, given that the null hypothesis is true. Let's say you decide that cigarette smoke is not dangerous. That is the null hypothesis. Then you find your rats are getting lung cancer. Then you would say the probability of rats not getting lung cancer is very low. That implies that you are seeing something. I am going to assume a much tougher standard in my experiment with a P-value of 1%. That means that if I have 100 subjects, one of them has to have the outcome.

What happens in the real world with P-values much higher than 1% is that you could have three studies and they all have outcomes. You could have several different outcomes, not just the one you are testing. What is then reported, are all of the outcomes when in fact it should be none. For example…news clip about powerlines causing brain cancer, leukemia, breast cancer, birth defects, reproductive problems, fatigue, depression, and many others. It's implausible that a single thing causes many things.

- A single exposure causing many outcomes is a sure sign of the multiple comparisons problem! All of these studies find different things. If they don't start replicating each other, you shouldn't pay attention to them.

<u>NTP Study-the claim:</u>

- There is clear evidence that RFR causes heart tumors in male rats
- There is some evidence that RFR causes brain tumors in male rats
- There are problems with the NTP Study: (see slides for detail)
- The problem with the NTP study is the Multiple Comparison Effects.

Heroux theory:

He claims that electric fields from cellphones disrupt proton transfer in water, thereby "influencing the properties of water and the stability of DNA"

- This is a valid scientific question. We should delve into it.
- So what is going on here is something called the acid-base reaction which creates H_3O molecules. There is about 1 H_3O molecule per 10 million H_2O molecules. The extra proton can hop along chains of water molecules. This is called the Grotthuss mechanism. This is normal and is a chemical reaction. What is the effect of an electric field on chemical reactions?
- There is a study by Boxer at Stanford using fields from 2,000,000 V/cm to 100,000,000 V/cm to see a reaction. Cellphones max out at 1V/cm!
- So the physics of it and the chemistry of it say its fine but the magnitude of it says it's not something to worry about. A cellphone is not sufficient to cause any chemical reactions.
-

Chamberlin Presentation: I need to correct or point out what he said.

Chamberlin claim: power per unit area becomes alarmingly large.

- Significance of 1/r2 Power relationship. The implication that having a cellphone in your sports bra (per slide) is definitely not a good idea, I have a problem with. This is misleading.
- There is something called the Frauenhofer distance. The near field and the far field have different laws.
- You need to compare to IEEE localized MPE at 30 Ghz. It's well below that.
- I have to say this is not what is actually going to happen. What is actually going to happen is very complicated. You have to simulate these on computers.

Abrami: We are running out of time. We need time for questions and responses from Dr. Heroux and Dr. Chamberlin on your remarks. We may take you up on your offer to dial in at a future date. You mentioned the WHO but the WHO categorized RF as a group 2B carcinogen. Can you tell me how that works? You said the WHO said there is no problem but they have graded it like lead and thalidomide.

Swanson: Sure I can address. First a technical point. The reason there seem to be these conflicting statements is it is actually the IARC which is a sub portion of the WHO that made that statement.

Abrami: There are many articles saying WHO.

Swanson: Just because they ascribe it to WHO, it's really IARC a sub portion. They do categorize it like lead like you said but also things like coffee, sawdust are in that group.

Abrami: Ok . You made your point on that.

Swanson: This committee (IARC) like IEEE only smaller looked at literature and concluded Group 2B. The standard for that is a very low bar. They made this on two things. The first is a data point on the interphone study in Europe and a collection of studies from Swedish researcher Hardell. The other

studies find no effect. I actually wrote to them and asked them, what are you doing??? What they said was, we are applying the Precautionary Principle.

Abrami: Dr. Sherman would bring that up, the Precautionary Principle.

Swanson: I have written about this. I am fine with the principle. But you can go overboard. It would be prudent not to go outside, not to get on a plane but I do it and accept the risks associated. One thing about the data points on the phone study. They self -reported that the numbers are unreliable.

Abrami: So why then is there a legal notice on RF in your cellphone telling you to keep it away from your body?

Swanson: It's not science. It's precautionary with a flavoring of legalese is what that is.

Abrami: So you are saying there is no science behind that legal notice?

Swanson: Correct. Yes.

Abrami: Let's talk about insurance industry. They recognize wireless radiation as a leading risk and place exclusions not to cover it. What does the insurance industry know that we don't know?

Swanson: I am not qualified. I don't work in industry and don't talk to them.

Heroux: You make a great point of giving a lot of influence to the concept of ionization vs non ionization. So if I take a copper atom in space and I want to extract an electron from it, it will take me a fair amount of energy. Is that right?

Swanson: Yes.

Heroux: We call this the extraction energy from the atom. But if I take a group of copper atoms together, how much field do I need to move the electrons in them?

Swanson: You don't need much. It's easy.

Heroux: It's called the degenerate fermi gas. The fact that you bring these atoms together changes considerably the electrical properties of the material. So you agree with me that if you have a material that has closely packed atoms and the electrons or protons move through the material then a small electric field can influence the motion of charges.

Swanson: Yes. But so we are not confused. We are talking about metal and of course people are not metal. There is an analogous effect on people though that I rarely ever mention where cooperative effects can cause something below the ionization. However, it's extremely rare and I don't feel like I was lying to you.

Chamberlin: I feel epidemiology is going to play an important part in the decisions of this commission. Your slide on gliomas vs cellphone usage is pretty convincing and that may not be the issue. But something that does concern me in the same time frame (1989-2005) is a 32% decline in male sperm

count. That is major and significant. If you look at the studies that have been done, they are pretty convincing even exposing people at low levels below .1W/kg. They are getting statistically significant effects. I am not talking about P-values of .05 but of .001. I am wondering if you are aware of these and it correlates very strongly to wireless networks and cellphones.

Swanson: There are a lot of studies who are going to see an effect and some are going to be statistically significant. The real question is, are they reproducible? I don't look through all of these but every time I do look at one, I see problems and I don't see reproduction every single time. It's just amazing. I thought the NTP study…wow, this is a going to be a good study. Oh my god…they had problems. This always happens. The existence of these studies doesn't surprise me and would concern me if they could be reproduced but they can't. So I have to look at the consensus.

Chamberlin: There were 16 studies where statistics looked good and they all say the same thing. It's global epidemiology 32% sperm count decrease.

Swanson: Let me address sperm count. I use this in my class. There is a problem with studies. They are not based on same criteria or same subjects. About four years ago, the Danish Army did a study and they completely debunked this. There was no effect.

Wells: The Boxer lab slide is that a static field not an RF?

Swanson: Yes. I believe it's a static field.

Ricciardi: You just made a comment that you don't buy into these studies because they aren't reproduced. Many of these have been including the NTP study which was reproduced twice. What peer reviewed studies have you done?

Swanson: I have not done animal studies. I do theoretical studies.

Ricciardi: I find it difficult that you can dismiss all these studies showing biological health effects from cellphone radiation. The international EMF scientist appeal. That's 2,000 reproduced papers of studies over and over again with 240 scientists studying the fields on biology and health. How do you argue that health and regulatory agencies state that there is a scientific consensus that cellphones are safe when so many experts disagree?

Swanson: That's a good question. This thing is called the 5G appeal. These are scientists and doctors in Europe and North America saying let's slow down on 5G. So how many scientists and doctors are there in Europe and North America? They have 260 people out of 26,000,000 that have signed. That's not consensus.

Ricciardi: You misunderstood me. I wasn't talking about a petition. I was talking about 260 scientists doing studies.

Abrami: I think he stated his position already. We are short on time. If you could spend some time later on the phone or webex maybe in a few months. We may have more questions for you and you can finish. (He ended his presentation just before Nasim and Kim).

Next meeting: Friday, December 13th . 8:30 was agreed upon. We will have one speaker and then talk through where we want to go next.

V. Meeting Adjourned at 10:35 am.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
12/13/19
8:30-10:35am
LOB 202

Meeting called to order by Rep Abrami at 8:30 am.

In attendance: (10)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Carol Miller-NH Business & Economic Affairs Dept.
Senator Tom Sherman-president of the senate appointee

Not present: (4)
Frank MacMillan, Jr. MD-NH Medical Society Environmental Medicine
David Juvet-Business and Industry Association
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Brandon Garod-AG designee, Asst. AG Consumer Protection

Agenda:

I. Approval of minutes from 11-21-19:
Minutes were approved.

II. General Discussion:

Abrami: Recommendations will be based on general consensus.
Minority reports can be written by anyone if there is disagreement.
Focus: things that we can do as a state: from as simple as warnings…to ordinances.
There are things going on in our state right now. Dr. Sherman and I are cosponsors in smart meter bill allowing opt out without having to pay a fee to do so.

A. The electromagnetic spectrum discussion on terms such as: frequency, wave length, photon, electron volts, etc. and comparison from radio to Gamma. Frequency is the inverse of wave length.

B. Energy. Radio waves are the lowest electron volts. Gamma Rays are highest at 1.24MeV.Where is the break point? None of this is linear. Science says ionizing radiation which expels electrons from atoms or molecules, doesn't happen until UV rays. However, we have learned that it's actually doing damage below that. The question is: Is the science still out on damage beyond "heat", which is the FCC's standard? It seemed from one presentation that they looked at papers beyond heat so we still want the FCC to talk with us. I will see what we can do.

Sherman: We may be able to inspire them with a nudge from one of our Senators. I would be happy to do that.

Abrami: Kent, I took this from your presentation!

B. Photons: EMR can be represented by discrete packets of energy called Photons.

1. Increasing transmission power will increase the number of photons (although the energy in each photon remains constant).
2. The energy in each photon is proportional to the frequency of the transmission.
3. If the photon energy is great enough to detach electrons from atoms and molecules, it is referred to as ionizing radiation.
4. All the charts that I look at say that happens at UV level.

Wells: When you are ionizing radiation and you remove an electron, you are breaking a chemical bond but you can break a chemical bond at much lower energies. That's why we can see. This is also why humans can photo-synthesize vitamin D. They do it at energies much lower than UV.

Woods: Along those lines, we have to remember, and this is important. This is isolated episodes. However, biological systems work collectively. They diffuse their base energy around parts of a molecule. There is thermal activity already and sometimes can cause a disruption of a bond without anything occurring from anything external. We have to remember that these are terms that we are learning but they are for isolated singular entities. Some electrons are shared by biological systems and are a very different process. We have to go from a single item to a collective and that's a big jump. These are some of the experiments that Dr. Heroux is working with that tries to address that biologic collective entity.

Sherman: One factor…..Transmission power: If I remember correctly, people in industry were saying that each tower would be lower in power because there would be so many, is that correct? My question is: if you increase power, there are more photons but the energy in the photon is proportional to the frequency. So when you increase frequency to 5G but decrease transmission

power, you will have fewer photons but they will each be higher energy. What does that mean to us on the receiving end?

Wells: And the antenna is closer. As 5G single transmitter power density goes down but the number of them is much larger and they are much closer. It‘s like little Christmas tree lights around the room instead of just one bright one.

Sherman: Does that mean that the total amount of exposure will go up?

Wells: Yes.

Sherman: Because of the proximity of the antenna?

Wells: Yes.

Sherman: even though the power is down?

Wells: Yes.

Sherman: The photons will have more potency and you are closer to them.

Wells: They will have larger numbers. The total power of a 5G system has five orders of magnitude which is 100,000 times more intense than a 4G system!

Abrami: This is something we have to focus on. Kent, do you have something to add to that?

Chamberlin: No. I agree with what’s being said.

Heroux: Basically with the beam forming you tend increase the directionality. It’s more focused. With the old systems, they broadcast to a very wide area. So it’s true that the new system 5G will be less power input into the antenna. But the beams will be much more focused and the cellphone will also have the ability. You are talking about very narrow beams that will be directed to you when you use the system so that means increased levels of radiation because of this concentration. The antenna is spending less power because it is not broadcasting everywhere.

Sherman: You just said something that I don’t’ think I put this together until now. When the cellphone is 5G capable, is the antenna putting out the same level of radiation?

Heroux: It’s going to put out the same type of radiation. They are miniaturized antenna in a chip that is implanted inside the phone which you will hold so you will direct the beam to wherever it wants. You will have a more concentrated energy coming from your phone. The radiation pattern will be fundamentally different.

Sherman: So will it be 5G level radiation be coming out of your phone?

Heroux: Yes.

Abrami: Ken wants to talk about antennas after we get through this.

C. Specific Absorption Rate: power absorbed by mass of tissue=energy is absorbed by the human body when exposed to RF/EM field=Watts/kilogram. US cell phone standard is: 1.6Watts/kilogram or less.
D. IEEE/ICNIRP 209 standards are still the same basically what the FCC uses.

Dr. Swanson said that the FCC reviews biological standards as well, not just heat. We really need to speak with FCC on this.

Chamberlin: I thought my question to Dr. Swanson was pretty direct. I asked him which of the two approaches setting standards, did they use. One he described was on animal studies exposed to increasing radiation until their behavior changed, divide that by fifty and you come up with a standard. That was one way. He also said they relied on publications written but he didn't say which did they use? He said both but I don't feel like I got my question answered. If it's the behavior in animals, then that is a short term phenomena and does not address the concerns that we are looking at in this commission where people are going to be bathed in electromagnetic radiation 24x7. I am really unhappy with where we are, with finding out that piece of information.

Abrami: Dr. Heroux, I know you went back and forth with him on this and you were involved.

Heroux: Yes. The FCC cannot try to implement a national standard for radiation without claiming it is taking everything into account. Yet, they don't have biologists on their staff. They have a tradition of being a spectrum allocating agency which is very important for coordination in the country but they are not biologists. A better body to ask is the IEEE. Again, the IEEE is heavily influenced by engineering tradition and I would reinforce the argument of Dr. Woods. All of these things about physics are entirely true and entirely valid. What what we cannot forget are that biological systems, the fact that we think and we act are processes. These processes involve manipulations of electrical charges in our body. These processes fundamentally move electricity around in our body. Those are unstable processes that can be influenced by vanishingly small amounts of energy. Energy is an immensely valuable concept. But the complexities of biology have been underestimated by engineers eager to serve the public with applications and by the FCC eager to serve commerce.

Roberge: I asked Dr. Swanson a question related to the FCC standard as well. I thought I remembered a conversation about the standard being focused strictly on heating rather than other biological effects. That was my question with him, to understand are they strictly looking at effects of heat or are they looking at other biological effects? I am not clear on his answer. I am not clear if the standard evaluated other studies or just heat. I also thought it has been awhile since they set the standard.

Chamberlin: I would like to interpret what I heard him say. As long as you are below UV Ionizing radiation, the only factor is heating. There is a question about how much heating you can tolerate. That has been the industry mantra on radiation exposure for as long as I have been in the field. I believe that is what they are using as the criteria.

Abrami: That standard hasn't changed much over time, is my understanding.

Sherman: I apologize. I could not be here for that meeting. We are talking about human health effects. This bathing 24x7 is not just on the human environment. It's on the entire environment. Do any of you know if there are any studies on plants or animals and others exposed to this?

Chamberlin: Yes. There is a study that shows that tree and plant health near cell towers is degraded considerably. I have a paper that says that.

Ricciardi: There are many studies and a big study on the damage to bees. I did ask Dr. Swanson because he dismissed the fact that it harms bees. So I handed him the study. It has a huge impact on the environment.

Abrami: Let's pause on that one. There was a study done on bees using twelve hives. Half of the hives, they put cellphones in and in all six, they did not come back to the hive. They got confused and you wonder …why is that? It must have to do with their navigational system. I always thought they had sensors that pick up the Earth's magnetic field. All of a sudden we are going to cloud the Earth's natural magnetic field with man-made different frequencies.

Ricciardi: This one is the exposure of insects to radiofrequency electromagnetic fields from (2-120Ghz), published in Scientific Reports which is the first study to investigate into how insects including the Western Honey bee absorb the higher frequencies to be used in 4 and 5G. The simulation showed increases in absorbed power from 3% to 370% when insects were exposed. This could lead to changes in insect's behavior, physiology and morphology, over time. I did ask Dr. Swanson, can you confirm that these frequencies are safe for pollinators and what credentials he had to speak to this? I don't feel my question was answered at all.

Abrami: This is one I feel we need to follow up on. I found studies on bees at low levels that impacted the number of queen bees produced by 40% something like that, which is significant. Bees are our health, food, etc. It's navigation, which can also be biological. I don't want any of us to sound like alarmists. We want the facts to come out and we want to understand this. But on my list, I think bees and probably migrating birds as well are important.

Wells: there has been a lot of work on homing pigeons, migrating birds and bees. They also use iron to determine which orientation the EM field is. The effect is if you hit the frequency that will make that move, you will make that sense blurry or obliterate the usefulness. There haven't been a lot of studies determining what those frequencies are. However, if you confound the major pollinators, that puts all of plant life in jeopardy.

Abrami: yes…that's oxygen and food.

Woods: It's important for us to ferret out in these studies which include 5G because our charge is 5G. We know that that the photon energy is different. The comment that I heard him say was, how many G's do you need to study? We need to study 5G. As we go through this, we need to make sure studies include 5G. The energy is definitely different and we talked about that. Some of the studies do not include 5G.

Ricciardi: There is a recent study this year on 5G in France and Netherlands. They meaured the RF from small cells increased radio emissions from the base stations while decreasing the radio emission from the user. They found that in the area human sickness is well documented and has increased since it's been installed. This is all involuntary exposure hanging in front of people's homes. With your phones, you have the choice to turn off or not own. I have issues about choice and it's a privacy thing, too.

Abrami: The 1/R2 rule. Meaning the further away you are is a physics principle we need to talk about too.

Issues:

- Biological effects of non-ionizing radiation.
- We need to make sure these studies are not flawed.
- We need to find studies that are replicated.
- We need to understand the FCC approach to standard setting. Are biological effects included or not?
- Impact on navigation of bees, birds and other living things such as interference with Earth's magnetic field used for guidance (non-biological).
- Energy level from cell towers and small cells based upon distance. What other factors?
- Legislative activity, ordinances and the courts around the country and the world.
- RF Communication security. It's scary what's going on in China. Facial recognition, etc. Pretty soon you won't need any devices.
- Insurance Issues: why is it insurance companies won't insure this stuff?
- Smart meters on homes.
- Precautionary Principle. Dr. Sherman, I know you think this should apply here.
- Final report will have recommendations for future legislation or public health warnings based upon solid facts. We will come to a consensus. Anybody can write a minority report on any part they disagree with.

Sherman: One thing to consider is looking at all this frequency and power. Are we already beyond the safe level? Is 4G not safe? Is what's out there now unsafe even before 5G?

Abrami: well, we are not going to take people's cell phones. That's not going to happen. To industry, it means money. There are not definitive studies on 5G that there are not health effects. I asked Swanson that. Where are the studies that say 5G is going to be safe? Show us the definitive studies.

Ricciardi: I asked him, are you saying that 4 and 5G are not harmful? He said yes. To Dr. Sherman's comment about already being dangerous, your cell phones already have warnings buried in your phone to not put them close to your head or ear. People really don't know that. It is dangerous. We aren't going to get rid of phones. One solution we may want to consider a right to know law at the point of sale because people will still buy them but they may use them more carefully, just like cigarettes are still sold with a warning.

Sherman: That's my point. If this commission finds out that maybe we have crossed that threshold into what may be dangerous, I think transparency in sharing that knowledge is important. Also with 5G, one of the concerns is everyone will be exposed whether you own a phone or not. Are we already at that point with 4g whether you own a phone or not and is that exposure potentially toxic? That is something where we can at least raise the question.

Ricciardi: Very good.

Heroux: I have a number of comments. I have been in this business for a long time and I want to emphasize the importance of what has happening here and the influence that you are going to have. You are not the FCC. You are not the IEEE. You are not the Chinese government. But, you are a public body that has NO conflict of interest. You can claim that engineers have a conflict of interest because they are pushing products. You can claim that the FCC has a conflict of interest. This body apparently has none. It is looking at data and reality. The discussions that we are having today are incredibly rare. They are usually held in private between individuals. Although New Hampshire has limited power implementing laws and regulation, what you will recommend, will be heard. That can have tremendous influence on the future. I see that responsibility on the shoulders of this committee, as huge…. planet wide, in my opinion. First point!

The frequency range of 5G can be very wide because industry is very flexible in what it does. Some frequencies used in 5G are lower than some used in current systems. Some that have been allocated are much higher. As Tom Wheeler would say, if someone tells you that they know what 5G is, run the other way because not even industry, itself knows. So, we are forced to evaluate electromagnetic radiation as a whole.

About scientific studies: All scientific studies are flawed. You would have to have unlimited money and time to produce one that is not. The weakness of the overall process is that because you can criticize ANY study, a committee that has a philosophy, can get rid of studies it doesn't like. This is a reality that is inescapable. The philosophical attitude of the people assessing science is absolutely tantamount.

Another problem is that the reproducibility of experiments that you are familiar with in engineering or in science is higher than what you have in biology. This is because biological objects are inherently extremely variable. So when you impose the same standards of reproducibility on biology to those of engineering or science, it's extremely unproductive, in my opinion.

The physicists have to bear the guilt of the atomic bomb. I am sorry to say this but electrical engineering will have to bear the responsibility of 5G. In a sense, it's electrical engineering's atomic bomb. Probably the people who can attenuate and manage this are here.

III.Ken Wells: Presentation on 5G malign applications:

Culture of Safety:

It has been said in this room, that little research has been published on the hazard or the safety of these frequencies. I have been involved in hobby auto racing as a driver, pit crew and safety corner worker. I am used to cooperative safety culture that asks, what is the worst thing that could happen? Then you work together to make sure that is very unlikely or impossible. I don't see that 5g is progressing that way. I think we would be wise to take that same approach with high frequency radio frequency.

Is it possible for radio frequency to cause harm?

There is an RF weapon that's called "active denial system: that uses 3.25mm or 95 Ghz band of 5G. In testing, it was able to create a burning sensation in the people it was aimed at in a tenth of a second. It was able to create 1st and 2nd degree burns in less than a second. In one case a subject was hospitalized for two days. So, yes RF radiation can cause harm. From this military experiment, we have evidence that RF can cause pain and injury. I would like to explore what could happen if instead of a cooperative safety culture that I spoke about, that a maligned player either foreign or domestic wanted to pursue a nefarious use of this RF against a civilian population. In theory, could a 5G network of small cells, IOT and devices be weaponized? I think so. This is the worst thing that can happen scenario that we must render impossible.

Physical descriptors of RF. There are three major ones are used universally.

1. Photonic Energy that you can categorize in terms of frequency or wavelength.

2. The intensity of radiation: The brightness if you will. It expresses how much energy strikes an area in a given time.

3. Duration of exposure. The IEEE standard 95.12019 is substantial and you should look in to that document. The research in that describes a quantity called fluence which describes field strength times the time you are exposed to it. It implies that pulses of RF should be separated by a few tens of seconds to avoid damage. That is not currently incorporated in the standard but something I think we need to pay attention to.

Absorption: waves transmit energy from place to place. EMR interaction with matter is frequency dependent. It has three ways it shows that dependency. The first one is heating. Second, is quantum effects with sharp bands particular frequencies that are strongly absorbed by particular atoms and molecules. That is not so well studied.

Third, you have anisotropic effects. Those are not uniform in all directions. Those include things like polarized emission and absorption, tunneling, and we don't really understand the biological role very well. We know they are very important. We know that we can point to these in chlorophyll and DNA.

Membrane bound biological processes like photosynthesis, oxidative phosphorylation (respiration), reproductive fertilization and neurological processes are all things where we think these electronic reactions are happening. There is even some theory by Roger Penrose and others doing research that the human brain might even enlist what is not well understood called quantum entanglement. There could be a role of chaos theory. As Dr. Herox said, very small electrical fields are involved in these biological effects.

On page three, I took measurements from a cell tower. I happened to be hiking and got some readings of a 4G Verizon tower. Dr. Swanson told us that the amount of power was hard to pin down. The manufacturer said it was only about ten or twenty watts. I am not sure what we should believe. Since there is so much variation on it, we need to be able to put a large error safety bar on these values. I am most concerned about the layout of these small cell antennas which resemble a phased array.

A phased array is the way that modern radar picks its direction. Remember that old ones had oscillating antennas. A phased array nothing moves but you change the characteristics of the antenna in order to steer the beam. The hardware layout for small cell 5g antenna areas meets the requirements for a phased array about a hundred meters apart over an entire city. Once this antenna is built, a maligned operator using software could upload to the array to alter its function from the benign communications function to a high powered steerable array either to disrupt communications or to actually be used like this military device. Foster et al say in IEEE 95.1 “The use of multiple steerable beams from 5G base stations will introduce new issues for compliance assessment for future RF exposure risk” which I think is quite an understatement.

I don’t think that we or the FCC, can effectively regulate either operating frequencies or power levels of such an array because today’s equipment hardware characteristics are completely transformed by software. You need only to consider the VW “Dieselgate” cheat to see how software can be used to hide or reveal deeply embedded nefarious capabilities of hardware. Since regulation of wave parameters can’t be done with this array, the phased array deployment has to be blocked by controlling what kind of physical antenna can be built.

We could continue on our current path of allowing maligned foreign entities to sell us 5G equipment or even components that go inside these things. How hard would it be for a remote operator over the internet, to toggle the equipment from its benign communications into another role? This role may operate on another frequency for espionage and surveillance, or to increase the power as a weapon and deny us our Constitutional right for assembly. It would be easy if that maligned capability was built into the hardware that we purchase as a Trojan horse. There is once piece of good news in this. The atmosphere attenuates the signal fairly strongly.

There is a spectrum on the last page. In the mm band, there are really only a few windows. The military application picks the biggest of the three peaks between 1-10 mm at 3.75mm and those are also the same bands you want to use for communications. The Air Force began development of” Active Denial System” in 2000. It used 3.25mm (95Ghz) RF as a crowd-control device whose range was “greater than conventional small arms” (3km). In testing, it could cause “an instantaneous burning sensation” in .1 sec

exposure, along with first and second degree blistering burns on human subjects for exposures of less than 10 secs. One case required a two day hospitalization. It was tested as a 30MW mobile truck-mounted "area denial" system in Afghanistan in 2007. Could a malign player (foreign or domestic cyber-attacker) pursue a nefarious use of RFR against our civilian population? All of this suggests a couple of avenues we could consider.

Prevent the rollout of antenna array that can be used as a phased array. Transmitters should be built using MIL-SPEC US component suppliers, with the same degree of security and oversight used in other weapons systems. Do any citizens in the US ever worry about their constitutional rights, or oppression at the hands of their own government?

Abrami: We need to end here. We are going to have to follow up on your major points.

IV: Tim Schoechle PhD: National Institute for Science, Law and Public Policy presentation:

Schoechle: Computer and communications engineer for 45 years and on the faculty of the University of Colorado for a number of years prior. I'm speaking now for the National Institute of Science, Law and Public Policy think tank in Washington that writes on health and safety issues as well as telecommunications and energy issues.

The purpose of this paper is to give an overview of current technology and both the technology and the policy issues in telecommunication including internet, wired and wireless.

1934 the Telecom Act established the FCC which regulated broadcast radio and telephone service.

1986 The Bell Monopoly (AT&T) was broken up.

1996 Telecom Act revised the 1934 Act. Wired Communications were covered under Title II (common carrier), leaving the wireless and cable essentially unregulated.

1990-2010 Wireless rolled out 2nd and 3rd generation wireless.

What developed out of that was the reincarnation of the Bell Monopoly that began around 2000 which resulted in today's duopoly of Verizon and AT&T. This is not the Bell AT&T.

A major point here is: the massive cost subsidization of wireless by diversion of fiber to serving cellular network. One notable point is Verizon's abandonment of FIOS that it was marketing in 2000.

Abrami: You say there are two major players but what about T-Mobile?

Schoechle: Cable is the third player. It makes it more complicated because it's a wired service and wireless. It's really a trio-poly. The rest is much smaller.

Abrami: Talk about the flow of money and the diversion of subsidization. Are you talking about the charge on landlines that were supposed to be used for optical fiber infrastructure?

Schoechle: The "Book of Broken Promises" is a 600 page book that describes in detail how this diversion took place. The obligation was to upgrade wired infrastructure from the charges that ratepayer money for on the telephone bill. That money was charged against the wired and used for the wireless. It amounts to about 500 billion dollars. Basically, it made wireless look a lot more profitable than it would be otherwise.

The drivers: the need to cell more phones and now its 5G. It's about selling equipment. There has been a slowing on the sale of cellphones. The industry philosophy is planned obsolescence.

The new subsidy is YOUR public rights of way. It's a preemption of local property rights and rights of way that give telecom a grant by right to public property. Over twenty states have adopted legislation to take away the rights of localities which was inspired by if not written by the American Legislative Exchange Council (ALEC). It was written to take away control of states and localities of deciding on this equipment.

The FCC is a captured agency and presently chaired by a Verizon attorney, Chairman Agit Pai. It's not surprising that it serves their purpose.

Surveillance Capitalism: There has been a transformation in the past twenty years that began in 2000 to a surveillance business model. This is really important if you want to understand the telecommunications industry and particularly the IT industry.

It has gone from selling products and services to the new model of trading in personal data. The tail is wagging the dog. The data is more important than what the equipment does. This was developed by Google and refined in 2010. It has been adopted by Facebook, Microsoft, Amazon and now Verizon, AT&T and the entire IT industry. There is a book called "The Age of Surveillance Capitalism" by Shoshanna Zuboff of Harvard University. She has written a monumental piece that details how this occurred and the social implications. You have to understand this to understand why information technology is going where it is today. It is selling data, selling behavior and advertising primarily. It is also selling behavior modification, which has political implications as we know. Selling control of people is where this is headed.

Wireless devices and networks are complex and proprietary. I am going to compare wired and wireless. The wireless is unregulated. It has progressed rapidly. It is extremely complex and changes all the time. Wired networks that are copper or fiber are simple stable technologies and are open. What you have is essentially a generation of wireless technology which is designed primarily to gather data about you. Wired networks particularly optical fiber, are much more secure than wireless.

Some of the risks of the wireless industry:

- Loss of community rights, property rights and rights of way for private corporate gain.

-A loss of revenues that come out of that is essentially a forced subsidization of your community to wireless by giving them stuff they would have to pay for.

-If 5G was not subsidized through this form, it would not be feasible.

-The loss of community environmental regulation is a critical factor. There are a lot of environmental implications to this technology.

-Risk to personal privacy and corporate and government surveillance.

-Risk to public health and safety. Vast literature on this suppressed by industry or ignored by federal regulators.

-Damage to the environment birds, bees, insects, plants, animals, tree, etc. particularly mm waves.

-The FCC limits are obsolete and they have no health expertise and have swept this under the rug.

What can states do?

- Let's get fiber to everybody. Fiber should be the first priority. Fiber is a basic utility like sewer, water, roads, etc. Wireless is an "adjunct service". The fiber should be owned and controlled by the municipality. This should not be privatized. Fiber access is superior to wireless in every respect except mobility. The fed has no policy on this and local power companies and rural electric companies are stringing fiber optic. It offers speed, stability and better privacy, safety in weather events, reliability and it's cheaper.
- Internet access is a necessity to modern life. You can't operate government today without the people having access to the internet.
- Cellular wireless is an energy hog as well.
- Community fiber would reduce the need for cellular wireless.
- Enable community fiber.
- Integration of distributed energy. Fiber will be needed for solar/storage and the future of the electric grid.
- Enable local control of cellular wireless facilities: Initiative in Colorado is repealing ALEX laws passed in 2017 which preempts local legislation.
- California just enacted CCPA (California Consumer Privacy Act). Take a look at this.
- Health and safety studies of EMF need to be supported.
- Enforcement of Environmental Protection laws. The appellate court just overturned part of the FCC order on the basis of its failure to enforce NEPA, the Environmental Protection Act.
- Antitrust enforcement and divestiture. The last thing we should do is allow merger between T-Mobile and Sprint. Fifteen AG's from states have filed a separate lawsuit challenging this merger.

- Read ,"The Book of Broken Promises" and do something about it. There is a case proceeding in the 10th district in Washington, DC in January on this investigation.
- Support the Green New Deal: 1/ a distributive solar micro grid and 2/fiber smart grid and optical fiber nationwide.

FCC has abdicated its responsibility to public health and safety as have other regulatory agencies.

FAA has failed to regulate creating a debacle which could sink Boeing.

California PUC has failed to regulate PG&E, one of the country's largest utilities and is in bankruptcy largely due to the failure of regulators.

Another example of regulatory capture and the revolving door is now we have the FCC's failure to investigate cellphone radiation, safety and their obsolete radiation limits which flies in the face of the NIH Toxicology Program study that shows cellphones can cause cancer.

Abrami: You have reinforced many of the things we have been talking about in this commission. What do you know about what is going on in China and their 5G rollout?

Schoechle: I submitted a paper ," What is 5g and why do we care?" In it, it refers to China. It's a financial driver in China and part of a surveillance state. It takes surveillance capitalism and the capitalists are the government.

Abrami: So we should be concerned about the chips and things coming from China?

Schoechle: It's not just China. Korea is also a major manufacturer. They have become famous for LG, the television that are watches you. Those televisions are sending information to Google and Facebook and who knows where else on the internet. You don't even know that is happening.

Sherman: Is there somebody in the legislature in Colorado that you have been working with who has been translating some of the work you have been doing into legislation or bills?

Schoechle: The majority leader is on board with this. I wrote a 20 page report named "Reclaiming local control over cellular wireless facilities". I just sat down with a member of the House and went over that in great detail. We are looking for a sponsor for that bill. We are in recess right now. I can give you more detail on that if you want to follow up with me.

Sherman: That would be great. I am chair of Senate Health and Human Services. We try to not reinvent the wheel. If there is legislation enacted or in process that seems to be working through the system in Colorado that may be appropriate here in New Hampshire, we would like to take a look at that.

Schoechle: If you send me your contact information, I will try to facilitate that. The big focus in Colorado last session was major changes in energy policy. Electricity, oil and gas have been a major political debate in Colorado and we have made progress on that. Telecommunications will be in our next session.

Heroux: In your report in section 3.3.3 pg. 34, you say most of these sources never turn off and cannot be turned off. I believe you say this in context of IOT. Would you agree that the hardware switch on these devices would allow a person to eliminate radiation and eliminate transmission of information if the user wants to? Do you think it's feasible to implement or to legislate for such a device that would restore an individual's right to privacy and manage his radiation exposure?

Schoechle: That is a good question. The trend in the consumer electronics industry is to develop products that don't turn off. They look like they turn off and you think you turned it off but they are still on. This is a problem from an energy standpoint and from a data standpoint. I think what you are suggesting would be a good idea and we would have to look at how policy would influence the consumer electronics industry.

Heroux: You could design it that the switch is only disabling the transmission. You make it unable to send out data and you eliminate the radiation. You could also say that the fact that it is off, you do not disable the other functions of the device. It is a matter of engineering. We all depend on engineering. This type of switch could go a long way toward protecting privacy and making it possible for Electro-sensitive people to survive. How can this be imposed? Do we need IEEE to promote this? Do we need the Chinese government to promote this? How can this be achieved? You know industry well. If the goal is to restore that kind of power to the individual, what is the path to achieving this?

Schoechle: That is a wonderful question. I will have to think about that. It's not so simple. Particularly, with cloud data, the whole business model on these products is capturing that data. You are asking to change the business model for a whole industry. I agree with you completely. We will have to think that through very carefully but I think there is a path. Maybe the IEEE, but an organization called Consumer Technology Association (CTA) is more likely. I am on the cyber security committee and that would be a good focus for that. We are writing a new standard for consumer products. CTA2088. We also have an international committee that works on this. There is a concept of residential gateway for this as well. We could address it through standards and at least make that an option that people could buy.

Heroux: Since realizing that you are the best person probably anywhere to do this, I assume that we can count on your cooperation to further this idea perhaps in cooperation with the Committee in some form or other.

Schoechle: Absolutely yes!

Miller: I would like to explore your statement on enabling community fiber. You also said community fiber would reduce the need for cellular wireless. I am not sure I agree with that statement since we like to be mobile and fiber is not mobile. The other thing is why do you say community fiber owned and operated by municipalities?

Schoechle: Well, because for the municipality, there is a political process for governing it. If it is provided by a Century Link or Verizon, even if it's fiber, you don't have any control or assurances of net neutrality or if it will be equitably distributed in the community. You don't have that control. It's not something that should be privately controlled.

Miller: You go on to state that cooperative electric utility is a better model in some ways for smart grid which would be enabling fiber to the premise. That is not community controlled either. That's controlled by members through charter but not a community controlled network. So I am not sure what you mean, totally controlled by municipality? Or partnered with an electric coop to disperse fiber? Can you elaborate on that?

Schoechle: My first choice is municipal electricity and municipal fiber together. I consider the perfect model as Longmont, Colorado. They have done both of those. They have the most advanced fiber system in the country. That is preferred. But America is very diverse country. The rural electric associations are called coops. It is possible to go through the coops in a democratic way unlike a private corporation. They are like a Frankenstein monster, out of control and basically ungovernable.

We are looking at a new technology standard Ethernet cable Cat5 or Cat6 copper wire. This can carry data over short distances at the same speed as fiber. This can also deliver DC power. You can plug phones, computers to a USB connector throughout your home so you don't even have wireless in your home. That is coming… a USB connector standard USB3 type C something like that. This will be the new standard because this is the new internal wiring in cars will be gigabit ethernet.

Miller: This doesn't address mobile access. People want to be mobile.

Schoechle: I am saying it will lessen the dependence on mobile. Right now, if Verizon had their way, you would only have mobile access whether you want to be mobile or not. If you have fiber, you will have faster better service and when you are mobile, you have a mobile phone. I have a mobile phone and it's an old flip phone. If I want to do data, I use my laptop plugged in at home. I am not going to do that in a car driving around. People need the choice.

Sherman: I am not sure people would be quite so wedded to their phones if they were aware of the health impacts to themselves and the environment. If you were to take that new USB technology, would you be able to go to airplane mode on your phone and still have complete access to your phone? Would an on/off switch shut down antenna? Like an airplane mode for television or CPAP machine which is now wireless, as well? Would the concept of being able to shut down on all devices be what we are talking about?

Schoechle: Yes. It's analogous to airplane mode. Airplane mode is to prevent radiation for interference with aircraft systems. Right now many cell phones have a feature called wifi calling so you are not using cellular calling but using fiber access or whatever so you are not using cellular wireless network. Of course the cellular operators don't like that but all the phones now work that way. You could plug in your phone when you get in the house and turn off your cellular antenna and still have phone access.

Ricciardi: The town that I live in is entertaining fiber optics. We would have to put it on our ballot for the people to vote. I have two questions: I have heard different things. If we put fiber optic in, would that make it easier for 5G to come to our area? Would that give them a segway to attaching themselves?

Schoechle: That is a very good question. Many of my colleagues and I have arguments about this. Some say you are just going to enable 5G sites by putting in fiber. Well, that's why it needs to be democratically controlled by the people in the community.

Ricciardi: But my understanding is that the FCC can just allow them to come and put the 5G in. You won't have a say as a municipality. If that is the case, we would just be making it easier for them.

Schoechle: They can't make you use their fiber. The FCC ruling is just about siting, not the use of fiber.

Ricciardi: Oh, so it could help you keep 5G away.

Schoechle: The issue is not whether there will be fiber or not. The issue is who is going to own it and control it. That's the issue. If you put it in, you control it. If Verizon puts it in, they decide how it's used. That doesn't stop them from putting in 5G but they have to put in their own. They don't get their subsidy off of us.

Ricciardi: In the state of New Hampshire, our utilities are in the public right of way. There is a NH law that I have looked into. I have been looking into an ordinance for this. That is a factor in our state. It is a little difficult to overcome.

Schoechle: Yes. A lot of these laws were written that way and need to be revised. That's unfortunate. The goal should be Local Control.

Heroux: I have a comment about mobility. We need mobility. The cellphone industry has paid little attention to reducing exposure of users. There are some people who occupationally need to use the cellphone. They don't even have a choice. In other words, I recognize the right of people to accept EMR exposure if they want. However, there are people who do not have a choice to use the devices that are on the market. It is possible to reduce the exposure of a person by a factor of about a hundred if you make the proper engineering efforts to do so. You can have the exactly the same services you have now but your risk would be reduced a hundred fold by design of the antenna and software adjustments to the phone. There will be no loss of functionality however, an enormous loss of biological impact. Industry in the past has not done it. It needs to be told.

Schoechle: I agree completely. That is a very good point.

Abrami: Here's the issue. 5G is a concept that means something different to every one of the phone companies. They are all developing their own version of 5G which makes it hard to track. One thing for this commission will be a Health issue potentially and definitely a political issue is the deployment of these small cells at telephone pole heights in front of people's homes. That becomes a real intrusion. Regardless of what the science says, many people will say, I don't want that. We already know the

battles in our communities to put in a regular cellphone tower somewhere in the town, let alone a small cell in front of a home.

What is your view on that? We have engineers, doctors and toxicologists on this panel so we are having interesting conversations that really should be happening at the Federal level. What is going on in Colorado? Are there deployments of these small cell towers?

Schoechle: Well, yes. Verizon is rolling out in Denver. The issue has not come to Boulder yet. But the issue is what they have done with these ALEC laws and the FCC. They have lawyers that go around and tell city councils and county commissioners… oh…. you need to change your codes now to be in compliance with state and federal regulations. Our response is, let's change those. Of course that is a bigger hill to climb. People are getting up in arms because they are seeing the permitting of these small cells. Just the permitting has raised concern and communities are mobilizing around here. There are over a hundred cities around the country that have bonded together to sue the FCC. They have had some success. In November, there was a ruling in the 10th district. Industry wants to do this because 5G will need a shorter range. People don't realize that 4G and 5G will be bonded together. You cannot separate them. You will have both 4G and 5G. The new small cell sites being put in are 4G which will become 5G as well when they figure out what that's going to be. The technical standards aren't finished, the spectrum isn't allocated. 5G is an add- on to 4G which allows faster data transfer. It does not support voice communication. It doesn't support a lot of the things that your present cellular supports.

They talk about 5G for autonomous vehicles. I think that is a bunch of hype. There are safety issues that have not been addressed at all. It's marketing hype. The term 5G is a marketing term. It is not a technical term.

Sherman: My nephew is an engineer on the autonomous car, Waymo .They have no dependence on the internet. It is completely autonomous. So it's not just hype. It's a lie.

Schoechle: Right.

Abrami: Thank you for your time.

Schoechle: I would like to connect with the commenters. Thank you. I like the idea of technical standard approach to devices.

V. Next meeting: January 10 8:30-10:30 Devra Davis and Theodora Scarato

We are now going into Legislative Session. We need to do meetings on Monday or Friday. What about professors? Friday seems to work best.

VI. Meeting Adjourned at 10:35 am.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
1/10/2020
8:30-11:00am:
LOB 308

Meeting called to order by Rep Abrami at 8:30 am.

In attendance: (12)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Carol Miller-NH Business & Economic Affairs Dept.
Senator Tom Sherman-president of the senate appointee
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Brandon Garod-AG designee, Asst. AG Consumer Protection

Not present: (2)
Frank MacMillan, Jr. MD-NH Medical Society Environmental Medicine
David Juvet-Business and Industry Association

Agenda:

I. Approval of minutes from 12-13-19:
Minutes were approved. Unfortunately, the minutes were posted on our website prior to approval. We will make sure that does not happen again.

Abrami: Discussion about subcommittees and members meeting outside of the regular meetings. Small groups are allowed under the rule is 50%+1. If groups are larger, we will have to develop subcommittees.

II: Theodora Scarato, Executive Director Environmental Health Trust:

Environmental Health Trust is a scientific think tank. We coordinate with scientists all over the world on issues such as wireless, climate change and environmental health issues. Dr. Davis has long worked on climate change, toxic chemicals, environmental possible causes of breast cancer and toxins in the environment. I have a lot in a power point. I hope it will be useful for you. I will not get to everything in here as my focus will be on policy.

At EHT, we publish research and brief policy makers as well as develop educational campaigns for people and for parents on how do you reduce exposure. I have a lot of materials. The most recent paper I published was with Frank Clegg, former Microsoft Canada President. There are links to all of this and more in the power point and it's all hyperlinked.

The Babysafe Project: There is a campaign that we have co developed with Grassroots Environmental Education is called the Baby Safe Project. This campaign has been signed on to by over 240 doctors and scientists and educators, to reduce exposure to pregnant women and developing babies because of research showing brain impacts. Dr. Hugh Taylor, who presented at the press conference for this campaign talked about his research showing damaged memory and increased hyperactivity after cellphone radiation exposure to pregnant mice. There is other research that Dr. Davis will go into as well showing impact on brain cells to what would be legal exposure limits of radiation.

Many pregnant women take the phone and rest it on the abdomen because they don't know. People don't know to keep the device away from the abdomen or use safer technology and you won't get that exposure. I have a quote from Dr. Taylor, chief of Obstetrics at Yale. That might be someone that you would be interested in having to talk about his research. He has a quote:" I am deeply concerned about growing exposure to cellphones." There is a video online at the BabySafe Project where you can watch him talking about this with recommendations on how to reduce exposure.

Wireless and energy consumption: Health and environmental effects of 5G are not just about the radiation, it's also the energy consumption from all of these devices and all of the additional small cells. There is a French climate think tank report (The Shift Project) which talks about the explosion of energy use. Even though there are energy efficiency gains, they are not keeping up with the amount of devices and these new installations, which create an increase in energy use. They document that as well as the environmental effects and every part of the life cycle of devices. For example: You have conflict minerals, e-waste from disposing devices and energy use of the manufacturers. All of these are polluting our environment. This report has a short two pager which is useful for the highlights.

Insurance coverage: I know that one of the questions of the commission is: why don't insurance companies cover damages from electro- magnetic field exposure? As you probably know, in the annual reports of almost all of telecom companies are statements to the shareholders such as " If radio frequency emissions from wireless handsets or equipment on our communications infrastructure are demonstrated to cause negative health effects, potential future claims could adversely affect our operations, costs or revenues". "We currently do not maintain any significant insurance with respect to these matters."

We have a page on our website linking to all the annual reports with these statements. Why are shareholders being warned of potential risks in the future and not people? I got involved almost a decade ago because I am a parent. I did not believe this at all. I knew enough that I had to take some time to dig in and here I am.

We have list on our website that we try to have a repository with compendiums of information that has all the white papers of industry where the insurance companies rate EMF as a high emerging risk. The SwissRE report just came out rated 5G mobile networks: the impact is high. The quote in this report with regard to health effects is: "As the biological effects of EMF in general and 5G in particular are still being debated, potential claims for health impairments my come with a long latency." I think that's most people's concerns here.

The Harvard Center for Ethics Report: What's going on here? If there are all these studies showing adverse effects, why isn't there the follow up that we would all expect from an exposure this great? In this report, the investigative journalist talks about money that has gone to Congress and the way that the FCC has former telecom executives as commissioners and also when you retire from the FCC, many commissioners end up working for the industry. This is all documented and he also talks about the correlation to Big Tobacco. "It is these hardball tactics that recall 20th century Big Tobacco tactics." This report is from 2015 and I really want them to update it because so much has happened since in terms of this issue with the revolving door. The title of the report is: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates by Norm Alster. There is also published research that has found industry involvement affecting the quality of the results, the design of the studies, sponsorship and publication bias just like there would be in most industries. The consulting firms of Big Tobacco are now working with Big Tech. There is a report out that we are looking at a 12.3 trillion dollar market.

Revolving Door: This is a slide that I made showing the Former FCC Chair, Tom Wheeler was the former head of CTIA, Ajit Pai, the current FCC Chair was formerly a Verizon counsel, Brendan Carr, FCC Commissioner who was a former lawyer for Wiley Rein LLPP who represented the Wireless Industry in suing San Francisco for their Cell Phone Right to Know Ordinance. Bruce Romano, Asst. Legal Chief in the FCC's Office of Engineering and Tech went to the law firm of Wiley Rein representing the CTIA.

Short Timeline of US Regulatory Action on RF and Human Health: This is probably one of the most important slides that I have. You don't have it in your packet.

Abrami: please give us your non PDF versions of your files that we can click hyperlinks.

Scarato: I will do that. This is just a short timeline. It does not have everything in it.

In the 1970s-1990s, the EPA had a robust research program tasked with developing RF safety limits.

1996: the EPA was defunded and told that they could not work on EMF as they were set to release their phase one of safety limits which was on heating effects. The second phase was supposed to be on non-thermal.

1996 FCC adopted RFR exposure limits based largely on limits developed by industry and military connected groups (ANSI/IEEE C95.1-1992 and NCRP's 1986 Report).

We adopted those limits without our experts setting what is a safe limit? What is a safe limit for long term? What is a safe limit for children and pregnant women? Later in 2008, the National Academy of Sciences did a report documenting gaps in our understanding of the issue. What is going to be the impact of children exposed for a lifetime? That is my number one question. My background is as a social worker and I directed programs in schools. I worked with a lot of kids who were born of crack addicted parents. I know the differences between the kids. You have trauma, brain impacts from prenatal exposure. Kids who have been adopted and we know their history. That's what really brought me into this too. Knowing the challenges of my clients and knowing the impact that brain damage can have.

2001: GAO report and letters from experts in government saying there were problems with these limits. Those were not responded to. In 2008/2009, there were Congressional hearings on cell phone radiation.

2012: GAO Report: " FCC cannot ensure it is using a limit that reflects the latest research on RF energy exposure." Reassess RF limits and update phone compliance testing requirements.

2012: H.R. 6358 The Cell Phone Right to Know Act was proposed at the federal level and not passed. When I found out cell phones emitted non ionizing radiation, I thought what?? Why didn't I know that? My kids spent time on the phone because long distance was free and I spent hours on the phone talking to my girlfriends. I just wish I had known and I could have made that decision.

2013: FCC open inquiry proceedings (in response to GAO 2012 report) We have links to the docket and the submissions, doctors, scientists, industry, cities, lawyers.

2018: GAO listed status of the 2012 report as "closed/not implemented". But just recently, the FCC issued an item closing the inquiry, saying there is not science that says we need to update our limits. They based that on the FDA's opinion. There is a three page letter in the docket. You can see all of these.

Abrami: Just so you know Theodora, one of our goals is to try to get someone from the FCC to actually talk to us. We are a state. We are not the federal government. But I am not going to give up trying to get someone from FCC to answer our questions.

Scarato: I would hope the FCC as well as the FDA would answer your questions. We have questions. Scientists have been writing letters. I have a slide on letters that have not been responded to. I believe the American people need to have answers to these questions. What the FCC did on Dec 4, 2019 was to say there is no need to update the limits, "that we decline to revisit our RF exposure policy as it pertains to children". "Similarly, the FDA maintains that the scientific evidence does not show a danger to any users of cell phones from RF exposure, including children and teenagers" even though there was a submission in the docket on damaged brain cells.

There were submissions that said the testing of the phones should require zero spacing. They don't think that they need to. They think the information in devices is adequate to inform people of these issues. I think I am pretty smart and I did not know that information was there. I have a Samsung Android and I cannot find my SAR testing easily at all. It is not in my phone. It is not listed online. The only way is to go to the FCC and type in your model and make to figure it out. That is not adequate. I would expect more of our government.

Gray: Mr. Chairman. I do object to some of this testimony. Let me explain why. A lot of the testimony that we are getting right now is: somebody wrote a letter and we didn't get an answer. Somebody else wrote a letter and we didn't get an answer. I have sat through many hearings on vaccines and listened to this electromagnetic radiation all the way from when I was a teenager and we were worried about the power lines. I would love to hear the data that you have got. The experts from the FCC have said there is no scientific data out there. That's what I am interested in, the scientific data that deals with 5G, because that is the crux of this committee. If there is data about the scientific problems with 5g then I want to hear that but I don't want to hear that I wrote a letter and I didn't get an answer.

Abrami: Well, I don't disagree with you. We are trying to get at the essence of this. I want to talk to the FCC directly and the IEEE. We are still trying to get at the facts. We have talked a lot about the science on the commission probably more than any other state legislature. I am hearing conflicting things about the FCC. Did they look at biological effects or not? I want to know. It would help us as a commission to understand. As the Chair, I am not releasing a report if the FCC says X and we say Y without data to base that on. People will ask, just like you did. What did you base that on? The FCC says its fine. That's why we have to keep digging.

Sherman: I want to remind the commission that this is our guest. We don't usually shut down a guest because we don't like what they are saying. I would ask that we let her speak as invited and you can be your own filter for what she has to say rather than objecting to her testimony.

Woods: I understand the Senator's concern. But by the same token, even if we have scientific data, we need to know what context or social context this has been interpreted and conveyed. That is just as important to me. If we find that the FCC got a letter and didn't respond and we know there is a study about that, then that non response is important. I understand that data is important but the context and how it is conveyed is also important.

Abrami: The other thing Theodora, you are doing a great job laying this out. This commission is deep into the weeds on this. We don't know all of what you are saying here. We are filling in gaps so continue along your presentation. The other thing we will be talking about with Devra is we need to see that some of these studies are replicated. We can't look at a study and say that's bad if it's not replicated. For me to feel more comfortable, science has to be replicated.

Scarato: She is going to be talking about that. I had read the questions that your commission is tasked with. I was basing my presentation from the policy side based on those questions. I am trying to explain why and give you links to it. For example, the American Academy of Pediatrics sent a letter with concerns to the FCC. I felt it was important to talk about this.

Abrami: I agree. Public policy wise, like you said earlier, most people don't know you shouldn't keep it on your body. I did not know that myself until about a year ago. As a commission, we would really like to see what other states and municipalities are doing if you have that.

Scarato: I can fast forward to that.

Abrami: You may want to do that because we may run out of time.

Scarato: The Systematic Review: This is important. It is a gold standard and I want to point out that is hasn't been done. When scientists are writing letters, one of the questions asked is where is the systematic review? Where is the full report on all the studies and what they found and how to weigh them by independent experts? What does the science say as to what is a safe level? I know that is a question that you are looking at.

What do US Health Agencies say about NTP study? I am pointing this out because I think it's important for the commission to see what different federal agencies are saying on their websites about this issue. For example, on the National Cancer Institute, unless you know what you are doing, you would be hard pressed to even know what this study found. All they say is, "primary outcomes observed…". This is not what most of the American public would even know what that means. The FDA disagrees with findings of NTP yet no systematic review, no report, no citations, no FDA peer review. The CDC says nothing about NTP. EPA says nothing on NTP and sends you to the FCC. The EPA used to actually have statements on their site. We watch all the sites and you can see what they previously said. They had a statement about an open question of safety, but that's been changed.

2014 The Department of Interior letter states "however, the electromagnetic radiation standards used by the FCC continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable to today".

2002 EPA letter to the EMR network of VT: "federal health and safety agencies have not yet developed policies concerning possible risk from long-term, non-thermal exposures"- Robert Hankin, EPA,2002.

FDA: Scientists 2019 letters to the FDA that have not been answered.

NTP: Ron Melnick is a 28 year NIH senior scientist, who lead the design of the NTP study. He has published how there are unfounded criticisms of the NTP and addresses that.

The FCC said testing phones are zero mm is unnecessary. Women put their cellphones in their bra. I can probably find three or four women on the street in DC who carry their phones in their bra because they don't know. Phones are always radiating even when you are not on them. They say that operating instructions are adequate. Kids don't know.

Abrami: Theodora, please for the sake of time, it would be great if you get to what states or municipalities are doing.

Scarato: Montgomery County, MD has a federal court challenge to the FCC. This was filed before the FCC did its filing stating they don't need to update the limits. This case is still proceeding. How can the FCC be streamlining 5G when they haven't completed their inquiry? The FCC should complete the 2013 review before issuing 5G streamlining order. See the links to Putting the cart before the horse-"FCC's 5G first, safety second" policy by Albert Catalan, Eric Gotting and Timothy Doughty, the Journal of Local Government Law. That's one of the lawsuits to know about. I have a link to the filing.

Cooley: Mr. Chairman and Ms. Scarato, I don't mean to interrupt but I think there needs to be some clarification to that slide. The way that you characterize it is that Montgomery County is suing on RF grounds. Montgomery County raised the RF issue in light of the FCC's state and local item with respect to streamlining 5G facilities. I think that's an important clarification for the minutes. I hope I wasn't disrespectful by interrupting you but I wanted to make that point.

Scarato: I hope I was clear on that. What they are saying is, how can you streamline 5G without having finalized the inquiry preceding it or pushing something forward without having done the review?... not that there is a health problem. That is what I meant if I wasn't clear on that.

Cooley: I believe that Montgomery filed again though after the FCC item on Dec 4th. I would like that to be clarified.

Scarato: Oh. I know they are continuing their case.

Cooley: They are continuing their case. I am not disputing that.

Abrami: Theodora, you may want to check that out and get back to us.

Scarato: Yes. I will

Letters from Senators: We have links on our site of senators who have written letters to FCC and FDA, asking for their review on 5G and their letters.

Lawsuits: I wanted to point out two lawsuits: 1/ Irregulators vs FCC and the Fegan Scott lawsuit. Irregulators lawsuit alleges that there was money for maintenance of wired lines that was switched to wireless. I am summarizing. The Fegan Scott lawsuit is about separation distance in phones.

NEPA decision: The FCC's action to streamline 5G, has stripped local authority with regard to infrastructure. There was an appeal by the National Resources Defense Council and Native American Tribes that was won. There needs to be compliance with NEPA (National Environmental Policy Act) for small cell and wireless facilities. Cities and states have argued about amount of caps and leasing spots. There are two separate cases. The FCC has vacated a part of their order saying they do not have to be in compliance with NEPA. So now, small cells need to be certified it meets NEPA requirements. The NRDC did a Q&A about what this means in terms of municipalities. I will provide a link to that.

Federal level: Three Bi Partisan bills on 5G passed the House at the federal level. (H. Res. 575, H.R. 2881, H.R 4500)

Local ordinances: Cities and towns have been coming up with in order to address this because many people say ,I don't want these in my front yard and what do we do? Then they realize they don't have an ordinance in place to handle it. They don't have a permitting process. They don't have any kind of authority. Cities and towns are trying to find out what authority they have and make the most of it. Examples: (City of Los Altos: installation of small cells on public utility easements in residential neighborhoods is prohibited; 500 ft. set back from schools; 500 ft setback for multi-family residences in commercial districts; 1500 ft separation between installations)(Petaluma: 1500 foot minimum separation; No small cell shall be within 250 ft of any residence)(Bedford, NH: 750 foot setback in residential) (Burlington, MA: annual recertification fees; applicant must pay for legal notices of public hearing) (Fairfax, CA: small cells prohibited in residential zones; 1500 ft separation; city to study citywide fiber optic cable network)

Example of issues that come up from lack of infrastructure and permitting/compliance: I will tell you what happened in our town. On this slide, that small cell on private property is illegal even when it was placed on private property six years ago. It was placed there even though the permit was for down the road. The owner repeatedly testifies asking, can you please remove this from my property? Everyone says they can't because no one has authority. It is still there. What is happening is that there isn't the infrastructure that there needs to be to oversee the permitting process that needs to be done. Community members started looking in to this and found several permits that were incomplete and over a dozen that were placed where they shouldn't be placed. Then there is the whole issue on, why can't this woman get that removed from her home? You could have a whole meeting on permitting, review and compliance.

Sherman: I don't understand. We already have utility poles and rights of ways. If this is in violation, why doesn't it fall into the utility right our way or violation thereof and why can't it be removed on existing statute? For example, in Rye there are double telephone poles going in and they are failing to remove the old poles. That's a violation of the right of way and now will be removed. I don't understand why this would take five years if they are in violation of the right of way.

Scarato: I am not going to profess to know all of the details of it. You can watch her present just a few months ago. Every jurisdiction has different policies.

Abrami: I know this isn't the science part of our discussion. 5G means something different to everyone. Different companies are rolling out differently. We are concerned what's in those antennas, how much power is coming from them, how far away should they be from each other, a home or business. Eventually, we will get to that. From a policy stand point, we have to understand the science to be able to make intelligent recommendations Just from an aesthetic standpoint, as a homeowner, I would be upset too. We need to separate the aesthetics from a science too. Some people just don't want it for aesthetic reasons. We are concerned about both because there will be push back. We are trying to get ahead of the curve and understand the science.

Scarato: We all had that question but it's quite complex because every antenna or small cell facility will have different antenna depending on the network using a variety of frequencies. 4G is a backbone of 5G, as I understand it. There is a study that came out that I don't' know if Dr. Davis will talk about. There is a study that looked at small cells in communities and communities without them and found there will be an overall increase in environmental level. Industry will say it's negligible. Scientists looking at biological effects will say it's important to consider, I believe. I don't want to speak for anyone but I know that is what is being put forward. That's a good question. We aren't getting 5G but are getting 4G and they put cells 2-10 homes.

Abrami: Usually, we hear of 5G in mm waves, further up the spectrum.

Scarato: But they aren't going to be using only mm waves. They are also using low, mid and high band frequencies, at least from the CTIA report. All of those frequencies will be utilized in 5G depending on the carrier and location. So, to say it's only mm waves is…

Abrami: Every company is different is my guess.

Scarato: <u>What can cities do to retain their authority</u>? Many cities want to retain as much authority as possible related to 5G. There are now 120 cities in Italy passing resolutions on 5G. In Cyprus, they removed wireless from pediatric units and provide safety information for parents. Internationally, is all online on our website EHTrust.org.

Cooley: Thank you for your presentation. We can talk about what is happening internationally but the US has a unique set of laws. In terms of what cities can do, we have to remember the FCC state and local order is the law of the land. It went into effect in January 2019. Yes, it is being litigated. Oral arguments are February 10th in the Ninth Circuit in Pasadena, CA. As we are looking at policy recommendations, we have to remember there is federal law. There is also the Communications Act section 332, specifically which we should delve into because other states are looking at what they can and cannot do in this space. I want to frame that properly. Yes, there are ordinances around historic preservation, aesthetics that cities can look at. But in terms of legal framework, I don't think New Hampshire would want to be inviting litigation by recommending something that would perhaps run afoul of federal law. On that slide, I wanted to make that point.

Scarato: I would expect that lawyers would assure that local, state and federal law was being evaluated depending upon where you are. There is a lot that you can do and a lot that you can't do. There is a lot that cities can do actually.

Cooley: Yes. Absolutely, I am not disagreeing with that. The only other point I wanted to make. You mentioned a Federal Right to Know law that was introduced in Congress in the early 2000s and you mentioned the San Francisco Right to Know Ordinance which you seem to allude could be something the commission could look at.

Scarato: As I understand, San Francisco continued their arguments and decided to pull out because whoever won would have to pay the court fees and it was not implemented.

Cooley: That's correct. It was never implemented.

Scarato: Also, the Berkley cell phone law did pass which I did not talk about. It basically says that people have the right to know when they buy a phone from a retailer that if it touches the body, it could exceed FCC limits. The Supreme Court let it stand.

Cooley: It was not implemented.

Scarato: Right.

Roberge: On your slide that had cities with protective ordinances, you use the term facilities in terms of setbacks for facilities. Are you referring to antennas?

Scarato: When I said facilities it refers to the installation of equipment and antenna.

Roberge: I just wanted to make sure we were talking about antenna and equipment not a facility as in a building.

Sherman: I have a quick question. With multiple different networks and multiple different carriers in any one municipality are there multiple different 5G networks being proposed? Does each one emit a certain amount of radiation? If for example,you have TMobile and Verizon in same setting,what does that mean for total exposure for the public? Is it double? How does that work?

Abrami: To add to that question. Currently, there are towers with multiple antenna, will there be sharing?

Cooley: Yes, there will be sharing and Theodora made a great point. Carriers will be using different frequencies. TMobile for example, their 5G will mostly be on their existing macro towers. So they are going to be 200 feet in the air vs Verizon or AT&T who might be using the millimeter wave on that light pole. It's not kind of a yes or no answer.

Sherman: If we are in Concord and we have TMobile, Verizon, AT&T all providing service, are we going to have three different networks to which we are exposed all at the same time? Or is it one shared network? The ultimate question is does it mean are we going to have 3X the 5G exposure? And what does that mean?

Cooley: I am not an engineer but the answer is no. Depending on the facility being used, they are going to have different power levels which will change the amount of non- ionizing being emitted. So, it's not really apples to apples to say…. you've got one Verizon, one AT&T , one Sprint and one TMobile because they are probably not all going to be on the same facility because they are using different spectrum frequencies. So, it's not just to say, Yes…. You will increase by four. This is really an engineering question.

Scarato: While that's true, it's also true they don't want to share installations. It came up in Washington, DC. They don't want to share a hotel but that means that different carriers don't want to share an installation. Each will have its network rolled out. You will get the increases.

Cooley: But that's specific to DC. There are locations where hoteling does occur and carriers share one pole. It's completely specific on the network needs and the spectrum being used.

Abrami: We have an engineer right here with a question.

Gray: I wanted to go back and defend my comments in the middle of the presentation. When a guest is asked to come given the criteria, I expect certain things from that guest. I don't expect to get bombarded with health things that are trying to tug on my heart strings, other information that doesn't go back and say yes. We have this but here is the data that I can look at that says this is happening. I've got a lot of people from Health and Human Services coming to talk to me about vaccines that say here is anecdotal information that this person ended up with because of that vaccine. We go through this whole presentation and we say, so what real data did they present at all that says here is this radiation, this frequency of radiation, this level of radiation that caused these things and that is why we are protecting you. So, when we go further than that and you say there are a bunch of cities out there who have regulated placement of antennas. What information did they use to regulate that? If it's clearly identified information then everybody across the country would have done it. Or is it because they were scared? I am on the planning board and City Council in Rochester. There are people there who would like to regulate all kinds of things. It's just like the environmental thing, global warming. Give me data. Don't give me, I asked a question and I didn't get an answer.

Scarato: Dr. Davis will be talking about that data and all that data is on our website. Dr. Davis is presenting the science. I am presenting the policy.

Abrami: Yes, Theodora. You did exactly what I asked you to do. I was trying to get a sense what's going on around the country related to this in terms of ordinances and states taking action and all of that. We, as a commission are doing a pretty good job of not taking things on face value. We are trying to understand the science. This may have not met your needs today on this but we are trying to get as much information on this as we can. I understand your position, Senator Gray. When I talked to Devra the other day, I told her what I want to know is what studies have been replicated multiple times.

We will be meeting through October on this and we will continue to try to bring in the right people. We have the outlines and the picture and we have a lot of filling in to do as a commission. Thank you for your comments but our guests are our guests. As a commission, we do appreciate you coming here.

Wells: I just want to make a quick point from a moment ago, just to clarify the science of electric fields and magnetic fields. When we talk about electromagnetic radiation, they are additive. It does not depend on the frequency you are talking about. It does not depend upon what brand name it is or the locality. It's called the superposition principle. If you have multiple carriers in an area, they will overlap and add.

Sherman: I think that answered my question.

Chamberlin: The 1996 Telecommunications Act says that health effects from exposure to radiation cannot be used for objecting siting. How does that come into play or does it come into play in the legislation you are familiar with?

Scarato: Well, it says that concerns about environmental effects cannot be used in the siting of facilities. This was then interpreted by case law and lawsuits to be health concerns. If there is a community and people only talk about health concerns and the city says because of these health concerns our citizens have, we are not going to site the tower, then they can be sued. People say don't we have a right? How can this be? (Section 704 of the 1996 Telecom Act) I didn't mention this, but at that time, this was the most heavily lobbied bill in the United States. The lobbying only increased after. The amount of money that went into that bill was pretty impressive. I would say that everyone should be able to have their time in court to argue if they have been harmed.

Cooley: I would add that there is litigation just filed yesterday actually in Camden County, Georgia with Verizon. They are suing on the merits of that very issue. The FCC has exclusive jurisdiction over regulating anything that emits RF. So, if a locality does violate that, they may see litigation as we saw yesterday.

Scarato: Several times companies or CTIA have sued and they haven't always won. They haven't always talked about health issues but aesthetics and other things.

Sherman: For my part, I found this very helpful. So, thank you for coming. We are trying to make our decisions on whether or not to move forward or how to move forward based on as much science as we can. You have given us a nice framework on what others are doing in terms of implementing policy. With your help, there has been for me a nice framework on what are the limits of our capacity to do so.

One of the most troubling parts to all of this and you are not the only one who has shared this with us, so you are not alone is that it sounds like the FCC has sole jurisdiction over what happens with the rollout of these networks, yet they are completely in bed with industry.

In the medical world, which I represent, we have a similar problem with pharma and their regulation and the FDA. This is not something this commission can take on but you provided a framework in a nice way to help us understand what are the limits of policy that we could actually consider and roll out if we wanted to provide regulation. Thank you for coming and providing some of that perspective. I think we need both policy and science. So this has been helpful.

Heroux: I would like to address you as representative of CTIA. I just want to drag you out of your comfort zone. As a specialist, I have heard hundreds of reports of deleterious effects of electromagnetic radiation, and you have sat very patiently as we outlined these things in sessions.

What about the positive effects of cellphone use? What I mean by that is, if because of wireless and a cellphone, I can avoid a car trip and then perhaps a car accident. Then surely there are benefits to this,

right? There are benefits to the use of wireless. Has the CTIA supported and documented the benefits to using wireless? After all, we have to balance the negative with the positive.

Cooley: Thank you so much for that question. This is a policy question, right in my wheelhouse. Absolutely, I will do a plug for CTIA.org. Accenture and Deloitte have done host of studies on the benefits of what 5G will bring to this country. Nationally, 3 million new jobs, 500 billion contributed to the US GDP.

Heroux: I am sorry. I don't mean about economic activity because that is dollars that can go one place or another. I am talking about avoiding deaths and diseases. Surely, wireless has substantial capability. I perceive that your industry has not documented these things in great detail but have been driven by an alternative variable, which is commercial success. In other words, if things are bought, people want them. So this is an index on how useful they are. My point is…we love potato chips but we can have trans-fat potato chips. You see where I am going?

Cooley: Yes. The benefits of 5G for remote health care. If you live in a rural area and you don't want to have to drive into the city or remote surgery. AT&T is doing some really exciting stuff. There is the first 5G hospital at Rush hospital in Chicago. There are absolutely benefits to consumers and society and agriculture. Drones survey networks so we can see where people are without service. We need to save them if their houses are on fire so we can communicate with first responders, so yes. There is a ton of research on that and independent agencies as well. I would be happy to provide this commission with those studies.

Heroux: Most of those things like remote surgery doesn't need 5G. It can use fiber optics. What I am talking about is specifics. So you could come up with a report that would document the advantages of wireless specifically independent of data transmission. We have not seen that much documentation on this aspect of it. Ultimately, we will have to balance these things right?

Cooley: I am happy to share those use cases with the commission because I disagree.

Abrami: yes. I would agree.

Cooley: I am happy to share those reports we have right now and there are a host of reports coming out, I think second quarter of this year that are not CTIA. We don't do the research. Other entities do the research. I am happy to share those.

III.Devra Davis PhD, MPH, President, Environmental Health Trust (via speakerphone):

I have been working in science at some of the highest levels for many years. We started Environmental Health Trust when I was at the University of Pittsburgh Cancer Institute, where I had set up the Center for Environmental Pharmacology. I worked as a member of the President's Cancer Panel. I was

confirmed by the Senate. So, I have been around for a while. I have written two books. The most relevant and recent book is “Disconnect: The Truth About Cell Phone Radiation”.

I am going to first explain that when it comes to getting information about any toxic agent whether it is chemical or in this case, RF, we look at experimental studies including *modeling* of exposure. Please understand that that is all we have for exposure. We can’t go inside the brain and actually pick up exposure when it comes to humans. What we can do is use computer simulations that are anatomically based on models of the human brain including specific parts of it that are relevant. I will talk about today, particularly the hippocampus. We can fairly accurately model those. Those models have been validated and are used right now. Some of the models I am going to show you are used to set the standards for surgery or approval of equipment by the FDA.

Then there is *invivo* testing which means whole animals. We take animals and expose them usually over a period of several weeks or some time for two years. Rarely, are animals exposed from before birth to their death.

Next we have i*nvitro* studies which look at cell cultures either animal or human cells to measure DNA damage or other things that happen in cells. Those studies, I want to stress are done in order to predict human effects and prevent them. That is why every drug that you take is subject to animal testing. The same standards being applied to testing drugs have been applied to testing RF. Please keep in mind that everything we know for certain causes cancer in people because we have data for example from asbestos or arsenic will produce it in animals.

In terms of *ecological* studies, we can look at trees and grasses. There are experimental studies as well on bees and other smaller animals.

Finally, we have *epidemiology,* the study of people and I am a fellow at the American College of Epidemiology. I was also a member of the American College of Toxicology. So, I am familiar with both of these overall approaches both, toxicology and epidemiology.

For epidemiology, *cohort* studies are the weakest form of analysis that we have. In the case of what we are looking at for brain cancer, we cannot follow people through their entire lifetime with detailed information. We therefore rely on case control studies of those with the disease and compare those to others who do not have this disease but are otherwise similar.

The next slide shows you a child. It explains that because of the modelling studies that have been done, we can conclude without question, that children will absorb more RF into the brain soft tissue inside the skull and 10x more into the bone marrow of the skull, compared to adults.

<u>Virtual reality simulations:</u> I just showed that to you because virtual reality is a very cool and exciting thing but the way it is often used is with wireless transmissions and when you have a microwave radio right in front of the eyes and frontal lobe, you are getting greater exposure if you look carefully through the top of the skull of the six year old on the right side. You can see much greater penetration into both eyes and we are very concerned about the eyes of children right now from a number of exposures.

Summary of the EU REFLEX Project: The European Union in about 2000, funded about ten million dollars for twelve different research labs in seven countries. They were asked to look at the question of whether or not the same radiation that would be received from cell phones could break DNA in a variety of human cells and by the way including brain cells and human lymphocytes and fibroblasts. The conclusion of that study, much to the surprise of the people doing it, was that they found clear evidence of DNA damage. At the beginning, when they first found positive results, they assumed they had faulty equipment. They had so much money that they went out and bought new equipment to test things. Those of you with a medical backgrounds, which I am pleased to know are on your commission and also part of your legal body there, understand that being able to buy new equipment means you have a lot of money. The results shocked the researchers. They clearly showed changes in gene and protein expression in several different cell lines. Interestingly, they did not show damage in the mature human cell line. Damage was much greater in human fibroblasts and human cell lines that are less mature, stem cells.

Abrami: Can you go back to that slide please? So, they replicated a study that was done in 1994 but it was a 2004 study they replicated again?

Davis: Yes. In 1994, Lai and Singh produced a study showing damage to the brain of the rat from cell phone radiation, DNA damage. They were shocked by the results. They did the study all over again. When they were about to publish the results, the industry engaged in what was called "War Games". That was the strategy and what it was called in 1994. Remember, in 1994, very few people used cell phones (about 10%). People in industry understood the importance of this, went to the journal that accepted the article for publication and tried to get it unaccepted. They went to the NIH and accused the researchers of fraud and went to great lengths to conduct what they called War Games. That was 1994. In 2004, when another group was asked to see if there was anything to this, they were confident they would find nothing. In 2004, they replicated it.

Abrami: This is the EU REFLEX group.

Davis: The Comet Assay: Right but there's more. I'd like to show you more about the replication of the DNA on deregulation of cell proliferation and exaggerated programmed cell death otherwise called apoptosis and genotoxic effects all show from very little exposure. The next slide is a summary from there (The Comet Assay). You can see the sham or the perfect cell on the left is a cell with no DNA damage. When you have damage, you get a common tail. See the tail on the top right and the bottom. In 1994, those tails were only measured by somebody looking at them and giving you an estimate of what percent tail there was. Now we have much more sophisticated ways of automating the measure and extent of that tail. The top right is damage from gamma radiation like you would get from massive exposure from a CT scan which could happen in a pediatric CT scan where the scanner is not properly set. The top left slide is your control. The far right on the top is the impact of gamma radiation from xray like pediatric CT scan gives you that much exposure. The bottom right was what they achieved after 24 hours of exposure to mobile phone like radiation at 1.3 watts/kg.

Abrami: Is that continuous exposure for 24 hours?

Davis: Yes. It was exposure like a cellphone. A cellphone is not continuous. Within four seconds, you get huge changes in power density over time.

Abrami: I am trying to understand how far away that cellphone was from the eyes. This is eyes right?

Davis: No. These are not eyes. These are cells taken from the brain.

Heroux: It is slightly lower than the FCC SAR limit.

Davis: It was below the US current standard of 1.6 watts/kg.

Subsequent work confirms the REFLEX project. They showed clear evidence non- thermal microwaves from mobile phones affected repair of DNA in human cells. They showed the same effects at the GSM frequency of 915Mhz. These studies referenced at the bottom of the slide, were all produced subsequent to the REFLEX Project from 2004, 2005 and 2009.

Abrami: so there are four other studies listed there?

Davis: That's correct.

Sherman: All of those corroborate the findings of DNA damage?

Davis: That is correct. Further, the next slide is from Lerchl.

Lerchl: Lerchl was widely known as a skeptic of any of this. In 2015, Lerhcl started with exposure at conception. The rodent reproduces in three weeks. In a very short time, you can follow these animals through their lifetime. Then the equivalent of early childhood, the animal was injected with a known carcinogen, something that we know causes cancer (ENU). Then, those animals were subsequently exposed to RF exposure. The levels of exposure were .04 watt/kg, .4 watts/kg and 2 watts/kg. What you can see is that the control animal developed very few liver cancers. The ones exposed to the carcinogens developed more. But the ones exposed to cellphone radiation developed far more. Much to the surprise of the investigator, they were able to show that the mice exposed in the womb to a known cancer agent, then exposed to cellphone, had significantly higher rates of cancer, tumors to the lung and liver. The study was designed to replicate an earlier study by Tillman, also of Germany. When he first presented his results, said they were remarkable. His study was ignored. Lerhcl found higher rates of cancer in all of these mice. Also survival times of the animals were much lower of those who were exposed. This was a very powerful replication as well and further replication because you had asked me, Mr. Abrami about focusing on replications.

The NTP study: You already heard about this so I won't go into that. But, I want to remind you that what is on the website of the National Toxicology Program right now summarizes this information. It states clear evidence of tumors in the *heart* of male rats. I want to stress these are very rare cancers. I suppose in a way, that's the good news. There was also some evidence of tumors in the brain of male rats, again rare. There were multiple cancers in other organs, some of which did not achieve statistical significance

but were still elevated. In the NTP study, they said, not only do we have evidence of cancer but precancerous conditions of the heart, meaning damage to the heart. This is quite worrisome.

The publication that came out from NTP shows DNA damage to the *frontal cortex* of both rats and mice. I want to stress that although the cancer showed up only in the rats, the DNA damage showed up in both the rats and mice. There is clear evidence of replication of results of DNA damage. The cancer results are also replications. This is not a one off study.

I want to stress something about the frontal cortex. It's really hard to get mice to make phone calls. That is why the exposure has been carefully calculated not to increase the temperature of the animal but to allow whole body exposure that simulates the kinds of exposures that can occur today.

Slide 14 and 15 give you a much more detailed analysis of NTP. Slide 14 looks at the tail of DNA using computers now. In 1994, they had people who could just look at the tail. Now we have computers to do it. They can score the number of cells in terms of the evidence of fragmentation of the DNA. Zero is your control. You will have some fragmentation of DNA just because that's life. We are breathing. We have sunlight. We get DNA damage all the time. If we are healthy, we eat our broccoli and sleep in the dark, we will have repair of our DNA. This is showing that exposure to CDMA which is a type of cellphone radiation. You get statistically significant damage indicated in the male rat *hippocampus*. The hippocampus is what allows us balance, memory and impulse control. It has been well studied in many different systems and shown to be damaged by exposure to cell phone radiation. Slide 14 is showing you the rat and slide 15 is showing you the mice.

Slide 15 shows the effects to mice are in the *frontal cortex*. In the rat, it was the *hippocampus*. Slide 16 discusses the implication of the NTP result. Dr. Melnick was involved in setting up the study originally in 2008. The study was designed to test whether or not heat was the only effect. They set up a study that did not heat up the animals. That design was carefully calculated by Swiss engineers using methods that are validated, they were able to show results that I just showed you, increases in brain tumors, increases in heart as well as DNA damage in multiple organs in both rats and mice.

Abrami: Is that the replicated study that was done?

Davis: Yes. Smith-Roe is the first author of that study that was just finally published in 2019. Dr. Melnick and I and many others believe that the FCC by issuing its latest order saying we are going to be keeping our 23 year old standard for RF is ignoring this body of evidence I just showed you and more. I would like to show you a little bit more.

Gray: Before you leave that. The radiation that you applied is less than what it would take to heat. What is that in relationship to normal radiation from a cellphone an inch away from the head?

Davis: Thank you for that question. It is the same radiation you would get from a phone and they did it with ten minutes off and ten minutes on simulating the way we are exposed. As you may be aware, even when a phone is in your pocket as long as it's turned on, it's constantly checking for signals from a tower.

Gray: I understood that it was the same radiation. What is the level of radiation? I want to know if the radiation that I would get from a cellphone an inch away from head is a higher level than what these rats and mice would have experienced just below the level that would cause heating.

Davis: Well as a matter of fact. I am really glad you asked that because the answer is we get more exposure from our phones than these rats got. The reason we know that is because I assume you have seen the results of the Chicago Tribune test. Have you?

Abrami: No.

Davis: Theodora, I think you should show them the 60 second video of the test from Chicago. Do you have that? The Canadian Broadcasting Corporation, the French government and most recently the Chicago Tribune have actually taken real phones and tested them. They have found that the phones when in your pocket emit actually more radiation than the NTP study. The NTP test, tested the amount that they are supposed to emit. The Chicago Tribune paid for independent testing at an FCC approved lab. They took phones off the shelf and what you may not be aware of is that the way phones are tested today. They are provided by the manufacturer to a test facility and they select the phone to be tested. There is a whole scandal about that because as it turns out when you do that, of course the phones pass the test. When you take phones that you can buy and test them next to the body, they all fail the current test. (Nine out of ten of them to be precise) They fail it by as much as five fold in the United States.

Sherman: That is significant, what she just said.

Scarato: I wanted to say that when you put a phone near your body, you are getting an intense localized exposure near where the phone is. NTP did that at localized exposure, not the full body number. They wanted to see what the intensity would do to the tissues. This is not a whole body number but a localized number that we are talking about when we are comparing. The FCC occupational limit is 8.

Abrami: So, when they did the test and took the phones off the shelf what did they do?

Scarato: They measured the SAR levels at body contact and at 2mm and the French government measured hundreds of phones and body contact and found excesses of the limit.

Abrami: Most of the public is putting it next to the body because they don't read the fine print.

Sherman: I am trying to get at what is the significance of exceeding by five fold in the Tribune test? What does that mean to us?

Davis: The significance of the Chicago Tribune test should be that it would call for re-examining the whole test approach.

Sherman: So we are basing the emissions coming from phones based upon the tests done by the manufacturers under FCC guidelines but these independent tests in Europe and by the Chicago Tribune

and Canada are showing no, that's not necessarily the case. We may be getting five times that exposure of RF. Is that correct?

Davis: That is perfectly said. Thank you.

Scarato: in high exposure conditions.

Cooley: I just want to add to the record from that Chicago Tribune story which came out in August. The FCC immediately opened an investigation to look into that. On December 19th, after doing their own independent investigation, the FCC published a report saying they tested the same models and found all of them compliant with the FCC exposure limits.

Sherman: This is the FCC that currently has every member as a member of industry, former, future or current. Is that correct?

Cooley: The commissioners. If we are talking about the "Captured Agency" slide that Theodora had. The commissioners don't do the testing.

Sherman: No. But they are the ones who approve what comes out. It's like an Editorial Board. Is that correct?

Cooley: I don't know how or if they approve of a report. I don't know that process.

Davis: The protocol for the FCC was developed based on the assumptions that the only effects that needed to be avoided were heating. The tests were developed 23 years ago when phones were solely used by medical and business people. How many of you used a phone 23 years ago?

Sherman: I did.

Davis: Well, you are probably the physician in the room.

Sherman: yes.

Davis: My dad was a brigadier general and he also had one but very few people with normal jobs had phones. It was only about 10%. That's when phone protocols were set up and they were set up to be tested up to an inch away from the body because they would be in a holster which is the way people had pagers and phones in those days. They didn't carry them. They had them in a holster.

Scarato: Can I clarify what Beth is saying here? When the FCC did their test after Chicago Tribune, they tested at 5mm from the body. They didn't test at zero mm which was the whole point. They said they are compliant but if you look at the test report, it says 5mm. Then the news headlines read," they are compliant". But it says right on the report… 5mm. The issue is people have close contact.

Gray: The 5mm problem bothers me alright? The reason it bothers me is there are 2.54 mm per inch so if I take 5mm, I am at a quarter of an inch or so and when I look at where the antenna is in the phone because there is a spacing there, I would think that 5mm is probably a pretty good distance when I have the phone right up to my ear.

Davis: It turns out that the antenna in the old days were towards the head. The newer antennae are toward the thyroid and lower. Your smart phone can have four or five antenna: One for data, one for video, one for voice, one for satellite GPS which is not RF. You have multiple antennae now that are located lower in the phone. We are now concerned that one of the explanations, not the only one but one of the explanations for the increase in thyroid cancer could be cellphone radiation.

Ramazzini: (slide 18) I do very much appreciate the opportunity to speak to all of you. I am delighted and honored to be able to speak to you and the fact that you exist really means a lot to all of us that have been working on this issue for quite a while. I never imagined I would be spending a decade or more of my life on this. I previously worked on lead and asbestos and I thought this would be a pretty simple issue but it's not simple. Ramazzini did a study like Lehrcl but they took thousands of animals and exposed them at different levels before and at conception and followed them until they died.

Their results on slide 19 was to show damage, the same type of damage that the NTP found at levels of exposure to their animals that were far less than NTP. In particular, they showed a *synergy* between RF and xrays (gamma radiation). *This is really important because it shows there is an additive effect between RF and gamma radiation (xrays).*

Abrami: the Ramazzini study was an independent study basically in parallel?

Davis: yes. It is the equivalent of the NTP for Italy.

<u>Uptake of glucose in the brain</u>: Slide 20 is a summary of a paper that was published in JAMA by some of the top researchers of the US government, the Director of the National Institute of Drug Abuse on the effects of cellphone exposure to the uptake of glucose in the brain.

Slide 21 shows the study design. A person with two cellphones strapped to their head. The study was done more than a decade ago. They had a PET scan which can measure the uptake of glucose in the brain. The person with a phone strapped to their head did not know whether the phone had been turned on or not.

Slide 22 is the results. If you look at the slide to the right, it shows the increase in glucose in the parts the brain that got the most exposure. Look at the slides comparing glucose uptake when the phones were turned off compared to the slide with the phones on. Look at the increased amount of glucose in the exact part of the brain there was the exposure. Why is that important? *Alzheimers* has been called *diabetes of the brain* because people with Alzheimers have too much glucose in the brain. Nobody knows the consequence of having too much glucose in the brain from holding a phone next to your head. It remains unknown. This study was subject to "War Games" as well.

Slide 23 explains part of what might be going on. You will see the control on the left without exposure. The slide on the right shows little tiny dark spots of damage, *indicating that the blood brain barrier has been breached.* At the bottom of the slide you will see references.

Abrami: is this a human brain? Or no?

Davis: oh no. We can't do that. These are Sprague Dawley rats.

Davis: at the bottom of the slide you will see references to subsequent studies. The first study showing this was in 1975. Alan Frey did that work. Cold War was still on and radar is a vital part of it and he was basically told to stop doing research. All of that is documented in my book.

<u>What happens when you have a cellphone in your pocket</u>: I have done a Ted X talk that I think you will find interesting. I make the point that sperm have to swim the equivalent of the distance from Los Angeles to Hawaii in order to succeed in fertilizing an egg. Do you know why it takes at least a quarter of a million sperm to make a healthy baby?

Abrami: why?

Davis: It's because they don't know how to ask for directions.

Abrami: I fell for that one.

Davis: When you get these slides on your own computers, you can simulate the exposure. Look at the white in the control slide. That indicates either the nucleus or the border. On the exposed slide, you can see that on some of the cells, the nucleus has been degraded and in many cases, the border is gone. Again, indicating damage to the membrane. So, cellphone radiation damages the membrane of the *brain* as well as the *testes*. I believe the *eye,* as well.

Abrami: I see the Cleveland Clinic quote there. Was this research done there?

Davis: Yes. Some of this research has been done there. Some of it has been done in Australia at their equivalent of the Cleveland Clinic and other work has been done at other clinics. What's interesting is that people doing this research started to do it two decades ago because they were concerned with the number of doctors showing up having fertility problems. What they concluded in a cross sectional analysis was that those who had the most beepers and things on their pelvis had the lowest sperm count.

<u>Recent study glioma on Slide 28</u>: Summary of the most recent work I have done with Prof. Anthony Miller who has himself authored more than 600 publications. It basically shows every study that has looked at people who have regularly used phones for ten years or more, for an hour a day or more we found an increase in *glioma*. More studies have been done now. The most recent study was released this week.

<u>Thyroid Cancer</u>: The American Cancer Society supported a study of thyroid cancer. It was done at Yale University that shows a double risk of thyroid cancer from those using phones that had specific SNPs which are quite common. These SNPs have to do with repair like p53 and other things that have been identified. The newer phones have antenna located closer to the thyroid. The study concludes that they have found a link to an increase in cancer from regular cell phone use. *It was just published this week*.

Effects on children's brains: Slide 31 tells you of the effects on the brains of children are substantial. Here is a study that looked at the brain matter of preschool aged children, using MRI. I don't know how they got approval for this study but they did. They concluded that there was degradation in the brain white matter looking at microstructures with heavier regular screen use, which is further reason why the American Academy of Pediatrics has said we must reduce exposure in young children.

Abrami: They based it on one study or the preponderance of evidence thus far?

Davis: Well, this is one study but it's a replication of many other findings on effects of attention, behavior and learning in children.

Effects on memory in teenagers: Slide 32 looks at teenagers and again they find a deficit in memory of kids. I will let Theodora talk to you about synergies on slide 33 they found in Korea. Mr. Abrami, you had stressed you wanted replication. I am showing you these are all replications of results on adverse effects on learning, behavior and attention from cell phone use in children.

Why so many conflicting studies? Slide 37: The answer is, follow the money. The majority of the studies in this field have been funded by industry or the military. That's just a fact. Analyses of the studies show that 75% of all the negative studies have been funded by industry or the military. Microwave News 2006 assessed *funding bias*. You don't need to be a statistician to know which way the wind blows.

Insurance Industry Slide 39 shows secondary insurance Swiss Re and Lloyds of London and others will not cover damages from wireless devices or EMFs. They rank it in the same category they once ranked asbestos.

Abrami: We were well aware of this fact. Have you spoken to anyone from the insurance industry about this? Why don't they insure?

Davis: Several years ago I did. They run the numbers. They think there is sufficient scientific concern and the 10K reports of wireless industry say they may face liabilities from lawsuits. There are lawsuits right now on behalf of people with brain cancer that are still going through the courts. They have not been thrown out and frankly I think they are going to win.

The last slide is the one of the cartoon. I just want to remind you. It had been very difficult to get people to stop smoking in the environment of children because the science had been deliberately manipulated. Unfortunately, that is what we are dealing with here as well. Why did the FDA reject the NTP? They have not even given a reason.

Sherman: We kept hearing about the need expressed by federal agencies for a comprehensive review of all the studies that have been done and yet that hasn't been done is my understanding. Is there any plan for comprehensive review? If there is, would that review take into account funding sources? We know from several other medical studies that the impact of funding is huge on conclusions and editorial control of final conclusions on the studies.

Davis: Environmental Health Trust, I can say is that we are the mouse that roared. We have managed in the paper that I shared with you, Miller et al. That is the closest thing to a comprehensive analysis. That was done in 2018 two years ago.

Abrami: We have to pause. Beth has to leave. I am thinking about the 14th of Feb for our next meeting.

Cooley: I am not available but I can see if someone internally is.

Davis: What is your schedule for completing your work?

Abrami: We have until October to have our report finalized.

Davis: Your work will be vitally important because there is a huge gap. The federal government has abdicated it's authority for years. We have been really shocked at the appalling situation with the FDA. It just flies in the face of science I have shown you just briefly here. I could have shown you even more on male and female reproduction in animals. I could have shown you more effects on humans. This simply indicates that there is a robust body of scientific evidence, including the study I just showed you that just came out on the thyroid (Luo 2020). That study is putting another nail in this coffin. We know industry knows how to make safer phones. The real question is for 5G, what does all this mean?

Sherman: Can we get a link to that?

Scarato: Yes, and also the bees because they look at MM waves specifically.

Abrami: Yes. We are interested in bees. That is an area we want to pursue.

Davis: I have a video in my slides of the bees. This study was done by bee experts with three hives. What it showed was the hive with phone off and the control hive had no effect. The hive with the phone turned on, those worker bees did not return and they stopped producing honey. Obviously, you are not going to have a phone in a bee hive. But it's clearly indicating a susceptibility to this exposure.

Abrami: This has been very helpful. We are trying to get the facts and understand. Unfortunately, as a commission, we don't have the resources of the federal government here in New Hampshire. We don't get any funding to do anything other than us being here as volunteers. We are going to work as hard as we can to get at the facts. We would like to hear from the FCC somehow or at least a member that was in the room. You suggested that there may be someone that may be willing to chat with us.

Davis: I think he may be willing to do it without being identified by name. It is a tough business.

Abrami: Well, we will take him anonymous.

Davis: I will ask.

Sherman: I can talk to our federal delegation and see if they can twist some arms to get somebody here. This is something Jeanne Shaheen should be able to compel.

Davis: I fully agree by the way .The appalling thing is there isn't any staff member at the FCC now with any training in this field of bio-electromagnetics.

Abrami: I would like to know in their last ruling, what they based their decision on?

Davis: Montgomery County if preparing to file suit against the FCC because in their statement, they confirm the 23 year old standard. They do not show any recognition of the 1900 pages of scientific evidence they received in response to their proposed rules. They asked the question: in advanced notice of proposed rule-making, should we change our standards? They received hundreds of scientific statements including from us stating that they should. In failing to review the 1900 pages, they are violating the Administrative Procedure Act. I don't know if any members of your commission are a lawyer.

Abrami: We have someone from the AG's office on our commission.

Davis: That's wonderful! I would like to talk to the AG and see if the state wants to join this lawsuit as an Amicus. It doesn't cost any money. Montgomery County probably has a budget equal to your state.

Garod: have any other states joined?

Davis: We think California is going to. What I have been told by a reliable source who was at the meeting, was that Ajit Pai said, I don't care about science. This is what we are doing. That is so arrogant.

Sherman: Are the FCC meetings public?

Davis: This one was certainly not.

Abrami: Devra, I will connect you two by email and you guys can have a chat.

Davis: and I will connect the AG person with the AG person in California.

Abrami: well, we will start with you talking to him. We are out of time now. We would appreciate maybe down the road having another conversation with you.

Davis: I am happy to do that. The fact is that the federal government is failing in its duty to protect public health. That's very unfortunate and therefore you guys are in a very important role. You really are. I have been accused of being a closet Republican. The fact is it may take Republicans to do this because the Democrats have been in bed with these guys for a long time. I hope I don't offend anybody.

Abrami: Let me see, about half anyway.

Davis: The fact is both Republicans and Democrats are both well supported by this industry.

Abrami: At the state level we do this on the cheap. We don't get any money.

Davis: I know you are a citizen legislature with real lives and real jobs and you are doing this as well and I am truly grateful to each of you.

Abrami: We are trying to do what we can do and to get the facts. We appreciate your time and Theodora as well. I will connect you with Brandon our Asst. AG. Another other questions:

Woods: how do you know the level of scrutiny the FCC gave to the scientific information provided? You say they didn't' look at it. How do you know that and what level of scrutiny did they give it?

Davis: I know that because of a person who was at the table when this happened.

Woods: Ok

Sherman: Is there any reference to the science?

Davis: No. it's as if all of it doesn't exist. Let me be clear, five years ago I brought a number of different scientists who had done this research from Turkey and England to the FCC and met their so called interagency group on RF radiation and briefed them. There is such a group. They have no power. They have no authority. They have no statutory standing to do anything at all except to advise. I don't go into the FCC to brief anyone any more. There is no one to brief. In fairness to the agency, they have huge responsibilities to a lot of different things. This issue is one where yes, you want faster connections to your services. You don't want you fire and police to rely on wireless. It's not reliable. Snow and rain can interfere with it. When you have too many people trying to call, its slow. We cannot afford to have emergency services, public health and the hospitals relying on wireless. It's not safe. We need wired connections and we need to have a major push for fiber optic cable and broadband access to and through the premises.

Abrami: We saw that on 911 in NYC.

Davis: From the point of view of the Dept of Defense, they have issued a report on this warning about the vulnerabilities we face. Demanding wired connections for those that need them is the way to go. I think those in public safety have to reset the conversation. If you are really going to protect public health and safety, you've got to have it wired. It's the only secure connection you can have.

Scarato: I want to add to what Devra was saying about to the two questions about the FCC. How do we know what the FCC did or did not review? There is actually an item the FCC released where they talk about the decisions they made and based on what. As an example, Environmental Health Trust put in countless submissions. We were one of the high submission groups and they didn't address our submissions at all. They addressed some but the large majority of research on biological effects was not addressed in any deep way that one would expect. On the NTP, they just said we are going with what the FDA said. There is a three page paper on what the FDA says and there is only one paragraph on the biological effects. Scientists would expect a more robust document that goes over you gave this study but this scientist thinks this. That wasn't there.

My second question of who is doing a systematic review? The WHO EMF Project which is different than the WHO International Agency for Research on Cancer, there have been a lot of criticisms of transparency on the WHO EMF Project for many reasons of which I have a link to. They have been trying to do a review and it's been mired in questions of transparency. Who are the experts? Who is picking

the experts? Whereas, the International Agency for Research on Cancer, when they did their 211 determination that you are familiar with Class 2B possible, they vet the researchers for ties with industry and I should add that they are now calling for a reevaluation for the carcinogenicity of RF and that should be completed before 2024. That is model systematic review on everything.

Miller: I would argue that the solution that Devra is proposing does not solve the problem at all. Our public safety entities all have fiber to the premises. They don't have access to fiber when they are on the road. So mobility and interoperability are key.

Davis: Let me be clear. There is no 5G for voice. There is probably not going to be 5G for voice for perhaps a decade or more because 5G as you all know is fast and short. It doesn't go very far. In order for you to have 5g on the road, you need to bury it in the highway and people are proposing that by the way. The 3G and 4G that you use now travel miles.

Miller: Are you saying that 5G is the only product or technology that causes radiation?

Davis: No.no.no.

Miller: So, it doesn't matter which generation, 3, 4 or 5. They all cause radiation. I think the mobility factor is very important. So the solution needs to come elsewhere within the design of the devices and not to be taken lightly.

Davis: I completely agree. That's why California issued safety advice about how to use cellphones more safely which your commission should consider. The French government issued a guidance that will take effect in July that said, the abdomen of teenagers and pregnant women should not be exposed to cell phone radiation. That's the French government conclusion. We need to educate the public about how to use cellphones more safely and we need to encourage cellphone designers to do frankly what many of them are already doing to redo the software and the hardware so exposures are much less. There are things that they are doing to do that. Within the industry, there are people I have talked to who say the only problem is the lawyers, no offense again.

If they come out and say now we have got a safer phone and people will say, why didn't you make one before? What about all these people who have tumors in their ears and tumors in their brain and other problems that came from their phone? It's a huge liability problem for them. You are absolutely right. We need safer phones. By the way, our twitter handle is @saferphones.

Abrami: We have had conversations about that in this commission recently as well. This shouldn't be adversarial with industry. We should be shooting for the same goal. Let's make it safer.

Sherman: Devra, two of my close friends were Marianne Donovan and Ron Herberman.

Davis: oh my goodness. Two of my dearest friends.

Sherman: I served on a board with them. But back when Ron was testifying and taking an awful lot of heat for that in Congress, one technology that was available was a very lightweight shielding along the skin side of cellphones to shield from RF from the antennas. Do you know what happened to that? It was low cost and light weight and could have been incorporated into the phone without much difficulty.

Davis: That was a company called Pong but has been renamed. There are cases that have been devised that do reduce the radiation somewhat.

Gee, then you know then what Ron went through. You know what happened to Ron who was such a distinguished scientist. He told me had never experienced anything like that in his professional life.

Sherman: yes, I was there when that happened.

Abrami: Out of respect for everyone's time, we need to go.

IV. Next meeting: February 14th. 8:30-10:30 Agenda to be determined.

V. Meeting Adjourned at 11:00am.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
2/14/2020
8:30-10:40 am:
LOB 202

Meeting called to order by Rep Abrami at 8:30 am.

In attendance: (10)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee (*Augustinus Ong attending for Michelle)*
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Senator Tom Sherman-president of the senate appointee
Brandon Garod-AG designee, Asst. AG Consumer Protection

Not present: (4)
Frank MacMillan, Jr. MD-NH Medical Society Environmental Medicine
David Juvet-Business and Industry Association
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Carol Miller-NH Business & Economic Affairs Dept.

Agenda:

I. Approval of minutes from 1-10-20:

Abrami: Michelle is not here but we are allowing *Augustinus Ong from the Radiological Health Section of DHHS t*o sit in for her.

For us legislators, it's been an interesting past couple of weeks with most of us running non stop. Bethanne Cooley could not be here and we knew about that. I am not sure about Carol Miller. We are allowing Augustinus Ong to sit in for Michelle Roberge from DHHS. With regard to the minutes, Bethanne Cooley sent me a note saying, she was incorrect to say that the San Francisco Right to Know Ordinance was struck down. So I am going to adjust the minutes on page 9/10 and take out those comments. I give her credit, she went back and checked and found she was incorrect. With those corrections, minutes were approved.

II: Denise Ricciardi- Outside call concern:

Ricciardi: I debated about this but I think in the interest of transparency, it is important to mention. I received an email in my personal email which is not the email that I use for this commission, from Dr. George Carlo in Washington. He said that he wanted to speak to me and thought he could be of help to this commission. I called and I was uncomfortable and uneasy with the conversation and I asked him to speak to our commission. He said that he could not do that, that he has to work under the radar. He kept using the word "we" when talking with me and I asked him who is "we"? I asked him how did you get my personal email? Oh, somebody gave it to me.

This went back and forth on the phone and we followed up via email and I used the right email that I use for the commission. He asked, why can't you and some of the delegation come to Washington and talk to me? I said because of Right to Know laws and transparency and I was very uncomfortable. I am not implying anything… for the record. I did research him and do you mind if I just read this?

Public Health Scientist and Epidemiologist, is one of the world's leading experts on Electromagnetic Radiation. But from 1993-1999 Dr. Carlo headed a 28.5 million dollar project funded by the telecommunications industry. It went on to say that he studied cellphone health effects and discovered that the risk of acoustic neuroma, a form of brain tumor was 50% higher in long term use of cell phones and it goes on. I am just putting it into the record for the interest of transparency. I am not implying anything. I just want it to be known.

Abrami: thank you. Are there any questions on that?

Heroux: Most of you are aware of Dr. George Carlo's past involvement?

Abrami: not really.

Heroux: He is an epidemiologist and a lawyer and at one time he was retained by the cellphone industry in wireless technology research to devise a research program that would shed light on the effects of cellphones. After he was recruited by the cellphone industry, it seems that things became very complicated and nebulous so people have various takes on that but he is a very important central character in this whole issue. But, I would say that his motives are a little bit uncertain for many people. So, that is his history but he is a very central character in this issue.

Abrami: Did you ever ask him if he would be willing to speak with us here?

Ricciardi: Oh yes and I have it in email. He says he can't. He has to work under the radar that what he says could be taken out of context. I just felt uncomfortable. I debated if I should address it or not but I think it was the right thing to do in bringing it up. I hope you all agree.

Gray: I just want to remind the commission here that your task is 5G. It isn't 3G. It isn't 4G. Your task as defined in legislation is 5G. If you are going to say other technologies you should relate it to that there could be difference because of mm waves and get it back to the topic. Your task is not 4G or 3G. It's how 5G affects and whether we should do something about 5G.

Abrami: We discovered early on and I didn't realize this when I wrote the bill for this commission, that you can't talk about 5G without talking about 3G and 4G. We broadened it early on in our meetings. It turns out that 5G is this nebulous thing. It depends upon what company you are talking about with 5th generation. Will they use mm waves or not? I understand what you are saying Senator but it seems we cannot talk about 5G without talking about the others.

Gray: Representative, there was the opportunity to put a bill in this term that would have expanded the scope of this but we didn't. I am just trying to do what the law tells me. The law tells me this commission is supposed to look at 5G. What is the health effect of 5G vs 4G? We talk about the size of the wave. We talk about how that can affect and again, a lot of the things we have had as testimonies don't deal with 5G at all. They deal with 4G technology, things that were studied and not using the same size waves that we are talking about in 5G. Again, that is what our task is.

Abrami: If you go back to one of the earliest meetings and review those minutes, I said I believe if there is no objection, I think we have to broaden this a bit. I have been on plenty of commissions that things get broadened as they come up.

Today we are going to get at the towers that are 5G with Paul. We have conversation among us that the technology is hidden in the antenna. So it's very hard for us to understand even that if this is proprietary how much power, the configuration of the antennas and all that so ….

Ricciardi: It is my understanding that if 5G were to hang in front of everyone's home, that it can't solely work on its own. It would be piggybacked with 4G. If I am correct in that, that's where they come together.

Woods: Two aspects. Number one, looking at 5G is relatively new and research is not as robust but looking at using 2, 3, 4G it's like any other research protocol. You look and say what does that tell us? Then you look at mechanisms and then you say, let's look at 5G. It gives us a basis in which to look at 5G and educates us for parameters that we need to verify. Secondly, we also need to understand what 4G does because we haven't really gotten into synergies yet. Physical systems and biological systems for sure become more complex with synergies. We really haven't but I am sure we will as we go along, talk about synergies. I think those two things are important for us to look at both. I understand the concern and we have to focus more as we go along in terms of decision making.

Gray: The things the good doctor has said is consistent with my statement. If you are going to talk about other technologies, you need to say why 5G is going to be harmful, how it compares to it. Again, don't' just throw out a study and say its cellphone technology, so it's bad.

Abrami: I agree. A lot of the testimony we have had is on cellphones themselves. Again, a cellphone is communicating with whatever.

Wells: Just to reiterate something we talked about before. When we talk about electromagnetic radiation, you talk about characterizing it by frequency, energy intensity and polarization. That's really

what we need to talk about whether its brand name is 5G or 4G is immaterial. The characteristics of the waves that we talk about are given by the physical parameters.

Abrami: To me, what we are discussing is all things RF radiation. Our goal is to try to understand this. Where is the line drawn and where or if, are the health effects? We are in contest with FCC and FDA. We are just a little state here but what keeps me going is there is enough compelling research out there saying something that it seems we should pay attention to. Where we end up late summer or early fall, I am not quite sure. We haven't started bringing this together. What can we do as a state? Where are we heading with this? First of all there are a bunch of lawsuits out there right now against the FCC and those things will play out. The other reason for the bill was to get ahead of the curve as a state on all the push back that is going on around the country. I don't know whether that pushback is based on hysteria or not. I don't know. But, there is pushback. Every day I get stuff sent to me like yesterday from Huntington, NY. My brother lives there. I said to him, do you know anything about this? He said not really. Are we straying off the theoretical parameters a little bit? Probably but I think we need to. Is someone going to slap my wrist for doing that? I think you have to, in order to be able to discuss this topic.

Chamberlin: Because 5G is an add-on to 4G, the more we understand about the preceding technologies, the more we are going to understand about the impact of 5G technology. It is really important that we look at the body of information that is out there on previous generations.

Heroux: With 5G, we have no epidemiology and relatively few studies. The other aspect is that there are low, middle and high frequencies for 5G. As Mr. Wheeler of the FCC said, the technology is ill defined. So we don't have a very precise target. They are going to be on common structures. To be well instructed about health impacts, you have to know about EMR as a whole and experience we have is from earlier generations, if we are going to epidemiology information as a goal at all.

Abrami: the studies of 3G and 4G impacts do impact what we are looking at. I appreciate the comments but we have to plow forward. Obviously, in our report we are going to be addressing 5G but if we find out that there are things we should mention in our report related to RF radiation, we should do that. We are going to vote and I mentioned this once before. A House commission is different than a Senate commission. You sign off on a report on a Senate Commission. We don't sign off. Your way of not agreeing with the majority is to write a minority report. That's the way our commissions work.

III. Pat Abrami: Smart Meter Bill:

The next thing on the agenda, is this on topic or not on topic? We have heard some discussion about smart meters. I was minding my own business one day when I overheard the prime sponsor of the smart meter bill. I said we are doing 5G, sign me up. Senator Sherman signed up too. I think the Representatives can understand, sometimes you look at a title and think I could contribute to this bill. Unfortunately, I had not read the bill until just before the hearing a few weeks ago. It turns out that the prime sponsor knew nothing about the topic. He was submitting it for a constituent. NH has a statute on the books about smart meter gateway devices. That was passed eight years ago. It's a pretty strict provision. My understanding of a gateway device is that it gets readings from your

refrigerator and different appliances and that connects to your electric meter. My sense and I am guessing now, is that this was more about security than RF radiation when they passed this bill. We are big on security in legislature. If electric company wants to put one in your home, you have to "opt in" not "opt out". That's a tougher climb. You have to sign a piece of paper that says, yes, I want this device in my house. This was almost like a preemptive strike on something that someone was anticipating.

Sherman: I remember the discussion on this. I think one of the problems was if you have a meter that can be read by anybody because it's transmitted then this was mostly a privacy issue. If your use goes up significantly, that's your business. I think the big concern was law enforcement being able to tap into this.

Abrami: So it was a totally different angle.

Ricciardi: Do we have a law here in NH about privacy protection because that segways right into the lack of privacy with 5G. I just wonder. Do we have anything in place?

Abrami: I don't know.

Sherman: I don't think we have a single law about privacy protection. Even the technology of license plate readers being used by police was blocked in the Legislature. So we don't allow them to hold onto the license plates after you go through the toll booths. We don't allow police to go into a parking lot and do license plate scans. I don't think there is a single bill on privacy but I do know that as bills come through there is a high level of scrutiny on how much personal freedom this might impede.

Ricciardi: That should coincide with 5G then because that is surely a lack of privacy.

Abrami: When I read the literature on preparing because I testified on this bill. There were four issues: One was privacy with the smart meter relaying to electric companies.

Chamberlin: I don't know if we are talking about the same bill but there is a current bill that came before the House Science, Tech and Energy Committee about 5G smart meters and one of the concerns was health, so they deferred to our commission.

Abrami: Yes. That's the one. I testified that day. You missed the hearing that day. The bill was filed and what it did was mark up the existing statute basically taking away what we have. I testified in the hearing and said this bill needs to be worked big time. It turns out that there are different degrees of smart meters. There are like three layers of smart meters. Eversource came in and said, wait a minute. We have a truck that drives around and it activates when we want to take a measure that is very low level. It only pulses when it is signaled to pulse. Eversource saying wait a minute, what are you doing to me and you would have to agree with that. Then there's is the electric coop, which is bigger than you think. They have it and they say that theirs only pulses 14 times per day. You can't really say there are any health affects because it pulses 14 times in a day. The continuous pulse is the third. I think that's the one related when you read the list about health effects. So

clearly, in your committee there wasn't enough evidence for them to consider so what they did was they asked if our commission could take a look at this. So, if we have time, we will take a look at it. Does it have to do with 5G? I don't know. But its continuous pulsing and people are concerned about continuous pulsing.

Sherman: We actually have a new lawsuit in Rye. A resident is having to leave she said because of the smart meter pulsing from a town building which is actually the school. She is suing the town for cost of having to move to a new location. The concerns are already out there and are affecting municipalities.

Abrami: The big thing especially apartment buildings where all the meters are in one spot, that's the ones that I read are problematic. Supposedly there are ways of shielding that.

Wells: I think we should hear some testimony on that. I am very skeptical that a metal plate is going to do anything except radiate on the other side. A faraday cage will keep the field out but it won't keep it in.

Abrami: We have to bring in the right witness who knows this topic cold with the different types of smart meters. They did the right thing. The bill was not ready to be passed and Science and Tech did not have the time to fix it. They have 50-60 bills I think in their committee. They have a lot. That was the smart meter update.

IV. Dr. Paul Heroux-Cell Tower Placement

Heroux: Essentially, this is about 5G. 5G will have as a primary consequence installation of a lot more towers in our environment. The question is, what do we know about the impact of EMR coming out of towers from the past? I did a short study trying to gather the written literature on this. I have a number of articles that I will leave with you and I have as well an Italian film on the Vatican. What this film does is help us gain historical perspective on how long conflicts relating to the radiation can drag on throughout the years. The situation with the Vatican is still ongoing. They are going on trial for manslaughter. This is something that is very old but persists today.

Essentially, we don't have epidemiological evidence obviously, on the impact of 5G towers because they are very new and sometimes they are not even activated yet. Some of these units can function in one mode or another. The experience we have is from towers of the past. I have assembled some publications. There is a publication here by Michelozzi, 2002 that describes childhood leukemia up to a distance of up to 6km from the powerful Vatican radio transmitter. The Vatican needs to broadcast throughout the world. They have very interesting antenna. They are huge structures that rotate. Of course the intensity of this radiation is very large which is why it seems that the epidemiologists have detected health effects as far as 6km away. This is an extreme area of antenna not representative of cell phone towers that we have in our immediate environment.

Abrami: That's an important point. They are their own little country. Do they have standards?

Heroux: They have standards of radiation that are different than those of Italy. Of course the radiation is coming across the border which is a problem we all have. Radiation from one in multi-family dwellings impacts the neighboring family. This is not an uncommon problem. In the Vatican, you have a very powerful transmitter with a very small population of people affected because it's mostly small cities and countryside around these huge transmitters. But epidemiologists observed very high relative risk.

Abrami: Can you give us a sense though of how intense?

Heroux: It was at the legal limit for Italy.

Chamberlin: These are under 30Mhz aren't they?

Heroux: Yes. There are a number of antenna there and the relative risk was 7 for lymphomas and for non- Hodgkin's lymphoma and leukemia 5 times. So there is very high intensity and very high relative risk of these diseases.

Then Santini in 2002, this is a study that is remarkable in that it documents a number of health effects, not only cancer but other neurological effects. But, it is weak because it was based on questions asked of people, which is always much less reliable in terms of epidemiology. Of course the investigators tried to do the best they can. This is not like the documentation of say a tumor but they said up to 300 meters, they could observe neurological effects from cell towers.

In 2010, Khurana provides a review of 10 base station proximity and neurobehavioral effects and three investigations of cancers. He reports that 8 of the 10 studies report increased prevalence of adverse neuro-behavioral symptoms or cancer in populations living a distance of less than 500 meters from base stations.

Probably the most convincing evidence, I would say is from Dode in Brazil 2011. This is a study that if you read it through, is performed in a way that is very open handed. They used tumor classifications and sub-classifications from the international committees. They used public health records. They had the cooperation of utilities as well as many universities and their documentation is very detailed. So, if one is to be given weight, it should be that one. Essentially, they came to the conclusion that yes, they can document these effects.

What is most striking, is they can also detect that if they install a cell tower near your home, within two years, is when you will get the maximum incidence of cancer. They documented cancer because, unlike neurological symptoms, cancer is not subjective especially when they are quantified by histology and by international classification. This report of a large city in Brazil with a large population which is known to have a public health system that documents. Within 500 meters of a base station and there are many base stations that are documented, you will have increased incidences of cancer. These exposures are much smaller than the FCC limit of course. They have a range of exposures that they measured within the study. I think this, needs to be read.

In 2020, Pearce essentially provides the most recent assessment. Each of these studies of course goes through a bibliography of its own. It promotes, again the 500 meter setback to limit future liabilities of

the cellphone industry. He is talking mostly to the cell phone industry and saying if you want to limit your liability in the future, you should respect the 500 meter distance.

In 2018, I have an article by Affuso which examines the economic impact on home values. If you are within .72 kilometers or 720 meters of the base station, your home value goes down by up to 9.78%. As the NTP studies are more widely known in the population, this is probably going to increase.

We do have studies of high intensity that have documented cancer at long ranges. We have studies over large populations that also confirm the 500 meter danger zone. In other words, your health will not be the same in terms of cancer and neurological impacts if you are within that zone. So when we are considering 5G, we will be considering antennas that apparently will have more powerful output because of this radiation goes less well through oxygen and water. It has focused beams to go through structures to attain people who are hidden. So as a result, exposures will be more transient, more focused and more intense. But we don't have epidemiology on that. We would have to wait 10 or 20 years before we have the information. Sadly, the only information we can rely on is information from the past. I think that anyone should read the study on Belo Horizonte, the third largest city in Brazil will see that this study was done very carefully and in my opinion is very convincing.

Ong: Dr. Heroux, in the Brazil study, was there any comparison between the pediatric incidents and the types of pediatric cancers before installation of these towers and comparison of those rates and incidents after these installations?

Heroux: I believe that all the cancers were classified according to international standards so some of these classifications are specific to pediatric but the control were regions that had no cell towers that were investigated at the same time.

Ong: But you mentioned earlier that the Belo Horizonte have very good cancer registry. So for the same region, you will have the same data prior to the installation of towers vs. the rates after installation.

Heroux: I believe their data covers approximately ten years. I believe that they used the reports within those ten years and discriminated between those near cell towers and those that were not.

Abrami: Well, what I think he is trying to say is, are there other reasons for this higher rate of cancer and filter out the other effects that may cause it. I understand what you are trying to say.

Heroux: I guess you would have to read the study to satisfy yourself about these details.

Sherman: Getting at one of Senator Gray's concern, to fully understand. This study was done with presumably 3G and 4G towers. Is that right?

Heroux: Yes. Those are similar to ones that you would see here.

Sherman: One of the things that you mentioned was that the peak cancer effect was within two years. So we wouldn't have to wait twenty years to know. If we used this as a springboard for what is

happening with 5G, it would be interesting to do a study in a city that has already implemented 5G then you might be able to do the before and after registry.

Heroux: Yes, ideally but the wheels of government and science turn rather slowly in a sense. This was done in 2010 but this technology is about 10-15 years old already…before you get the agreements between the number of universities and public health systems and so on and so forth. But they have a record of when the antenna was installed and when the cancer occurred which allows them to come up with this statistic.

Abrami: This is the thing that has been nagging me about the small cell tower. We just don't know. That is the whole premise of this. We just don't know and how do we get at that? Clearly, there is not money supporting research.

Gray: Part of what we are hearing is that if there is a 500 meter limit then the amount of radiation is very important in to the rates of cancer. I am accepting your data at face value okay? Now, we look at 5g technology. We have smaller towers. We have less power. So that 500 meters may be 275 feet. You talk about being able to submit a minority report. If I was to try to do the peer reviews about all the different things that people have presented to this, I would be talking about billions of dollars. I go back to 1960's when I was watching 60 Minutes talking about the EMR coming off high power lines going through the Midwest affecting the cattle that we eat and we are all going to die because of it, okay? Again, I am just trying to get you to stay on topic and the 500 meters… yes. There may be a component in there that the amount of radiation nearness to it, you said 30 Mhz and below and 5G starts at 30Ghz and above…all of these things affect what we are supposed to be looking at and the results we are going to get. The one study that we were given that they talked about it wasn't fair to do whole body radiation on a particular animal because that would have a much more devastating effect and all you have to do is find one cell within that whole body that would react.

Abrami: we are not there yet. We are still working on this.

Sherman: We have had a lot of scientists around this table. I think nobody is pretending to come to any conclusions at this point. But in science and in healthcare, we try to look at all available data which is what we are doing. Some is going to be historical data that comes from other RF sources. I think it's perfectly reasonable to look at other RF sources especially since those aren't going away. 5G isn't coming in and replacing all of this as far as I understand it. 5G is coming in on top of 3G and 4G. So, I think it would be a little bizarre for us to look at 5G in a vacuum without the understanding of the current environment and the data on the current environment. I think with a cautionary tale that I hear coming from Senator Gray is that doesn't necessarily mean that we can extrapolate data from 3 and 4G and say that this is going to be the impact of 5G. Study commissions go where the data takes them and I think we are doing that. I haven't heard of anybody coming to any conclusions yet. I think we are still looking at data.

Ricciardi: I just wanted to mention that I believe I forwarded Rep. Abrami information on a town in the Netherlands that put in the 5G, the town became rapidly ill. I can go back and find that. That is 5G and that is evidence on human beings. And that is on topic.

Chamberlin: That was a small study as I recall.

Ricciardi: Yes. They put it in and very shortly after the whole area became very ill.

Chamberlin: True. But somebody could claim that maybe it was a water problem as well. I am interested in following up on that…. particularly, in places like South Korea where they have installed on a larger scale. We need to keep our finger on the pulse there. If you find any more of those, forward them to the rest of us.

Heroux: Can I have one last remark? Essentially, the tower question of course takes care of the general environment but in relation to the new phones which will also have this and possibly more radiation from these phones. The phones could be altered in a very simple way to simplify things for users in terms of health impacts and even perhaps for industry. These cellphones are immensely useful. But one of the problems is that when we hold them close to our body, they tend to over expose us to radiation. There is all this controversy around the proper SAR. They can put 5 cameras and 10 antennas in the most recent phones.

What you can do is put a proximity detector in a phone so that when it comes near to your body, it doesn't work and doesn't radiate any more. This would mean that you could use your phone exactly as before but the risk of overexposure of the phone would be severely reduced, in my opinion. You would cut out all the extreme radiation putting it in your bra, your pants near your genitals or near your head. This is something that is not done right now but technically it is far from impossible. It's relatively easy to put in a distance detector and you would be instructed by your phone to expose yourself less. I think from the point of view of industry that if it is told by government to do that, they don't incur any more liability. If they do this on their own, their lawyers will tell them…hmmm.. you are admitting to something that may not exist. This is a problem. But if it's imposed on them, you are solving a problem for them as well.

V. General Discussion:

Abrami: Thank you. So I have amassed a list of potential speakers. I have reached out to most, but not all of them yet. If there is no comment on the paper, it means I have not talked to them yet either by phone or by email. Dr. Carpenter we will hear from in a minute. Dr. Martha Herbert can do something in April or May. Dr. Sharon Goldberg has been in conversation with Michelle. You can read through the list. I wanted to talk to Hardell because he is the former WHO fellow who is retired that was involved in this whole thing. Kelting is retired and will be our speaker next month. Dr. James Lin, I am really interested in. He is an electrical engineer but his appointment is in a medical school. He has published a lot in IEEE. I talked to him the other day and told him he could do it by phone. He doesn't like to do it that way and wanted to know if we could pay for his travel. I said, well, you don't understand. This is New Hampshire. We don't have a budget! So he is thinking about it. I have not contacted everyone yet.

Dr. Chamberlin, I was going to talk to you if you have any need to have a fellow electrical engineer come in for any kind of seminar series, maybe we could tie it to that.

Chamberlin: I will check into that.

Abrami: I think this guy is worthwhile having. I have checked some of his papers. They are very technical papers that he presents. I know that there are some others names that aren't on this list that people are suggesting to me. I am going to warn you Senator, that Carpenter may be a little broad so bear with us. He is aware of some legal actions in NY State. I know it would be great and I am trying to get more focused on the technical. With this group, I think we know what the issues are. We understand the science here.

We can start the discussion about the next meeting. March 6th won't work because Dr. Sherman, Sen. Gray, and I are on the Seacoast Cancer Cluster Commission together that day. Beth told me that she cannot make the 13th. On the 20th, Senator Sherman will be out of town.

Gray: On the 6th, you could do an afternoon meeting because the Cancer Cluster meeting will be over.

Sherman: I have a Seabrook working group on the opioid crisis so I can't be here.

Abrami: We could do the 20th. Out of fairness, I want to make sure we have Beth at the table.

Garod: I have a jury trial the week before that. There is a possibility it may not be over.

Abrami: Brandon, did you ever connect with Theo or whoever?

Garod: After you sent the email, I responded to her but have not heard back. I encouraged her to reach out to me.

Ricciardi: So, you did reach out to Theodora? Ok.

VI. Dr. David Carpenter-University of Albany "What is 5G and what do we know about the health effects of 5G?"

Abrami: David, welcome. You are in our meeting. We have someone who will move the slides for you. Please introduce yourself.

Carpenter: I am David Carpenter. I have two titles here at the University of Albany part of the SUNY system. I direct the Institute for Health and the Environment which is an interdisciplinary research institute that is a collaborating center for the World Health Organization. I am also the Professor of Environmental Health Sciences and the former Dean of the School of Public Health. I have been involved in issues related to electromagnetic fields for a long time. I first came to NY as the director for the state health Wadsworth laboratories. Two weeks before I arrived in New York, there was a settlement between the state Public Service Commission and the State Power Authority asking the question was there an elevation in cancer risk by high voltage power lines? As a new guy on the block, I was given the responsibility of administering that program. We had 15 research projects funded by state utilities. At the end of that project, we did find elevations in childhood leukemia in children living

exposed to high magnetic fields. I became the spokesperson for New York State on that issue. Once you touch a controversial issue like this, you never escape. It's never been my personal research but I have been involved in this and published extensively on it. I have been on national and international committees.

Abrami: What did NY State do about that?

Carpenter: Effectively nothing. They did establish a standard for the magnetic field for the edge of Right of Ways. But they determined that standard by measuring the magnetic field at the edge of Right of Ways and the standard was the highest one there so there wouldn't be any new magnetic fields greater than those that were existing. This is really one of the problems with RF fields. We are all so dependent on things like electricity and communication frequencies and nobody wants to restrict use of it and hopefully not make it worse than it presently is. It's very difficult to restrict use.

Electromagnetic Spectrum:

Let's go to the second slide, the electromagnetic spectrum. The form of EMR that most people know is visible light. At higher levels than that, we have the ionizing portion of the spectrum that includes x-rays and gamma rays and these have enough energy to directly damage DNA, cause cancer and birth defects and that sort of thing. Below the visible light, we have infrared radiation which is heat from the sun. Without that, life on Earth would not be possible. Below the infrared, we have the communications frequencies. It is important to note that the 5G that is being proposed is just below the infrared. It's Gigahertz frequency. The electromagnetic spectrum is all packets of energy with different frequencies. The higher the frequency, the more energy it contains. But the frequency is important. At the left of the slide, the extremely low frequency that's the magnetic fields associated with electricity that I was originally involved in.

Radiofrequency (RF) EMFs:

The point is that these radio frequency EMFs are communication frequencies, everything from radio to television to cell phones to radar. This exposure has increased enormously in the last number of years. Now we have Wi-Fi everywhere. We have smart meters put on many of our homes. These are meters that use RF waves to transmit your use to the utility. In the future, there are going to be ZigBee drives in your refrigerator, dishwasher and every appliance and it's going to communicate your electricity use to your smart meter. That's' going to make the kitchen and laundry room particularly hotbeds of exposure. Driverless automobiles will use RF fields to see the car ahead and will enormously increase exposure to these things. The microwave oven uses RF fields and most of these frequencies are in the microwave range. Clearly, if you can cook your potato with a microwave, there is potential harm from exposure. But most government agencies, certainly the Federal Communications Commission (FCC) has the position (which I think is wrong) that there is no hazard from microwave exposure if it is at an intensity that is not sufficient to cause tissue heating.

RF in the Ambient Environment:

It used to be that RF environment was really radio and television. In the past few years we have increased the RF in the ambient environment enormously and with the imminent rollout of 5G there is going to be a great increase in human exposure. One punchline is that 5G has not been studied. It has not been around long enough and we don't have any population of humans that have been exposed so that we can determine whether it's really dangerous or not. We do know a lot about our existing 3G and 4G. As these generations develop, they go to higher and higher frequencies. Our cellphones, Wi-Fi, smart meter are all 3G and 4G frequencies. What does this sudden increase in RF exposure suggest regarding human health?

Health Risks to Humans from Existing RF:

We know very well that extensive use of a cellphone held to your head increases the risk of cancer. Gliomas particularly, less so other forms of brain cancer, and particularly glioblastoma which is a very malignant form of cancer. This is the cancer that killed Ted Kennedy, Beau Biden, John McCain, the lawyer in the OJ Simpson case. I am not saying that it was definitely cell phone use that caused all their cancer but these are people who undoubtedly used cell phones a lot. The cancers only occur on the side of the head that people use the cellphones most of the time. In addition to the glio cancers, there is a Schwannoma tumor of the auditory nerve that we see commonly called acoustic neuroma. It's not a cancer but a tumor that grows in the bony cavity in the ear and causes problems. There are some elevations in cancer of the parotid gland on the cheek and the thyroid gland. It seems likely that excessive exposure to RFR at non thermal intensities increases the risk of a variety of cancers and what is really critical is which part of the body is exposed.

National Toxicology Report/Ramazzini Intitute Study/Other:

Now the International Agency for Research on Cancer (IARC) which is part of the World Health Organization (WHO) has rated communication frequencies as possible human carcinogens. This was a number of years ago and one of the reasons why it wasn't a stronger reading in that there hadn't been clear evidence that cellphone frequencies cause cancer in animals.

National Toxicology Program (NTP) which is part of the National Institute of Health (NIH), just last year came out with the results of a two year study. It demonstrated that rats exposed to cellphone frequencies develop schwannomas of the heart.

Abrami: Just so you know, we have talked to those folks.

Carpenter: Ok. Let's go on. The Ramazzini Institute did a similar study but at much lower intensities. They found exactly the same thing. We now have good animal evidence in addition to human evidence. There are other health effects that are well documented, particularly reduction in sperm counts and infertility in men from abnormal sperm and some evidence of spontaneous abortion and premature birth in women with excessive exposures. There is some evidence for cognitive alteration in children, if

they are on their cellphone too long. It's difficult to understand if it's a direct effect of the radiation or because kids aren't sleeping because they are talking all night.

Then there is the very controversial but pretty clearly real problem with Electro-hypersensitivity. Some people, by no means all become the best way to say it is "allergic" to the RF fields. They develop headaches, nausea, vomiting, and a sense that the brain isn't working properly. Sometimes they have heart palpitations and a general feeling of ill health. This has been seen in adults and now fairly frequently in children in school environments where there is intense Wi-Fi, much more controversial than brain cancer.

Emerging wireless technologies:

5G (5th generation cellular technology) as I have said, is RF but at a higher frequency that we have at 3G or 4G. It's being promoted widely just about everywhere. This is the whole concern of the Trump administration with Huawei the Chinese company. The idea is that 5G when fully developed is going to just change the way that life on Earth is done. It's going to be the Internet of Things, Smart Appliances, Smart Cities, certainly self- driving vehicles and wearable devices. A lot of hype about this and a lot of sense that somebody is going to make a pile of money and that this is going to be good for communication at the much faster rate than we have currently with 3G/4G. The 5G frequencies will be in the Ghz range which is higher than current 3G/4G which are lower than 1Ghz, in the MHz range. Ultimately, the 5G can be up to 70 Ghz which is almost at the frequency of infrared radiation. It will be 100x faster than 4G, potentially add new jobs and a lot of economic growth. It's a higher speed greater capacity.

Limitations of 5G:

The problems with 5G are several. Because it's at much higher frequency, the waves do not penetrate as far as the 3G/4G waves do. They are easily blocked, even by weather. The radiation will not penetrate a building. It will not go through glass and won't travel so far. This is a real problem so as 5G is being implemented around the country and world, instead of the cell towers that have ranges of over 2,000km, the 5G will require mini cell towers to be placed in front of every 6-8 houses in urban areas. The 5G will only have a range of 20—150 meters not kilometers. That means that as these are placed everywhere, you are not going to be able to walk down a side walk anywhere without being continuously exposed. Now if you are in your house, since the beam won't penetrate the house, that's probably a good thing. Now one of the real problems however, as we are rolling out 5G, our current infrastructure is 3G and 4G. These mini cell towers places all along the street are not just going to be exclusively 5G, they are going to be 3G and 4G as well. While we haven't really studied health effects of 5G, I have already told you of health effects of 3G and 4G. This is going increase the exposure to 3G/4G dramatically. These mini cell towers are going to be everywhere. That is a real problem totally independent of the question what are the hazards of 5G.

Abrami: We have talked about these things in our commission. We are trying to get at what is in those towers. It's really about the power. Let me ask you though, the issue with the small towers is you get every company with different strategies of 5G. Can you discuss that a little bit?

Carpenter: Well, I am not an expert on that. I know that each company has their own power also they don't share their information very much. It is very difficult to get that information. They really don't want the other companies to know what they are doing. I can't really answer that question. But I do know that all of the ones being implemented right now are not exclusively 5G. I think the expectation is probably pretty good that 5G is not as dangerous as 4G. That's because 5G is not likely to penetrate the brain. It's not likely to cause brain cancer because it's going to be blocked by the skin. Now that raises a whole series of other questions. What is going to be the effect on the skin? Is there going to be an increase in skin cancer? Is there going to be alteration of sweat glands? We don't' really know that answer. Again, my big concern is the greater exposure to the 4G frequencies which we know to be hazardous in extreme exposure.

Abrami: This is the discussion that we are having. The towers are lower to the ground. They are right in front of your house. There are science issues and all that but there are emotional and aesthetic issues that people are pushing back on. Our understanding is that it is less power and we are trying to grapple with how much damage compared to a large cell tower.

Carpenter: In the large cell tower, there have been studies showing increase in leukemia in people who live close to the large cell towers. But the large cell towers direct the beam at the horizon. That's for the purpose of having a reception over a very long distance. These small cell towers close to the ground are going to have beams directed right at everybody. It's going to dramatically increase exposure relative to that you would get from a large cell tower.

Abrami: It's the $1/R^2$ rule right? The closer you are to the tower….

Carpenter: that's right. The question is …whether the beam is directed or if it's like a radio transmission tower which is 360 degrees. Our current cell towers have a focus beam at the horizon. For some reason, people living very close to a cell tower probably get less exposure than people living some distance away where the beam then sort of spreads down. These mini cell towers on a lamp post or wherever they are on the street are going to be very close to the ground level and it's going to be impossible not to have elevated exposure.

Abrami: Usually with cell towers, there is a radius around and there is nothing there. There are plenty of studies showing the fire station concerns but these small cell towers are going to be right on the street and low to the ground.

Carpenter: yes. I was actually in California for the Fire people opposed to towers on every fire station just for that reason and they did block that plan.

Sherman: On these small cell towers that will have 5G and 4G, is it a lower power 4G since there are going to be more and they are going to be closer and there is not going to be the same need to shoot at the horizon? Or is it the same power as the big towers?

Carpenter: I don't actually know the answer to that question. I suspect it's going to be a lower power. But, I don't actually have good knowledge of that.

Abrami: Let's keep going.

Carpenter: The issue is there is no real research on 5G. There are a few animal studies now. Again like any new technology, there are people making outrageous claims for hazard and others that make outrageous claims for safety. So, I think we just don't know. But the issue of cancer from RFR, that is very strong. The issue of effects especially on male fertility is very strong. The Electro-sensitivities are certainly going to increase as people are exposed more.

Carpenter: Is there anything uniquely bad about 5G? I think the answer is no, other than the fact that the way it's being implemented is going to increase exposure.

Who is protecting us?

The FCC has no health expertise. I visited them several years ago trying to push them to at least have some cautions in their recommendations. They basically said, we don't have any health expertise, we depend on other agencies for that. Then they don't have any other government agencies that are pushing them. I am actually a plaintiff in a legal case against the FCC for their standard, which says that there are no adverse health effects except those caused by tissue heating. That simply is not true.

Abrami: Can we pause on that for a second? Which suit is that? There are several out there now.

Carpenter: Well this is all fairly recent. Bobby Kennedy is the lead attorney on this suit. But there are several out there. It's really sort of outrageous that the Federal Communications Act of 1996 specifically prohibits placement of any cell tower based on concerns of health. This is a real problem for many localities and states because this is federal law. You can object for other reasons but not for health concerns.

How Strong is the Evidence of Harm?

The evidence is very strong for 3G and 4G, especially for cancer and effects on male fertility. It is less strong on some of the other things but certainly enough evidence to merit concern.

There are so many sources of RF and the average rate of exposure to RF has increased over time. Since 2003, there has been an enormous increase as we have gone to just about wireless everything. The latency for many of these health effects, especially cancer is going to be long. We know from ionizing radiation that the latency is 20-30 years. One big concern is we roll out all these new sources of exposure, what is going to the long term impact? We are seeing an increase in glioblastoma risk in the US and around the world. Not so much in other brain cancers. Actually, some of the other brain cancer rates are going down. But, there is reason to be concerned.

The conclusion is with 5G, you can download your movies faster. There may be other benefits. It is not obvious to me what the other benefits may be to the individual, maybe to business, maybe to government but it's just that we are rolling out 5G very rapidly without any good information as to whether the risk might exceed the benefit.

Abrami: Well, thank you on this. Let's talk about NYS. That is where you are based. Are you aware of anything going on legislatively in New York? I thought I read that they may be thinking about forming a commission like ours.

Carepenter: They haven't gotten past that. It's being rolled out across the state and there are a number of legal actions. There have been a couple of meetings in the state assembly on the issue, but no significant legislation has passed. There is a growing concern. It's interesting, one of the Vice President's here at the University of Albany, asked me to give a talk for a public group and he knew nothing about the issue until they put a mini tower in front of his house. That seems to be happening around the state. Little information, if any and then the mini towers are placed and implemented and that gets people pretty concerned. There is a fair bit of angst among the population but only the population where it's being put out otherwise there is very little information.

Abrami: I just received something about Huntington, Long Island. I had seen this before, a public hearing in their town council. For five years they have been complaining to the town officials and they are very concerned because these small cell towers are going up in their community and a lot of people are pushing back. We are seeing this across the country.

Carpenter: Sure. It's really across the world. I am being taken to Australia to talk about 5G this summer.

Abrami: We just heard that Switzerland put a hold on 5G until they understand the science a little better.

Carpenter: Yes. I think one of the concerns is that there seems to be absolutely no benefit to the ordinary individual maybe to business and industry. Other than the fact that you might be able to download a movie more rapidly, what's the benefit?

Abrami: one of the things that I saw was autonomous vehicles but it turns out that the industry is not going in that direction with the little towers along the road. It's going to built into the cars.

Carpenter: It's going to be built into the cars and likely to be lower frequency.

Ricciardi: I just wanted to clear up a question I have or make sure I understand it correctly. Although our commission is tasked with the health effects of 5G, what I understand and correct me if I am wrong, because it will actually be placed approximately every few homes and because it cannot work independently and has to work with 3 and 4G, what's going to happen is whether we know much about 5G or not, the fact of the matter is everyone is going to be living under a cell phone tower and being exposed to radiation continuously which can heat tissues over time. Is that correct, Dr. Carpenter?

Carpenter: Well, the last part I think probably is not correct. If you have low intensity to these, there may be a level of heating that can't be measured but you would be constantly exposed but there would not be any measurable increase in temperature. That's the debate with the FCC because there is this enormous amount of information showing health effects at non thermal levels. But, I don't think because you are continuously exposed at a low intensity that there would be a measurable increase in temperature.

Ricciardi: Okay, but you would be exposed continuously which would potentially precipitate other health effects.

Carpenter: That's correct. I am sorry I probably should have prepared a more technical presentation. I didn't realize that you were so well informed on this. We have a pretty good idea what the mechanism of these damages is. The primary mechanism is that non thermal levels of RFR generate Reactive Oxygen Species (ROS), commonly known as free radicals. If you remember in the NTP study, they demonstrated direct DNA damage in those rats and these were clearly non thermal intensities.

There are many nasty things that generate ROS. In fact, our body generates them just as part of the normal metabolism. We also have a whole series of enzymes in our body that are there to protect us against them. Very clear evidence that non thermal levels of RFR cause the generation of these ROS. If you are exposed continuously, then you have a continuous generation of those ROS. You don't need the temperature rise, to cause harm. The ROS can damage proteins, lipids, carbohydrates and DNA. The evidence is quite strong that this a common mechanism that then leads to a whole variety of other changes. For example, changes in brain metabolism and blood flow to the brain and whole variety of things. There is a good body of evidence that allows us understand how you might get damaged from continuous exposure to RFR at levels that don't raise body temperature.

Sherman: Just a quick question. What you are describing is the epigenetic impact of non-thermal RF levels. You are actually changing the DNA. Do you know of any evidence of people who are more predisposed like family history like genetic makeup? In other words, is there anything in your genetic makeup that would predispose you to increased risk of being within an RF field?

Carpenter: I don't know of any real study on RF fields. There is a very interesting study on the magnetic fields from power lines. There is a study on electricity from China I believe that did look for different genetic traits in children that developed leukemia from being near power lines and children exposed who didn't develop leukemia. They did find there is a genetic susceptibility factor there. I would be quite surprised if that weren't also the case with RF but I am not aware of anyone that has really studied it.

Wells: On one of your slides, you talked about current 3G/4G cell towers having a range of 2,000 km. I just wanted to check on that because my interest is not just on the transmitter power but the power over the area and what that means in terms of the intensity in watts per square meter to which people will be exposed. So, 2,000 km is the correct figure for 4G?

Carpenter: Well, yes. That's the correct figure. Of course not every cell tower has intensity that goes that far. For example, in most urban areas you don't have that intensity. But in rural areas and so forth, you have a higher intensity. That's also true when you use your cellphone. If you are a long way from the tower, your cellphone automatically increases the intensity of the signal it sends back to the cell tower. That 2,000 km is sort of the upper limit of a cell tower.

Wells: If I can just follow up on that. You talk about 5G only penetrating skin. I was wondering if you would comment on current SARs on Watts/kg versus intensities of watts/square meter. Which do you think is the more appropriate way of looking at exposure?

Carpenter: well, certainly with 5G watts/square meter is more appropriate metric because we have no reason to believe 5G is going to penetrate beyond the skin. The 5G is actually being used a little for crowd control. If you have sufficient intensity with 5G, of course you have tissue heating. You can direct a beam at someone who is trying to escape the police.

Abrami: Rep. Wells is all over that one!

Chamberlin: So, I have a question about the strength of the evidence that exists. Since getting on this commission I have been reading a lot of papers and I find that there are lots and lots of papers out there. You can't deny that there is a risk of harm. It's also somewhat overwhelming, the number of papers that exist. Have there been attempts to bring that all together to these meta studies that you mention? Where can I get access to them with high statistical confidence that a problem does exist?

Carpenter: That's a good question and it's a complicated one. The place where most of the evidence is put together is in the BioInitiative Report. I was the co-editor of that. But that report was criticized by just about every national and international body, as being selective. In fact, it was not selective but we have not had effectively any government agency with real credibility and that's true around the world acknowledge the strength of the evidence that I think see and I think that you see. The problem is, first of all you have a powerful industry that doesn't want their product tarred as being dangerous. Secondly, we are all so happy with the benefits that come from modern technology that we don't want to hear that it's potentially harmful. I am frankly baffled by the antagonism that the Bioinitiative Report has received. It was criticized as not being peer reviewed. Well, the original report wasn't peer reviewed but almost everything in it was published separately in peer reviewed scientific journals and passed review. But it remains a very controversial subject.

Abrami: Can you send us that report? The chair has been corrected. We already have it.

Carpenter: It was originally published in 2007 and updated in 2012. There have been some additional updates in 2014. It's huge and much more than anybody ever wanted to know and I think the individual chapters on specific subjects. I think there is something like 3 or 4 thousand references in the report.

Abrami: Are you the prime author on this?

Carpenter: No. I was a co- editor. I had the major role in writing the public health chapter. But each of the chapters was written by other people and actually Cindy Sage was my co- editor and was the power behind it but I had a major role in identifying who would write chapters and so forth.

Chamberlin: As a follow up question, can you give us the sense of relative risk? Is the relative risk something like 1.2 or something like 10? And do these have associated low e values?

Carpenter: Well, I am involved in all kinds of hazard investigations. My major research actually is PCBs and dioxin and pesticides. Some of my colleagues wouldn't agree with me but I don't think the relative risk here is anywhere near as it comes from things like smoking and chemicals that are toxic but one has to be careful about this because again, our exposure has increased so dramatically so recently. We have evidence in links to cancer but in latency being long, what's going to happen twenty years from now? You can look back at smoking and you can look back at PCBs and DDT and these things in the 60's and 70's were thought to be quite harmless. Now we know they increase the risk of all kinds of diseases. That's why that last slide I mentioned the Precautionary Principle. At the moment I don't see that the relative risk comes anywhere near the risk we have of other kinds of exposures but I am not sure that it's not going to be viewed as much greater in the future. If you put a mini cell tower in front of every 8th house, in every street in the US, who knows what the outcome is going to be in 20-30 years? The cancers that we see are relatively rare. But they are also fatal when you get them.

Sherman: Dr. Carpenter, I am also a physician. I am a state senator here in NH. I sense some frustration in your voice. One of the issues that we have been grappling with which is what Rep Abrami talked about is PFAS how it's in our drinking water. But the similarities between both of these is that we have very powerful and well- funded industry that is basically dismissing all science that is raising alarms in both of these areas and one of the big concerns that I have is that well- funded would not be a good description of the NH legislature and certainly not the people who are pushing back against industry. You are in an academic setting and you are doing some really good work on this. Do you have any suggestions on how we can lift up the Precautionary Principle before everything is installed and in place and we have to wait 10-20 years to know that we have just done in an entire generation? Do you have any models or any communities that you worked with that have been able to mitigate the influence that some of these companies so we are not regretting down the road that we did not provide at least some precautions as we move into this new era of RF exposure?

Carpenter: well, I certainly work with a number of communities that are trying to do that but I can't say that it's been very successful. The big barrier here is the 1996 Federal Telecommunications Act. There have been some communities where industry has sort of backed off hoping that the angst will go away but in others, the telecommunications companies has basically taken legal action on the basis of the Federal Communications act saying we have the right to put these in and you have no right to object to it.

I think what I would really like to see is that provision in the Telecommunication act being invalidated. It is outrageous that communities and states are prohibited by that regulation from opposing this kind of development. We don't have that similar kind of thing with chemicals like PFAS and PFOA. This is a very strange situation where we are prohibited from protecting the health of the public. You can debate how hazardous this is but it should not be up to industry just doing anything it wants to and public and other forms of government having no ability to block it.

Abrami: Let's go back to the Kennedy case. What are the two sides on this? Is it the FCC?

Carpenter: The case is that the FCC by virtue of having this philosophy that there are no harmful effects other than those caused from tissue heating is causing severe harm to the US population. The plaintiffs are a public health person and a mother of a child that died of a brain tumor. There are a couple of people that have Electro-hypersensitivity. The goal of the suit is to get the FCC to tighten the standard of exposure for RFR.

Abrami: we are probably the most lax of most countries, right?

Carpenter: Oh yes, by far. There are other countries that are equally as lax but we are way more tolerant of exposures than others. The Russians have had the lowest standards for the last fifty years. Now, I don't know that they reinforce it that much. Our standards are just ridiculously high.

Abrami: What court is this going to?

Carpenter: I don't know. It's directed to a federal court but I am not clear where it's going to go yet. This has all happened in the past couple of weeks. There are other suits pending too.

Abrami: The Environmental Health Trust that we head from a month ago. They have a suit as well against the FCC. As a commission, we want to talk to the FCC and also where they get their guidance. If the FCC says well, we listen to the FDA and FDA is saying there is no problem, I think that's part of the suit the EHT is involved in. But IEEE is setting standards, right?

Carpenter: Engineers and electricians setting standards for health is pretty ludicrous.

Abrami: We would love to talk to someone from the FCC but that is proving to be a bit of a problem and the FDA. EHT said what we should do is write a letter to the FCC with questions and the same thing to the FDA with questions. They have been known to respond. I think we need to do that. If we can't bring in a human being to testify, we can at least say we tried to elicit comments from the FCC. What I am suggesting to everyone here, send me your questions. I will sort through them and we can talk about it for the next meeting.

Carpenter: I think that is a very good plan.

Abrami: If you have any questions, send them to me, too. Someone in the back of the room would like to talk.

Public speaker: I have one quick question. For all the doctors in the room, I recently saw a video with Dr. Lena Pu who had done a blood test on a teacher who was in a classroom with Wi-Fi and the blood test indicated after a day of exposure that the viscosity and quality of her blood had basically coagulated like it was cooked. Would it be simple to do a study on people who say for a week have not been exposed to any cellphone, Wi-Fi, television and do the blood test and then test again after exposure? I am wondering if there are any other parameters besides cancer that should be looked at. I think blood quality is pretty important and leads to all kinds of other stuff.

Abrami: I thank you for your comment. We have been trying to explore the different research that is out there. Does anybody recall anything on blood?

Heroux: Yes. The rouleaux formation is very well known. Even short term tests can show if you expose blood to EMR and you have some but even if you show that to the FCC, they will say…so what?? This will dissipate after some amount of time and the mechanism for that is probably that you have free mitochondria in the blood actually. It's very new data. You have a lot of mitochondria floating freely in the blood and they help the red blood cells to coagulate together. There is plenty of that kind of evidence. What does it mean for the people in that class? If no one is willing to take that step, we are wasting our time.

Abrami: In the classroom situation, we are talking about routers everywhere. One of the people who testified for us when we got the bill passed was Cece Doucette who years ago was involved in getting wireless technology into the school until she realized, what have I done? Now she is working to try to undo some of it and have safer technology. There is no reason schools need these routers. They can be hardwired for instance.

Carpenter: With hard wire, there is no exposure whatsoever.

Abrami: And actually speeds are better.

Sherman: Speeds and reliability.

Sherman: Do you know any blood impacts Dr. Carpenter?

Carpenter: There are colleagues in Paris that have done some very good work on measuring some things in the blood that are markers of people that are electro-sensitive. They focus mostly on this electro-sensitivity. Again, all the markers they are finding are related to these Reactive Oxygen Species (ROS). Dominic Belpomme in Paris is the one who has done that. We have published with him and I can send you the article with that information and I would be happy to do that.

Woods: We already know that blood can be temperature sensitive. There's cryoglobulin anemia in people where if you put an ice cube on their skin, they get hives. This is a known entity and it's not everybody. Again, it's a genetic variation. But it bespeaks a broader picture in fact that a lot of the studies at least to my eye have been bulk tissue or bulk material investigations. What we are wrestling with now is getting down to the molecular level instead of bulk tissue, we need to look at cellular and molecular levels and that's what we are hearing here and what we have been surmising where we need to go. We don't have a lot of these good molecular studies although we know mechanisms clearly can take place already , like you mentioned the mitochondria and we have talked about other issues before that get away from what the IEEE looked at and getting down to the molecular level. We are trying to make that transition.

Sherman: I have one question. We are mainly interested in human health impacts but we have heard some rather frightening studies on environmental impacts. Can you comment on those Dr. Carpenter if you have any expertise or knowledge about environmental impacts, specifically of 5G but since this is going to be ubiquitous, the concern is this is also going to be 3G/4G… bees, insects, plants. Any thoughts?

Carpenter: Well, there is some evidence for effects on bees for example, some concern that the demise of the honey bee may be related to the RFR distorting their ability to find their way back to the hive. Again, that evidence is somewhat weak. There is a tendency whenever there is a health problem, whether its bees or humans, everybody has got their favorite villain to blame. I don't think that the effect on honey bees is very strong. On the other hand, the suggestion that hives that are placed near cell towers lose their population of bees relatively quickly. I had a high school student do a project with me last summer. She was looking at the effects of cellphone radiation on the growth of plants. She used wheat seed and had an active cellphone by one plot and an inactive by another. The active cellphone resulted in poor growth of the wheat. So, there is some evidence but again it's not 100%. Again, I agree the concern should be human health. Unlike many of the toxins that we have studied, I think we have stronger evidence for human hazard than we do for plants, bees and animals. It should be humans we care about. That's why I emphasize human research.

Abrami: There aren't research dollars coming this way.

Carpenter: They are not coming this way. They are not there at all. Again, that is the influence of the industry.

Ricciardi: I just want to comment. Knowing whether we know all we need to know about 5G or not, it disturbs me that we know it is going to work with 4G. We already know what that can do and living near a tower can do. They roll out 5G in the state of New Hampshire and it is going to be in front of our homes. Essentially, they are forcing our residents to live under a cell phone tower. I don't understand that. We know 4G is not safe and they are going to hang together in front of people's homes.

Carpenter: That is exactly right.

Sherman: And there is nothing you can do about it.

Ricciardi: This is the "Live Free or Die" state here. Now that you are putting something in front of my home that may make me ill, I am sorry, I just had to put that out there.

Abrami: Well, we can do what we can do as a state but there are laws that trump others. The 1996 law, that's the real issue.

Ricciardi: Well we are certain that 4G will do harm. Whether 5G does or doesn't they will be hanging together in front of my house. That's my point.

Abrami: There is evidence. Yes. There is frustration with the current state of affairs. As a commission, I think we are all more educated on it than three or four months ago. Dr. Carpenter, I really appreciate, the dialogue was great. Thank you. If you send us that one article, that would be good.

Carpenter: Alright. I will do that right away.

Sherman: thank you so much.

Carpenter: My pleasure and I really appreciate the fact that your commission is looking into this.

Abrami: Ok. Thank you. That was a good summary and it sounds like we keep coming back to the same thing. We know what the issues are and I would really appreciate any comments or questions please send to me via email on the FCC and the FDA.

Sherman: For my part and this is not a part of the commission but I will reach out to our federal delegation on the clauses in the FCC law. I don't see any reason why health effects should not be part of, it doesn't matter what political party you are from. If there is a health impact or potential health impact, it should be part of the decision of whether you can roll out new technology.

Abrami: Well, politically they figured it out if there were health effects, it would slow the whole thing down. That is the political reality of what happened and here we are. I have been in meetings on just regular cell towers in my town and know how hard it is to get just a regular cell tower up. People are up in arms about that, let alone be in front of their house. Verizon was getting very upset with our town as it took three or four locations before they said okay since they were concerned we would be sued by Verizon. So, the last location, they said okay. This is where it is going to go, despite upset residents in nearby areas. I was in these meetings and the neighbors were arguing health effects even with 4G towers. They said no, can't talk about that. That's just the reality.

Sherman: One of the things that he said that struck me was essentially the further you are from the source, the higher the energy that is going to be generated by your phone so while we worry about Rye has the same issue. We can't seem to get a cell tower. We have spotty cell service all along the seacoast. Does that mean that our cellphones are maxing out with our local exposure? Could the fact that you don't have a cell tower nearby and have to have a more powerful transmission from your phone increase your risk more than having a cell tower closer?

Gray: I can comment on that part. There is a decrease risk from radiation that comes from here. There is an increased risk of the radiation that comes from the cell tower antenna. You are closer to the antenna, you are getting more radiation. But with this, the power level of the phone goes down.

Sherman: That is what I am saying.

Abrami: I think we have concluded that from our meetings is that's the reality, the your cellphone works harder, the further away the tower is, it's really working hard to make a connection and is continuously trying to make that connection and will wear your battery out quicker too.

Wells: I was wondering if we could take a look at that FCC act of 1996, The Federal Telecommunications Act. If it's about cell tower placement with respect to health effects, there may be another way of addressing this.

Abrami: Section 704. We will have it for the next meeting.

Heroux: It was interpreted in the courts as meaning "health" but the wording is "environmental" that they use in the act itself.

Abrami: so the court interpreted the words.

Heroux: Yes. It's an interpretation.

Ricciardi: There was an incident in Bayville Elementary School in New York. You can research it. They put the tower near the school and after five years, 30% of the students and teachers got different cancers and three of the children died. They had a lawyer, I can't think of his name but you can google it. They went to court over it and they definitely conclusively showed that it came from that tower but because of that Telecommunications Act of 1996, nothing could be done about it.

Heroux: So the mechanism by which this occurred is very simple. In Washington, industry lobbied the government elected officials for a uniform law that would implement prosperity, essentially. But they confused communication with wireless and the deregulation of the industry when the breakup of AT&T happened, made it very profitable to promote wireless vs. optical fiber. Essentially, those are all unintended consequences that happened historically.

Abrami: there have been arguments from other speakers we have had here that on your phone bill, they have been deducting money for wired communications (landlines) but that money has been diverted to wireless.

Abrami: I will see everyone on the 20th. We won't see Senator Sherman.

Sherman: I will be here in spirit.

Ricciardi: Dr. Sherman so you will be getting someone to move forward with the FDA or FCC?

Sherman: yes, that gives me two things to talk about with our delegation. I will do both.

Ricciardi: Ok. Thank you.

VII. Next meeting: March 20,2020 8:30-10:30

Meeting Adjourned at 10:40 am.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
7/1/20
1:00-3:00 pm EST
Via Zoom (https://unh.zoom.us/j/98794338097)
Via telephone-US (+1 646 876 9923) ID: 987 9433 8097

In attendance: (11)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Senator Tom Sherman-president of the senate appointee
Brandon Garod-AG designee, Asst. AG Consumer Protection
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers

Not present: (3)
Frank MacMillan, Jr. MD-NH Medical Society Environmental Medicine
David Juvet-Business and Industry Association
Carol Miller-NH Business & Economic Affairs Dept.

Meeting called to order by Rep Abrami at 1:01 pm

Abrami: To respect everybody's time, I am going to start the meeting. This is the Commission to Study the Environmental and Health effects of evolving 5G technology. This is the first time we are meeting via Zoom. We have had a hiatus of about 4.5 months. The last meeting was February 14th. The State House has been closed for many months and we finally got the green light to proceed via Zoom. We are using Zoom, courtesy of University of New Hampshire through Kent Chamberlin who is the Chair of Electrical and Computer Engineering Dept. Kent will go over some technical things then I will read a paragraph about why we are doing it via zoom and not in person. Kent, I will turn it over to you.

Chamberlin: This is very brief. I am assuming most of you are pretty familiar with using Zoom. In your upper right corner, you have speaker view or gallery view. You can play around with that if you want to only see the speaker or the whole gallery. You may want to play with that. You won't hurt anything. Also, if you are not speaking, please mute yourself. You will see the mute indicator on the lower left. If you wish to speak, you can unmute yourself or push the space bar, say what you are going to say and when you let up on the space bar, you will be muted again. It's a good idea if we all mute ourselves so we have no background noise. Also, if you are dropped or have any problem, you can always rejoin the session. That's really all I wanted to say on how to use Zoom. Anybody have any other comments on how we might best use zoom?

Abrami: Kent, we wanted to save the gallery squares for our members, our guest, Joel and Deb. How do we do that?

Chamberlin: If you go to a block that only has a name on it and you right click, it should give you an option to only show those who have their video turned on. This will reduce the clutter on your screen. Is that working for people?

Anderson: I think there are several members who have their video turned off, Senator Gray and Senator Sherman and Brandon Garod. So they may disappear off the screen as well. You won't see their names. Just be aware of that.

Abrami: Ok. We will go with that. I have to read a public statement now:
As chair of the Commission studying Environmental and Health Effects of evolving 5G technology, I find that due to the state of emergency called by the Governor as a result of the Covid 19 pandemic in accordance with the Governor's emergency order number 12 pursuant to executive order 2020-04, this public body is authorized to meet electronically. Please note that there is no physical location to observe and listen contemporaneously to this meeting which was authorized pursuant to the Governor's emergency order. However, in accordance with the order, I am confirming that we are providing public access to the meeting via telephone and other public access via video means. We previously gave notice to the public of the necessary information for accessing the meeting, including how do I access the meeting via Zoom and via telephone. This information was printed in the House Calendar and Senate Calendars.

Welcome everybody to the meeting. Most of our meeting is going to be hearing the presentation from Dr. Herman Kelting, who has been so gracious to be flexible in his calendar. I reached out to him about four months ago. He was going to be our next guest when we stopped doing our meetings because of the virus. We will be following along his syllabus he sent to us. Before we hear from him, we have to review the minutes of the last meeting which was February 14th.

I.Approval of minutes from 2-14-20:

Dr. Chamberlin gave me two corrections this morning. One on Page 5- one quote Dr. Chamberlin feels was from Dr. Sherman. "I don't know if we are talking about the same bill"….

Sherman: As long as it's not inflammatory, I am happy to take credit.

Abrami: Also, on page 19, the last line Dr. Chamberlin said " low e values should be low p values". Without objection, we will make those changes. Are there any other changes that people noticed from those minutes? If not, instead of taking a vote, I will say without objection, we will approve the minutes as changed. Ok with everybody? We are all set. The minutes are approved with those changes.

II: Direction during the final months: We lost four and a half months and we need to discuss where we go moving forward. I think this is going to be the last presentation on the science. In reviewing Dr. Kelting's syllabus, it is a good refresher. There's a lot of good stuff in there that will get us going again from the science standpoint. Most of us are in agreement, not all of us, that the FCC needs to look at the biological effects. We have been trying to reach out to the FCC and FDA with no luck on this. With that said, it's hard for us as a state government to change the FCC's mind on anything. But that does not mean that we shouldn't focus on certain guidance for our cities and towns on the actions that they can legally take to help mitigate any potential harm. I think that's where we need to spend the next four months on looking at what is reasonable guidance that we can give. What really highlights this for me is that about a month ago: Deb Hodgdon, who takes our minutes and me, who are both from the same town were asked by our Planner to attend a zoom kind of meeting with our Planning Board. All the meeting was really was to give the Planning Board an update on what's coming down the pike on 5G. The two takeaways I got from that meeting are that most planning boards have no idea what 5G is and they have no idea of any of the issues surrounding it. I thought we were just going to be observers in the meeting but they asked me to give an update on 5G. They were very interested in what we had to say. The other takeaway is that they are very interested in what we come up with as a Commission for guidance. They are looking for some guidance as a town. We know that there is pushback in other towns and other towns are doing things. I think we need to formulate what is reasonable and what can help with this issue.

Denise Ricciardi who is on our Commission, is on the Board Leadership in the town of Bedford. They have recently adopted ordinances that Denise was instrumental in drafting. We don't have time today to talk about those. I have done research on what other towns around the country have done and there are a variety of actions being taken. Whether they hold up to a legal standard is another discussion. But towns and communities are trying to at least put some parameters around 5G. We should be looking at those examples and working our way through to what we think is reasonable.

Now, understand as I have said over and over again, as a Commission in New Hampshire, we are going to have differences of opinion among us as Commissioners. The way this is handled from the House is that there can be a Majority Report and there can be a Minority Report. That's the way we handle these things. We only have four months. Denise and I chatted earlier about, is there any way we can get an extension? There really aren't many commissions that have reactivated since the shutdown. I will ask leadership in the House whether we can get an extension. The problem we have is that it crosses over into a whole new Legislature and we may be able to do something next year to continue our work. But I think we have to assume our goal is still to have a report out by November 1st. If we think we still need more time, we could see if we could get legislation passed but that will have to be the beginning of next year.

Because there are a lot of us, what I would like to do is to form a subcommittee to start putting some meat around the bone of ideas. Then present that to the full Commission for discussion. I think that is probably the more efficient way of proceeding. I will be looking for volunteers of those willing to work on that subcommittee. If you volunteer to be on the subcommittee, we will probably have to meet once a week for an hour or two and I don't want to wait any longer than a month for the next Commission

meeting. Because we lost 4.5 months, I can't see any other way to do this efficiently with the time we have left. If everybody wants to be on it and is willing to work every week on it, that's one thing but I don't want to have to ask everyone to do that. Tom?

Sherman: I think it's a great idea, Pat. I unfortunately, cannot be on it because I am chairing a subcommittee for the drinking water/groundwater Commission. It's a great way to get this done as long as it's representative and as long as all of us have ample time for feedback and input. Getting something down as a framework for a report and allowing feedback and discussion as a full group is a great way to do this.

Abrami: Well, the way I have done it in the past is there will be a lot of introductory stuff and all that but there will be sections of the report. I am really looking at the recommendations section that we really need to focus on. I don't want to put people on the spot here. I will just ask you to drop me a note if you want to be on the subcommittee. Denise already volunteered and I think Kent may want to be involved. Any others that want to help, that would be great. If I don't think we have enough, I may be reaching out to you and asking again if that's ok.

III. Next Commission Meeting:

Everybody pull out your calendars. Let's talk about the Next Commission meeting now. How about the 27th?

Sherman: Patrick, I work on Mondays. We usually meet on Fridays.

Abrami: Can everybody do Friday, the 24th? I think we are good for our next Commission meeting to be on Friday July 24th at 9 am via Zoom.

Ricciardi: Mr. Chairman, could I just bring something up for the record? All things being fair and equal, our information is important. As you know, I wrote explicit questions with your permission to the FDA and the FCC and still waiting for a response. At some point if we don't hear back, those are invaluable to making these very important decisions that I think those questions should be put in the record.

Abrami: Ok. Without objection, does everyone agree we should put those questions asked of the FCC and the FDA into the minutes of this meeting? Does anybody object to that? Ok so with that, we will put the record of those questions asked of the FCC and FDA into this meetings minutes.

Ricciardi: thank you.

Abrami: I will share with you those questions after this meeting. By the way, we have been having a problem getting things out the way we should. Because of the virus, the staff has not been as accessible as they should to distribute things or post on our webpage. I am trying to be in catchup mode on the things I thought were sent out but haven't been. So I am working on that. I apologize for that.

With that said, most of our meetings we have had, we have tried to get our arms around the science. We have a group that understands the science to a good degree. Dr. Kelting has put together a

presentation with 13 objections. When I looked at it, objections 7-11 are really at the heart of what we want to talk about more. He can start a little earlier and go a little longer if need be because there is a lot of material here. Dr. Kelting has been looking at this issue for many years and has published on this issue and we welcome him. After his sections, we will pause for questions.

IV. Herman Kelting, PhD presentation *(For more details, please refer to presentation materials)*

"I am grateful that you have invited me to testify on the safety of 5G/4G Small Cell Antennas placed in residential and commercial areas which I. I object to 5G/4G SCAs based upon adverse health results. In my testimony I will discuss the attributes of 5G/4G SCAs and 13 objections related there to; time will permit me to discuss only a few research citations. Since 5G is new and has only limited historical application even in 5G/4G SCAs, and 4G and prior generations well established, my research evidence will emphasize the link between 4G and prior generations RFFR with injury to living organisms. I will also discuss 4G emissions in the context of cell phone, Wi-Fi, macro cell phone base stations, etc. because 5G/4G SCAs add to already high levels of 4G emissions from many other sources. As a general rule, I oppose air-borne, wireless emissions."

Attributes of 5G/4G that I will use in my objections to 5G/4G.

A. Two sets of antennas in a "5G/4G SCA": One beam forming on-demand 5G antenna and three 4G antennas, the latter pulsating 24/7 RFFR sited at about every 100 meters in residential neighborhoods. Movement of 5G source (e.g., cell phone) transfers signal to 4G antenna. Hence, I have concluded that the purpose of 5G is not to get 5G into residential neighborhoods but to bring 4G into neighborhoods to satisfy increased demand and revenue. *SCA wireless emissions may be avoided by* ***hard wiring from street to homes.***

B. 4G signals are being increasingly modulated, thereby more biologically active, and potentially more harmful to living organisms. [Oram Miller]
   1. Marginal harms to fetuses and young children are very severe from 4G/5G and all other wireless communications with thin skulls, over adults who are also harmed.
   2. All RFFR is a stimulant causing anxiety, depression, stress, and many other illnesses. Its radiation places a forced on charged particle on our bodies, namely electrons.
   3. **Remember this: All manufacturing processes fail in the sense they operate outside the engineering design:** 5G/4G antennas may mal-function to create very high-power densities and frequencies injuring those nearby, who will not know the extent of the damage because they do not have meters. Even if one can prove harm with a meter, damages are limited to the company's equity because insurance companies do not insure injury from RFFR.

C. Power densities of SCAs have not been publicly disclosed.
   Oram Miller indicates power densities from 5G/4G SCAs may be up to several hundred thousand $\mu W/m^2$.

<u>Objection #1: 28 llnesses/ 20 Symptoms known to be caused by or inferentially linked to RFFR</u>. [Letter from Herman Kelting to the secretaries of Health and Human Services and Homeland Security; original letter dated October 3, 2019; Revision 1 dated January 8, 2019; Exhibit C Herman Kelting. "United States Congressional Research and Legislative Proposals to Educate the American People About the Power Density Safety of Wireless Communications (uW/m2)." *Indian Journal of Applied Research* 8(1) (January 2018): p. 263-271 (hereinafter "IJAR Jan 2018"].

A. There are twenty-eight (28) Illnesses known to be caused by RFFR. These include increased risk of brain damage to fetuses, miscarriages, cancer. children's behavioral difficulties, ADHD, cancer of the brain, salivary gland, and breasts; leukemia, anxiety, depression, stress, sleep disturbances, reduction in melatonin, cataracts, inflammation; damage to the testes, sperm, blood brain barrier, DNA (damage through strand breaks), eyes, heart, thyroid hormones, electromagnetic hypersensitivity (EMH), damage to the autoimmune system,[1] etc. [IJAR Jan 2018, p. 264-265] If a woman places her cellphone in her bra for five years, there is about a 1.0 chance of developing breast cancer.

B. There are also twenty (20) symptoms reported by those living near 4G MCPBS (three 4G antennas housed within 5G/4G SCAs) and earlier generations. These include sleep disturbances, headache, depression, fatigue, dysesthesia (pain, itchy, burning from nerve damage associated with neurological injury), concentration dysfunction, memory changes, dizziness, irritability, anxiety, nausea, EEG changes, paranoid states, adverse neurobehavioral symptoms, etc. [IJAR Jan 2018, p. 264)

C. Nine Determinants of Injury from Wireless Devices: This is a compilation that I have done on the subject.

1. *<u>Distance from the RFFR-emitting device to a body organ</u>.* Since emissions from a device spread out with distance, the closer a body organ is to the emitting device, the greater the percentage of emissions hitting the body—if a cell phone is placed at the ear vs. using speaker phone many inches away, a much higher percentage of total emission hit the brain, salivary gland, and other nearby organs. The brain is obviously the most vulnerable to injury. Storage of a cell phone in the bra for five years has an approximate 100% chance of resulting in breast cancer. 500 meters minimum distance from MCPBS to humans and should be 1,000 meters for a two safety multiple.
2. *<u>Frequency modulation:</u>* RFFR signals (e.g., cell phones) utilize a high-frequency carrier wave that is transmitted over long distanced with an attached modulated, lower frequency that carries information. The modulation may utilize frequency or amplitude modulation. Signal modulation is an extraordinarily complex technical process that may cause injury to living organisms.
3. *<u>Peak (not average) power density of pulsed radiation transmitted to the body</u>.* Power density is the far field (after joining of source magnetic and electric fields) measure of RFFR strength measured by $\mu W/m^2$ (micro watts per square meter). RFFR professionals have concluded that it is pulsating peak power densities that create the most harm to

living organisms; RFFR meters have options to measure instantaneous, maximum (peak), and average maximum (peak) RFFR.
Peak densities vary widely based upon the nature of the RFFR-emitting device and signal strength. I measured the far field of one cell phone at boot up of 500,000 $\mu W/m^2$, which can exceed 20,000 $\mu W/m^2$ in normal operation depending upon signal strength and other factors.

4. *Spatial RFFR density from multiple sources.* The spatial RFFR density is a measure of pulsating radiation density from multiple pulsed RFFR devices such as cell phones, Wi-Fi, cordless phones, wireless security systems, *etc.* in an enclosed space. It is distinguishable from the metered power density *per se* because it is a function of the number of RFFR emitters in an enclosure (e.g., Wi-Fi plus 25 cell phones in a classroom)
5. *Meters understate harm from multiple nearby RFFR emitters.* As the number of emitting sources in an enclosure increases, the spatial density increases, but the power density may increase little because of the random combinations of peak instantaneous power densities from individual sources. To the best of my knowledge no one else has discussed understatement of power densities from multiple nearby RFFR emitters.
6. *RFFR source enclosed in material space- vs. outdoors-sourced RFFR.* RFFR sourced within an enclosure (autos, busses, aircraft, trains, elevators, drywall enclosures; metal is the worst enclosure) reflects off the confining material surfaces making equal RFFRs more harmful indoors than outdoors.
7. *Age at first exposure to RFFR.* Fetuses have thin, incomplete skulls with six separated bones and RFFR will make direct, almost unimpeded contact with their brain through the six thinner skull bones and cranial sutures between bones, which continue to age two. Thereafter, children have thinner skulls for several years, and continue to receive more RFFR than adults. The most dangerous situation is exposing a fetus or small child to RFFR in a metal enclosure such as a car or crawling around a Wi-Fi-sourced RFFR.

   "Children whose mothers used cell phones during pregnancy had 25% more emotional problems, 35% more hyperactivity, 49% more conduct problems, and 34% more peer problems." [BioInitiative 2012, Section 1 "Summary for the Public 2014 Supplement, Evidence for Fetal and Neonatal Effects," citing Divan et. al. 2008]

8. *Cumulative life-time exposure to RFFR.* It is not age linear because younger people suffer more than older people because of brain structure and skull structure.
9. *Unique cellular and organ attributes and receptivity to RFFR.* Each person has different cellular and organ compositions and, thereby, different receptivity to RFFR contamination.

Objection #2: Evidence of mental illnesses of college and high school students.

A. 25% of college students and 20% of high school students (2018) are claiming mental disabilities caused by anxiety, stress, and depression to take longer course and SAT testing times and private testing rooms because they cannot tolerate the presence of others. [IJAR Jan 2018, Exhibit G: Douglas Belkin. "Colleges Give the Disabled More Leeway." *Wall Street Journal* 05.25.2018, A3; Exhibit H: Douglas Belkin and Tawnell Hobbs. "More K-12 Students Get Special Help." *Wall Street Journal.* 07.05.2018, A4.] It is known that anxiety, stress, and depression are caused by RFFR and from this knowledge I deduced my inference that these mental disabilities are caused by cell phones and other RFFR emitting sources.

B. College student depression rates increased from 30.9% in Fall 2013 to 39.3% in Fall 2017 ("Felt so depressed that it was difficult to function.") [IJAR Jan 2018. Exhibit E: *National College Health Assessment Survey*, p. 14]. It is known that RFFR causes depression.

Objection #3: Increases in suicides of young people

A. Actual suicides for 10 to 14-year age group declined from 242 in 1999 to 180 in 2007 and increased to 517 in 2017 = **11.1%** Geometric mean (GM) increase for ten years ending in 2017. [IJAR Jan 2018, Exhibit F]
B. Actual suicides for 15-24-year age group declined from 4316 in 2004 to 4140 in 2007 and then increased to 6252 in 2017 = **4.2%** GM annual increase for ten years ending in 2017. [IJAR Jan 2018, Exhibit F]
C. College students who "Seriously considered suicide" increased from 6.0% in Fall 2010 to 12.1% in Fall 2017 [IJAR Jan 2018. Exhibit E: National College Health Assessment 2017, p.14; IJAR Jan 2018, p. 266;] "Seriously considered suicides" doubled in 7 years: **10.5% GM annual increase in** "Seriously considered suicides"**.**
D. Notice the similarity in IRR growth rates of 11.1% GM actual suicides for 10-14-year age group and 10.5% GM for college students "Seriously considered suicide."
E. In my opinion, there is a near 100% chance the increase in actual and contemplation of suicides are caused by RFFR from cell phones, Wi-Fi, MCPBS, and are additional measures of a catastrophic health crisis NOW.
F. One medical doctor told me this: "Doctors know that cell phones cause suicide."
G. **In my opinion, there is a catastrophic health crisis NOW that is being concealed**.
    1. Reported anxiety, depression, stress, and suicides to Secretaries of Health and Human Services and Homeland Security in original letter dated October 3, 2018.
    2. Secretary referred my charge to National Institute of Health immediately.
    3. NIH rejected three days later and stated "no notice to sender."
    4. HK reported NIH rejection of catastrophic health crisis to federal law enforcement agency as an improper rejection of a catastrophic health crisis.
H. On May 27, 2020, HK accessed the CDC website for precise reference for the suicide data in Exhibit F and was unable to find it after a 45-minute search. Then called CDC and telephone responder looked for 45 minutes and could not find it. The WSJ has had a number of articles on suicides and it appears to me that the historical suicide data for 1999 to 2016 has been removed from the CDC website.

I made a number of predictions in my published article. I am just going to the last one. Some of the others have already come true of course. The last one is that working lives will decline from the mid- sixties to the mid- fifties as people have more exposure to cell phones and radio frequencies. If that occurs, that is going to pretty much be a terrible situation in an economic sense for the United States because of the additional time for retirement payments plus the loss of the skills.

Objection #4: Species extinction from 5G/4G SCAs/RFFR [Letter from Herman Kelting to Mayor Katrina Foley, Costa Mesa, CA. dated January 24, 2020 opposing 5G; HK presentation to Costa Mesa City Council February 18, 2020]

A. Barry Trower: Physicist and well-known UK 5G weapons expert, who was associated with 5G weapon systems used to injure Catholics in Northern Ireland stated:
   1. Installation of 5G/4G SCAs will result in only one child in eight births being born normal three generations (60 years) from date of 5G/4G SCAs installation.
   2. He also indicated that the RFFR injures 4,500 electrical subsystems in the human body by placing a force on charged particles.

B. Evidence of species extinction in five generations or less is supported by the following scientific studies and other evidence: (ten supporting references follow but I will only refer to a few because of time.)
   1. A Greek study of the reproduction of rodent births exposed to RFFR resulted in "…mice exposed to 0.168 nW/cm^2 (1,680 µW/m^2) became sterile after **five** generations, while those exposed to 1.053 nW/cm^2 (10,530 µW/m^2) became sterile after only **three** generations." [A Balmori, 194] "A progressive decrease in the number of newborns per dam was observed, which ended in irreversible infertility" [Magras IN, Xenos, TD. "Radiation Induced Changes in the Prenatal Development of Mice." *Bioelectromagnetics* 18 (6) (1997): Abstract, 455-461 cited in A Balmori. "Electromagnetic Pollution from Phone Masts." Effects on Wildlife." *Pathophysiology* 16 (2009): 191-199, 194] (Foley 01.24.2020)
   2. Study of 361 men in fertility clinic had reduced sperm count, motility, (moving property through the female reproductive tract), viability, and normal morphology (size and shape of sperm under microscope, >14% normal) as daily cell phone usage increased from zero, < 2 hours/day, 2-4 hours daily, and to >4 hours daily usage [IJAR Jan 2018, Ref 47,Agarwal, 2008]. When you follow these decreases through multiple generations you have the end of species. That is a 55% decline with an increase in cell phone use from 0-4 hours/day.

Group	CP Usage	Sperm Count	Motility	Viability	WHO Morphology % Normal
A	No use	85.89	67.80	71.77	40.32
B	< 2 H/D	69.03	64.57	68.21	31.24
C	2-4 H/D	58.87	54.72	57.95	21.36
D	> 4 H/D	50.30	44.81	47.61	18.40

3. Experiment showed that the reproductive capacity of the insect Drosophila Melanogaster declined 36.4% (1 min), 42.5% (6 min), 49.2% (11 min), 56.1% (16 min), and 63.0% (21 minutes) exposure to a GSM 900 MHz carrier frequency and 217 Hz information frequency with exposure at a power density of 100,000 $\mu W/m^2$ (10 $\mu W/cm^2$). Again, this power density of 100,000 $\mu W/m^2$ is far less than the 6,000,000 to 10,000,000 $\mu W/m^2$ FCC MPE safe limits. This experiment showed the important relationship between time of exposure to RFFR and injury to a living organism. [Panagipoulos DJ et.al. "The Effect of Exposure Duration on the Biological Activity of Mobile Telephony Radiation." Mutation Research 699 (2010): 17:22.[2]

4. Cell phones operating at 900 MHz were placed in three colonies of honeybees and turned on for 10 minutes for ten days. After ten days the worker bees never returned to the three test hives because the cell phones were "…frying the navigational skills of honey bees and preventing them from returning back to their hives." Production of eggs by the queens was reduced from 350 to 100 eggs/day. The authors concluded that cell phone RFFR is a better explanation of Colony Collapse Disorder than any other theory. [Sainudeen Sahib S. "Impact of mobile phones on the density of honeybees." *Journal of Public Administration and Policy Research* 3(4) (Apr 2011): 131-133.] (Sisolac 08.29.2019, 13-14)

There are others listed in my presentation but I think this is adequate for proof.

C. Doctors and scientists opposing 5G/4G SCAs *(There are others, but here is one*)

<u>Baden Wurttemberg, Germany October 23, 2019</u>

Seventy (70) doctors in Baden Wurttemberg signed and 25 doctors in white coats delivered the letter, "Doctors Warn Against 5G Mobile Communications" to the prime minister on October 23, 2019 asking for a moratorium on 5G small cell antennas because of harm to living organisms. They expressed particular concern with "electro hypersensitivity (EHS)" which now affects 5-10 percent of their population. One doctor-signatory in Baden Wurttemberg stated ***"To protect the population, we need Wi-Fi free schools and a 5G moratorium!"*** *In my opinion, we also need control over macro cell base stations.*

D. Many communities have stopped 5G or will not be producing it.

<u>Haifa, Israel banned Wi-Fi in schools April 20, 2016</u>

On April 20, 2016, Haifa, Israel banned Wi-Fi in schools because of the increase in EHS/EMH and because many children were contemplating suicide. It is known that Jenny Fry, a UK teenager, committed suicide because of Wi-Fi in her school.

E. HK request for medical school research from a friend at (Stanford University) dated May 18, 2020 9:50 AM

Does RFFR make Covid-19 more virulent? Asked for Covid-19 (1) free of and (2) attached to host cells to be placed under an electron microscope with a variable frequency/variable power density RFFR to determine if the virus is more active under RFFR bombardment similar to neurons being more active in an RFFR field What gave me this idea is that we know that six CA firemen receiving brain and neurological injury from macro cell base station on the roofs of their fire stations resulting in permanent excitement of brain neurons.(hich was outputting between 10-20,000 $\mu W/m^{2)}$

Abrami: Herman, can we pause right here and see if there are any questions at this point. I think what Herman is doing is adding to the list of papers and things that we have already heard about and discussed in the past. He is highlighting some of the papers that are of interest to him. Any questions or comments?

Chamberlin: I just have a question and it involves the bee study. We heard about the bee study and saw the paper on it. This is of course, very convincing. If you put a cellphone in a beehive and it's going to destroy the navigation abilities of the bees now that would be convincing. We are looking for strong evidence. It kind of surprises me that this is a fairly simple study to do. Do you know if it's been replicated?

Kelting: To the best of my knowledge, yes. In other words, there are other studies that have also shown damage to bees with the application of radio frequency. What I have done in my work is pick the best study available and I do not do exhaustive searches with additional support.

Chamberlin: Alright. Thank you.

Wells: I have a question as well. On objection 1, you list illnesses known to be caused by or linked to radio frequencies and I am wondering, could these antennas be used or hacked to cause deliberate injury in your opinion?

Kelting; yes, certainly. Remember, 5G is a beam form signal and that means when you turn on your cell phone, there is a beam that envelopes your body about ten degrees wide and if they combine that with facial recognition, they can do anything that they wish. They can change the power of the beam because that's what they did to the Catholics in Northern Ireland. It's not exactly the same because they can use higher frequencies but they can beam form and take out people with facial recognition in the antenna system.

Abrami: We know in China, they are using facial recognition with their 5G. There are plenty of reports showing that. Is that what you are hearing Herman?

Kelting: That sounds sensible but I am not totally familiar.

Abrami: Let's continue.

Objection #5: Injury specifically from 5G

A. "Preliminary observations showed that MMM [millimeter waves > 30 GHz] increase the skin temperature, alter gene expression, promote cellular proliferation and synthesis of proteins linked with oxidative stress, inflammatory and metabolic processes, could generate ocular damages, affect neuro-muscular dynamics…available findings seem sufficient to demonstrate the existence of biomedical effects…" [Di Caula A. "Towards 5G Communication Systems: Are There Health Implications?" *International Journal of Hygiene and Environmental Health* 221(3) (Apr 22, 2018): 367-375
B. 5G transmits data in a very short time period, but there are indications that "…these bursts may lead to short temperature spikes in the skin of exposed people." Research has also shown that peak to average temperature ratios "…may lead to permanent tissue damage after even short exposures highlighting the importance of revisiting existing exposure guidelines." This means that current heat standards are too high and should be lowered. [Neufeld E and N Kuster. "Systematic Derivation of Safety Limits for Timer-Varying 5G Radio frequency Exposure Based on Analytical Models and Thermal Dose." *Health Physics* Sept 21, 2018.] [Letter from Herman Kelting to Nevada Governor Steve Sisolac, Nevada Senator Nicole Cannizzaro, and Nevada Assemblywoman Shay Backus dated August 29, 2019 (Revision 02), 11-12].
C. 5G operates at the same frequencies (e.g. greater than 24 GHz) as the sweat duct, which is a helical antenna operating at a high specific absorption rate in extremely high frequency bands. This suggests 5G will heat the skin, one of the adverse consequences of 5G.
D. In an e-mail dated May 27, 2020 2:05 PM , Professor Joel Moskowitz stated "**My note:** This review summarizes research on the effects of millimeter waves (>30 GHz) on the skin. None of these studies has examined 5G millimeter waves. 5G employs specialized technology including phased arrays, beam-forming, and massive MIMO (sending multiple data signals simultaneously over the same radio channel). 5G millimeter waves may be more biologically active and result in more adverse health effects than the earlier millimeter wave studies found."

Objection #6: Injury from secondary, endogenous RFFR: Sommerfeld and Brillouin precursors

1. Sommerfeld and Brillouin precursors are induced, propagating transient RFFRs generated endogenously in the human body (or other mediums) from an exogenous source RFFR with a changed sinusoidal structure (about 6 times smaller amplitude) that displaces charged particles in human tissue, thus damaging those particles. (A117). This means that Sommerfeld and Brillouin Precursors are RFFR that propagate endogenously within the body from a source exogenous to the body without attenuation and travel faster than the source pulse. They induce movement of proteins, DNA, and ions of potassium, sodium, chloride, calcium, and magnesium. (A117) These movements damage cells and organs [Albanese,R, Blaschak, J, Medina, R, Penn, J. "Ultrashort Electromagnetic Signals: Biophysical Questions,

Safety issues, and Medical Opportunities." *Aviation, Space, and Environmental Medicine*. May 1994: A116-A120 ("Albanese May 1994".; see also OMB No. 0704-0188 94-24875 AD-A282 990 dated Jan 90-Aug 93; Jakobsen PK and Masud Mansuripur. "On the Nature of the Sommerfeld-Brillouin Forerunners (or Precursors." *Quantum Studies: Mathematics and Foundations* (November 8, 2019)] Thus, 5G beams immerse the body in a 10-degree RFFR, enter the skin and breed new, induced RFFR that travel faster than the original pulse with the radiation of the propagated RFFR damaging cells deep in the body just as 4G RFFR does.

2. Regarding the failure of FCC safety limits to consider Sommerfeld and Brillouin Precursors, Albanese stated "However, IEEE C95.1, 1991 was developed from biomedical data on pulses whose onset and offset times (or rise and fall times) were much slower than those shown in Fig 2; the standard does not embody the precursors phenomenon. Thus, in practical term, the sharp ultrafast category of pulses being discussed are not covered by IEEE C95.1-1991 or by any other formal guideline known to us…**Until the issue of tissue damage mechanisms associated to pulses that cause precursors is fully studied, the authors recommend zero human exposure to such unique precursor and gendering pulses."** [Albanese May 1994, A118]

<u>Objection #7: FCC antenna safety standards applied to MCPBS ignore radiation injury to living organisms at power densities many times lower than the FCC antenna safety standards.</u>

A. FCC antenna safety standards: 6,000,000 to 10,000,000 $\mu W/m^2$ based upon frequency.
   1. These FCC safety limits ignore actual injury from radiation at much lower limits than 6,000,000 to 10,000,000 $\mu W/m^2$. Six CA firemen received brain and neurological injury from MCPBS on the roofs of their fire stations emitting 10,000 to 20,000 $\mu W/m^2$. [Letter to two secretaries Revision 01 dated 01.08.2019, Exhibit N]

      Rep. Abrami, have you heard of this California study before?

      Abrami: yes

B. International antenna safety standards:

   Compare the safety of FCC safe limits of 6,000,000 to 10,000,000 $\mu W/m^2$ with other countries antennae safety limits. The wide range in country antenna safety limits means **no country really knows antenna safety limits and that the US, with the highest antenna safety limits is clearly in conflict with all other countries in this list.** [Remke, Amar and Mahesh Chavan. "A Review on RF Exposure from Cellular Base Stations." *International Journal of Computer Applications.* 104(12) (Oct 2014): 9-16]

Power density %US

Country or other geographical area	W/m^2	µW/m^2	
USA public exposure guidelines at 1800 MHz	10	10,000,000	100%
India	9.2	9,200,000	92%
Canada (see Attachment)	3.0	3,000,000	30%
Australia	2	2,000,000	20%
Belgium	1.2	1,200,000	12%
New Zealand	0.5	500,000	5%
Exposure limit in CSSR, Belgium, Luxemburg	0.21	210,000	2.1%
Exposure limit in Poland, China, Italy, Paris	0.1	100,000	1.0%
Exposure limit in Italy in areas with duration hour	0.095	95,000	0.95%
Exposure limit in Switzerland	0.095	95,000	0.95%
Germany: Precautionary recommendation only	0.09	90,000	0.90%
Italy: Sensitive areas only	0.025	25,000	0.25%
Exposure limit in Russia, Bulgaria, Hungary	0.02	20,000	0.20%
Austria: Precautionary limit in Salsbury only	0.001	1,000	0.01%
Germany BUND 199	0.0009	900	0.009%
New South Wales, Australia	0.00001	10	0.0001%

(1) Building Biology Institute RFFR anomaly standards for up to for sleeping: They consider 1,000) µW/m^2 as an extreme anomaly. They suggest for sleeping purposes that you have considerably less than 1,000) µW/m$^{2.}$ For example, I have shielding paint on two bedroom walls of my home which brings me down to near zero.

	None	Slight	Severe	Extreme
a. Radio frequency field radiation (High freq., EM waves) µW/m^2	<0.1	0.1 – 10	10-1000	>1000

C. RFFR power density meter readings from emissions of a MCPBS (MCPBS) taken 06.09.2020 by HK. MCPBS located 150 feet from about 100 two-story apartments with more apartments adjacent and to the east of the front 100 apartments. Meter readings taken about 100 feet from the MCPBS and 50 feet from apartments. Meter used: Safe Living Technology Safe and Sound Pro II. (Herman's research)

1. Power density meter readings in $\mu W/m^2$:

108,000	97,300	**224,000**	159,000
212,000	97,300	147,000	135,000
97,300	**311,000**	162,000	145,000
135,000	**580,000**	175,000	**200,000**
147,000	**208,000**	**224,000**	

2. Descriptive statistics

Average	196,663 $\mu W/m^2$ Rounded 197,000 $\mu W/m^2$
Stdev	109,569 $\mu W/m^2$
Coefficient of variation	0.56

3. How would you like to live 150 feet from a MCPBS emitting an average power density of 197,000 $\mu W/m^2$ when 6 CA firemen received brain and neurological injury from MCPBS on the roofs of their fire stations emitting 10,000 to 20,000 $\mu W/m^2$.
If you look at these statistics with the bolded very high values and recall that the firemen were injured at between 10-20,000. These poor people in 100 apartments are living within 50 feet of this power density.

Abrami: so Herman, this is interesting. I know a lot of people look at the readings based upon an average. What is your feeling on an average v. what the peak would be?

Kelting: Perhaps, I was not clear on that. These are all peak readings. What I do is turn on my meter and clear it and for 15-20 secs it registers peak, hold and gets the highest peak and that's what I record on here. These are not averages. Averages are much lower. Probably less than 10%. Peaks injure.

Sherman: Could I ask a question? So is it how long you are exposed to peak, is the duration of exposure as important as the intensity?

Kelting: It's a combination of both. Remember now, you are talking about a macro cell phone base station pulsating RFs, the peaks of which are within a 20-30 second interval are as I recorded here. This goes on 24x7. Theoretically if you came back one hour later or two days later, you are going to get about the same distribution and the same averages..

Chamberlin: My question involves the bandwidth. Of course, the wider the bandwidth, the greater the peak you will see because you will be looking at a superposition of a greater number of frequencies. Do you happen to know the bandwidth?

Kelting: no. I do not. I only measure radio frequencies and that could probably be one of the inadequacies of my work. But you have alerted me to that and I have a meter that measures frequencies so perhaps in the future I can consider that.

Abrami: But here's the thing. These are still within the FCC standards. Correct? The question on the table is, is the FCC standard set too high?

Kelting: That's correct.

Kelting: On January 14, 2020 I wrote a letter to the Clark County Board of Commissioners on two sets of macro towers and cell phone base stations. One was emitting up to 218,000 micro watts per square meter about 100 yards from the two facilities which was about 100 feet from homes and the second was power densities on a building with two antenna on top which were concealed incidentally. They were emitting in the building up to 37,100 $\mu W/m^2$. That building is a Community Center.

D. Studies of harm from 4G MCPBS at power densities small fractions of FCC MPE limits,

1. In a study of 1000 individuals living for ten years within less than 400 meters from a GSM cellular transmitter site in Germany, it was found that the likelihood of getting cancer was three times greater than for those not near a cellular transmitter and that the patients fell ill an average 8 years earlier. Radiation in the inner area was 100 times the radiation in the outer area. The authors concluded it was necessary to monitor the health of individuals living near high radio frequency emissions from cellular base stations. [Eger, Horst, Klaus Uwe Hagen, et. al. "The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer." Umweit-Medizin-Gesellschaft 17(4) (2004): 7 pages]. (Sisolac 08.29.2019, 12-13)
2. An apartment building with two cell phone base stations on the roof had a mean power density of 3,811 $\mu W/m^2$ with a power density range of 15.2 $\mu W/m^2$ to 112,318 $\mu W/m^2$. The mean radiation was reduced by 98% when the power density from the two cell phone base stations was disregarded. The authors concluded:

   "Due to the current high RF radiation, the apartment is not suitable for long-term living, particularly for children who may be more sensitive than adults…the simplest and safest solution would be to turn them off and dismantle them."
   [Hardell, Lennart, Michael Carlberg, et.al. "Radio Frequency Radiation from Nearby Base Stations Gives High Levels in an Apartment in Stockholm, Sweden: A Case Report." *Oncology Letters* 15(5) (May 2018): Pages 1-29]. (Sisolac 08.29.2019, 12-13)

3. In Belo Horizonte, Brazil, it was found that deaths from neoplasia (i.e., abnormal growth of tissue; cancer) increased with close proximity to cell phono base stations. For those living within 100 meters of a CPBS, the death rate was a relative risk of 1.35, for 500 meters 1.08, and for 1000 meters 1.00. The death rate from neoplasia varied from 5.83 per 1000 individuals to 2.05 per 1000 individuals. Cell phone base stations were concentrated in the Central Southern region and varied from 8,980 uW/m^2 (0.898 $\mu W/cm^2$) to 30,660 $\mu W/m^2$ (3.066 uW/cm^2) in 2003. Brazilian power density standards were 4,513,400 $\mu W/m^2$ (451.34 $\mu W/cm^2$) at 900 MHz and 9,024,900 $\mu W/m^2$ (902.49 $\mu W/cm^2$) at 1800 MHz.

Notably, the death rate from neoplasia in Belo Horizonte occurred at power densities much lower than the US standard of between 6,000,000-10,000,000 $\mu W/m^2$. [Dode, AC, Et.al. "Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil" Science of the Total Environment 409 (2011): 3649-3665].

4. In a study of tree damage in Germany, it was discovered that cell phone base stations damaged the sides of 60 trees facing the MCPBS. The median power density from the MCPBS on the damaged side was 995 $\mu W/m^2$ and on the undamaged side was 125 $\mu W/m^2$ using peak and peak hold values. A power density of 995 $\mu W/m^2$ is obviously far less than the FCC safe threshold of 6,000,000 to 10,000,000 $\mu W/m^2$. It is also a little less than the Building Biology recommendations of less than 1,000. The authors quote from M. Repacholi, head of the International EMF Project of the WHO (p. 567), who said in part: [Waldmann-Selsam C, et.al. "Radiofrequency Radiation Injures Trees Around Mobile Phone Base Stations" Science of the Total Environment. 572 (2016): 554-569.]

   > "Given that any adverse impact on the environment will ultimately affect human life, it is difficult to understand why more work has not been done…research should focus on the long-term, low level EMF exposure for which almost no information is available"

5. In an Israel study of cancer rates near a cell phone base station, it was discovered that 3-7 years' exposure times had cancer rates 4.15 times the cancer rate in the entire population and that the cancer rate for women was 10.5 vs. 1.0 for the whole town of Netanya. The power densities were "far below" current guidelines of 5,300 uW/m^2 (0.53 uW/cm^2) for thermal effects. [Wolf, et. al. "Increased Incidence of Cancer Near a Cell Phone Transmitter Station." International Journal of Cancer Prevention. 1(2) (April 2004).]

6. In a Greek study of the reproduction of rodent births in response to a microwave power density of 1,680 $\mu W/m^2$ (0.168 $\mu W/cm2$) it was found that the rodents became sterile after five generations and those exposed to 10,530 $\mu W/m^2$ (1,053 $\mu W/cm^2$) became sterile after three generations. Note that these damaging-to-living-organisms' power densities are considerably less than the FCC safe limit of 6,000,000-10,000,000 $\mu W/m^2$. [Magras IN. "Radiation induced changes in the Prenatal Development of Mice." Bio electromagnetics 18 (1997): 455-461 cited in A Balmori. "Electromagnetic Pollution from Phone Masts. Effects on Wildlife." Pathophysiology 16 (2009): 191-199.,]

Objection #8: FCC antenna safety standards disregard power densities emitted by body proximate devices (i.e., personal property).

A. There is only a heat standard for body proximate RFFR emitting devices and it has been shown many times there is radiation injury even though the heat standard is met.
B. In a letter dated February 7, 2014, the Office of the Secretary of the Interior, stated:
   "The electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today."

Objection #9: RFFR meters understate power densities from multiple nearby RFFR emitters.

This means that when you meter an area with two or more emitters, the peak power densities will not measure appropriately the addition of the second to the first and here is why.

Assume two single 4G MCPBS emitting antennas each emitting peak power densities of 10,000 $\mu W/m^2$ with a combined theoretical peak of 20,000 $\mu W/m^2$.

When you meter, you should probably get at some point a peak of 20,000 $\mu W/m^2$. You will not get that because antennas will be emitting ***unsynchronized*** peaks and lows. The probability of measuring two MAX peaks of 10,000 $\mu W/m^2$ each for a combined total power density of 20,000 $\mu W/m^2$ is zero. Thus, if we have a metered instantaneous peak of 8,000 $\mu W/m^2$ for Antenna #1 and a metered instantaneous peak of 4,000 $\mu W/m^2$ for Antennas #2 for a combined instantaneous peak of 12,000 $\mu W/m^2$, 12,000 $\mu W/m^2$ will be the peak for the two combined antennas, which is 12,000/20,000 $\mu W/m^2$ = 60% of the true combined peaks. You will likely never get the true a peak of 20,000 $\mu W/m^{2.}$

Abrami: Let's pause there. Does anybody have any questions? None. Ok keep going Herman.

Objection #10: Legal vs. equitable standards to measure safe human exposure limits, US statutes and case law.

A. Legal Standard is from Telecommunications Act of 1995 Section 704(a)(7)(B)(iv) Public law 104 104th Congress 110 Stat 66:
   "No state or local government…may regulate the placement, construction, and modification of personal wireless facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commissions regulations concerning such emissions." [Telecommunications Act of 1995 Section 704(a)(7)(B)(iv) Public law 104 104th Congress 110 Stat 66].

In my opinion, Telecommunications Act sets a legal statutory, not equitable standard, for safety unrelated to actual known injury. **704(a)(7)(B)(iv) is unconstitutional because it violates equitable safe power densities.**

B. It is essential that equitable standards of the National Environmental Policy Act not be overridden by federal legislation. I believe there is a bill in Congress that is attempting to override the National Environmental Policy Act (NEPA).

One of the fairly good cases is.

1**.** In *United Keetoowah Band of Cherokee Indians in Oklahoma, Individually and on behalf of all other Native American Indian Tribes and Tribal Organization et al Petitioners vs Federal Communication Commission et al* No. 18-1129 decided August 9, 2019, the court was faced with the following issues and factual situations and held as indicated:

2. *Principal issue:* Was the FCC order "Acceleration Wireless Broadband Deployment by Removing Barriers to Infrastructure

(1) "<u>All 'major Federal actions significantly affecting the quality of the human environment' trigger environmental review under NEPA…42 USC §4332</u>(C). Major federal actions 'include actions …which are potentially subject to Federal; control and responsibility.'40 CFR §1508.18. Under the Commissions procedures implementing NEPA, if an action may significantly affect the environment, applicants must conduct a preliminary Environmental Assessment to help the Commission determine whether 'the proposal will have a significant environmental impact upon the quality of the human environment' and so perhaps necessitate a more detailed Environmental Impact Statement 47 CFR §1.1308; see also 40 CFR §1.1508.9. [7]

The summary of the legal issues that I have in this section is to emphasize equitable standards not legal standards, which are unconstitutional.

Abrami: Let me pause you there Herman. So you are saying that for Indian reservations, different rules can apply now?

Kelting: No. I am not saying that. First of all, I am not a legal expert on Indian Reservations and outside of them. But what I have just quoted you from was from a federal law that is not specific to Indian Reservations. It was applied to Indian Reservations but is broadly applicable in my opinion, to all other circumstances as well. In other words, the NEPA is broadly applicable to all situations where there is environmental injury. That is why we need to use equitable standards not legal standards.

Abrami: So let's take section a/ The FCC granted licenses for the telecommunication companies to install SCA on Indian lands without any historical preservation or environmental review. So what did they do? What happened in this case?

Kelting: I don't know. I think the case was the DC court of appeals.

Objection #11: RFFR-emitting devices may interfere with reception of the Schumann Resonance

A. The Schumann Resonance is a set of Extremely Low Frequencies caused by lightening in the ionosphere/atmosphere with a main frequency of 7.83 Hertz (cycles per second) and harmonics of 14, 20, 26, 33, 39, and 45 Hertz. Those resonances are very similar to the RFFR harmonics in the human brain.
B. Practical application of Schumann Resonance
   Experiments with individuals living underground indicate they became depressed until the Schumann Resonance was added to their environment. To give you an illustration here, I used a bike helmet lined with a heavy duty tin foil and got a severe headache several times. The tin foil of course should protect me from outside frequencies. When I removed the tin foil, I did not get the severe headache. My hypothesis was that maybe I had become separated from the Schumann Resonance like underground humans and that separation caused the headache.

Abrami: Before you go on Herman, does anyone recall? Didn't we talk about the Schumann Resonance somewhere along the line at one of our meetings? No? Ok. It sounded familiar.

Objection #12: 5G/4G SCA legislation does not provide a reasonable accommodation for those with Electromagnetic Hypersensitive.

A. SCAs will be universally installed throughout cities and those who are EMH will have no place to go for freedom from RFFR. Your choices will be stay in your home or suicide. There is one lady who has EMH in a place where they have installed 5G and she has to have her meals delivered to her in her house. She can't go outside.
B. Kalamata, Greece did a pilot study of 5G/4G and rejected it partially on the grounds of no protection for EMH individuals.

Objection #13: Environmental power densities should be disclosed in transfers of interests in real and personal property or in the use and occupancy of public buildings.

A. Objective: Inform the public of the quantity of power densities ($\mu W/m^2$) in their environment.
B. Regulatory issue #1: Power density disclosure to buyers and lessees of residential real estate.
   1. Power density disclosure of $\mu W/m^2$ to buyers and renters by state law. State law should require environmental assessments

a. Meter immediately outside the housing unit. "Outside" means around the outside the walls of the building including only the detached housing unit or around the outside walls of a multistory building containing several housing units all at ground level.
b. Meter inside the housing units within three feet of all interior walls during ordinary working hours or evening hours as required by the buyer or lessee. Date, day, and time must be shown on the inspection.
c. Estimate spillover RFFR from adjacent housing units if you are in an apartment or a condominium. Turn off electricity in target housing unit and turn off all RFFR devices. The remainder RFFR is from outdoors or from spillover RFFR from an adjacent housing unit. Can estimate spillover RFFR my metering near party wall. I have personally measured wifi once that was throwing off a million ($\mu W/m^2$). I believe that was in the far field three feet away. That's terrible. That means that across the party wall, those people are probably getting 900,000.
d. Measure of harm: Imagine a six-month old baby crawling on the floor with a 1,000,000 $\mu W/m^2$ Wi-Fi nearby in the same or spillover adjacent apt. Getting his or her brain fried from grossly excessive RFFR/EF. That child is going to be injured, perhaps for life.

Abrami: Herman, let's talk about this for a minute. The upper limit of the federal guideline is 10 million $\mu W/m^2$ right? Or ten W/ m^2 and your example is only one tenth of that FCC limit.

Kelting: Yes and my proposal in informing the public, does not include a safety standard within the legislation. It will only say that every home and apartment will be metered and the results delivered to the renter or the buyer. There will be no notice of what is safe or not safe. The purpose of that is to avoid criticism in comparisons with the FCC. Let people start doing their own research and when they do, then you are going to get complaints. I am thinking this is the golden arrow to defeat the FCC.

Abrami: Right. I think I understand what you are saying. Publish what the readings are and let people make their own decisions.

Kelting: Exactly. It will come to a point where people will say, I am not going to buy your house because I am getting 10,000 $\mu W/m^2$ and over there at that house, I am only getting 20 or 30. I bought my house in an area by metering first. I selected my house in an area with low radio frequencies, typically less than 10.

Abrami: Ok. That's something that the Commission will be thinking about.

C. Regulatory issue #2: Need power density disclosure and prohibition of use of RFFR emitters in public buildings.
   1. "Public buildings" mean all buildings that have unrestricted public access including government buildings, retail stores selling personal property or services, restaurants, exercise facilities, *etc.*.
   2. The disclosure should be made using a time-dynamic RFFR meter showing power densities in $\mu W/m^2$ with one time dynamic meter for the lesser of 10,000 square feet of floor area or the actual space. This is so when you go in a building, you know what the power densities are. Those densities will include any cell phones and

wireless devices in the building. That's the beginning of managing radio frequencies in buildings in my opinion.

3. Prohibit use of wireless devices in public buildings (e.g., government buildings, schools, anyplace there are concentrations of people in an enclosure). I am also suggesting this after being a government agent and working in government buildings for thirty years of my life. Now that means that people won't be able to talk to their children at three o'clock while at work or talk to their buddies. That will reduce the power densities in buildings. Furthermore, there are issues of trespass. When you have a cellphone that is emitting a beam that is hitting my body, you are trespassing on me which, in my opinion is illegal under equitable standards.

D. Regulatory issue #3: Need power density disclosure to buyers of RFFR-emitting personal property (e.g., cell phones, Wi-Fi, cordless phones, automobiles) at point-of-sale.
   1. Electric field within about one inch of the item (near field), if not a moving vehicle
   2. Power densities (i.e., $\mu W/m^2$) within three feet (far field) of the device, if not a moving vehicle.
   3. For autos, meter inside vehicles in an environmentally near zero geographic area.

So in addition to the mpg on a car, there should be power densities in that car as well. The same thing for wifi, cell phones, etc even though I recognize differentials in signal and signal availability is a factor.

That pretty much closes it. I would like you to comment on what you felt about this presentation.

Abrami: you summarized a lot of work that we had gone over before the shutdown. This is all good. Some of the last comments about not having cellphones in buildings, that's a tough sell.

Kelting: yes. But if you start doing some other things like disclosure in rental and buying property, then people will become acclimated and want disclosure.

Abrami: Well let's open this up…. New Zealand, for example, their standard is 500 $\mu W/m^2$ or 5% of what our standard is. We have talked about this many times. How can we be so high of a standard and other countries take a totally different position? It's all over the board. Australia is 2,000,000 and Canada is 3,000,000. We have been discussing this a lot which is why we have been trying to get in touch with the FCC to answer our questions. It is hard getting through to them.

Kelting: It's impossible because they are controlled by the telecommunications industry. What happens with federal agencies is that eventually substantially all of them are controlled by the industries they regulate because their managers are essentially appointed by those being regulated.

Abrami: yes. We have heard all those arguments. As a state we can't set up standards. All we can do is warn and give guidance. I want to at least be able to say that we have tried to reach out to the FCC and FDA and others because someone is going to say why didn't you talk to the FCC? We just have to be able to say we tried and have gotten no response.

Chamberlin: At this point, after what I have read and after having other presenters before you and hearing what you are saying, I am totally convinced that there are deleterious effects on health due to radiofrequency exposure. I am sold. But, what I don't know is relative risk. In other words if I have a cell phone and live near a cell tower what is my risk compared to say, smoking or driving a car? Do we have

some dose relationship between exposure and risk? Am I ten times more likely to die from cancer if I have a cellphone? Can you put some context behind this and give me some relative understanding of how exposure is risky?

Kelting: My answer to that question is the probability of extinguishing humanity in sixty years if we continue the rate we are going even without 5G is about 100%. We are in a process of destroying humanity right now and the evidence is being concealed. My letter of complaint incidentally on that case went to the Federal Bureau of Investigation.

Abrami: They didn't respond, I imagine.

Kelting: no.

Gray: I find objections to most of what Mr. Kelting has presented today. I can't count the number of times in his presentation he said, in my opinion. I can't count the number of times he has referenced studies that have been disproved by other things. I would admit that there probably is a radiation level that I can probably reach that would be deleterious to humans but to talk about extinguishing the human race, to talk about suicides and all these other things with studies that have not been reproduced, have not been verified and are using high levels of radiation or animals or different species that aren't humans who aren't affected the same way and taking that as gospel. I just can't get there. Thank you.

Kelting: Senator, you could if you were Electromagnetically Hypersensitive as I am because I can feel the junk.

Heroux: I think that to answer your question as to evidence that there is or isn't…. in order to assess the health effect, you have to measure it and you have to believe that there is something to measure. In relation to electromagnetic radiation, when the federal government through the FCC expresses an opinion about risk that is so clear, that there is no risk below thermal levels, there hasn't been much incentive to perform measurements. There are individuals who attempted to do this. So the only variable with relatively reliable documentation is cancer. This is a variable that has a digital quality to it. Either you have it or you don't. There are international bodies who measure this in a routine fashion. What we have on this subject as you already know, are the two reports from International Agency on Research on Cancer that says low frequency and radio frequencies are related to cancer as well as a number of studies like this Brazilian study that I think is very convincing on the impact of cell phone towers because not only do they determine from an established set of cancers but your probability of dying from it is higher if you live near a cellphone tower. The problem essentially with Dr. Kelting's presentation is that he goes to a large number of effects on which there is relatively little proof because it hasn't been investigated in a very systematic way. So, we don't have the means to investigate everything in detail but perhaps cancer is an exception. Thank you.

Abrami: Let's bring this back to 5G vs. cell phones or whatever. The real issue is our communities are going to be asking for guidance on 5G. If they roll out small cells in any community, they will be rolling them out in front of people's homes low to the ground and the great mystery to all of us is how much energy is coming out of them and is it safe to walk near one of these? Obviously, industry is probably saying yes, they are very safe. We wouldn't do it if it wasn't safe. There is enough evidence out there of ills from RF radiation on all topics. You name it, there are plenty of studies. From the beginning, we have

asked, have the studies been replicated? But to me, there is enough evidence of concern. We will all have to put ourselves in the position of asking ourselves if the cell company came by and put an antenna on top of my telephone pole that is 100 feet from my house, would I think that's a good thing or a bad thing? At this point, I wouldn't be too excited about it because I am not 100% convinced that there is not some concern for safety. Maybe it's not conclusive evidence as of yet but I think the body of evidence will have to be built over time. That's the concern that we have to address for the state of New Hampshire and for the communities and citizens in the communities. That's a tough thing to get our hands around but that's what we are being asked to do.

Sherman: I was just going to second what you are saying. Whenever you are looking at studies of human health especially with potentially deleterious exposures, one other that we are grappling with is PFAS. How good are the studies on PFAS? Well, they are good enough to say everything is pointing in a bad direction. Is there something that is absolutely unequivocal? We know that with Mesothelioma and asbestos and bladder cancer and arsenic or smoking and lung cancer? No.

Is there something right now with 5G that says, boy this is really bad for us? I think it depends on who you ask. But you have got a very large, very well- funded, very powerful industry saying, trust us. We wouldn't do this if it were damaging or harmful to human health. It reminds me of some other industry issues we have had in the past saying trust us and not trying to make sure the data is robust. Therefore the data is suggesting that there is no harm. So we are left with the Precautionary Principle of public health which is, we have enough evidence to be concerned but not enough evidence to be definitive as far as I can see from sitting in on these things and what do we do?

I think the most troubling thing for me is that especially in New Hampshire but throughout the country, there is a certain amount of choice of what we expose ourselves to. With 5G, that choice is gone. Unless you want to stay in your home and wrap yourself in aluminum foil, you don't have that choice. You get into people's personal choice. We have a choice whether or not to use a cellphone but we don't have a choice if the 5G tower is going to be right outside our window because the FCC covers that. They are in charge. That is what I find to be the single most troubling aspect to this. This isn't something I can choose like what kind of drinking water I will be drinking. I can choose whether or not I smoke cigarettes. In this case, I don't have a choice. The bees don't have a choice. The environment doesn't have a choice. The trees don't have a choice. And if we get this wrong and the industry is wrong or is suppressing knowledge, which we have seen before for example in tobacco. We could be screwed, to use a medical term.

Patrick, I think you are on the right track which is saying how do we embrace what we have always embraced in New Hampshire which is our personal choice as well as our personal responsibility and recognize different people's interpretation of what is so far to me is not absolute data and what can we come out of this with in terms of recommendations? I think one recommendation is you are not going to go wrong if your community says, no 5G until we know it's safer but my concern is that we may not be able to do that.

Abrami: There are communities that have said that. It becomes how long does that last before the lawyers catch up with that and the company wins that argument. That's something that we have to consider. Whatever we do we have to be pretty confident that it will cut muster and terms of legal action or legal recommendation. I think there are things we can do to nibble around the edges on this. I

think that's what we want to do as a subcommittee is to put some things together that we think might be viable.

Sherman: I also wouldn't try to litigate this in any recommendations. I wouldn't guess where these lawsuits are going to go if a town says no 5G or something like that. I think we can certainly recognize that there is the risk of litigation or some would say with certainty if you try to close the door to 5G. I find that very troubling that an entire community would not have ability to say no to something that has some significant evidence that it may be harmful.

Kelting: How many of you own RF meters? For those of you who believe that RFs are safe, buy a meter and defend its safety based upon what you meter.

Heroux: I can recommend for you a meter, the GQ EMF390 for about $200 you can get an ELF meter that goes to about 10Ghz and also has a frequency analyzer. It is truly a quantum leap in what is available to the consumer. It is made by an American company. It can monitor the fields every second for 24 hours and download it into your computer. So a lot of the measurements you are talking about for protection of housing and buildings become feasible when you have that kind of sophistication available to everyone.

Ricciardi: I wanted to make a couple of comments and thank Senator Sherman because I echo what he is saying. There are a few things we have to remember. We definitely have enough science and evidence to show that things are unclear and unsafe. But if we were to go and say, ok the Telecommunications Act, the FCC has not provided us with proof that is safe. That is the problem. When you are putting 5G in front of people's homes, we have to remember that it doesn't work alone. It has to have 4G with it so essentially you are forcing someone to live in a soup of microwave radiation because the science is there with the 4G. Really, that is unconstitutional.

In addition to that, we are not a town deciding whether we should roll out 5G or not. We are a group of people that have been selected on what is the best thing to do for the state of New Hampshire. It doesn't mean we have to talk about litigation because our job is to make strong recommendations on our findings whether it's agreed upon or not but that's what we have been tasked to do. That's what we have to do. We are making what we find to be an important decision for the state of New Hampshire.

Abrami: Yes. We do but again I still feel that they have to be, I don't want to say reasonable but that would not violate federal law. I think that one of the recommendations may be that our federal legislators need to do more. I think this is something we need to continue to discuss how far we want to go with this.

Woods: I have a technical question. What chance are we going to have to sort of have an executive session? I don't need to get into detail but some things that Paul and I have raised and Ken and Kent as well. I think some of the basic science things need to be reiterated perhaps. Again, we don't know all of the outcomes but if we can provide a little bit of discussion about the real basic science like we talked about proton tunneling. Our presenter brought up the issue of precursors. I think that is an important issue and I don't think people understand what a precursor is but that can have a significant impact from a quantum mechanical perspective. We have done a couple of things. We have brought this down from concern only about the ionizing radiation. We did point it out to one of our presenters no, that doesn't count. You need to talk about the non- ionizing radiation. I think even though we don't have all of the

answers, I think we can provide in our report the concerns that we have and point out that there is some basic science at the quantum mechanical level that will support that. That needs to be done because of A, B and C consequences.

Getting back to my original question, are we going to be able to do some exec sessions where we can talk about that among ourselves and flesh out some of these other issues?

Abrami: We can't have exec sessions as a whole. They need to be public. We can meet as subgroups I think up to 50%. I would love to see that actually of the more technical folks in the group. All this information is great. We have gathered a lot of good information that we need to not lose. That should be available in the report to all our communities in New Hampshire. Here are some of the facts that we found so far.

Sherman: I was just thinking that maybe before you start your subcommittees maybe the next Commission meeting could be free discussion among the Commission. There is enough resource here, people with enough knowledge. I have some questions about some of the testimony both today and in the past that I would love to just bounce off other Commission members.

Abrami: Tom, at this point I am not planning on inviting any other guest speakers because I think it's time for us to do exactly what we are talking about here. We have to start talking among ourselves and I see a lot of heads shaking yes. I think that is what we will definitely do next meeting.

Woods: That is sort of what I had in mind when I said exec session. I didn't mean exec per se but what Tom is referring to about having an open discussion.

Sherman: And then the subcommittee could take that and I know there has been some really great feedback from Commission members, great questions, and a lot of information. So having a session where we can distill that down and then the subcommittee can then go get to work. We can get a little clearer from all of us, where each of us is. Pat, I don't know maybe it would make sense for each of us to maybe start out with saying where we are and then have a discussion after that of where we are as a Commission.

Abrami: I think that is a good idea. Assume the next meeting will be two hours of discussion among ourselves about where we are at. Everybody will have a chance to weigh in on their position. I think I have a sense but you never know. Then we talk through what we think the structure of a report will look like, too. I don't want to lose some of the knowledge that we have. The report will include the minutes of these meetings as an attachment. Our minutes are quite extensive. I know when I did the report for the marijuana Commission, that report was 200 pages long with all the attached minutes we had to it. There is a lot of information in those minutes that I think is valuable.

Chamberlin: The reason I go back to relative risk is because with a number of things available to us there is a risk associated that we decide is acceptable. Here is an example: We drive cars and yet we lose 30,000+ people per year with traffic accidents. They die but we consider that to be acceptable. With something like 5G, it will clearly have benefits associated with it. Is the risk relatively low that we can go ahead with it? Or is it such that we can't? That is the one thing that hasn't come out in all the testimony that we have heard. How much of a risk is it? Is it comparable to smoking five packs of cigarettes a day? I don't know. If we are going to get traction with this politically, we need to be able to impose the realism

that this is a significant threat or perhaps it isn't. But that's one thing that I haven't yet found out in my reading either. Can anybody shed any light on that?

Woods: To me, there are two parts to the risk. One is the relative risk and the other is exposure to risk. With driving a car, you can take the back roads and stay off the highways but with 5G, you may not have that choice. There is exposure risk vs. personal acceptance risk and that has to be differentiated as well.

Wells: Just a couple of things that Dr. Kelting said today that I wanted to make sure didn't get lost. He talked about disclosure with real estate, etc. and also about RF trespass on my body or on my home. I am thinking there might be a parallel here to 20th century strip mining in Pennsylvania where a farm owner didn't own the mining rights and found himself sitting on a pile of gravel the next day. I am wondering if there is some sort of precedent here that we should be looking at.

Abrami: Herman are you still on with us?

Kelting: Yes. I am here but I am not familiar with strip mining or the case law associated with it.

Abrami: Ken, I am not sure myself but that is a good question though.

Wells: The idea of signal trespass onto my property. Dr. Woods was just talking about whether you can choose to expose yourself to the risk or not. In the case of driving, you can. Whether you decide to smoke or not, you can. But this is more like a second hand smoke kind of thing. You can't protect yourself from it under the current circumstances.

Abrami: the other thing is 5G hasn't really been rolled out extensively yet. The other problem we have with 5G is that it's a marketing concept. Each company, it means something different. Ken, I know we have talked about antennas. What's inside the antenna? How are they configured? I think one thing we can grapple with is how much energy is coming out of the antenna. I think we have boiled it down to that. The FCC standard is set so high that even if we said as a community there would be periodic monitoring of the levels that seems like it's pretty high intensity to have on top of a pole twenty feet off the ground. I think the industry would say no it's not that level of intensity coming out of that but we don't know. A lot of that is proprietary information. We don't know what the intensities are going to be.

One of my thoughts was let's monitor. Let's say a community in agreement with the cellular company says that it should not exceed FCC standards. But those standards are way high. The cellular company shouldn't object to that since they feel that things are safe within the FCC limits. My instinct is that 10 W/m^2 is very high level. As I said before, why did New Zealand set their standards at 5% of our levels? I don't know. Maybe they are just being more cautious. But it makes you think. Why do some countries have totally different standards than our standard? Some would say they are erring on the side of caution as Tom would like to say. Well, how can they get away with their 5G at their standards and we have standards set at 10 W/m^2 ? These are conversations that should be happening at the federal level really. We would love to talk to the FCC. We would love to have them on our zoom meeting right now answering our questions.

Ricciardi: I just asked when you say that FCC says this is safe then why does the Telecommunications Act say health cannot be a consideration? If it's so safe, why would that be in there?? Just a question.

Abrami: and it's a good one.

Kelting: I would like to mention one thing here. For 4G, you could insulate your body with silver embedded cloth. With 5G at the higher frequencies, you will be required to use tin foil only. It will go right through cloth even with silver threads.

Gray: Beam forming is something that I don't know that we have explored very well. It would seem to me that beam forming would cause very short time increases in radiation during the time the beam is formed. But may reduce radiation during times when we are just in monitoring or not in beam forming mode. Things like that are things that are unique to 5G. I don't think we have had sufficient discussions to understand what would happen.

Kelting: When you connect the 5G, if you move your source, it automatically transfers to 4G. So what you are really doing is communicating with 4G in all likelihood. The purpose as I indicated earlier, is that they want to put 4G into residential neighborhoods so they can increase the capacity of the system. It's not to get 5G in there.

Abrami: Help me out here. My understanding is that the 4G cell towers will be communicating with the 5G small cells, is that correct?

Heroux: 5G is an engineering concept that is designed to increase the capacity of the environment to transport data. What industry is really adept at is to transport a lot of data through wireless and essentially with the IOT concept, there is no limit to the opportunities there are to increase the amount of data being transmitted whether you use beam forming or to broadcast it. All of these avenues will be exploited and you will get to the maximum allowed standard ultimately in your environment. This is something that is expected because engineers develop applications in as much as they have the opportunity to do it. What is missing in here is that these agencies like the FCC are essentially blind on impacts on the electro-sensitive people certainly and the other health impacts of this radiation. But the intention of industry is to facilitate communications. Ultimately, wireless is a dead end. It's a little bit like oil because the spectrum is limited and you have to have more and more expensive techniques to transport more and more data. What we should be thinking about is society will need a lot more data. Let's favor optical fiber over wireless because it is not only hygienic, very safe and it has a lot of virtues not being promoted simply because of commercial reasons. Thank you.

Abrami: I just noticed we are getting a lot of chat comments. Kent, is there a way we can save the chat messages?

Chamberlin: Yes. I will save them all.

Abrami: Some of it looks like they will be helpful. There is one that says China and Russia have science-based standards on their evaluation that non thermal effects exist. There standards are certainly set a lot lower than ours. European countries have set precautionary limits. If you can share this with me and I can share it with everybody. There is one on India, which dropped its limits to one tenth of what it was before. Parliament addresses issue of beam forming and measuring issues. There is a report that some of the more technical members are interested in and we can have a discussion around. I guess I am not that much of a Zoom expert. I should have been following some of this chat going on here. We will save it and send it out.

Sherman: on the select committee, we incorporate the chat into our minutes. You may want to do that.

Abrami: We have at least fifty people on and I was told there would be people on from around the country, which is good. Herman. Thank you very much for sharing your information with us. It was very helpful. I want to thank everybody. We are getting applause here from everybody. Again, I wish we didn't have that pause for four and a half months. Got a little rusty here but I think we are back in the groove.

Roberge: Rep Abrami, I have a clarifying question. This was a very helpful discussion. As I sort of prepare for our next meeting on our position and open discussion. I need a little clarity on the charge of the Commission because what I continue to hear and this is a little bit challenging is that 3G/4G and 5G really aren't separate. They are necessary in order for the other to exist. My question is, as we begin to think about recommendations, are we looking strictly at 5G? Is that the charge of the Commission? And how do we differentiate that? That's where I am struggling.

Abrami: Thank you Michele for the question. If you go back to one of our early meetings and it's in the minutes. We early on discovered that you can't talk about 5G without talking about 3G and 4G or RF radiation in general. So, we have to talk about it all. We have learned that you can't uncouple 3/4G from 5G because they do interact with each other. We are going to try to focus on 5G but it's going to spill over to the other technologies as well. Are there any other comments?

Thanks to Kent and UNH. We are using their zoom to hold this meeting. We used your space yesterday too, for a House meeting. Kent and Ken were you there yesterday? I couldn't find you. Maybe I didn't look hard enough.

Woods: Yes. I was here.

Wells: I was wearing a mask. It was hard to recognize me.

V. Zoom Chat from 7-1-20 Commission meeting:

00:26:12 Ken Wells: Does NH have any recourse to Communications Act of 1995 insistence that municipalities and states cannot prohibit installation of antennas?

00:35:28 Ken Wells: Meeting again July 24 @9am via Zoom

01:22:30 EH Trust: I think the case is this: https://ehtrust.org/federal-court-overturns-fcc-order-which-bypassed-environmental-review-for-5g-small-cell-wireless/

01:23:08 EH Trust: Here is the link to the case decision https://www.cadc.uscourts.gov/internet/opinions.nsf/4001BED4E8A6A29685258451005085C7/$file/18-1129-1801375.pdf

01:49:22 Ken Wells: GQ EMF390

01:49:45 Ken Wells: RF meter

01:57:10 Bruce L. Cragin, PhD: You just don't want to hear from any more physicists!

01:59:12 Paul Heroux, Dr.: I am amazed that we could not get the FCC to appear.

02:00:09 Bruce L. Cragin, PhD: More good sense. Thanks for that.

02:00:59 EH Trust: The FDA should do a risk analysis f this type but has refused. Dr. Melnick states this should be done https://ehtrust.org/statement-by-ronald-melnick-phd-on-the-national-toxicology-program-final-reports-on-cell-phone-radiation/

02:01:34 EH Trust: "A quantitative risk assessment of the data from the NTP studies on cell phone radiofrequency radiation needs to be performed by the FDA and that information should be used by the FCC to develop health-protective exposure standards. In fact, it was the FDA that nominated cell phone radiofrequency radiation to the NTP, and I quote "to provide the basis to assess the risk to human health of wireless communication devices." Therefore, I urge the FDA to immediately conduct the risk assessment of the NTP data."

02:04:06 EH Trust: Plus there should be an assessment of the impact to birds bees and trees but none has been done. There is no health agency tasked to evaluate and develop a federal safety standard regarding impacts to trees, bees and birds. It is a gap

02:06:01 EH Trust: Montgomery county - Maryland did monitoring and found FCC limits were breeched until 10 feet around the antenna facility.

02:06:34 EH Trust: China and Russia have science based limits based on their evaluation. That non thermal effects exist.

02:07:15 lori: State Law 12'K:11 e) needs to be amended to allow testing and monitoring of RF . How can we even know if the FCC standards are being met without monitoring, sampling and testing

02:08:10 EH Trust: Several European countries have set "precautionary" limits . I have these details. And some of the documentation can be found here https://ehtrust.org/policy/international-policy-actions-on-wireless/

02:08:51 EH Trust: China- https://web.archive.org/web/20120413171654/http://www.salzburg.gv.at/Proceedings_(20)_Chiang.pdf

02:09:09 EH Trust: Russia- https://www.researchgate.net/publication/228104887_Scientific_basis_for_the_Soviet_and_Russian_radiofrequency_standards_for_the_general_public

02:10:23 EH Trust: India dropped their limits to 1/10 th pf what it was before because of this report https://ecfsapi.fcc.gov/file/7520958381.pdf

02:10:29 EH Trust: asI understand it

02:11:04 EH Trust: India published their findings as detailed here https://ecfsapi.fcc.gov/file/7520943486.pdf

02:12:14 EH Trust: European Parliament reports adress the issue of beam forming and measuring issues in this report https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/646172/EPRS_BRI(2020)646172_EN.pdf?fbclid=IwAR3cD0TDOqGHpOmCWPnANN-Y6RBaa0eoQ4ZN0nuUwpVaLL8MIDtt6aKtiYM

02:13:57 Bruce L. Cragin, PhD: Don't confuse legislation with science!

02:14:11 EH Trust: European Report here also https://www.europarl.europa.eu/RegData/etudes/IDAN/2019/631060/IPOL_IDA(2019)631060_EN.pdf

02:15:22 EH Trust: According to Belyaev 2019, "the health effects of chronic MMW exposures may be more significant than for any other frequency range." The abstract states that, " Various responses to non-thermal microwaves (MW) from mobile communication including adverse health effects related to electrohypersensitivity, cancer risks, neurological effects, and reproductive impacts have been reported while some studies reported no such effects. According to Belyaev 2019, "the health effects of chronic MMW exposures may be more significant than for any other frequency range." The abstract states that, " Various responses to non-thermal microwaves (MW) from mobile communication including adverse health effects related to electrohypersensitivity, cancer risks, neurological effects, and reproductive impacts have been reported while some studies reported no such effects.

02:15:36 lori: Thank you for all your work

02:16:59 EH Trust: Brillouin precursors can be formed by high-speed data signal as Microwave News 2002 pointed out "Introducing Brillouin Precursors: Microwave Radiation Runs Deep." When a very fast pulse of radiation enters the human body, it generates a burst of energy that can travel much deeper than predicted by conventional models. This induced radiation pulse, known as a Brillouin precursor. Brillouin precursors can also be formed by ultrawideband radiation and, in the near future, by high-speed data signals." The 2002 Microwave News article discusses the controversy over the Pave Paws radar system which used phased array radiation. In 5G communication systems, the phased-array antenna is one of the lead front-end components. https://microwavenews.com/news/backissues/m-a02issue.pdf

02:17:29 EH Trust: ""When a very fast pulse of radiation enters the human body, it generates a burst of energy that can travel much deeper than predicted by conventional models (Oughstun 2017). This induced radiation pulse is known as a Brillouin precursor. Brillouin precursors can be formed by ultrawideband radiation and by high-speed data signals as used in 5G."found in https://ieeexplore.ieee.org/document/9002324

02:18:29 Augustinus.Ong: Thanks for the meeting.

VI. Important questions need to be answered for NH 5G Commission:

(Questions included in the minutes sent by D. Ricciardi to FDA and FCC)

From: "Shuren, Jeff" <Jeff.Shuren@fda.hhs.gov>
Date: June 24, 2020 at 4:28:49 PM EDT
To: Denise Ricciardi <dricciardi@bedfordnh.org>
Cc: OC Ombudsman <Ombuds@OC.FDA.GOV>, Patrick Abrami <abrami.nhrep@gmail.com>
Subject: RE: Important questions NEED to be answered for N.H. 5G health task commission

[External]

Dear Ms. Ricciardi,

Thank you for reaching out to me. I have forwarded your questions to the FDA's Intergovernmental Affairs Staff who handles inquiries from State and local governments. I have included Karen Meister, their Acting Director, on this email, as well.

Best regards,

Jeff

-----Original Message-----
From: Denise Ricciardi <dricciardi@bedfordnh.org>
Sent: Tuesday, June 23, 2020 10:38 PM
To: Shuren, Jeff <Jeff.Shuren@fda.hhs.gov>
Cc: OC Ombudsman <Ombuds@OC.FDA.GOV>; Patrick Abrami <abrami.nhrep@gmail.com>
Subject: Important questions NEED to be answered for N.H. 5G health task commission

Dear Dr. Shuren,

We would appreciate an answer to these questions regarding cell phone radiation. If you could number them one by one it would help with clarity of your response.

Regarding the FDAs report "Review of Published Literature between 2008 and 2018 of Relevance to Radiofrequency Radiation and Cancer<https://www.fda.gov/media/135043/download<https://www.fda.gov/media/135043/download>>

1. Why did the FDA only focus on cancer as a health effect?

1. The FDA said of the National Toxicology Program findings that the FDA was unsure if the tumors were a causal effect or if these results were "due to weakening of the immune response due to animal stress from

cyclic heating and thermoregulation"Does the FDA think that cancer could be an effect of whole body heating, that cancer is a thermally induced effect? If so, what other studies show that heating causes cancer?

1. Did the FDA review in a systematic way the research on impacts to the nervous system?

1. At the Commission, a study on how millimeter waves interact with insects was discussed. Did the FDA review in a systematic way the research on impact to bees, insects and pollinators?

2. Did the FDA review in a systematic way the research on impact to trees and plants?

1. Did the FDA review in a systematic way the research on impact to birds.

1. If the FDA did not investigate impacts to insects or trees, what US agencies have done so?

2. The FDA website page Scientific Evidence for Cell Phone Safety<https://www.fda.gov/radiation-emitting-products/cell-phones/scientific-evidence-cell-phone-safety<https://www.fda.gov/radiation-emitting-products/cell-phones/scientific-evidence-cell-phone-safety>> has a section entitled "No New implications for 5G". Does the FDA believe that 5g is safe or that 5G has the same health issues as 3 and 4G ? What is the FDA opinion on the safety of wireless?

1. What is the FDA opinion on FCC limits in terms of long term health effects. Does the FDA believe the current limits protect the public, children, pregnant women and medically vulnerable from health effects after long term exposure.

1. The FDA is aware that cell phone can violate FCC SAR limits at body contact on high power. The FDA has written that because there is a safety factor. What is the safety factor for the SAR the FDA relies on. At what SAR level above FCC limits will the FDA intervene?

1. What actions specifically is the FDA doing now in regards to 5G and cell phone radiation in terms of research review? How often will the FDA be releasing reports?

1. Will the FDA be evaluating the safety of 5G cell antennas? If so how? If not, what health agency is ensuring that 5G cell antennas are safe for people, wildlife and trees.

2. Cell phones and wireless devices emit several types of non ionizing radiation in addition to radiofrequency radiation. For example the devices emit magnetic fields and when a pregnant woman holds a laptop on her lap the measured fields can be high even into the baby. What agency ensures safety

related to extremely low frequency (ELF-EMF) electromagnetic fields- also non ionizing? Currently we have no federal limit, no federal guidelines and confirmed associations with cancer and many other health effects. Kaiser Permanente researchers have published several studies linking pregnant women's exposure to magnetic field electromagnetic fields to not only increased miscarriage<https://www.nature.com/articles/s41598-017-16623-8<https://www.nature.com/articles/s41598-017-16623-8>> and but also increased ADHD<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2763232<https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2763232>>, obesity<https://www.nature.com/articles/srep00540<https://www.nature.com/articles/srep00540>> and asthma<https://jamanetwork.com/journals/jamapediatrics/fullarticle/1107612<https://jamanetwork.com/journals/jamapediatrics/fullarticle/1107612>> in the woman's prenatally exposed children. A recent large scale study <https://www.sciencedirect.com/science/article/pii/S0013935120303662?fbclid=IwAR11X_74FIT7y_RpO9WvbkE8AmAlBHAVU67yjKW8A6ZWPnPsLRioLxGsy1o#<https://www.sciencedirect.com/science/article/pii/S0013935120303662?fbclid=IwAR11X_74FIT7y_RpO9WvbkE8AmAlBHAVU67yjKW8A6ZWPnPsLRioLxGsy1o#>> again found associations with cancer. Please clarify which US agency has jurisdiction over ELF-EMF exposures?

1. Will the FDA be initiating any research studies on 5G and health effects?

We As a health study commission on 5G/ take these duties very seriously. We are unbiased and we are seeking all answers And facts. We are requiring your answers to the above questions.

Thank you,
Denise Ricciardi
Committee Member appointed by Governor Sununu.

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The Right to Know Law (RSA 91-A) provides that Town email communications regarding the business of the Town of Bedford are governmental records which may be available to the public upon request. Therefore, this email communication may be subject to public disclosure.

V. Next meeting via Zoom: July 24th 9-11

Meeting Adjourned at 3:02 pm.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
7/24/20
9:00-11:00 am EST
Via Zoom (https://unh.zoom.us/j/93912769762)
Via telephone-US (+1 646 876 9923) ID: 939 1276 9762

In attendance: (12)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Senator Tom Sherman-president of the senate appointee
Brandon Garod-AG designee, Asst. AG Consumer Protection
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Carol Miller-NH Business & Economic Affairs Dept

Not present: (1)
David Juvet-Business and Industry Association
.

Meeting called to order by Rep Abrami at 9:03 am

Abrami: For the sake of time, I am going to open the meeting. This is the New Hampshire Commission to Study the Environmental and Health effects of evolving 5G technology. I have a short version of something I have to say. Due to the Covid 19 virus and the Executive order signed by the Governor this public meeting is allowed to be conducted via Zoom. It is open to the public for viewing and was duly posted as a zoom meeting. With that said, if you are not a member of the Commission, can you please turn your cameras off and mute yourselves? That would be much appreciated.

I. Approval of minutes from 7-1-20:

The first order of business is the minutes. I sent them out about a week ago. By the way, Deb you did a great job of compiling them once again. I did get an email from Michelle asking for two corrections. I think we misunderstood for Augustus Ong, listed under attendees. Michelle was in attendance. Also, on page 29, "this was a very helpful discussion". Those are the changes that I have gotten so far. Were there any other changes? So without objection, the minutes are approved as amended.

II: Around the table member thoughts:

Abrami: The first thing we are going to do today is go around the room. The zoom room if you will. What we would like to do is talk about where we are at and the kind of recommendations, possibly that we would like to see in the report and where you stand on the whole issue. I am envisioning the room as it was at the State House and will go to my left. That means, Tom you are up first. Again, it's a general discussion and your thoughts as to where we are at and what we should be doing.

Sherman: Thank you, Patrick. I think I said it and it was in the minutes from last time. My overriding thoughts on this are that there is enough evidence to raise concern but I'm not sure there is enough evidence to show causation between exposure and specific health impacts. So, what the means to me is that there is more than ample evidence that a non-biased large scale study or studies needs to be done to demonstrate that we are not going to be implementing an entire system of communications that would put either human health or the environment at risk. I think of the Precautionary Principle. I also recognize we have several other examples where industries have said to us, this is safe. I can think of my own profession where we used to say, "Trust me. I'm a doctor".

I think we all know that phrase, trust by verify is the very least where we need to be. In this case, there is ample distrust because the Commission has already seen the amount of industry influence on the regulatory bodies. By the way, that's nothing new in Washington, DC or in some states. When I was in Virginia, our entire oversight for agriculture was from people who had formerly been in the industry. So when you think of some of the chemicals like glyphosate, people from the industry were regulating the industry and we know where that gets us.

My overriding New Hampshire response to this is, I would like to see the ability of communities to control their environment until such a time that an independent, scientifically based study or studies have been done to demonstrate the safety of this technology. I think that is consistent with Precautionary Principle of public health. I think it is consistent with the way many of us in New Hampshire view our personal freedom. And I don't believe we have ever been shown a compelling need to, right at this moment, on an urgent basis, implement 5G technology. I guess that's my summary statement.

My plea would be to have to start working on these studies and to ask our federal delegation, as they've done with PFAS, to start looking at where there has been exposure and what has been the impact. And start funding some of these studies at a federal level outside of the different regulatory agencies. I was really impressed by the consistency of response or I guess the consistent lack of response from the EPA and the FDA. It's amazing to me, that they seem to not want to respond even to a statutory state commission. So, I guess I'll close by saying the parallels to other exposures that we have, are really clear. And the lessons that we've learned from something like PFAS, where a few years ago, I started working on PFAS back in 2014. The industry knew about those dangers from the 1950s. They continued to profit with manufacture until at least 2003 when DuPont pulled out. 3m continues to and at this point, we have over a 100 communities and/or water systems in the state impacted and those are just public systems. Now we're playing catch up. But at the exact same time this week coming

out and Lancet are two, scientific articles looking at the data on PFAS and broadening the concern to diabetes, obesity, breast cancer. None of which, we have talked about on our way through this. So here we have an opportunity before the industry has an ability to expose us. To say, let's put the brakes on, let's get the data. You show us that it's safe in independent studies, not funded by you, but funded by an independent body and overseen by an independent body. And then we can move forward together to implement this new technology. That's my feeling I and thank you for the opportunity.

Abrami: Thanks Tom. I forgot to mention that once we're done with the round table, I'm going to ask Denise to just briefly discuss our non-response from the FDA in relation to the FCC. That is a discussion that we need to have. The other thing is that this meeting is being recorded, so everybody knows, It's pretty much for the ease of doing our minutes at the end for Deb. And that, any chat room discussions that are going on will become part of the minutes. We did make them part of the minutes from last meeting. Ok. Let's continue around the room here.

Wells: Yes. Thank you. In looking over the materials that we were previewing for this meeting, I came up with a number of recommendations, about seven of them. And it seems to me, that there are three levels of issues here. One is *general RF* radiation from Wi-Fi, 5G and all that. Then there *specifically 5G* and then on top of that, and I would give it the highest priority is the 5G *small cell antenna network*, which I think poses particular hazards. And I think that we should explore ways that New Hampshire can take unilateral action to protect our population, our environment, our forestry industry, and also supply the fastest broadband and communications to our population. I have a couple of things that I think would be worthwhile here. If this type of technology is to be developed, the state of New Hampshire could require that installers and owners of these systems carry enough insurance to cover the potential claims of New Hampshire residents who are exposed. We should require also insurance to compensate based on potential losses in the forestry industry, agriculture, hive losses, etc. Here's another separate issue. It occurs to me there's a parallel here with 5G and the mining rights in coal country where farmers found that they didn't own the rights to the mineral below them and their farms were turned into strips of gravel. I think it's a private property and liberty issue.

Broadcasters must be specifically granted rights for their signal to intrude on private property. And if they don't have those rights, they must not do that. Senator Sherman mentioned the problem that many of the studies, clearly there are conflicts of interest. I think that, that following the example of Jersey City and some others where they there's been a moratorium placed until, say, a UNH study is completed when that is not funded by industry, but where there's a demonstrable freedom from conflicts of interest.

Abrami: I guess there is some debate on whether Jersey City moratorium is in place or not.

Wells: Yes. I understand. I saw the petition that was circulated as a possible model. Then I wonder if the state of New Hampshire can impose its own maximum intensity limits and require that equipment have an accessible off switch if they're found to be out of compliance. And with that, I think I'll conclude my remarks and listen to what others have to say.

Abrami: Okay. That's very good, Ken. Thank you. There are some good points from both you and Tom so far.

Chamberlin: So as I listen to the previous two speakers, I'm in agreement. I echo their concerns. And essentially Sherman in particular, what you had to say is very much along the lines of what I feel both what you said just now and what's in the minutes. My belief is that we have a serious issue with exposure. The scientific data is pretty overwhelming. Although those data, the data is, is being completely ignored by the regulatory bodies. And that's kind of the elephant in the room here is we have a regulatory body that says that these standards set 30 to 50 years ago are acceptable. Yet the evidence, scientific evidence suggests that it's not. So that clearly is something that we have to address, explicitly in whatever report we have. Other issues, is the yes, we can ask for things like insurance. We can mandate that the providers have insurance to cover any issues that may come about as a result of this. The property rights, is also a good angle also.

But at this point, I don't feel like I need to see any more scientific evidence. I'm pretty convinced. Since I got on this, I'd been reading article after article and that's pretty convincing that yes, there's a problem. The one thing that we don't know that would be nice to know is the degree of risk. How much risk do you encounter by having a cell phone? being near a cell phone tower? We need to, to get that. And I think that we can and we should pursue something like a moratorium until we figure out and get answers to some of these very important questions.

As was pointed out earlier, this is not new. We have seen these types of issues. That is where industry just says it's no problem. This won't hurt you. We've seen that from smoking doctors, from the tobacco industry. We've seen from the fossil fuel industry dealing with things like climate change, which they knew 50 years ago that this would have an impact. So we keep seeing this pattern again and again. And what happens is that the industry makes an investment before we're able to find out or to demonstrate that whatever they're investing in, causes problems. And once they've made the investment, it's kind of hard to turn back, but I think that we have this opportunity now to just move forward to come up with moratorium so that they won't invest they won't get too much of an investment, won't get ahead of the curve as it were, before we figure out how much of a risk this imposes. Thank you.

Abrami: Thank you, Kent. Good points.

Ricciardi: I, too concur with everyone who has spoken. I think the one thing we can agree on all of us is that whether some of us believe it's unsafe and maybe some of us are uncertain. I think the biggest thing we can agree on is that there's a lot of disagreement in the scientific community. I feel that the science that we have seen and the evidence that has been brought before us and all of the materials we've been reading and speakers we've been listening to. I am convinced have a serious issue. And I really believe that it will harmful to just put this out. And I think we have to put stipulation on how things should be. I feel that the state could impose mandatory hard wiring for technology. In the meantime, continuing studies that are real studies. We’re having a problem with the FCC. They haven't changed anything after all these years. It's a captive agency. They are a non- health agency. I made some

notes. We could as a suggestion, call for a halt to 5G and its infrastructure until RF limit has been set by federal health and safety agencies. There is no health agency overseeing any of this.

Again, state could call for wired infrastructure which is safe, and actually is faster. Not only that, it's safer in the ability to not be hacked. So, there are many measures there. We can call a halt until the scientists determine how the adequate methods of measuring should be. We can also pass bills that support further research for transparency and education on 5G and wireless devices to be used in the Internet of Things. In my opinion, it would be completely irresponsible for this commission to just blindly roll this out with all the compelling evidence. I don't want us to be like the PFAS or the tobacco industry. And there are some huge differences with this than anything else. If this is put in front of every other home, you are now robbed of your choice. You know, if you don't want to use a cellphone, you don't have to use a cellphone. If you don't want to live near a tower, you can look to where you want to live. This robs you of your choice. And that goes against our New Hampshire constitution. I have a full report on all of this, but that's sort of the gist of it. Do you want me to go right into segue into the questions that I've sent to the FCC and the FDA, or do that at the end?

Abrami: Why don't we do that at the end? I've got Carol Miller next.

Miller: Morning everyone. Here are my thoughts on this… I mean, the science is the science whether it's true or false, it's overwhelming. Every article that I've read, it's just overwhelming. But having said all of that, RF is RF. We've RF with 4G, 3G, Wi-Fi, whatever you name we have RF in our lives. And there are people who are sensitive to RF. And depending on the degree of RF they're getting it could cause the health issues or whatnot. We have some big challenges ahead of us. Cell services not regulated at the state level. It's regulated at the federal level. So I'm not sure that towns in the state can dictate anything to the Cell carriers. There are strict rules in place and we could be setting ourselves up for major lawsuits. So that's where some of my concern goes.

My recommendations really are more practical. And I agree with everyone else's recommendations that have been said so far. What can the industry itself, due to its devices and to its antennas and its system, to reduce the effects of RF to the public? Is there a technology that can do that shielding in phones that that creates less RF to the individual? And, and I think, it could be a costly solution for the industry. But if we're going to have any effect by, I think that that's where we really need to focus our efforts, along with all the other recommendations. Yes. Let's study it. I mean, it has been studied. We need to study it. Can towns literally put a moratorium on it? I don't know. Can the state say that everybody has to have a wired connection? I don't think so. So what we need to do is look at things that can be accomplished and through this committee, get that information out there. And I'll close my comments.

Abrami: Somewhere along the line over the over the years a left turn was taken. We were heading on the journey to fiber optics. And then then now we got, you know, the evolution of 5G. And we know fiber optics is actually more robust. They carry more information and they're less likely to be hacked if you will.

Miller: yeah, but that doesn't solve mobility problems. That's the lore that cell cellular coverage is. It's the ability to have your phone on you and your data anywhere any time. But that does not mean to say

that fiber isn't important. Fiber is the infrastructure of the future and where New Hampshire should be funneling any investments, or all investments, right? (I like the thumbs up) to fiber connectivity and stop putting band-aids on a sagging telecommunications infrastructure. I have very strong feelings about that. But cellular is a different creature altogether. It actually needs fiber to be able to transport data. e Everything comes into the wired network, even by cellular. So it's the mobility, the ease of use, it's the instant connection, instant reach ability that the mobile industry has captured. And so therefore, there needs to be some work on their part to abate all of this RF bubbling to the surface. And, you know, I agree with everyone else, but I just wanted to offer a practical solution or I guess sound check to what we're actually doing here.

Abrami: Thank you Carol. Beth Cooley, you are up.

Cooley: Alright, can you see me? Hear me? I am having some issues.

Abrami: I like those things behind you. Looks like Star Trek.

Cooley: Yes. I am in outer-space. Well, good morning everyone. I appreciate the opportunity to provide our thoughts at this point in time. You know, in terms of recommendations at this point, my thoughts are, I think we need more experts because everyone has been anti 5G at this point. And in fact, some of the "experts", their research on this topic has been called "junk science", quote-unquote. So my first recommendation and Rep. Abrami, you and I talked about this before the pandemic is Dr. Swanson didn't get to finish his presentation back in November. So I'm sure he'd be happy to answer questions because he ran out of time. I understand some folks may not agree with his point of view. But I think Rep Abrami, you and I discussed offline that we want a balanced approach to this commission. So that's sort of point one in terms of the experts in the science. I think the other side has some questionable credentials. Second, I think it would be helpful. We sent around, I think maybe three weeks ago, a recent study from the radiation safety journal on 5G a new study. I think it would be helpful to hear from the authors of that as well. And Rep Abrami, if you're open to it, I'd be happy to see if we can do some outreach to those authors. And that's sort of my first recommendation on the on the expert side.

I'm the first to admit I'm not an expert. CTIA is not an expert. We defer to those that are. We think we need to hear from the people that are smarter than us.

Abrami: Beth, I've always said to you, I'm open to hearing from all sides. And you gave us Dr. Swanson and he was sort of out of time, but we could probably dedicate some time more or any other experts that you may have.

Cooley: Yeah, that would be great Rep Abrami. And I want to say they're not, you know, industry experts. They're speaking their thoughts, their research. So I'd be happy to do that outreach.

The only other item I'd like to raise that I'm not sure that we've talked about. I think it's been distributed. But it's important to note that other states have done this. They've done the research and even your neighbors in Vermont and Connecticut have done this. And I think it's important to look at those recommendations. Other states like Louisiana, Oregon, Hawaii have also done reports on this as

well. So I believe some of those have been distributed, but I don't think we've talked about them. I know there have been a lot of things distributed into this group in terms of articles and studies. So I'd just like to highlight that other states are doing this too. And rather than re-invent the wheel, I think it would be helpful to look at what they looked at.

Those are sort of my two recommendations at this point in time. I appreciate a given me the opportunity.

Abrami: Well, Beth, if you have any documents from these other states that you could share with us, that would be fine.

Cooley: Absolutely.

Abrami: Okay. Well, thank you.

Ricciardi: Can I interject to make a comment?

Abrami: Yes.

Ricciardi: Okay. Since Beth did bring that up, I actually have in front of me what other states have done. And she referenced Hawaii. I can send this link out to everyone. Hawaii county planning board passed a resolution to halt 5G. Farragut,Tennessee has a resolution calling on state and federal governments to halt 5G until health risks are evaluated. The Washington DC advisory 3G/ 4G committee resolution opposing small cell wireless and 5G technology, wants studies confirming safety. I have a whole list here that does speak to what Beth just said. I'll make sure that committee gets that.

Cooley: Yeah, Denise, I think that's a good point to look at what other states have done, but I think it's important to understand the context. For example, in Hawaii county, the council passed the resolution this week. It's a nonbinding resolution. As you well know, it is illegal to stop infrastructure at the state and local level on the basis of RF, as that is regulated at the federal level. So the Hawaii county resolution that was passed is non-binding, and I believe Rep Abrami sent out our comments when it was before the planning board a few weeks ago.

Abrami: Yes I sent it out and I also want to know if theses have teeth or not. That's the question, you know, in the legislature we do resolutions to Congress and to the federal government but they're not binding to anybody other than it's a statement of a position. In this case, we have a commission that that's looked at this very closely. And that is a bit different than some of these other commissions from other states. I would say we have more technically minded people on this commission and then some of these other states may have, you may know more than I do about that Beth. Tom has his hand up.

Sherman: But I just have a quick question for Beth, you used the term “junk science”. I was wondering which science you were referring to when you called some science “junk science”.

Cooley: So this wasn't a quote from me. Another scientist called one of our previous speakers, research on cell phone RF issues, “junk science”.

Abrami: Okay. Thank you. Okay, we will move on now. Brandon Garod.

Garod: It’s Brandon, that’s ok. It’s a very common mistake. So I am a little bit leery at this point of continuing to hear from experts on either side because I think that we could call experts for the rest of the Commission. I think we there is a difference of opinion. Some people think it’s safe. Some people think it's not safe. I think there is enough evidence to suggest that it might not be safe that we should as a commission, have an obligation to flag that for the state. And you I don't think that hearing from more experts is going to move us in one direction or the other in terms of a commission deciding definitively yes, this is safe or no, this isn't safe. I think that there is some evidence it is not safe.

It is not, in my opinion, a foregone conclusion that this is definitely not safe, but if there is evidence to suggest that it might not be safe, I think that it is important that it is thoroughly vetted and tested before there's an enormous roll out in the state. And I think that's even more important, echoing what Senator Sherman said at the beginning, which is that there really in my opinion, does not seem to be immediate compelling need to have 5G in the state of New Hampshire at this point. My cell phone works great, almost anywhere I am. I can get on Wi-Fi, almost anywhere I am. We're able to meet as a commission remotely. We're able to do our jobs remotely. I'm not sure what the benefit is of having 5G if it's not thoroughly vetted and tested and confirmed, definitively, to be safe before it's rolled out. It would be great. You know, the faster things are, the better things work. Obviously, it's better for us moving forward technologically as a society. But at this current juncture, I don't see an immediate compelling need. I think that it's clear as a commission that we have some evidence that it's safe and some evidence that it's not. And now it turns to, you know, what are we as a Commission going to do in order to fulfill the task that we've been given as a commission, which is to make a recommendation.

And that's where I really struggle. Because like others have said, you know, I'm I think I'm the only lawyer on this commission. I spent some time doing some legal research yesterday and in anticipation of today's meeting. The Telecommunications Act of 1996 is very clear. The state cannot pass a law or regulation that prohibits the telecommunications infrastructure from coming into the state. It is preempted. It's completely regulated by the federal government. There's a carve-out for public health and safety but that is limited because there's a lot of litigation that has come from that in terms of whether that only applies to the state, or whether that can be attributed to local government as well, towns and municipalities. And overwhelmingly, for the most part, it's only the state that can pass a resolution that directly correlates to protecting the health and public safety. I don't think that the science is there in order for us to pass any sort of law that would prohibit or inhibit 5G, in order to say that it is in a direct correlation to protecting the health and wellness of citizens of New Hampshire. Any sort of recommendation that is passing a law or passing a regulation or a barrier to entry is going to be heavily, heavily litigated. And you know, whether it's successful or not, as, you know, is always an open question. But I think that to the extent that we decide to recommend any sort of legal barrier, we need to be prepared for that. That's going to result in a very long drawn-out legal battle.

I do certainly support any recommendations that we can make that are not likely to lead to extensive litigation that we may not have a leg to stand on. I think that the public needs to be made aware of the findings of this commission. I think that there needs to be more public awareness about the issues. And I

think the people in New Hampshire have a right to know about the science and about the studies that have been done. Anything we can do as a commission to increase public awareness even if it is like the Hawaii resolution. Yes, it's non-binding. But it's something. It's at least the community saying, yes, we have concerns about this. And this is what we're going to do to take the steps that we can in order to make people aware and to do our part to say that we as a community have concerns. And I think that is probably the sort of recommendations that we need to be looking at moving forward as a commission.

Abrami: Ok Brandon, that's great. When I speak at the end, I want you to react to one of the things I am going to say whether we even think it has potential of being a legal issue. So thank you. Michelle Roberge.

Roberge: I represent the department of Health and Human Services on this commission. We feel, where this is regulated at the federal level, that certainly more work needs to be done at the federal level to ensure that the standards are protective of public health. We know that the standard haven't been reviewed for a number of years. We know that there are a lot of studies that have come out and certainly more studies that we've heard, and what we're learning from this commission. More robust studies need to be done to ensure that they are protective of public health.

So we really need to make sure that at the federal level those agencies that include FCC, FDA, EPA really need to look at the science. I know there was a recent publication put out by FDA, I think it was in February 2020. They did look at number studies but didn't move forward with a standard review but again, more support of looking at those studies where they are not just looking at heat, but they're looking at other biological effect as well. The department at that point is supportive of that. And that's where we stand at this point. And I know there's other recommendations that are coming forth and that would be something we'd have to reevaluate as we pull the report together.

And I know Representative Abrami and I shared in an email that where we are, our role in this commission depending upon what recommendations that come out, being an executive agency put us in a conflict of interest situation if the legislature tries to implement any of the these, we essentially could be the body or agency that regulating it. We have to be careful of conflicts of interest. We definitely agree that more needs to be done at the federal level where it is regulated.

Abrami: I did respond back to Michelle's request or query about specific recommendations. And given that Michelle's representing the Department of Health and Human Services, there's concern whether that's an official position of Health and Human Services. When I chaired the marijuana Commission, we had a disclaimer that the recommendations in the report don't necessarily reflect the position of certain state agencies. So, I'll share that language with everybody down the road. We can take a look at that. And that's a problem with a commission when you have State agencies on them. They're between a rock and a hard place. That will go for the AG's office as well. They have to be careful. Their input is very valuable but it gets a little bit sticky once there are recommendations being made. Okay. Dr. Heroux.

Heroux: Yes. Thank you very much for the opportunity. I am going to propose some strong measures, but I realized that we have to avoid conflict with the FCC. I also realize that the measures have to be low cost and potentially reversible as well. So I think of this in terms of protecting various populations. So

first, to protect people from radiation from portable phones, I think that we should make it a law that cell phones do not work when they are held against the head, in other words using the proximity sensor. This is a simple alteration in software that when you put your phone against the head, it stops radiating. That means that you'd have to use your phone in front of you. So it doesn't change at all the functionality of the phone, but it practically eliminates the strong radiation to the brain. When you consider that the cost of assessing this SAR is from $50 to $200 thousand per phone. You eliminate a whole area of conflict. Of course, industry is not very eager for this because it reduces emphasis on the issue of heat from cell phones. But you maintain functionality. It's a very simple alteration. These sensors are already there and you eliminate connections with glioblastoma or auditory tumors. So that's one thing.

Now, to protect people from radiation from base stations, without making any comment on levels of radiation, I think that a 500 meter hold back and there was a distance should be should be that much. If you can deploy 5G with that kind of hold back, you know, fine. But we have data that shows that proximity to these towers is a health risk.

Thirdly, to protect young children, I think we should adopt the same measures that were adopted just a week ago in Russia in relation to wiring schools, limiting strongly the use of wireless, and forbidding the installation of base stations near schools. This is something that they have concluded to be a good idea on the basis of their most recent evidence.

Then to protect electro sensitive people, I think that we have to take measures that give them recourse, in terms of protecting themselves. I think that we should maybe train a few physicians in New Hampshire to become expert in this area so that they can confirm that some people are electro sensitive. And when they are confirmed, they would be entitled to some form of protection.

Lastly, it would be a good idea to protect citizens and businessmen because if in the future radiation becomes a stronger issue than before, some people who buy property might not be aware of the radiation levels on the property that they are buying. And they may face big losses as a result of this ignorance. So probably in New Hampshire, you already have specialists who are capable of assessing radiation. Maybe there should be some sort of framework that would make it practical for these people to give information on the levels of radiation in various places when there are transactions occurring. And in this way, you could build a picture of exposure in the state, as well as give these businessmen some form of protection. Thank you very much.

Abrami: Thank you, Paul. And Senator Gray.

Gray: morning. I am old enough to remember back in the late fifties when there was a big to do about high tension power line and cows that would be grazing underneath the high-tension lines. Since then, you know, we've done lots of studies on lots of different things dealing with the electro- magnetic radiation. Part of what's going on here, in my opinion, is that we have created a fear. People don't like change. And certainly if you have a fear of getting cancer, that is going to create strong emotion in various people.

I'm not saying that there are not people out there who are hypersensitive to RF. I am not saying there is no problem with RF. I'm saying that most of the data out there that we see needs a good peer review. And in some cases, those peer reviews that have been conducted, have pointed out flaws in that data.

There is a big problem when I hear, well, gee, the industry paid for a particular study and therefore that study should be discounted. I don't believe that to be, you know, what should happen. Like any other study, whether the industry pays for it or does not pay for it, it, you'd be peer-reviewed. And the results of those peer reviews would tell you whether or not there is validity in the study, whether this study should be questioned further on that. We don't have, and the studies that I've seen, and there's not that many good scientific studies out there. That is, a lot of these articles that we've seen go back and reference either the same studies or they are redone.

Let's go back. It's the fear of change that tends to make us believe that there is a bigger problem out there than I believe that there is. Having the ability, if I own a piece of property and say, you can't generate any RF signal that's going to come across my property, that's just never going to happen. Okay? That's like saying you can't use perfume when the wind is blowing across my property because of the smell the perfume. I mean, this borders on the absurd.

The photo that we saw with the tree and half of the foliage being gone and the cell tower there, I want to tell you that that there was a new cell tower put up and there were two trees next to each other. One of those trees had to be removed for the cell tower to operate properly. And you know what? It looked very much like the picture that we saw. So, you know, a lot of this information I would claim is anecdotal at best. The information needs a good peer review.

Right now, I don't know of any studies that are out there that have been using any of the technology that 5G employs with the beam forming and all that, which would in my opinion, tend to decrease the radiation that's normally being put out there. But we're not there. We're not in a place where we can make a recommendation. And when you have somebody have insurance for this or that, I don't particularly see that one either. I don't see that we have a good scientific basis to make much of a recommendation at all.

Abrami: Thank you, Jim. Here's what we got before us. I think municipalities would be looking for us to give them some guidance. That's at a level that this really plays out at. It's really cell companies coming into a city or a town and saying we want permitting rights to put on top of telephone poles or install new polls or small cells. I think the majority report really has got to focus back on the small cell towers because that's the issue, that's the 5G. And as I've said over and over again, 5G mean something to every cellular company. It is just a concept. Each interacts with 3G and 4G differently. And a lot of its proprietary, so we have no idea what's inside those antennas and how those antennas are configured. What we do know and we can measure once installed, is the power intensity coming out of those towers. But we should say that a town should be able to say yes, we'll allow you to put in a cell tower but want to be able to periodically measure the intensity coming out of those small cell towers. Gary, did you just sign on?

Woods: Yes, I did. I'm in Nashville and I don't know what happened. I saw the notice that Kent put out to start at nine. Then, I got a notice that it was cancelled. My apologies.

Abrami: OK. Well, let me follow through and we will give you a chance to weigh in. Okay?

So, right now the, the standard's at, let's call it ten watts per meter squared is the US standard. But some of the other countries have set the standard much lower than that. Australia is two watts per meter squared. Canada is three watts per meter squared, but we're way up to ten watts per meter squared. So, I would think at the very least, and I don't see why this would be a problem for us to say to the cellular companies yeah, if you install these, a municipality has the right to monitor the intensity coming out. And I don't know why cellular companies would have a problem with that. There's going to be a working group where we'll put it in a recommendation from for the next meeting that we could go one by one and have a discussion around each of these. All of the things that were mentioned today will be grouped and, and then we will have to as a group at our next meeting really have that discussion around each. But for today, we're just talking about ideas.

So again, this comment is for Beth. I don't know, why the cellular company would object to a town being able to measure what's coming out of those towers and having us have that part of the agreement with the town. If those towers are on our end are out of sync with what the standard is, then those towers have to be turned off, something to that effect. So that's just one thought.

And one that Brandon, I'm going to have you weigh in on too is I looked at the documents that came out from other municipalities of what they've tried to do. One states requiring permittees to defend and indemnify the municipalities from any liabilities arising from installation, operation and maintenance of small cell installations. But why would the cellular industry, if they feel this is safe, not be willing to sign off on a permit that that allows this? Because it's the town that's bringing in the cellular companies and the towns are going to be, why should we have our municipalities be unprotected if there is indeed damage? We, as a commission are hearing both sides of this. And there could be. It's hard to say definitively. We've all heard and I think everybody's kind of agreeing that there's evidence of potential harm. But cellular companies are saying, no, there's no harm. And the FCC saying, no, there's no harm. The FDA says, no, there's no harm. Well good. If there's no harm, then why hold our communities liable for damages? So that's, that's one that I think we should we should be talking about.

I think we should be pressing the FCC. That's my third point. As a statutory commission, as Tom points out, I would just stress with them why are standards set so high? We know there are no biological effects that play into this standard. How can Australia or New Zealand be at .5 watts per meter squared and successfully roll out 5G? They are going to roll it out,I would imagine, with a lot less power intensity. Remember, those towers are going to be at the height of the telephone pole. Most of them are going to be stuck on top of the telephone poles. We also know, as commissioners, that we see the push back going on around the country. You know the industry likes it or not, there are a lot of people looking at this getting the message out that there's this potential danger. So the public is aware of this and there's going to be push back for communities on town selectmen and other boards to deal with this. My fourth point, I agree with some of those that said that we should as one of the recommendations, which is kind

of a neutral recommendation that we would share this with the federal government agencies that a more robust study should be done on 5G. That should be pretty neutral.

Other communities have looked at simple ordinances and loopholes. How many streets are off limits? Now, I don't know how enforceable that one really is. But some communities have that, are trying to do that. Others have mentioned setbacks. I think Dr. Heroux mentioned that. There are towns that are talking about setbacks, a 500 feet from residences, businesses, schools. Again, that's something that that we could talk about. But if it's on top of a telephone pole in front of your house, you walk under the telephone pole and that's where the greatest intensity is going to be right by the pole. That's something that we will address.

Something that came up from the last speaker we had is requiring power density disclosures for renters and buyers, public buildings, locations where general public may go. That's something that I think we should discuss to see if we can make that into a recommendation of some kind. Another community was trying to say, let's have all poles with 5G antenna have warning signs that RF radiation is being emitted above. That's a simple thing. Again, I don't know why the industry would object to that. Some people would want to know that there's RF radiation being emitted above. So those are some of the things that we can look at as a group.

Brandon, in terms of the liability issue, do you have any comment on that?

Garod: What specific liability issue here you're asking about?

Abrami: Well, I'll read it again that some communities are requiring, permittees, meaning the cellular companies, to defend and indemnify the municipality for any liabilities arising from permits and installation, operation and maintenance of small cell installations. The point is to hold the municipality harmless if someone could prove that they were damaged from the small cell towers.

Garod: I think that to the extent that municipalities are making that a condition of receiving a permit, it would be a law or regulation that's specifically preempted by federal law. This is really where the rub is. The communities, the municipalities, the towns, the cities… they're the ones that control the permitting. You have to go through a permitting process and you have to be approved and any law that's passed, that is a barrier to telecommunications coming in that's passed by state, is specifically preempted unless you can meet one of a few carve outs. The carve outs create another barrier. Unless the state has specifically delegated to the towns and municipalities, the ability to regulate telecommunications in any capacity, that doesn't even apply. It's only the state that has the ability to use those carve outs as like a safe haven for a law that serves as a barrier for telecom. And I'm not clear as whether New Hampshire has delegated any of that authority to the municipalities. But there's a lot of litigation since this thing was enacted in 1996 and it's usually a municipality trying to pass something. And the way that the telecom companies are able to beat it is by saying that they're trying to say that it's for public health and safety or for consumer protection, or to protect right of ways. Those are the specific carve-outs. But unless this state has specifically delegated to those communities, you can't even use those carve outs as a defense. I think there's a good chance that it would be preempted. Really, I'm not an expert. That's basically what I've come up with so far.

Abrami: I agree that the state legislature would have to enable the municipalities to do that. Is that what you're saying?

Garod: If there was a specific delegation from the state of New Hampshire to the municipalities to be able to regulate telecommunications coming in, in any capacity, then the municipalities would have to show that any regulation that they passed, which served as a barrier to telecommunications coming in, fits one of the few carve outs under the Telecommunications Act of 1996. And in trying to find a good case to use as a standard, it's almost never been done.

Abrami: Ok, well, so that's why we have the AG's office is represented to give us those insights.

Sherman: Brandon, I have a question for you from what you said. Why do the telecommunications industries have to come in and get a permit if everything is federal? On what basis could a town deny a permit? So in other words, is the permitting process just a rubber stamp? If you don't permit, they're going to take you to court. You know, they can come in any way with or without a permit with or without municipal law, with or without state law. Is there anything that a municipality can do to stop the installation of these antennae and 5G technology?

Garod: To answer your first question, which I believe was, why would they need a permit? They might not under every circumstance. But imagine what the companies are trying to do is come into a town and build several new towers, to build several new receiver or to build infrastructure they would have to apply to the town for, you know, building permits or in order to do construction within the town. There are laws that determine what sort of process you have to go through in order to be able to come into the town and build something. If there is a specific limitation on telecommunications, being able to do that, that is passed by the town…that's specifically what is preempted by federal law. Because federal law determines when telecommunications can come in and what they can do. So it's frustrating because you would think that at the municipal level that would be who is in the best position to determine what's best for your individual town. I think what I can say for certain, I don't know if there's anything that can be done, but what definitely can't be done is any sort of regulation that amounts to any sort of barrier to telecom coming into the town and installing new infrastructure.

Sherman: So the follow-up would be if a town doesn't want 5G, they just deny the permit.

Garod: Well, I think you have to have a basis to do it. I'm not a local government guy, so I don't know.

Ricciardi: I can answer the question what Senator Sherman was asking. So the reason there is a permitting process is each town has zoning laws in place. And the telecommunications company, when they come into your town and they want to put a cellphone tower, they do have to show that there is a need and that this is the only location and that they checked everywhere else. So it does go before our zoning board here in Bedford. Everybody's zoning has different regulation. The zoning we have in place is not a barrier to the telecommunications, but it is definitive things that we have put in place that are allowable by law. So for example, we have the 750 foot setback from any residential neighborhood in our town now and was put before the voters and voted on. So there are things like that that you can do. The other thing that you can do that is legal, that we have just completed is a "wires and poles" town

ordinance. So we did not single out the telecommunications. We did not say this is just to keep the rules in place for them, but it is all utilities, wires, and poles. And in that section, there are some very strict but allowable bylaw criteria. If 5G were to come and it's beyond our control because the FCC, so we put allowable things in place. And when you do this, you're protecting the residents of your town. But you'r making it more difficult, but it's across the board for all utilities. So by not singling out, then it can't be done. Anyone on our commission, and your towns, I'd be happy to provide a copy of what we just completed.

Abrami: Okay. Well, that that's something that I think would be helpful and that, you know, I think you have some specific recommendations that we're going to vet as a group in the next couple of weeks. Ken, do you have another leading question? I think Beth wants to respond. Would you mind if Beth responds?

Cooley: Yeah, I think the only thing I'd add to Denise's comments in terms of what a locality can do, technically, every locality should be complying with the FCC order that went into effect in January of 19. There could also be state laws as well. We've got 29 states and Puerto Rico that have passed laws that also need to be in compliance with their state law. But in terms of what Denise already outlined, localities also have say over aesthetics. In the FCC order, so long as aesthetics are reasonable, objective, and non-discriminatory. And that's what Denise was talking about when she was saying all utilities in the right away. That's the nondiscriminatory part. So in terms of an ordinance, that's also what you can outline is if everything in the right away is green, then we needed to be green and things like that. So just to piggyback off of what Denise outlined, that's how the process works. You do need to get a building permit. You can't just go in and build. Local governments also have the ability to deny a permit on the basis of public safety issues. So for example, if you're doing sidewalk work and the sidewalk is no longer wide enough for wheelchair that can be denied under ADA compliance. Public safety can also circumstance can also be where if a small cell would impede the vision of a driver around learner or a traffic light, things like that. So there's a process passing ordinances helpful to outline where control is retained in terms of the build out, but we'd also be happy to work with you. There are other communities in New Hampshire that have also passed small cell ordinances that we'd be happy to share. So thank you Rep. Abrami for allowing me to comment.

Wells: Looking at this as a physicist, it seems to me that there is an artificial distinction made between different types of RF emitters when in fact RF differs only in intensity and frequency and polarization and so forth. I'd like to see if we could get someone to look into why telecom is subjected one set of standards where say in FCC Class D, broadcast transmitter is limited to a certain number of megawatts per square meter at the property line. And so I think that this is something to look into. Why is there an inconsistency in what the power levels are allowed to be because the power levels on 5G are astronomically higher than they are for broadcast.

Abrami: We will see what we can do there. Ken, thanks. Gary, what we've been doing is everybody's been chiming in with some thoughts and potential recommendations to get the juices flowing here.

Woods: I have some thoughts thinking more as a physicist and where we are and our understanding of some of the basic processes or lack of understanding of the basic processes are, to me still troublesome. I tried to think of this in a number of dimensions. One of which is what I call the sort of the "arc of understanding". This is a little bit of sidebar, but hopefully it'll all come together in a second. When we looked about the human body, we had gross anatomy, the dissected anatomy, microscopic anatomy, cellular anatomy, chemical anatomy, synthetic biology. Then we focus down and then we've got the genetic code with at all we got all the answers now. Well now we don't have all the answers even though you have the genetic code. We know there's now epigenetics and we're learning more as we go along. To me, we're at the sort of the almost gross anatomy levels with microwaves. We're still talking about the impact from what we call a bulk material, irradiate a mouse total and see what happens. And it doesn't give us an understanding of the potential mechanisms.

You say, well, why do we need to understand the mechanisms? Well, let's give an example of a tornado. Sort of normal atmospheric conditions exist and all of a sudden a tornado appears because you've got a very confluence of a lot of factors that come into play that can create an isolated event. And we see that in a variety of things where seemingly normal processes result in a very abnormal event. And we know how to look at that. Chaos theory from a mathematical perspective has done that. And I'm sure Dr. Chamberlain probably teaches courses on for what are called Fourier transforms, where you'd take seemingly very, very benign smooth waves, you put them together and you get this big spike. So these things that occur and we're at that point, from my perspective, of beginning to understand the confluence of these things at the molecular level. And so this arc of understanding has not come down far enough for my perspective, for me to feel comfortable.

And I think there is a line in the Cyprus thing that I thought sort of synthesized my thoughts. And it said "that the potential aggregation and dynamic interaction with other signals". I think that's really crucial for us to understand. It's not just 5G coming in. And our last speaker talked about precursors, which is sort of the same sort of thing. You have a signal coming in and then it turns out it interacts and creates a different signal. And we'd make use of this in biology already in orthopedics. Being a retired orthopedic surgeon, we use magnetic pulsed impulses to enhance bone healing. And that's you're creating a field at the molecular level. Because we know our bone is basically what's called a piezoelectric material and it depends on electrical currents to do its job and stay strong. That's why you go up in space. You don't have gravity, that piezoelectric phenomenon doesn't exist. And you'd have bone loss. But that's an example of the kinds of interactions.

Epigenomic part is another example. And a lot of these processes, and we touched on this very briefly when the issue of proton tunneling came up. That's at an extraordinarily low energy level and secondary internal processes make that occur and change all the time. And we know that things, simple, things like the configuration of an enzyme is a configuration of proteins in general. It is highly dependent on these hydrogen bonds, which are susceptible to proton tunneling. And as a consequence, all these processes we have, we really don't have an idea of how these work and some of the secondary processes. We're back up the "arc of understanding" at the bulk material level. And until we can get further down. And we will eventually, but to me, we're not there yet. So I just wanted to offer that as a concern, At least from my perspective, a concern of where we are in terms of the science. And I'll leave it at that.

Abrami: That said. We don’t know what we don’t know. Thank you for dialing in from your vacation. Everybody's had a chance to weigh in. And what let's talk about next steps here. What I mentioned, the last meeting, I think we should form a work group to take these ideas.I asked for volunteers. I got Representative Wells, Dr. Chamberlin, Denise Riccardi, Carol Miller, Dr. Heroux, and myself that will meet as a work group, to at least put some ideas on paper. We threw a lot of the ideas around here today. We have to do, as a group is take each one of those ideas and see if it will pass muster as a recommendation in our report. And so that's what I think what we'll do. I will work with those people and set up a meeting to do that and then maybe have to meet once or twice before our next meeting. We're running out of time now. We have three months left. I did say I was going to try to follow up to see if we get an extension on the date, but because we go to the next Legislature, I think they really want us to have our report out by November first. So that's what we'll continue to shoot for. So any objection to what I just said? I think that we've got a small work group that will work on this and put recommendations on paper and will get that out to everybody.

And at the next meeting we'll go through each one of those and have a discussion around each one of those to see if there's support for it or not support for it. And having the discussion, some of the discussions we just had, the science discussions, but also the legal discussions as to what we can make work for municipalities. What message we want to send to the federal government about this delegation or other ways.

Sherman: I just wanted to remind everybody, you know many of us have served on many commissions and committees. And I believe if there is a dissenting view to whatever the majority wants, there is the capacity for Minority Report. Is that not correct?

Abrami: That's correct.

Sherman: So I'm just saying that not because I'm encouraging a Minority Report, but because for people who haven't served on commissions or members of the public, the goal is to reach some level of consensus, but perhaps not unanimity. And, and so we may end up with two reports and that's just the way Commissions work.

Abrami: Yes. I think I mentioned that the past. Yes. That's the way commissions work. Okay. Which brings us to Denise. I want you to just weigh in a little bit on the lack of the response to nonresponse response we got from the FDA.

Ricciardi: So I sent several questions to the FDA and the National Cancer Institute regarding answers that are very important to this commission and our decision making. The questions were ignored at first. After I kept at it, I got a response that was not an answer to the question. I point blank, asked and numbered the questions and said we need an answer to each question not linked to their website that we already know that we already have. That's very frustrating. And that was the situation on both counts with the FDA and the National Cancer Institute. So I tried to reach our United States senators offices and finally yesterday I spoke with a staff member in constituent services. And I have forwarded our questions to that office. And I feel at this point, it's going to take our U.S. senator to insist they answer the questions. And I find it very telling that they don't want to answer them. We are a

commission with a very important task and I don't understand why they want to answer these questions. I'll give you an example. I'll read one of my questions. The FDA is aware that cell phones violate the FCC SAR limits at body contact on high power. The FDA has written that because it's safety factor and that's what they do. What is the safety factor for SAR the FDA relies on and at what SAR level above the FCC limits will the FDA intervene? So they have written that that it is not safe on body contact, but then they don't do anything about it. And why will they answer one simple question? That's just an example. So that's where we're at. I'm still waiting.

Abrami: Tom, I'm going to ask you to help us out with that and try to get maybe Senator Shaheen or someone to help us out with that.

Sherman: I am happy to.

Ricciardi: It's her office that I spoke with. It wouldn't hurt to have you follow up as well.

Sherman: I can call l their state directors. I reached out to them about the FCC and we didn't get anywhere. It's not because they didn't try but because they didn't get a response. It's frustrating.

Abrami: So if, if the commission doesn't mind, you all remember Theodora from Environmental Health Trust. She had reached out to me about the FCC and if you don't mind if we give it a few minutes and then Beth, if there's anybody on this that from the industry that wants to respond, we will give them that opportunity as well. So if you don't mind, we'll have Theodora spend a few minutes. We have about a half hour left.

Scarato: Thank you so much. I had sent over and just wanted to make everyone aware of the documentation that I received from the EPA with a lot of questions. Their response to my questions was that the EPA's last review was in 1984 in terms of biological effects and they gave they cited that you should all have a copy of the questions and the answers. Just to go over what the EPA said. I said what's the research? Has EPA reviewed the research on damaged memory? They say they don't have a funded mandate for radio frequency matters. And in regards to the birds, bees, and trees, what's really important is that the limits were not set of course for birds, bees or trees and the EPA seem to confirm that in the answers that they sent. Also in regards to the safety factor, I would note that I think this is a really important question, so I'm glad it's being asked because it said that there's a 50 time safety factor. But when it comes to phones against the body, is certainly couldn't possibly be a 50 times safety factor for that in terms of the heating effect. So want to make sure you have that as well as the scientific letters that were sent to the FDA in regards to their report, their literature review on only cancer. They didn't look at other end points comprehensively. And you'll notice that Dr. Albert Manville, the former fish and wildlife lead, who is now retired, wrote stating that the current FDA statement is irresponsible, unfounded, and sets a dangerous precedent and so on. But please take a look at those letters that were sent by the scientists regard to the FDA. So thank you.

Abrami: Thank you. I think I did send that out to everybody. And if I recall, each response to each one of those was "that's not our mandate"….Something like that. Is that correct? Right. So we have got it because Congress has mandated us look at this, something to that effect. Again, next steps are going to

be getting the working together a couple of times. In terms of the next meeting, we could try to put a stake in the ground and come up with a date while everybody's on the Zoom meeting here. Are people on vacation? Are they staying local? August 28th? Who cannot make August 28th at 09:00 AM? Brandon can't. I want to make sure the Working Committee has enough time to do what they have got to do.

Sherman: I'm on vacation on the 28th, but I can do it anyway. I could do Monday, the 31st if that worked. I don't mind dialing in. It's no problem.

Okay. Okay. How about Monday the 31st? Anybody can't make money to 31st? Okay, why don't we save that date, the 31st at 9 am. I'm going to reach out to the folks who volunteered and we'll come up with some dates for us to get together in between. So well, we've got about 25 minutes. Is there any other general discussion we would like to engage in? If not, I'd like to open this up to any other folks on the on the Zoom meeting that our guests, if they'd like to weigh in. I would allow that now because we have time. Does anybody else want to weigh in? Questions? Comments? suggestions?

Bloede: Yes. Oh, can I speak? I am Paul Bloede from Coloradans for Safe Technology. We had a meeting recently, Zoom meeting with an attorney that I wonder if your organization is familiar with this national level Attorney. His name is Julian Gresser. And he had a lot of comments about the legal state around the country of this whole issue and I thought he was very incisive and we have a transcript now with his presentation to us, we have that transcript just from last week as a PDF file. I didn't know if that would be of interest. How I could get that file to any of you, should that be of interest?

Abrami: Can you get that to me?

Bloede: Yes. Do you have an email address?

Abrami: Yes. Use abrami.nhrep@gmail.com.

Bloede: Yes, definitely. I will get that out to you. I think you will find it interesting hopefully.

Abrami: I'll get it out the others. Okay, thank you. Cece?

Doucette: Thank you Rep Abrami. When I first started investigating the wireless radiation issue, I thought as soon as we saw that it's especially harmful to children, that my school would have jumped up immediately and shut off the wifi in schools.

Abrami: Cece, why don't you back up and explain your involvement in this.

Doucette: Okay. I spent several years at Ashland Public Schools in Massachusetts doing fundraising for what we kept hearing our kids would need to succeed in the world. And that was basically the 21st century classroom, which is an industry campaign to introduce wireless into our school systems. And I had spent many years doing fundraising because our town didn't have the budget for that. I started looking and an engineer friend of mine tipped me off that there could be harm. So I started my investigation and I came up with a few studies that were saying no harm. I didn't understand at that point that "no harm" is not the same thing as "safe", right? So I started looking a little bit deeper and

then I start finding peer-reviewed studies all over the world showing great biological effects. And the set of studies that got me on my feet were the sperm studies, where they've taken male human sperm and expose it to a laptop with the antennas on. And it changed the DNA, it slowed the motility in it cause far fewer sperm to be viable in just four hours of exposure.

We had just bought my youngest daughter a laptop going into high school. And of course she's using it right on top of her reproductive organs. So that was the day that I got involved in this. I have helped introduce legislation here in Massachusetts and I wish we were as swift as New Hampshire is. My bill has been in play for six years. There are others on the utility smart meters that had been in play for eight years. But even during this pandemic and the racial justice movement that's happening, our legislature is finally advancing three of our bills, so we're hopeful that that will happen here.

Early on in my journey, others who talked to me about legal action and I don't know anything about that. I didn't want to see lawsuits come into play. I just wanted us to do the right thing and especially protect our children. But then I got to listen to a conversation with somebody who was referencing Martin Luther King Jr. And what MLK was teaching us is that in order for important societal changes to happen, it happens through three channels. 1. The public gets educated and speaks up and thank you to Deb Hodgdon for being the catalyst in New Hampshire who then spoke to Rep Abrami, who then drove down to my kitchen table here in Massachusetts. We had a long conversation about wireless. 2. There is legal action that happens to hold those who have infringed upon our rights, accountable. 3. Public policy ultimately catches up with the science or whatever else the issue is. So as much as it makes me uncomfortable to think about legal action, it's part of how change happens.

So to our Attorneys General, I hope you will look at this as seriously as you looked at tobacco and do the right thing, reach out to your colleagues and other states, get this conversation going. My understanding is the industry has already set aside billions for the lawsuits that are going to happen. But we cannot afford to continue to expose our children even during this pandemic, handing out hot spots without any information on how to use technology safely. So I implore you as a mother, as a woman who fell down this rabbit hole which I never wished to be in. But once you know the harm, you can't “un-know” it. And we have to use every resource that is available to us to start protecting our children, especially right now. So thank you for your time. I hope the commission will report out favorably something that we can hold up with pride and say, thank you to New Hampshire for being our nation's leader. And then we can follow suit in our states too.

Abrami: Thank you, Cece. Is there anybody else that would like to weigh in at all? Okay. I don't see any.I I guess we will be adjourning. We will see everybody on August 31st at 9. And then, in the meantime the subgroup will be meeting. Did I mention that we're recording the meeting? I thank everybody for your time. Thank you to those who have tuned in from afar. Those on the Working Group, I will get an email later today with some dates that we can get together. Okay. Is there a Motion to adjourn?

Woods: I was the latest but I will make a motion to adjourn.

Abrami: motion to second by Carol. Without objection, we're adjourned.

V. Next meeting via Zoom: August 31st 9-11

Meeting Adjourned at 10:43 am

Text chat during Zoom meeting:

00:30:12 Bruce L. Cragin: ???

00:30:45 Bruce L. Cragin: ???

00:41:30 Bruce L. Cragin: Yes bring back Swanson!

00:43:58 Cece Doucette: Hawaii County Council just passed their 5G ban

00:45:51 Bruce L. Cragin: Ha

00:50:10 EH Trust: There have been attempts to overturn the Telecom Act section 704. Some links her ehttps://ehtrust.org/policy/the-telecommunications-act-of-1996/

00:51:17 christine.melkonian: YES, to public awareness

00:54:54 Cece Doucette: It was our state attorneys general banding together and suing the tobacco industry that finally brought the toxic effects mainstream. Perhaps the Commission can recommend that NH lead an effort for attorneys general to band together on wireless too, which if successful, would help to provide the funding to put safe, fast, sustainable technology in place. I believe NH still receives funding from the tobacco industry lawsuit today.

01:01:20 EH Trust: Also the Telecom Act Research continues to show effects from power lines. See studies here https://ehtrust.org/science/research-on-magnetic-fields-extremely-low-frequency-electromagnetic-fields-cancer-and-miscarriage/

01:02:08 EH Trust: Many countries have protective limits in regards to power lines, over a dozen. They set limits at the level linked to cancer in children. But the US has no limit at all. https://ehtrust.org/policy/international-policy-actions-on-wireless/

01:02:29 Bruce L. Cragin: Exactly, Sen. Gray. So much fearmongering.

01:03:56 EH Trust: Two published studies by the Ramazzini Institute "Carcinogenic Synergism of S-50 Hz MF Plus Formaldehyde in Rats" (2016) and "Life-span exposure to sinusoidal-50 Hz magnetic field and acute low-dose γ radiation induce carcinogenic effects in Sprague-Dawley rats" (2016) found that ELF exposed rats had statistically significant increased incidence of several type of malignant tumors when combined with a known carcinogen.http://onlinelibrary.wiley.com/doi/10.1002/ajim.22598/full

01:04:44 Bruce L. Cragin: And here comes some more ^^^

01:12:17 Bruce L. Cragin: Re. A., you're hearing ONE sde, not both.

01:33:08 Bruce L. Cragin: Physicians are not physicists.

01:33:27 Ken Wells: Bruce: This one is

01:33:48 Bruce L. Cragin: You, Ken? or Gary?

01:34:08 Ken Wells: Dr. Woods

01:34:35 Bruce L. Cragin: Thabk you. I will contact him.

01:37:54 Bruce L. Cragin: http://bobpark.physics.umd.edu/WN10/wn121010.html

01:39:17 Bruce L. Cragin: Sorry, I meant https://quackwatch.org/related/signs/

01:44:10 Bruce L. Cragin: https://americanbeejournal.com/why-we-shouldnt-fear-5g/

01:45:48 EH Trust: The FDA scientists letters are found here https://ehtrust.org/doctors-slam-fda-report-on-cell-phones-cancer-and-health-effects/

01:46:04 EH Trust: Dr. Manville https://ehtrust.org/press-statement-from-dr-albert-manville-on-the-fda-report-on-cell-phone-radiation-2/

01:46:38 EH Trust: The EPA letter can be found here https://ehtrust.org/epa-birds-bees-trees-5g-wireless-effects/

01:47:05 Bruce L. Cragin: "FDA scientists" or activist scientists?

01:47:24 EH Trust: The letter from scientists to the FDA.

01:47:42 Bruce L. Cragin: Yes that's more honest.

01:47:49 EH Trust: NIH scientists, experts internally signed, several on the world health organization emf group

01:50:20 EH Trust: Several of the scientists are expert advisors to the World Health organization who are asking the FDA to retract their flawed report on the studies.

01:54:13 christine.melkonian: YES

01:54:20 Bruce L. Cragin: I give up. You people are just lost. The idea that a commission of legiislators has the scientific capability to meaningfully question the standards is ridiculous.

01:54:26 EH Trust: Resources on Wi-Fi in School https://ehtrust.org/wifi-in-schools-tool-kit/

01:55:14 Ken Wells: Aug 31 at 9am

01:55:47 christine.melkonian: Thank you so much

01:56:28 Cece Doucette: Thank you to the commission members and others, please feel free to reach out if there is anything I may help with. c2douce@gmail.com

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
8/31/20
9:00-11:00 am EST
Via Zoom (https://unh.zoom.us/j/95489344931)
Via telephone-US (1 312 626 6799 (US Toll) ID: 954 8934 4931)

In attendance: (12)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Senator Tom Sherman-president of the senate appointee
Brandon Garod-AG designee, Asst. AG Consumer Protection
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Carol Miller-NH Business & Economic Affairs Dept

Not present: (1)
David Juvet-Business and Industry Association
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Meeting called to order by Rep Abrami at 9:05 am

Abrami: Due to the Covid 19 virus and the Executive order signed by the Governor this public meeting is allowed to be conducted via Zoom. It is open to the public for viewing and was duly posted as a zoom meeting. With that said, if you are not a member of the Commission, can you please turn your cameras off and mute yourselves? That would be much appreciated. In addition the meeting is being recorded as an aid to doing the minutes. All chat room discussions will be included in the minutes.

I. Approval of minutes from 7-24-20:

I have not received any comments or changes to the minutes. Are there any changes? Without objection, we approve the minutes from that meeting.

II: Proposed report format/ Procedural Discussion:

Abrami: We also sent out a copy of the agenda and the proposed final report format and recommendations the work group has been working on. That's the primary reason for the meeting is to talk about those and if there are any other recommendations. This is what I am thinking about the report: Preamble, Definition of Terms, Physics, Study process (who we heard from, etc.), then a section of the questions posed by the Commission in the legislation and the answers, our recommendations.

What we consider firm recommendations for lack of a better word and also listing some other things that we decided not to make recommendations. There will also be appendices and supporting documentation for the recommendations and of course the minutes will be attached to the report. This is what I am thinking but I am open to any changes. Are there any questions on that?

Cooley: Rep Abrami, just one question on that. In the outline, where would a minority report or dissenting opinion fit it?

Abrami: I will double check this but it's a separate report that gets attached to this report. I know there will likely by a minority report which is fine. I will get clarification on that. It was easier when we were at the state house and I could just walk over and ask but I will get clarification on that. OK?

Cooley: Yes, thank you.

Abrami: There is a work group that consists of seven members: Carol, Denise, Gary, Ken, Kent, Paul and myself. There are seven of the twelve members that have been active. The working group met three times. We started with a baseline of ten recommendations and we have done several iterations on these. Obviously, these are open to discussion today whether you think they should or should not be in the report, etc. Since I sent these to you I have gotten two updated versions that I sent to you this morning. Sorry it was late. One is from Paul with some minor changes. One is from Jim with some major changes. Hopefully, you have seen them.

Sherman: Pat, I also sent some minor edits to Paul's version this morning.

Abrami: ok. I didn't see those. So can you chime in when we get there? What we will do is take them one at a time and have a discussion around each one. I had a communication with Beth about, do we really want to take a vote on these today given that you have just received them this weekend. What we can do is take a straw poll to see where we are on each one of them and not be an official vote. When we do a final vote on these, if the majority votes yes, it will be in the report as a firm recommendation. If not, then it's not. After that, we will have a vote on the report with everything in it. There are twelve members that are active, so if it ends up 6-6, I will have to figure out what that means.

What I would like to hear from you today possibly three things. 1. I like it the way it's written. 2. I would like to make some changes then I could support it. 3. No matter what, I don't think this recommendation is needed. Certain members of the working group took charge of certain recommendations so I will ask them to describe the recommendation and what the motivation was behind it. If there are any other recommendations please let us know in this meeting and we can deal with those.

Sherman: Before we go to Recommendation 1, can I just make a comment on the first paragraph?

Abrami: Sure

Sherman: This is a great sentence but it's very long. On the last one it says ", thus the commission …" I think it would be clearer if you had a period and the words, "given these considerations, the commission yields". My feeling is that it's fine but I would have the last sentence be independent. That's in my edits for what it's worth.

Abrami: I get it. That's a good one.

Wells: I submitted an edited version of this one and changed it into a bullet list.

Abrami: ok. Boy, I am behind in my email. I missed that one too.

Miller: Which document should we be looking at? The original and everyone can chime in with their changes? I have multiple versions open and I don't know which one I am looking at any more. I think the one that you sent was Revision 3. Correct?

Abrami: Yes. If you see red in there, that means there were changes.

Sherman: which one did you send?

Miller: It was Revision_3 5G Recommendations.docx

Gray: since we are commenting on the first paragraph, I took out a couple of different things in my revision. I think that whoever puts this thing together at the end should consider removing and only presenting facts and not things that aren't facts.

Abrami: What you are saying is that the things that you crossed out aren't factual.

Gray: Right. You talk about the whole insurance industry, well that's not true, ok? The insurance industry if you leave it like that is more accurate. In the next sentence down you say "because of" instead of "due to potential harm". Thank you.

Abrami: I agree with those. These are good ones.

Gray: The word "determined" is used many places. In my edits part of my suggestion is that we take that out and replace it with the word "believe". The definition of determined is that it's found to be a fact or conclusive. In the first paragraph of the report we say that none of this is found to be a fact so again… take that word out and replace it with believe or a word of your choice. That would be a good revision.

Sherman: If you are anticipating a Minority Report, then wherever you have "the Commission has concluded" should be changed to the Majority or this Majority of the Commission has concluded… because you are going to have a Minority Report that has not concluded that necessarily. I think you will be a little more accurate using that phrase in the Majority report. That's only if there is going to be a Minority Report to recognize that the entire commission does not agree with this report.

Abrami: That's a good point, Tom. I anticipate there is going to be a Minority Report.

Gray: I will write it.

Abrami: Ok. So we are going to have a Minority report. Anyone who wants input into it can send me their comments.

Roberge: I haven't had a chance to talk with my leadership from DHHS on any of these recommendations so I may have additional comments from a resource perspective once I have had a chance to look these over with leadership. Also, I know we talked about this at the last meeting about not formally taking a position on the recommendations just due to the role of the department. I think we would just want to have a statement in the report reflective of that.

Abrami: right. It will say effectively that the recommendations do not necessarily reflect the position of any agency, Attorney General's office or Dept of Health and Human Services.

III: Work group recommendations and discussion:

RECOMMENDATION 1- Propose a joint resolution of the NH Senate and House to the US Congress and Executive Branch to require a review of the current radiofrequency (RF) standards of the electromagnetic radiation in the 300MHz to 300GHz microwave spectrum, used to measure exposure and health study to mitigate the health risks associated with the use of cellular communications and data transmittal, promulgated by the Federal Communications Commission (FCC).

Cooley: With the whole caveat that I received these Saturday morning and have not spoken with my members or with legal dept. so that will be my disclaimer throughout all of this discussion. My one question about this recommendation…. The first sentence of the last paragraph that says, " this commission believes that EMR is on the path to be confirmed as a class I carcinogen, where does that information come from? Is there a footnote? How is that assumption being presumed?

Miller: Recommendation 1 is a merger of something that I had written and Paul had written. That particular phrase came from Paul. Can you speak to that?

Heroux: Essentially that would refer to an article by an epidemiologist Anthony Miller who is very active with IARC. In other words, IARC has agreed to review the situation and in the last report what was missing was animal evidence and its likely there will be an upgrade to the classification because you have two major studies NTP and Ramazzini that now provide animal evidence.

Abrami: We need to refer to the papers either as a footnote or in the appendix.

Cooley: I think a footnote, Mr. Chair might be helpful because this is someone who has not presented before the Commission. I don't know who they are and it's the opinion of one person. I think backing up that claim or allegation would be helpful.

Abrami: The gist of recommendation 1 and I don't know Beth, why your organization would not think it's a good idea saying that we do have more to study. That's basically the thrust of this. There are a lot of organizations asking for this. Carol , why don't you spend a few minutes on this.

Miller: This is a joint resolution of the New Hampshire Senate and House to the US Congress and Executive Branch just requiring a review of the current RF standards and asking for a health study. The un-highlighted text is just back up and could probably be moved to the appendix. I don't know if anyone has any questions about that particular recommendation. I think it's pretty straight forward.

Sherman: I thought the recommendation was fine. It was straightforward but I thought there was a clearer way to describe what we are trying to get done. The edit that I suggested would read: " Propose a joint resolution of the NH Senate and House to US Congress and Executive Branch to require the FCC to conduct or commission a review of the current RF standard of EMR in the 300Mz-300GHz microwave spectrum as well as a health study to assess and recommend mitigation for the health risks associated with the use of cellular communications and data transmittal". I just think it's the active which makes it clearer than passive.

Miller: So you are suggestion after the word "require" to put the "FCC" right there.

Sherman: yes and after the word, "spectrum" I would use the words "as well as a health study to assess and recommend mitigation for the health risks associated with the use of cellular communications and data transmittal".

Miller: I am ok with that. Anybody else have an opinion about that?

Abrami: That's fine with me. Does anybody have a problem with that?

Gray: Again, I have made many changes in my edits and I don't object to many of the words that Dr. Sherman has put forward but I still think the rest of those paragraphs need to be looked at. When I read this report for the first time, it was very clear to me that someone who was a very big proponent of eliminating 5G or wifi, entirely, wrote this thing. That's not our job as a commission. I encourage you to take a look at my edits. I tried not to gut your proposals but to make it more neutral while still putting forth your proposals. Thank you.

Abrami: The work group will be meeting again on Friday. We have got our work cut out to try to pull all of these together. I am sure some of your words are going to make it into the report, Jim. The bigger question right now is who is opposed to having a joint resolution where we say that more study is needed on this topic? Who is opposed to that? We can tinker with the words.

Gray: I am not opposed to having a study but I want you guys to know that the reality of having a joint House/Senate Resolution is practically nil. The Senate has these resolutions and has determined that it's

better for the citizens to go out individually contact their Congressmen than to do one of these resolutions.

Abrami: It is our understanding on the House side that the Senate doesn't like joint resolutions. We were trying to give it a little more umpf. No matter what we do, it will be a sell to whether it's just the House, where we will have to get 201 members to agree to it. We thought it was important that as a commission that at very least, we make a statement that further study is needed, bottom line. Having the full House and Senate would give it more umpf than just the commission.

Ricciardi: I want to make two statements if I could with all due respect to everyone. I am going to speak for the seven of us on the working group. I don't believe any of the six of you are against technology by any means. We are for it and we presented solutions that are safer, quicker, better latency. I don't appreciate that we are called out as saying we are against it. That's simply not true. I've got my cellphone right here ok? I want to clear that up right now. We are not against it. We are against the way it is now and we have shown a better solution as you get down into the recommendations.

The second thing is, we are tasked with a job based on the findings that we found. We don't sit here and not put them forward because the Senate or the House won't go for it or we didn't do our job. Our job is to present the truth. You don't, not present the truth because you are afraid of the outcome. The truth is the truth. You place it there and see where it goes. The seven of us with the testimony, the evidence and the science came to these conclusions. Anyone else who disagrees is allowed to and I respect their opinion and they can follow up in a report. But I do think we should get through it so we all have a good sense of where we are at. I am going to reiterate this. It is unconscionable to not tell the findings because you are afraid it won't sit well with someone or won't pass. That's my two cents.

Abrami: Thank you, Denise.

Sherman: Pat, I have a few edits on the paragraphs following recommendation one if this is the right time to mention them and they are minor. The words "living things" at the end of the second paragraph. I would replace that with "organisms" which is a slightly more scientific term for living things. The Obama-Biden plan to combat cancer, I am concerned about including that if it was never adopted by any elected body. If it was 2008, was that a campaign plan they had in 2008 because certainly the FCC would not be held to any campaign plan. My recommendation would be if it was adopted, then include it but if it was a campaign platform, I would delete it and just have the first one which was the National Cancer Act.

Miller: I am ok with that. I didn't write that particular piece.

Abrami: I think Tom has a good point, Paul. Was that ever enacted?

Heroux: I am trying to find out what type of formal approval this had but I think I should do it later.

Abrami: yes. Please do it later.

Gray: Sometimes these things are done by Executive Orders. But the paragraph ahead of that, where you talk about the FCC, all needs to be restructured also. Rewording that so it flows much better is something that you should consider.

Sherman: I agree with Jim on that wording because rather than have the word "favorable" in that paragraph with the Ninth Circuit Court, I would use what Jim said which was what the ruling was and what it will result in. I haven't seen Jim's version of this but I would favor being as clear as possible. The word "favorable" leaves a question as to who is it favorable to? Is it favorable to the FCC or the plaintiff?

Abrami: Carol, I am looking at you.

Miller: I am ok with removing that and I am not that invested in the surrounding documentation and it should probably be moved to the appendix. With regard to this, there is a lot of information in there and I think it just muddies the water.

Abrami: Ok, you heard all the comments Carol to modify.

Miller: If people send their recommendations directly to me, I am happy to do that or its going to get lost in the shuffle. I have Senator Gray and Senator Sherman, who else had comments?

Cooley: I just had a footnote on the article by Anthony Miller.

RECOMMENDATION 2- Establish a State position that protects the State and all its Municipalities from any liability from harm caused by small cell antennae placed on the public rights-of-way. Specifically liability of the State of New Hampshire and its municipalities connected to harm caused by claims of personal damage or harm from the deployment of 5G small cell towers or the attachment of 5G antennae on telephone poles, electric poles, lamp poles, or other structures on the public right-of-way is by state statute transferred to the Federal Government. The Federal Government shall be required to defend and indemnify the municipality from any liabilities arising from permits and the installation, operation, and maintenance of small cell installations.

Abrami: We had some discussion about this. This had to do with protecting our municipalities from harm. Do we really want this recommendation or not because the feeling is that it will put citizens in a bad position. I actually originally wrote this and Paul took it from there. Our communities are being forced to deploy small cells at telephone height and I thought about holding them harmless. This was an attempt to protect our municipalities, but what about people?

Heroux: Well, this is a rather legal question. I think we all recognize the motive of Rep. Abrami's original statement. But, if the federal government cannot be sued and if this recommendation goes nowhere, what is the means by which we can support municipalities and individuals who might feel helpless in relation to this problem in the sense of congealing their actions together and make sense of it and rationalize it.

Woods: It seems as a discussion, we went over this very point and the complexities of having a liability element in there as a recommendation. We wanted to include it but perhaps put it at the end as an observation. And couch it in terms that we understand that this very well may be an issue that will come to the fore that we did not have a recommendation but wanted to recognize that this is an issue that will perhaps need to be addressed in the future.

Abrami: right. I put in my notes…discussing whether to demote to something less than a recommendation.

Sherman: Brandon is with the AG's office. Could we get an opinion whether this is even possible? What's happening is states and municipalities are being asked to approve these but based on FCC rulings, they don't really have a choice. As a result, if the people of the town are harmed, and go after the municipalities because they can't go after the federal government (FCC) then they are stuck. I am concerned that municipalities will bear the brunt of liability without being able to say no to the request from the cellular company. Do we have any wiggle room on this? Or is it something that is not worth mentioning because there is nothing we can do about it? Can Brandon weigh in?

Garod: I'll do my best with the caveat that gets into the question of what is civil negligence and what establishes the liability for civil negligence. That is pretty far outside the realm of what I typically do in the consumer protection world. But, I had two initial thoughts when I looked at this. Because municipalities are being forced to this and don't have a choice. To bring a suit for negligence there has to be some sort of negligent action like setting aside the standard of care. If they are being forced, I don't know how a community could be held liable for that. If they did have an option and did not do their due diligence and allowed this to happen, that's a different story. It's very clear that other than aesthetic regulation, the placement, design, size of something in a public space, municipalities have no authority to say no to 5G technology being moved into their town. I don't think there is a huge risk of liability for municipalities.

When I went back to the legislation, and looked at what the commission is supposed to do, I think this is a bit of an outlier. I think it may be worth mentioning that there are concerns about who would be liable. I don't see anything in the commission's tasks as to what steps we need to take legally protect municipalities or the state from possible liability. It's more getting the information out there, developing strategies to limit exposure, public policy statements rather than developing a plan to protect municipalities from liabilities.

I think that likely if there are lawsuits in the future, that they will be directed at cellphone companies who are pushing these things out aggressively without doing their research and they have acknowledged the risk of harm as they recommend not putting it near your head but if they are then

going to implement towers everywhere and not give anybody a choice, that's really their choice. I am not sure that their choice and actions can be imparted onto municipalities that don't have an option and trust the FCC that they are doing what they are supposed to be doing about safety. Those are my takes.

Ricciardi: The seven of you know that I have been against recommendation 2. I feel it's a dangerous recommendation and we should omit it. State government needs to make these antenna safe not indemnify or protect government from liability or responsibility when they allow them to be deployed unsafely. We need state government to say no to these transmitters and challenge legal cases around Section 704 of the 1996 Telecommunications Act that prevent them from even considering health and safety. I don't think we should have Recommendation 2 in there at all.

Abrami: My original thought on this one is…the new twist is that these antennas are going to be in the public Right Of Way. In the back of my head I'm thinking there is something different about these being in the public Rights of Way. We have two, the municipal and the state ROW. We have town roads and state roads. So, that's the game changer for me. That's what's different about this. We have no control of those antennae and what's coming out of them. I am okay with eliminating #2 or demoting it.

Sherman: The real problem here, as Brandon said is that the municipality and the state can only object on the basis of aesthetics. We should be asking our federal delegation to bring legislation that would allow or expand the ability of municipalities and states to challenge the placement of 5G/small cell technology based on concerns about health risk. That is getting to the meat of the problem here. The reason that #2 exists is because municipalities and states have no ability to challenge FCC ruling on the basis of health risk. To me, that's the crux of the problem. What needs to happen is we need to allow local control with regard to health concerns for this technology. Local and state governments should have some regulatory impact on whether or not this is rolled out.

I can't believe that the FCC can do this without any consideration of health impact. I would change #2 or I would change the concern to: the Commission will write a letter to our federal delegation urging them to bring federal legislation that would expand the ability of states and municipalities to object to implementation or placement of 5G/small cell technology based on their concern for health risk. That's the way I would take this, rather than going down the liability corridor which gets us into the issues that Brandon was talking about.

Abrami: Right, the courts are not reviewing whether it's good or bad. They are just following 1996 statute.

Sherman: Frankly, if the industry wants to bring Xenon ray guns out that transmit data quickly, they can do it if the FCC says they can do it. The FCC has the power to say, you have no right to object to whatever technology that the telecommunications industry brings forward based on health risk. That's it. That's the problem.

Heroux: what the FCC says is that certain levels of electromagnetic radiation and power density are not harmful. It has a stranglehold on that because this was a main preoccupation of the engineering community. It also says that you have to provide telecommunications service. But these two

requirements leave a lot of ground for other arguments. I think aesthetics is a very weak word to describe the leeway that you actually have. Without confronting the FCC, you can probably do lots of things.

Chamberlin: My point is that we might want to wrap #2 into #1 since they are pushing for basically the same thing having our federal delegation become involved in changing the policies for objecting to cell tower placement.

Abrami: that's a possibility. Also, I should have mentioned this earlier. We had a discussion in the working group about even using the term 5G but broadening that to a certain bandwidth of RF because 5G may be passe in a year or two with 6G. 5G is just a marketing concept. It's being rolled out differently by all of the cell companies. Some are using small cell towers and others aren't. I don't want to burden this here but we are looking for words to use in the report that would be broader then 5G.

Sherman: I would fully support that.

Wells: I agree and I can write some language about that.

Abrami: #2 won't stand the way it is and we will take a crack at it by either incorporating it in #1 or coming up with some additional language here. Basically, the change that would have the most impact is for the U.S. Congress to act. We all know that. That's a tough one. There are bills filed every once in a while but they tend to go nowhere at the federal level but as New Hampshire we will throw our two cents in. Or at least the Commission will.

RECOMMENDATION 3- Require the New Hampshire Department of Health and Human Services or other New Hampshire agency to include links on its website that contain information and warnings about RF-Radiation from all sources, but specifically from 5G small cells deployed on public rights-of-way as well as showing the proper use of cell phones to minimize exposure to RF-Radiation. In addition, public service announcements on radio, television print media, and internet should periodically appear, warning of the health risks associated with radiation exposure. Of significant importance are warnings concerning the newborn and young as well as pregnant women.

Chamberlin: the part that we were most recently looking at in our subcommittee is an establishment of a registry that would be on a website. The reason for that registry would be for people to log their concerns. How I became aware of this being at the University in electromagnetics, a number of calls from concerned citizens get routed to me. I tell them what I know about exposure to electromagnetic fields and they are sometimes concerned that they don't have an avenue for reporting their concerns. I tell them that there is not much they can do about exposure at this point because of the 1996 Telecommunications Act and so they are stuck. Where do they go? Do they go to the FCC? That doesn't seem to be a very productive avenue. I feel by having a registry, we can get a sense of how many people

are concerned in the state of New Hampshire and to build essentially ammunition if there are a lot of concerned people so we can go to the federal delegation and have them do something.

That's the second part that I really addressed and that is have a registry where citizens can report concerns so we can get a sense of how many people do have concerns. If it's only one or two then maybe the point is moot but if we are getting hundreds that's something that we should know. Paul, did you want to address the other aspect of this?

Heroux: You are right. We wanted to give an access point to monitor this situation and the access point could be for either individuals or organizations or a separate access point for both of these.

Gray: This is Jim. This recommendation first of all should not be for the Dept of Health and Human Services. It should be for the state because we don't care what department it is as there may be a better place to put it. It's more realistic if you have the state collect data. What we are talking about here is a man year of effort and supervision and if the volume is high, maybe more than that. That would be a budget issue and again, do we really want that and will the legislature approve it?

Abrami: we know most of these will have to go to the legislature for approval but first someone has to file the bill. Those discussions will happen there. We decided that we want to make the recommendations and let that process work through.

Chamberlin: I have done websites like this and to provide information and add links as we have done with the website associated with the Commission. In terms of a registry, it could be something as simple as a survey. I have created those in an afternoon. We could create a survey that is appended to the website. I think we are talking about a man week as opposed to a man year worth of effort.

Heroux: I echo that comment because with automation today, it's fairly easy to create a link and a person from within the state can access this link and file a pdf document automatically. If you have many requests then you might face the labor of assessing these requests but as Kent pointed out, you wait until you have many and then you know it's worth it. Thank you.

Roberge: As I said earlier, I have not had the opportunity to talk with leadership about this so I may have some additional comments. One thing that I thought of and it's been talked about a little bit here is funding for this. If the department is required to do a registry, there are obviously database requirements and an evaluation component. One thing that concerns me is that if we are collecting this information, at this point, we don't have any authority to do anything with it. That's somewhat concerning to me because if we are collecting all of this information, what is the dept doing with it? I know DES has been mentioned, I am not sure if they are appropriate either.

I know DHHS has a radiological program. It's a small program that is focused on ionizing radiation. We license and inspect sources of ionizing radiation including x-ray machines in dental offices or hospitals or industrial radiography in industry or a radioactive materials program. Again, that is focused on ionizing radiation. The department also participates with Homeland Security Emergency Management and an emergency response program specifically for Seabrook Station. Again, it's ionizing radiation. I'm not sure

that DES is the correct agency. That being said, any additional requirements to do inspections, monitoring or in this case PSAs and things like that, there is a funding mechanism that would be an issue. If you had a registry, what are you doing with that data? Is it confidential? Will there be private health information if people are talking about radiation sickness? How involved are we going to be with these activities?

Also, I am not sure where the PUC falls in any of this. They do regulation of power lines so the radiological health program does not do power lines. That falls under the Public Utilities Commission. I am not sure where Telecommunications falls and if that would fall under PUC or not. I just wanted to offer up those thoughts and certainly I am going to take this back to my program and I may have additional thoughts to share at a future meeting or through email.

Abrami: It is my understanding that telecom is not really regulated like the utilities because it's not considered a utility.

Sherman: I have a few thoughts. We have a commission to study environmentally triggered disease and we have been working on this kind of database on that commission. We have been disrupted by Covid and it's a senate commission so we have not been allowed to restart but what we have learned is DES has a site where private property owners can put their well test results in. I don't believe that required legislation or if they did that through rules. Individual well owners could enter their data into the site and make it possible for DES to develop a database for private well owners.

There is also on the public health side, and Michelle knows there is an entire infrastructure of public service and the ability to generate public service announcements. One concern I would have is with well testing you have a certified report from a well tester. But with this, if you have people self- report with what is on their digital read out on their EMF monitor that has not been verified. I would be concerned about any agency being compelled to report non verifiable data. Just a few thoughts but this might be something we could take up with the environmentally triggered disease commission. There might be a softer language to recommendation 3 and I agree with Jim that we should not say which departments would do this because it could be one of several departments.

Abrami: My concern is what data? What are people reporting? It's one thing if it's data but just feelings? I don't know we have to be careful…. feelings based on what?

Chamberlin: We will talk more about data collection in another recommendation but for this one, this is just a way for citizens to say I don't like the way the current legislation exists, Section 704 of the 1996 Telecom Act. Whenever people hear about it, they get very concerned about it because there is nothing they can do because of this legislation. How many people are concerned would be helpful to us as we move forward. If only a handful of people go on this registry and register a complaint, that tells us one thing but if we have hundreds then that tells us something quite different. It would only be so people who register could have their voices heard. Right now citizens who are concerned have no place to go. They can write letters to the FCC as I have and very likely nothing will happen. This just makes it a state initiative to identify people who are concerned so we perhaps can do something.

Roberge: Is this appropriate for an advocacy group? I don't know that it's an agencies responsibility to survey the feelings in New Hampshire. I would want to go back and talk to my leadership about this. Any data that we hold, we would have to make sure that the data is safe and valid. I just wonder if it's more something that an advocacy group would take on.

Abrami: Michelle, after you talk to your leadership, can you just drop me a note so I get a sense of where they are?

Chamberlin: So, actually the registry was an add-on to the first part which is a website that contains information about exposure to electromagnetic fields. This is informational and the add-on is to assess how many people are concerned. So what about the first part does this seem to fall within the purview of your organization?

Roberge: Before I make any comment on that, I would want to talk to my leadership. Right now, we are knee deep in Covid, as you know. I would want to talk with them and I can come back and share with this group what I learn.

Abrami: We have another six to go through and we have forty five minutes so we are going to move along.

RECOMMENDATION 4- Require every pole or other structure in the public rights-of-way that holds a 5G antenna be labeled indicating RF-Radiation being emitted above. This label should be at eye level and legible from nine feet away.

Abrami: Basically, with antenna being in the public right of way, I thought it wouldn't be a bad idea to have the poles labelled to that effect as they may be on telephone poles or light poles, etc. Current towers are usually surrounded by barbed wire fence or some structure around it at the base with a sign saying….don't climb the fence. Obviously, there are different reasons for that. That's all this is, to label the pole. Beware of the device on the top of the tower. Industry would have to label the poles. Can we open that up for discussion please?

Cooley: Just more of a comment and again, I still have to talk to my membership and my legal department. There are other entities in the public right of way that also use low level non ionizing radiation. So, I question if this is discriminatory. In the public right of way, you do have utilities, electricity lines and you also do have the cable industry deploying micro-wireless facilities also using 5G. Again, I have to talk to my members and legal and I wonder if this is a discriminatory practice should the commission endorse this in the majority report.

Abrami: So what you are saying is any device in the public rights of way emitting RF should have this sign. That way, it's not discriminatory. Is that correct?

Cooley: I don't know. I will have to speak with my attorney. I flag that as a concern. There are other entities in the right of way and this is targeting one.

Abrami: Brandon, do you have any comment on this one?

Garod: It's close. I think it's dangerous to apply if it only discriminates against one type of entity then it's definitely preempted. That's actually contrary to what the Portland case said. In the Portland case, they found that different types of restrictions can be applied to different types of infrastructure. Really, the key takeaway is if the effect of whether something discriminates against a particular company of particular type of infrastructure would have the effect of prohibiting their entry into the state to provide services, then that would be preempted. But, if it's simply requiring a certain type of infrastructure to provide a warning that is consistent with the type of radiation that is emitted by that type of infrastructure and placement of that type of infrastructure, I think there is an argument that could be made that that is permissible and wouldn't be preempted.

All of this is sort of fuzzy. I think that is in line with the court when the court prohibited the FCC from regulating too broadly a state or municipality's ability to regulate aesthetics that may be discriminatory against one particular entity but as long as there is a reason for it and it's not prohibiting their entry, I think there is an argument that can be made that it may not be preempted.

Sherman: I agree with Beth in a way. If there are multiple devices emitting RF, we should not have that warning limited to the telecom. Maybe the warning should read that there is an RF emitting device on this pole, no matter what that RF is. We know that cell towers look like. Right now, we don't know what 5G or small cells look like and we may not recognize that that emission is occurring from that pole. Rather than being specific about the industry, we should be specific about that which we are trying to protect the public from which is this level of RF exposure and that would get around Beth's concern. If it's a cable company or telecommunications company or wireless company, the point is to identify that that exposure is occurring.

Gray: The first thing you need to say is who is responsible for putting the sign up there. If it's the owner of the antenna, you need to say that. Second, your problem with this recommendation is that you go back to your preamble, nothing has been proven about the health effects so you are talking about potential health effects. Do I have to put a warning on the side of my house because it has a transmitter that transmits my water usage and electric usage to people who go by? Again, this needs to be looked at carefully because it could be a whole lot of impact if it's not done right.

Abrami: That's good, Jim. Thanks. I will take a crack at modifying this one and we will talk about it again.

RECOMMENDATION 5- Require that schools and public libraries migrate from RF wireless connections for computers, laptops, pads, and other devices, to hard wired or optical connections within a five-year period starting when funding becomes available.

Wells: This is mostly about schools and public libraries where the environment has already been fitted out with wifi. There is strong evidence that the RF associated with wifi might have greater impacts on young children. The Precautionary Principle would indicate that alternatives to RF would be preferred. Two possibilities would be to go to hardwired connections to every device or use a different frequency range and go up into the optical range where there are not likely to be any health effects to that. One of the things that the state of New Hampshire could look into is that classrooms could be fitted out with a device like Lifi which is an LED lighting fixture based optical data transmission. We need to look at how we fund this but Carol recommended one possible fund may be the FCC's E-Rate program for telecommunications and IT for schools and libraries. We figured if funding was procured then five years would be a reasonable amount of time to complete a project.

One thing that I think is an important point to note is that the optical means for data transmission is much faster than RF. So, essentially you would be saying, let's just skip RF and 5G and go into the next generation directly.

Gray: Certainly the opposition report on this one would be that if you link it to funding, and implementation, you take out the word, "require" and its better and the schools will do it because you are paying for it and its better. I don't have a major thing on this except the word "require".

Abrami: So just encourage schools and libraries to look at alternatives including Lifi.

Gray: you would want to put in there that when public funds or whatever funds are available.

Abrami: right. The reason we put about the funding in there is that schools have spent a lot of money putting this infrastructure in place and it would take a lot to reverse that course. Hardwire is an option but Ken's suggestion of Lifi and our understanding at this point, is that it wouldn't be an expensive option relatively speaking.

Wells: It appears that Lifi would be plug and play. It also involves an upgrade to a more cost efficient lighting. You might actually come out ahead on this. We would have to look into what the actual costs would be and savings but there is a possibility it would offset quite a bit of the cost with energy savings.

Gray: Just as a caution when you put something in your report that you don't have to do it until the funding is available, you are already that it's not that bad. Certainly, the cheaper that you can make it would mean that a parent of a child that is sensitive to electromagnetic radiation, could fund the conversion of one classroom or whatever. Just think hard about this one if you go forward with it. What if your data from studies proves that it's not harmful, then mandating is the wrong thing to do. In my example, the funding will dry up if the radiation is not harmful.

Wells: The E-Rate funding is not tied to harm. It's tied to telecommunications and IT in schools and libraries. But it's a good point you raise about taking federal out of the description of the funding. It is possible that you could get a charitable donation to convert school buildings. That's a good idea.

RECOMMENDATION 6-Establish new protocols for performing signal strength measurements in areas around cell tower radiators to ensure compliance with regulatory radiation thresholds and to evaluate signal characteristics known to be deleterious to human health as has been documented through peer-reviewed research efforts (e.g.,[1]). Those new protocols are to take into account the impulsive nature of high-data-rate radiation that a growing body of evidence shows to have a significantly greater negative impact on human health than does continuous radiation. The measurements should be taken in regions surrounding the tower that either are occupied or are accessible to the public. Commissioning measurements are to be performed when the site is installed and at regular intervals if required by state statute or municipal ordinance such as those required by the town of Burlington, MA [2]. Measurements should also be collected when changes are made to the tower that might affect its radiation, such as changes in software controlling it. Measurements should be performed under worst-case scenario conditions when the site is transmitting at its highest levels.

Abrami: One thing as a state that I think we need to know is…. if these antenna generating RF are even generating within FCC guidelines? This recommendation talks about what the state should be doing about this.

Chamberlin: This recommendation really has two parts. The first is to come up with new protocols for performing the measurements. The way we measure RF right now is the way we have been doing it for 50-60 years. It averages signals and does not take into account the summative effect of having multiple transmitters. One thing the FCC guidelines do not take into account at all and that is, in the last thirty years think of how many transmitters have been added to the RF spectrum. Now we are not being illuminated by a single source like a local tv station. We are being radiated by cell towers, our own cell phones, wifi and the way that measurements are taken now don't take the summative effect of those radiation sources into account. The first part of recommendation six takes that into account and prescribes a different way of performing these measurements. Also, what's being found is that it's not the continuous radiation that has the greatest effect on us but it's the transient nature and impulsive nature that has the greatest deleterious effect on health. The way this is worded, takes that into account and specifies a new way of doing measurements.

The second part says, you have to make the measurements and I could find no evidence that a cell tower ever has to be measured unless maybe there is a report of someone thinking the radiation is too great. The FCC doesn't have a commissioning for cell towers. I am familiar with this from working with the FAA. Any time you install anything, you always have a commissioning measurement to make sure it's performing according to specs. The cell industry from what I have read has basically made calculations about what power should be radiated from certain antennas and they say these calculated powers are below the FCC threshold so we are good. However, I know from experience that you can get what is called terrain or building focusing of electromagnetic waves that gives you far greater signals than you would expect from simple calculations. The second part of this says whenever you commission a facility, you have to go and make measurements under worse case scenarios and you have to do it using the new protocols.

Just basically wanting to make sure that the towers are putting out the types of power that have been calculated and that those powers are below the FCC thresholds.

Wells: Thank you, Kent. That's really excellent. I would make one suggestion though. When you talk about focusing by buildings and terrain, could you also add beam forming?

Chamberlin: You mean beam forming from the antennas? I wasn't sure how much detail I should go into but I am thinking when you set up a test protocol, you specify the beam forming will be at the location of the receiver. It's actually buried in the worst case scenario statement.

Wells: right. I was just thinking that you acknowledged that the radiation can be focused by buildings and terrain but it can also be focused deliberately.

Chamberlin: I will add that in. Thank you.

Roberge: I just had a question in terms of implementation of this recommendation. How do you envision that? Is that something that the cell phone company would do after installation? Do you envision a reviewing body of that or an independent analysis? It is unclear to me how this would be implemented.

Chamberlin: I was thinking it would be a third party or some independent measurement organization, perhaps even the FCC.

Roberge: I come at this from a regulatory standpoint. If you put a requirement out there and a measurement happens. It's fine if it all works out great but what happens if the measurement comes in and it's not consistent with what requirements are or is it a true requirement? Or is this just a recommendation? It's challenging to implement something like this if you don't have a true standard and you don't have consistent measurement protocols. What happens if it's above? Who will be the authority to make corrections or enforce? If you are thinking of this from an enforcement standpoint, for instance if this cell tower measures above, what happens then? From an implementation standpoint there can be challenges with that.

If you are thinking of implementing this as a licensing or commissioning and enforcement of it then there would be a cost associated with it establishing a protocol program whether it's on the federal level or state level. Who is the regulating body for that? Just a couple of thoughts there.

Abrami: We talked about this. We can get lost in the weeds on the detail. This isn't words or legislation. For that we would have to have a lot more detail than what you see here. We are saying we need a better protocol and the state has the right to ask for an independent person to measure at the worst case scenario that it's within FCC standards. This is not trying to change FCC limits on this. I understand asking, who do we go to if it's out of compliance. It could go to the courts. Either this is a good idea or it isn't a good idea. To me, this is a good idea. I don't have a comfort level that the industry is taking into account all the other towers and RF soup in the area that they aren't really above the federal limit.

What we are saying as a commission is, we think it's a good idea to use and independent body to measure and if it doesn't pass the test, then we as a state want to say you have to turn that tower off. Now they may come back and say, it's not our tower, it's the one down the street. These are the discussions that should be done at the federal level but it's not. We need to move forward with this recommendation and then the detail comes in if someone picks this up to write a bill where we would add more detail on some of the things you are bringing up Michelle.

Chamberlin: I can make this really brief. Cece linked in the text chat with some certification requirement from Burlington, Mass. I will read that and see if I can add some of what they have done to our recommendation and move forward with that.

Heroux: Actually, this kind of a situation has been taken into account in the past in relation to the tops of buildings where you have forests of radiating structures and this is why advanced equipment that has frequency analysis capability was created. If these locations exceed, for example thermal limits, there is a requirement that says you have to have a power intensity reduction. But it has never been taken into account for the general environment outside these facilities. Essentially, because it's assumed that outside this region there is no hope that you will ever reach thermal levels. But if you are taking into account crest measurements and peak characteristics, of course the situation can change very substantially.

RECOMMENDATION 7- Require that any 5G antennae located on a public right-of-way or new cellular phone antennae of any type, be set back 1,640 feet (500 meters) from residences, businesses, and schools within a municipality enforceable by the municipality during the permitting process unless all owners of a residence or business or a school district waives this restriction.

Abrami: We went back and forth of this one in the work group. I will let Paul explain.

Heroux: Essentially, here there is no desire to challenge the FCC on power levels. There is no desire to challenge the availability of wireless services. There is just a desire to have these towers with a setback from dwellings where people live or work.

Gray: Your 500 meters is .31 of a mile. The recommendation doesn't take into consideration anything about the transmission, what the power level is at any particular point along that .31 of a mile. I went to look up the things that were listed there and found it very difficult. It took me to Google Docs. I looked also at our webpage to find them. Again, I think if you are going to include something like this then you need to start getting into more detail. But a third of a mile would eliminate cell antennas. There are an awful lot of people you can pack into a third of a mile.

Cooley: Again with the caveat that I need to discuss this with members and legal department. I do think there is an argument that can be made that this violates section 332 of the Telecom Act. That is, you are trying to tell providers where they can and cannot site facilities which could have the effect of impeding service thus increasing the cost and providing a barrier to entry. You are saying where we can and cannot go which has been ruled as a defacto moratorium and has been ruled unlawful. Again, I need to run that up the chain but that is my initial impression.

Wells: this is a section where we need to make a distinction. It is referred to as 5G and we need to have an RF definition. The thing that is unique about 5G is not the frequency or the power levels but the proximity to people. This recommendation talks about a setback which is dealing with the unique quality of 5G. It's very close to people. There are some other applications and implementations like smart meters that might also fall into this. We need to come up with a definition of what sort of transmissions we are talking about because to call it 5G is to give it a trade name rather than a physical definition.

RECOMMENDATION 8- Require power intensity disclosures for renters and buyers and for public buildings (locations where the general public may go)

Wells: This recommendation requires power density disclosure for renters and buyers and also public buildings. The idea here is that some agency of the state would also be a recipient of those readings so the public has some idea of what they are exposed to. I understand that the objection has been made many times that there is no safe threshold that has been specified. But we know that just as kitchen appliances have an energy usage scale on them showing where they fall on the range of low energy and high energy use, the same sort of scale could be understood by buyers and renters that perhaps less intense energy is more desirable than more intense energy. They can figure out where they stand in that continuum.

One other part that is important on this, in order to make this practical, the instruments used need to be affordable and available. We have identified one particular example, the GQ 390 meter and the price is under $200. Some agency of the state could loan them or real estate agents may find it's more convenient to own their own.

On the state owned ones, it would be easy to get the manufacturer to verify they are all benchmarked and consistent in their sensitivity.

Abrami: the more thought I give to this one, there are really two pieces to this, the buyers and the sellers and then any public place. I think any public place would be really unwieldy. But the buyers and sellers, it's akin to getting a water test and a radon test. That's, basically what we are talking about.

Sherman: I have a concern. I see this running smack into the realtors. You and I have worked with them in the past and I am just thinking of a pre-recommendation compromise and one thought would be rather than requiring of a measurement and Michelle would probably tell us would require funding to have this program. In other cases, haven't we required full disclosure if you have knowledge of issues on the property. The seller would be required to disclose radon levels, lead paint, all of these other things. Couldn't we say the owner would need to disclose potential RF exposure or known RF when you sell a property?

Rather than putting in a whole new infrastructure, I think this is going to run into pushback at the fiscal level and at the regulatory level. But a lesser would be to require any known exposure to RF or RF levels.

Gray: This one is so broad reaching. What happens when I change one of my routers? Do I have to go retake the measurement and redo the posting? Again, we don't know what the safe level is. One of the things that could be done if we did know what the safe level is would be to set a limit up to this. And I know Dr. Chamberlin says it's the way we do beam forming and all that. This would be very difficult to do.

Abrami: the real estate folks have already weighed in by the way. You can imagine which direction they weighed in on.

Roberge: I was going to add in. Senator Sherman touched upon it. Depending upon how you envision this being implemented, there could be costs associated if this gets delegated to an agency to implement.

Chamberlin: we would definitely have to specify the conditions under which the measurements would be taken. I would say that when you are going to take these measurements for real estate purposes, you would turn off all internal sources so everyone would be on the same level playing field.

Abrami: Ken, you mentioned the Bio-initiative 2012 report, the 1,000 microwatts per meter squared.

Wells: There is a recommended maximum level by the Bio-initiative 2012 report of 1,000 microwatts per meter squared. This is a pretty high level. This is a peak exposure. These meters could measure peak and averages over 24 hours and could measure frequency. There is quite a bit of information that would be available and I think it would be valuable for the agency that collects this. It would allow them the basis for building a map of RF around NH and give them data for pursuing future public health investigations about say cancer clusters in relation to transmission or cancer clusters that are not related to transmission but perhaps some other environmental sources.

Abrami: This, ties back to Kent's proposal about a database but this would be real data. There could be hotspots in a neighborhood or a town. All we are saying is, maybe before you buy a house, you want to know about it. We went through this with radon and lead paint. The more we see radiation flying every

which way, I think this is prudent. It doesn't have anything to do with the industry or the federal government. It's just informing the buyer or the renter that you might be in a pretty hot zone.

Heroux: Actually, Senator Gray is right. If you install another antenna, the levels will change. Essentially, this is what you are trying to determine by a number of these measurements to see what the evolution in a particular place or state how radiation is evolving. These measurements are fundamentally fairly easy to perform if they are performed by an instrument. They are probably preformatted so compiling them could be relatively simple.

Woods: Going back to the fact that we could sort of massage this. The concept is very good and this is a recommendation that says to the public besides the legislators in this report that this is an area that we need to consider. Now, the details are going to be a morass to say the least. But I think as you pointed out earlier Pat, these are areas that we see as a commission that need attention. As Tom said, the realtors are going to have some input but I think that's for another day. To the Legislature and to the public, we are saying we feel this is an important issue.

Ricciardi: I just wanted to say that maybe an RF map would be good for people who are already microwave sick. That way they would know where the transmitters are the highest and could avoid them.

Wells: I think that's a great idea. I just wanted to point out that Cece Doucette put something in the chat that there is already an RF meter loan program in Ashland, MA through the public library. This would not be hard to do. They are not terribly expensive.

Gray: It appears what you really ought to do after listening to Dr. Chamberlin, is split it into two. If you are transferring real estate then taking measurements with wifi turned off etc. may be appropriate.

But if we are talking about posting for the public, then it's radiation when I walk into that building which would include all the sources inside the building. It is unclear what you are really trying to do with this. Are you trying to mix these two concepts together? You've got to remember that exposure for most people would be a long term thing that would affect them and not a short term thing.

Abrami: I agree. I think I said this earlier. Comingling the purchase of property vs posting measurements in public areas in the same recommendation is a tough one. If anything, we could split them out and vote separately.

Wells: How about if I take the public building part of it and make that a separate part or possibility for future consideration?

Abrami: that would probably be better.

RECOMMENDATION 9- Require all new cell phones sold in New Hampshire come equipped with a sensor that will stop the phone from radiating when positioned against the body.

Heroux: This speaks to the fact that there is an opportunity in cell phones themselves, to mute the radio emissions when the phone is held against the body. There are various ways of implementing this. Initially, I presented it as the fact that the phone should be hardwired to do this. There are many other ways to do this. The weakest way is to say we require that you can download an application that will make your phone behave that way. The most sensible one might be to have a toggle on the phone or a menu item that allows the phone to function in this manner. If you choose not to have your brain radiated, you can choose that function on the phone itself. Between these extremes of you having it hardwired or you having to do a lot of things to eliminate the radiation. Or there is another possibility the phone could come with the toggle switch installed and you could disable it if you wish. That means you choose and you agree that you believe that this risk is not substantial so you prefer to use the phone against your head rather than avoid the risk.

Abrami: I think it has to be individual preference. We want to give those who are concerned about it a chance to have something that will help them.

Wells: this is the first that I have heard of that last suggestion and I think that is a good one that the phone is delivered to the customer with the safety option on and the user has the option of disabling the safety function.

Sherman: One other option in this would be I believe this is true that they have this capacity but have opted not to install it on phones, the idea of instrinsic shielding that would protect the customer from radiation. There was a move about fifteen years ago to develop sleeves that you could put over your phone to shield against the RF that was emitted toward your head. I like the toggle idea. I would not go for the requirement that all phones shut down if you put them by your head. The toggle and personal choice is a great option. Or the other part you could put in there would be the intrinsic shielding.

Gray: Are we creating a scenario where phones are not going to be sold in NH anymore?

Abrami: this is simply a recommendation to the cell phone manufacturers to consider.

Gray: We are not as big as the state of California who has driven emission regulations by state regulation. I don't know that the cell phone industry is going to modify what is available to customers because of the state of New Hampshire.

Abrami: the cellphone industry knows that holding the phone against your head may not be the best thing because it's in their legal section. There must be a reason why they are saying that. So, if you believe that then why don't you install an option where a user could turn it off. That's all we are doing as a commission is recognizing this issue and making a recommendation. It's got to start somewhere. It's my understanding that other states are following us on these proceedings. If we take that first step, other states may also weigh in on it.

Ricciardi: I just want to add to that is that our job is to protect the residents of New Hampshire. That's what we are doing with these recommendations. Again, they are recommendations, not law. We have to do that. With all due respect to everyone, here all opinions are appreciated but as we know, the majority will write one report and those who are in disagreement are entitled to write their own. I would caution on making too many changes to the one we did if the majority agrees with it. Since the other report will be written anyway. Thank you.

Gray: The point that I was trying to make in a lot of this thing is that if we go right back to the first paragraph and we say these things aren't proven. So to make recommendations that may impact the cell phone may cost more in NH. There are reasons why we should be cautious in the recommendations that we make.

Heroux : I take Senator Gray's point that New Hampshire is not as large as California and in some instances may not have the same influence. But I have to say, I am a fan of New Hampshire and maybe you are as big as you feel.

Wells: I just want to remind everyone about New Hampshire's role in MTBE. We are not without influence.

Abrami: Let's do number ten. Eleven is still under consideration and twelve we can talk about next time.

RECOMMENDATION 10- Propose legislation that would facilitate the implementation of fiber optic cable connectivity deployment and internal wired connections to serve all commercial and residential properties statewide.

Abrami: it's just basically a statement that the state should promote fiber optic cable. Carol had to leave. I am going to let her weigh on this next time. Members of the work group, I want to work on their recommendations based on this input. Jim has some good comments in his as well as the others and should take those into consideration. We are running out of time. Unfortunately, we lost almost four months. I couldn't even get zoom time from the House. Good thing Kent has been gracious enough to let us use the University of New Hampshire's zoom account.

I think we need to have more than a meeting a month.

Sherman: We are having trouble on the Senate side with all the zoom meetings we need to have. So if we could have all the materials we need for the next meeting well in advance and preferably have a longer meeting rather than three shorter meetings and just get the work finished as best as we can.

Abrami: I'd like to do it in three weeks. How about Tues the 22nd at 9? We will make it a 2.5 hour meeting. Kent will set that up. Thank you everybody. We will make our way through this.

V. Next meeting via Zoom: Sept 22nd 9-11:30

Meeting Adjourned at 11: 15 am

Text chat during Zoom meeting:

00:51:58 Paul Heroux, PhD: Identify Health Impacts of Environmental Factors: Barack Obama and Joe Biden believe it is critical to understand the relationship between environmental factors and risk or onset of disease, particularly cancer.
They support the efforts of Senators Clinton and Hatch to expand CDC biomonitoring programs, and as president, Obama will expand the collaboration between the CDC and state public health agencies across the country to increase understanding and improve treatment of individuals negatively affected by environmental factors.

01:19:35 Cece Doucette: For Recommendation 2: Might NH consider taking a leadership role with peers in all other states, share the Commission's final report, and encourage them to make a similar request to their federal delegations? This approach might help to get meaningful action to protect the public sooner rather than later since the 4G/5G small cells are going up in real time, and children are being given wireless devices to access their education with no safety instructions.

01:29:43 Cece Doucette: Thank you, Dr. Sherman. It would be helpful to the public to label every RF-emitting device, including utility smart meters and the collection devices mounted on poles outside of residents' homes.

01:36:19 Cece Doucette: For Recommendation 5: Please vet all new technology through non-industry funded scientific investigation before exposing our collective children. LEDs and Li-Fi may have risks, but hard-wired technology to the premises with Ethernet cables and adapters is proven safe.

01:43:13 Cece Doucette: For Recommendation 6: Please see Burlington, MA Small Cell Policy, which requires an annual recertification by an independent expert, and the wireless vendor pays the town to complete the annual recertification.
http://www.burlington.org/town_government/small_cell_information.php

01:48:36 carol.a.miller: I apologize but I have a hard stop at 11am this morning. I will just disconnect when that happens.

01:48:53 Beth Cooley: Same here

01:56:29 Cece Doucette: For Recommendation 8: We have modeled an RF meter lending program at Ashland Public Library, MA. Others are emulating this too. It was based on kill-o-watt meters put on loan in our libraries by the energy industry.

02:04:35 carol.a.miller: Again I apologize that I must leave the meeting now.

02:06:10 Cece Doucette: Thank you, Ken.

02:09:00 Brandon.H.Garod: I apologize put I have to leave for another meeting.

02:09:26 Cece Doucette: Please consider adding a new recommendation to educate the public. I drafted a fact sheet with the MA Department of Public Health, and have built a non-profit with quick on-line courses that the public could take today and have the right to choose how they wish to use the devices within their control. Please see https://www.wirelesseducation.org/store/l2/ and https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnx1bmRlcnN0YW5kaW5nZW1mc3xneDo2OWYxMmNhY2ViNDcwMmQx

02:15:05 Cece Doucette: For Recommendation 9: Shielding can be helpful, but unless the shield absorbs the radiation, it will deflect it back into the hand, other body parts, and other people/children in the vicinity. We have seen hand cancers from cell phones too. See attorney Jimmy Gonzalez testimony in Florida: https://www.youtube.com/watch?v=XitM4Ikpvgo

02:17:31 Marty Feffer: Unfortunately, only humans will be able to make the choice to limit their exposure to cell phone radiation with the ideas you are discussing. The natural world who are also being irradiated, and have been, are suffering just as much, if not more, from exposure. Our responsibilities run deep and wide if we honestly look at the complete picture.

02:21:09 denise ricciardi: to sign off

02:22:51 Paul Bloede: My apologies for asking if I was being spoken to, earlier; I hadn't studied my notes from last time, closely enough, apparently, to realize there is a Paul who is truly a member of the commission: Dr. Paul Heroux. Again, my apologies.

02:23:51 Marty Feffer: Thank you for your work. Inspiring to other states.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
9/22/20
9:00-11:30 am EST
Via Zoom (https://unh.zoom.us/j/95115866784)
Via telephone-US (1 301 715 8592 (US Toll) ID: 951 1586 6784)

In attendance: (13)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Senator Tom Sherman-president of the senate appointee
Brandon Garod-AG designee, Asst. AG Consumer Protection
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Carol Miller-NH Business & Economic Affairs Dept * *(joined meeting in progress)*
David Juvet-Business and Industry Association

Not present: (0)

Meeting called to order by Rep Abrami at 9:03 am

Abrami: Due to the Covid 19 virus and the Executive order signed by the Governor this public meeting is allowed to be conducted via Zoom. It is open to the public for viewing and was duly posted as a Zoom meeting. With that said, if you are not a member of the Commission, can you please turn your cameras off and mute yourselves? That would be much appreciated. In addition the meeting is being recorded as an aid to doing the minutes. All chat room discussions will be included in the minutes.

Since we are going to be taking some votes today, I am going to have to do a roll call. That is also a requirement. The votes today will be in the order going to my left as we were seated in Concord for our meetings. Please say where you are and if anyone else is in the room.

Tom Sherman- I am here alone, Rye NH
Ken Wells- I am in East Andover with my dog.
Kent Chamberlin- I am in Durham, NH and I am alone.
Carol Miller- absent for roll call. (*Joined meeting while in progress later*)
Denise Ricciardi- I am in Bedford and I am alone.
David Juvet- I am at the BIA office in Concord. Others in the building but I am alone in my office.
Beth Cooley- I am in Sarasota,FL and I am alone with the exception of my dog.
Brandon Garod- I am at the AG's office, Concord. Others are in the building but I am alone in my office.

Michelle Roberge- I am alone in my office at DHHS, Hazen Dr. Concord.
Paul Heroux- I am in Montreal and am home alone in my office.
Gary Woods- I am in Bow, NH and am in my study at home alone.
Jim Gray- I am alone here in Rochester alone in the kitchen having breakfast.
Pat Abrami- The Chair is here in Stratham, NH and I am home alone.

Ok. Thank you. So we have 12/13 present at the moment.

I. Approval of minutes from 8-31-20:

I have not received any changes to the minutes. Are there any changes that anyone wants to make? Seeing none, I will say …without objection, we approve the minutes from that meeting.

II: What remains for the Commission:

Abrami: I spoke to the Speaker this week to see if there was any wiggle room with the November 1st date. He said it would be very difficult to change. So, my intuition is we strive to get to the November 1st date to get the report done. Just keep that in the back of your mind. We have had a work group of seven working on recommendations and we are going to vote up and down on those.

There will be a Minority Report. My goal is to give those involved with the Minority Report proper time to react to the Majority Report in their report. My goal is to have the total report done by the middle of October, if we can. We have a lot of pieces of it. Joel Anderson, staff member appointed to the Commission will be helping put those pieces together.

So, that's where we are at. My goal is to have one or two more meetings. The Majority work group will have to meet to put finishing touches on the report and get it to Jim and whoever wants to work with Jim on the Minority report to give them a week or two. I am thinking the full Commission needs to meet the third week in October just in case we need another week to do some adjusting.

III: Minority Report and Agency Disclaimer:

I sent out to everybody some sample reports of Minority reports. In this case, I think what we will do is make the Minority report part of the report and it will be the last section where the Minority can say what it's going to say. It will have a header that it's the Minority report. So it will be one report that will include both.

As far as the agency disclaimer, Joel dug out my old marijuana Commission report. At the end, the agencies had trouble saying they agree or disagree. Brandon, Carol and Michelle are the three that work for the state. This is what I think it's going to sound like: Members of the Commission of the study of the environmental and health effects of evolving 5G technology agree to the filing of the report by the chairman. This action should not be construed in any way as an adoption of any particular position of a commission member or the state agency or organization they represent on the underlying issue of the deployment of 5G technology. It's as simple as that. I think this may make the members who feel

uncomfortable more comfortable with their position on the report. Brandon and Michelle, any reaction to what I just read?

Garod: I think at first glance, that language probably will work for DOJ but I would like the opportunity to run it by the Attorney General to make sure that he is comfortable with it.

Roberge: I agree, same thing. I would like to run it by our folks here.

Abrami: I will retype it and send it so you have a hard copy to share with them.

I am going to move this along. We had a meeting and talked about most of these recommendations and a few new ones did come up. It would take a lot to change a recommendation. If someone says, if you change it this way or that way and I can vote for it, understand that the work group pretty much agreed to the language here. Obviously, grammatical things will be accepted and if you have a real issue with a particular recommendation, my sense is you would probably be in the minority report. I apologize in advance, but I am going to move this fast. I just want to make sure we get this all in today so we can move on to finalizing the report.

IV. Work Group Recommendations and Vote:

The rule is, we need to have a roll call vote on each of these per Joel and the folks that know about these things. We are going to talk quickly about each of these and take a vote. When you vote, you will vote … yes, no or abstain. The majority of those who vote yes or no will make it into the majority report. That's what the ground rule is. Is there any objection to that ground rule? I don't see any. Thank you.

If you read the intro to it, what the work group concluded is that (in my words) the science is conflicting in some regards but there is enough science out there that's showing more study needs to be done on this topic. Given that we tried to reach out to federal agencies and they didn't really answer our questions and all the other things I mention in this intro, the conclusion of the majority is that we have to use the Precautionary Principle here. You will find that we have softened some of the recommendations from the last meeting. I am assuming that there may be enough that these are the majority position but it may not be. It may be the minority. I kept the numbering the way it was so we didn't confuse anyone even though we will be taking #2 off the table. After we are done voting, we will reorder these for the report in a logical way.

Juvet: Mr. Chair, could I ask a process question before we start on each of the recommendations?

Abrami: Absolutely, Dave.

Juvet: As a part of voting, are you looking for just an up or down vote? Or can we, as members of the commission explain why we are voting the way we are for the permanent record? I don't want to make this process any longer than it needs to be. I just need some clarification.

Abrami: You can do that during the discussion.

Sherman: I know we are going on the recommendations, but before we do, in the version I have which says 5G commission recommendations at the top of it. I think it's the Sept 17th version. Is that the latest?

Abrami: yes.

Sherman: There is a sentence that to me does not make sense. Would this be an appropriate time for me to point that out?

Abrami: Yes. Please.

Sherman: It's in the introduction, midway through. You will see the words, "the effect of the soup". Then it says, "today, which will only be growing in the world of if the roll out continues is not known" That phrase grammatically does not make sense to me. I don't know what the intent of that phrase was.

Abrami: if anything, the amount of RF will be expanding over time.

Gray: I took it as "the soup" is going to be growing, the amount of RF. That's what I took from it.

Sherman: But if I could just wordsmith that just to keep it simple.

Abrami: Yes. Absolutely.

Sherman: The effect of the soup of RF waves surrounding us today, which is likely to increase over time. Perhaps, you could do something like that, because it was unclear.

Cooley: We will be providing comments to Senator Gray's Minority Report (CTIA). Second, I would just like to publicly object to the entire introduction, most notably the first sentence. The Commission has indeed not heard from many experts on both sides of the issue. As you recall, the Commission heard from one pro-5G Physicist on November 20, 2019 who ran out of time. I do understand that the pandemic did lose us many months. However, upon learning of new research during the summer regarding the safety of 5G, I offered to reach out to the authors of that study and I was told in no uncertain terms that there were to be no more experts. However, funny enough, I then hear of a so called expert presenting before the working group at their Sept 11th meeting. We would just like as an industry and CTIA to highlight that this biased approach and preordained outcome of the Commission has not gone unnoticed, and we will be making these facts very clear to the General Court. Thank you, Mr. Chair for the opportunity to speak.

Abrami: right and how many times did I say to you even before the virus, give me your best shot and any time you want another speaker, let me know. It isn't like I didn't do that. We lost about four months with the virus. The group argued that we really didn't have much time to hear additional testimony. Yes, Paul suggested we hear from this lawyer, who wasn't a technical guy to possibly help us with some of the language.

Ricciardi: I just want to address something since Beth has brought up the word "biased". I think you represent the CTIA and having been in a lawsuit in Berkley, not wanting to have the fact that the information about the proximity of the phone to the body that is hidden inside the information for the

phone, not brought out, which was the lawsuit. That could be considered biased too, seeing that you are on the Commission. Thank you.

Abrami: I understand. I had many emails about this, Beth. I batted them away. There were people out there who wanted you off the Commission and I said absolutely not.

Cooley: Yes. I heard both the allegations and personal attacks against myself, CTIA and the industry. Again, the facts will be made clear to the general court.

Abrami: That's fine.

Gray: This is Senator Gray. We need not to be defensive about comments that are made today and try to rebut them. We just need to accept them as a comment and move on or we are not going to finish anywhere near eleven.

Abrami: I agree, Senator. Again, that's what the Minority Report is for.

RECOMMENDATION 1- Propose a resolution of the House to the US Congress and Executive Branch to require the Federal Communication Commission (FCC) to commission a review of the current radiofrequency (RF) standards of the electromagnetic radiation in the 300MHz to 300GHz microwave spectrum as well as a health study to assess and recommend mitigation for the health risks associated with the use of cellular communications and data transmittal.

The Telecommunications Act (TTA) of 1996 was adopted before the health risks and biological effects of RF-radiation to the human body were fully known to the scientific community as well as the public. The Commission believes that the FCC has not exercised due diligence in its mission to manage the electromagnetic environment, failing to support technical means and investigations aimed at reducing human exposures to electromagnetic radiation (EMR) in telecommunications systems, and optimize wireless modulations to reduce biological and health impacts. Commissioned research should study the health effects and should be conducted by an independent research organization with standards which have been mutually agreed to by all the stakeholders. The FCC shall then ensure that the findings and recommendations are adequately disseminated to the public.

Abrami: First we had #1 as a joint resolution and I agree with Senator Gray, that the Senate does not like joint resolutions and they would never do one. So, we put a resolution of the House. Basically, what #1 says is more health studies are needed. We broadened the range to include anything in that range, not just 5G. Discussion?

Chamberlin: This is just wordsmithing. The section that says, "investigations aimed at reducing human exposures to EMR". Well, we are not really trying to reduce radiation, necessarily. The wording that I suggest is: "we want to set exposure limits that protect against negative health impacts". I would suggest making that change.

Sherman: I have a change as well. It reads, "require the Federal Communication Commission (FCC) to commission a review of the current radiofrequency (RF) standards**"**. I would say, "an independent

review". It's already been determined that the bulk of the FCC is comprised of Commissioners who have spent a significant component of their career in the telecommunications business. So, for them to have an in-house review of this, is like having the fox watch the hen house. That's true of any federal agency. They would typically do an independent review.

Heroux: Is it necessary to point to the FCC? We know historically what the FCC does and they just performed a review that they will just repeat. So, why not say the federal government?

Ricciardi: I agree with Paul. Also, the industry says that the biological effects are not health effects. We know that it is so I think the wording has to be in there that you have to have clarification about the impacts of biological effects.

Abrami: It's interesting that most of these changes are coming from the work group. So we are saying the federal government.

Ricciardi: and add protect against the biological adverse effects.

Heroux: Yes. This is what I was suggesting.

Sherman: She is referring to the non bolded section. I would leave it because it's more inclusive the way it is. It's in there twice already.

Sherman: Mine was independent review and Paul's was federal government. I kind of like leaving the FCC.

Abrami: I didn't have a problem with the FCC either.

Woods: I would leave it as the FCC and I think the important part would be to have fabricated that it's independent.

Sherman: Why don't we go ahead and vote on this one?

Abrami: So, keeping the FCC, adding independent review and changing to exposure limits to protect against health impacts, any other discussion?

Juvet: Mr. Chair, before you call the roll I just want to let the Commission members know that I am going to be voting against this recommendation. It states in the non bolded area that the commission believes that the FCC has not exercised due diligence in its mission and my organization just doesn't believe that is true. So, I will be voting against this recommendation.

Abrami: Ok. Thank you, Dave.

Gray: What I would put into the Minority Report on this one is that we don't have a problem with further research. You could even fund the research from the federal government. The way you conduct that research though and some of the other in here is what we would object to. In principle, the research I am good with but the rest of it…no.

Abrami: Thank you Jim.

Heroux: Just to be clear, I would vote for this recommendation whether it's FCC or federal government. It's just with the federal government somebody would have to make the decision to ask the FCC, which will be a further decision. But, both carry the same idea.

Abrami: Ok. Thanks, Paul. Ok. Here we go. I will call the roll: Tom Sherman (yes), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (absent), Denise Ricciardi (yes), Dave Juvet (no), Beth Cooley (abstain), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no), Patrick Abami-Chair (yes). There are 7 (yes); 2(no); 3 (abstain) and 1 absent. The motion passes.

RECOMMENDATION 2- Establish a State position that protects the State and all its Municipalities from any liability from harm caused by small cell antennae placed on the public rights-of-way. Specifically, liability of the State of New Hampshire and its municipalities connected to harm caused by claims of personal damage or harm from the deployment of 5G small cell towers or the attachment of 5G antennae on telephone poles, electric poles, lamp poles, or other structures on the public right-of-way is by state statute transferred to the Federal Government. The Federal Government shall be required to defend and indemnify the municipality from any liabilities arising from permits and the installation, operation, and maintenance of small cell installations. Since the State of New Hampshire and its municipalities are being forced by Federal Law to deploy 5G small cell towers and antennae on public rights-of-way, the Commission has concluded that that the State and its municipalities should be held harmless from any litigation claiming harm for any reason, including damage to health. The Committee feels that this recommendation should not be of any burden to the Federal Government or to the cellular industry and related industries who support the cellular industry, since they believe that 5G technology is safe and thus there will be no harm caused by having these antennae so closely deployed to the public on the public right-of-way. **DEMOTED TO SOMETHING THE COMMISSION DISCUSSED**

Abrami: The workgroup has decided to take this off the table. We kept it here for numbering purposes. It will be demoted to a topic of discussion in the report saying the commission discussed this issue. The position of the workgroup was to not include this recommendation. So are we ok just skipping this? If you want to say something, raise your hand or just speak out. It's quicker. There is no one monitoring this other than myself. Ok.

RECOMMENDATION 3- Require that the most appropriate agency (agencies) of the State of New Hampshire include links on its (there) website(s) that contain information and warnings about RF-Radiation from all sources, but specifically from 5G small cells deployed on public rights-of-way as well as showing the proper use of cell phones to minimize exposure to RF-Radiation. In addition, public service announcements on radio, television print media, and internet should periodically appear, warning of the health risks associated with radiation exposure. Of significant importance are warnings concerning the newborn and young as well as pregnant women. Even without further study, there is compelling evidence that the public should be warned of the potential dangers of RF-radiation and be told simple steps to lessen the risks of unnecessary exposure. Attachment XX shows an example of a simple cell phone warning.

The website must provide an option for visitors to register their concerns about current FCC exposure guidelines. In particular, this registry should provide a convenient and formal mechanism for New Hampshire municipalities and residents to weigh in concerning the contentious 1996 Telecommunications Act Section 704 that disallows using radiation-related health concerns as a reason to challenge cell phone tower siting. The primary use for the data collected on this registry will be to gauge the level of concern about RF-radiation exposure there is on the part of New Hampshire citizens.

Abrami: This has to do with public information related to RF radiation in general and public service announcements and postings of certain warnings. Kent, I think you and Carol worked on this.

Chamberlin: This is part of informing people about potential problems associated with exposure to fields. Now a lot of people do not realize that there are any negative effects. This would be an opportunity to provide warnings both on the signs and on the webpage indicating what those potential hazards are. The other aspect of this is to allow people to provide an opportunity for New Hampshire citizens to register their concerns about the current legislation, for example the Telecommunications Act of 1996. It would be just a way for them to air their concerns. The data would be used to inform us or the state about what the level of concern is. As I mentioned the last time, if only a handful of people are concerned, then perhaps it's not that big of an issue. But my own experience having people call me at the University to have me come out and make measurements and ask what they can do about cell tower exposure. I haven't been able to send them any place where they got satisfaction. This would be an opportunity to provide a registry for people to log concerns about exposure to RF fields.

Abrami: Kent, I think a lot of what you are saying relates to another recommendation. This was really Carol's. This was more about public service announcements and things on the website.

Chamberlin: I am sorry. I did mention that but my apologies that does relate to another one.

Sherman: there is a typo in the second line: "their" is what it should be.

Juvet: I just have a question about the first sentence in the bold where we are suggesting that the most appropriate agency or agencies of the state include links. As a commission that's been studying this, are we unable to name which agencies we think should be responsible for this?

Abrami: Originally, we had DHHS but we decided that it could be more than one. It could be others like environmental. So, we just kept it broad.

Heroux: In the version I have, the last paragraph, it does mention that the website must provide an option for visitors, as Kent had indicated. Does this mean that this paragraph has been transferred elsewhere? It means that there are links for people and perhaps by filling out a form.

Sherman: He is saying it reads that the website must provide an option for visitors to register their concerns about current FCC exposure guidelines.

Chamberlin: The intent was not to go to the FCC but would be a registry for the state of New Hampshire.

Heroux: What Kent is saying is that there is no way for any citizen who is concerned to voice that concern and their situation and it is not wise for New Hampshire to be totally deaf to such a situation. It could be fairly simple. There might be a standard form that can be uploaded and simply kept on file until for some reason it is decided that this needs to be analyzed.

Juvet: Mr. Chair, can I make a comment on this point? Two things: If we are only allowing a vehicle to only register concerns, you will get a very one sided point of view and I am wondering if that could be changed to say register their opinions.

Abrami: I think you are correct.

Juvet: the second thing is more of a procedural thing. I am unclear if this is established, what happens then? I am not quite clear on how this information will be used.

Abrami: The data could be accumulated and then interested parties would have a place to go to look for opinions of the public.

Juvet: One final comment about midway through that paragraph, you are labelling the 1996 Telecommunications Act as "contentious". I think that is a little pejorative also and I would remove the word "contentious".

Sherman: I would go one step further and take out that middle sentence because it is judgmental.

Abrami: you are suggesting that we take out the section that says: this registry should provide a convenient and formal mechanism for the New Hampshire municipalities and residents to weigh in concerning the contentious 1996 Telecommunication s Act.

Sherman: I would get rid of the word "contentious" no matter what. I agree with Dave. I would change it as a way of people logging opinions rather than telling people what they should be discussing.

Abrami: Most of the public has no idea what the 1996 Telecommunications Act is. Municipalities would because they are doing these sitings all the time.

Sherman: I would just get rid of" contentiou".

Gray: The first objection I have is the word "compelling" in the first non-bold sentence. If we look back to the preamble, we say the science isn't all in and throughout this report I don't believe we should set up a new division in the state anywhere that summarizes all this stuff and has action etc. But, we will put all that into the Minority Report.

Sherman: I agree with Jim. We are saying we are going with the Precautionary Principle because we don't know. So, saying "compelling" says we know. There is evidence that the public should be warned. There is evidence but there is some editorial comment in this report that is stronger than what I am comfortable with. Get rid of the word "compelling" and "contentious". I think it sounds a little less judgmental and a little more acceptable to your audience.

Juvet: Mr. Chairman, along those lines, in the very last sentence of the non bolded section says “the primary use of this data collected on this registry will be to gauge the level of concern. I would be more comfortable with “opinion” in place of “concern”.

Abrami: I am ok with that as well. Are there any other changes?

Roberge: I request some qualifying language around “appropriate funding” if this was to go to a state agency and the agency was required to do PSAs or whatever. There might be a funding issue that may come up.

Sherman: Michelle, you make me smile.

Abrami: … this cannot occur unless the legislature provides proper funding. Is that ok?

Sherman: you could say that the legislature fund the most appropriate agency in the state of New Hampshire. The first step as Michelle is saying and those of us in the legislature know the first step is you need the funding. You could put “supported by funding granted by the legislature”.

Gray: When this goes to the legislature for adoption, it will get reviewed and if there is funding required, it will be part of it. So, I don’t even think you need to talk to the funding specifically. Thank you.

Wells: Back on the last item where we talked about the level of “opinion”. I think it would be more appropriate to say level of “interest” about RF radiation exposure on the part of the public.

Juvet: I don’t have a problem with that. I agree.

Abrami: I think I got all the correct changes. We have the funding piece. We have the correction on the “there” to “their”. We got rid of “compelling”. We got rid of “contentious”. We replaced “concerns” with “interest”.

Juvet: Mr. Chair I am going to be voting against this recommendation and the reason why is related to the budget and potential fiscal issues. I am not ready to commit the BIA to supporting that before we have a chance to review the context of the entire budget.

Abrami: Remember, with any of these recommendations, it would take someone to put some of these in bill form to propose to the legislature and make it through a difficult legislative process.

Juvet: I appreciate that but if I vote for this, it could be construed that the BIA is in favor of that as a part of the overall budget. I’m not there yet.

Sherman: Could I just ask Dave a question? You do have the option of abstaining. If you are voting against it, my interpretation is that you are opposed to this moving forward as a recommendation….that the recommendation is something that the BIA could not agree to.

Juvet: Thank you, Senator. I agree with you. So, I will be planning to abstain on this one.

Cooley: I will be opposing this because of the implied risk of wireless radiation.

Abrami: Any other discussion? I will make a motion that we accept this.

Sherman: I will second.

Abrami: I will call the roll: Tom Sherman (yes), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (absent), Denise Ricciardi (yes), Dave Juvet (abstain), Beth Cooley (no), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no), Patrick Abami-Chair (yes). There are 7 (yes); 2(no); 3 (abstain) and 1 absent. The motion passes.

RECOMMENDATION 4- Require every pole or other structure in the public rights-of-way that holds a 5G antenna be labeled indicating RF-Radiation being emitted above. This label should be at eye level and legible from nine feet away. In the view of the Commission, the State of New Hampshire has the right to warn the public of potential harm of 5G antennae deployed in the public rights-of-way. Large cell towers all currently have fencing around them at their base to protect the public. This will not be the case with small cell towers or any pole with an antenna on top in the public-right-of-way. These public rights-of-way are the jurisdiction of our municipalities and not of the Federal Government. The Telecommunication Act of 1996 did not contemplate antennae being placed on the public rights-of way of municipalities. Thus, the State of New Hampshire has the right to warn the public harm by requiring the owners of these antennae to inform the public of potential from RF-radiation harm. See Appendix XX for an example symbol.

Abrami: We talked about his last time. The game changing with 5G, not all cell companies are rolling out small cells in the right of way but some may be. For many, that's a game changer. All this is saying is that if that is the case, there should be some sort of labelling that there is an antenna on top emitting RF radiation. Beth, I know you had some concerns about this as there is RF related to power lines and all that. The subgroup decided to keep this recommendation.

Juvet: Mr. Chair, I'm going to be voting against this recommendation. I think it sends a conflicting message. I think it potentially makes NH different than every other state in terms of 5G rollout. I think if this is an issue then it's something that should happen at the federal level as part of federal legislation so the requirement is the same for all states. I can't support this recommendation.

Ricciardi: I just have a question. Is there any rule for participation in these groups? When someone misses a lot of the meetings, I don't think they have all the information they need to make an informed decision. It's just a question, Mr. Chair.

Abrami: Let's go way back. Dave and I chatted early on and certain days of meetings Dave could not attend because of a conflict with his board meetings with the BIA. Plus we were into the science and I know Dave was pretty eye rolling. So after the virus hit and we finally came back, I just assumed that Dave didn't really want to participate. That was a false assumption on my part. Dave reached out to me and said he is officially appointed to this commission. I cannot take him off this commission. None of us can other than the person who appointed him. So, he is still a formal member of this commission and yes he missed a lot of the meetings. The minutes are out there on our site. I don't want to make a big deal about this.

Sherman: Denise, I just want to point out the minutes and presentations are on the site. If you miss commission hearings, you do have the ability to catch up. And I am assuming that anyone who is participating in voting is up to date. That's what we do in commissions as we have that capacity. I am on more than 20 commissions and committees right now. There is no way I can make every single hearing. I agree with the Chair. We should move on and assume that Dave has done his due diligence and has every right to vote as an appointed member.

Ricciardi: It was just a question. I wanted clarification. Thank you Senator.

Abrami: Just for the record, our minutes are basically almost verbatim of what's being said. They are very extensive minutes. I move to call recommendation four for a vote. Tom?

Sherman: on the discussion side, I just have to say I have a concern about this one. First of all the labelling, I agree with the industry that there are many sources of RF and I think the public should be warned but I'm not completely comfortable with this one. I am going to hold off on seconding it and give myself a few more minutes to think about it before we vote.

Woods: I will second it.

Gray: my problem with this one is we have regulations and if the emissions from the cell tower meets the current and if we are saying that the future ones of our recommendation number one if it exceeds those then a warning label might be appropriate but again, we haven't done the research from number one. It meets current regulations and therefore the added expense of putting that sign on there and if there is still anybody who climbs poles without a hydraulic lift then that sign could be hazardous to them climbing that pole. For those reasons, I will not be supporting it.

Sherman: Patrick, the more I think about this one, the legibility of the sign, I have to agree. Right now under current law, we have already said there needs to be more study. I really am uncomfortable with this one. I think I am going to have to vote against it.

Wells: We have had quite a bit of discussion on this because the current standards don't talk about energy density in watts per square meter. When you have antenna in the public right of way, there are orders of magnitude closer to people than existing antennas. So, the RF exposure is very high.

Heroux: The other thing is that if you require it to have a full survey of all RF sources other than 5G, I realize that this may seem discriminatory. Essentially, it's because there is densification that this has provided and it would be a substantial task to inventory all sources of radiation and make sure that all of them are labelled. But at the threshold of densification, I feel this is justified.

Abrami: any other discussion? Alright. I am going to call the roll: Tom Sherman (no), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (absent), Denise Ricciardi (yes), Dave Juvet (no), Beth Cooley (no), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no), Patrick Abami-Chair (yes). There are 6 (yes); 4 (no); 2 (abstain) and 1 absent. The motion passes.

Abrami: Carol, were you here when I called for the vote?

Miller: I am abstaining anyway.

Cooley: I'm sorry, a clarification on that last vote. So was it 6 (yes) 4(no) and 2(abstain) because Carol was not here before the roll was called?

Abrami: yes.

Cooley: so was it 6-6 and does not pass?

Abrami: no. It's the majority of those who did not abstain.

Cooley: got it.

RECOMMENDATION 5- Schools and public libraries should migrate from RF wireless connections for computers, laptops, pads, and other devices, to hard wired or optical connections within a five-year period starting when funding becomes available. There is strong evidence that the younger the child the more susceptible they are to the negative impacts of RF-Radiation. Hard-wired connections or optical wireless do not subject children to RF radiation. The Commission is aware that school districts and public libraries have invested much in wireless infra-structure and that a movement to radiation-less connections would require additional investment of resources.

New optical networking solutions for the classroom and office spaces (such as LiFi) offer faster, healthier, and more secure connections than RF-based WiFi. This technology utilizes visible light, which organisms can withstand without any harm at far higher intensity levels (such as direct sunlight) than required for transmission. Such optical data transmission using visible light offers giga-byte speed, as well as plug-and-play replacement of current RF WiFi routers. The optical wireless system can be incorporated in an upgrade to cost-efficient LED room lighting, which can save schools and public libraries significant energy dollars.

The hard-wiring and/or optical projects should be completed within five years from when the federal funding (via say through the FCC's E-Rate program for telecommunications and IT in schools and public libraries) is procured.

Abrami: so this one is encouraging the use of hardwire or optical connections within schools and public libraries. I will let Ken spend a minute on it.

Wells: Schools and public libraries should migrate from RF wireless connections to either hardwired or optical wireless connections within five years of when funding becomes available.

Abrami: Can you spend a second on LiFi?

Wells: yes. There has been adequate research that younger children are susceptible to RF radiation and the alternative to using RF sources would be faster optical systems like LiFi or hardwired connections which don't emit radiation. Lifi is a visible light. There is adequate evidence that living things are quite

resistant to visible lights. The speed and security of optical is better than RF based communications. This would be a step up in performance and security.

Abrami: The recommendation is also sensitive to the school districts have spent a lot of money already on WiFi. Understanding that these things have cycles and there is obsolescence. We are suggesting that when funding is available that this be looked at as an alternative to WiFi.

Sherman: Can I just wordsmith one thing? In the last paragraph of the non bolded section, there are words that say: "via say through" I would replace that with: "e.g." and commas. It's a little slangy for a commission report.

Gray: Going back up to the recommendation, I am not so sure that we need to say that they should migrate. Also in the non bolded section it says "strong evidence". There are organizations out there that sell that equipment and would be more than happy to help school districts migrate over. Should they? Shouldn't they? It goes back to your first paragraph, what is an acceptable limit? If you say schools and libraries should be assisted in migrating and you take out the word "strong" and it gets closer to something that I can support.

Sherman: I like it the way it is and if Jim is not going to support it in any event then I would leave it the way it is.

Miller: I would just notate "gigabit" not "giga-byte". It's just one word, gigabit.

Abrami: Ken, are you ok with that?

Wells: Yes, that's good.

Heroux: Mr. Chair, did you ask Carol where she was and if she was alone?

Miller: I am home alone except for the dog and he is on the deck.

Abrami: I will move for recommendation five. Tom?

Sherman: I will second.

Abrami: I am going to call the roll: Tom Sherman (yes), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (abstain), Denise Ricciardi (yes), Dave Juvet (abstain), Beth Cooley (no), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no), Patrick Abami-Chair (yes). There are 7 (yes); 2(no); 4 (abstain). The motion passes.

RECOMMENDATION 6-Establish new protocols for performing signal strength measurements in areas around cell tower radiators to ensure compliance with regulatory radiation thresholds and to evaluate signal characteristics known to be deleterious to human health as has been documented through peer-reviewed research efforts (e.g.,[1]). Those new protocols are to take into account the impulsive nature of high-data-rate radiation that a growing body of evidence shows to have a significantly greater negative impact on human health than does continuous radiation. The measurements should be taken

in regions surrounding the tower that either are occupied or are accessible to the public. Commissioning measurements are to be performed when the site is installed and at regular intervals if required by state statute or municipal ordinance such as those required by the town of Burlington, MA [2]. Measurements should also be collected when changes are made to the tower that might affect its radiation, such as changes in software controlling it. Measurements should be performed under worst-case scenario conditions when the site is transmitting at its highest levels.

It is recognized that theoretical calculations show that existing FCC guidelines will be met by standard cell tower configurations. However, there are cases where the radiation from towers can be focused by buildings, terrain, and antennas, causing signal levels to be considerably higher than would be expected in theoretical calculations unless those effects are taken into account. Further, if measurements are performed using the protocols that are advocated, they will be sensitive to the impulses and summative effects of other radiation sources such as nearby cell towers. The measurements being advocated will require wideband equipment that is typically not used in the averaged signal measurements that are currently used. Two peer-reviewed articles that address the effects of impulsive radiation on organisms are [3] and [4].

[1] Belyaev I., Dean A., Eger H. et al. EUROPAEM EMF Guideline 2016 for the prevention, diagnosis, and treatment of EMF-related health problems and illnesses. *Rev environ Health.* 2016;31(3):363-397. Doi:10.1515/reveh-2016-0011.

[2] Burlington, MA zoning Bylaw Wireless Facilities Section 8.4.6.2 "Annual RF emissions monitoring is required for all sites by an independent RF engineer to be hired with Planning Board approval and at the applicant's expense. Test results will be submitted to the Town as soon as available, and not later than the close of the calendar year. Annual testing of electromagnetic emission shall be required to ensure continual compliance with the FCC regulations.

[3] B. W. G. (2012). *Bionitiative 2012: A Rationile for Biologically-based Exposure Standards for Low-Intensity Electromagnetic Radiation*

[4]McCarty, D. E., Carrubba, S., Chesson, A. L., Frilot, C., Gonzalez-Toledo, E., & Marino, A. A. (2011). Electromagnetic hypersensitivity: P Evidence for a novel neurological syndrome. *International Journal of Neuroscience,121(12), 670-676*

Abrami: I will let Kent speak to this. It really discusses that there should be something more than the average when we look at signal strength.

Chamberlin: this also has two parts. One is that it says you have to perform measurements on a cell tower. At one point you need to do that at commissioning because there are factors that can cause signals to be greater than what you would expect from simple calculations that the cell tower manufacturers provide. Burlington, Mass has a requirement as a town ordinance saying you have to perform these measurements regularly to make sure you have not exceeded guidelines.

The next part relates to how you perform those measurements. The way that's been done for fifty years is to look at averages. It turns out that it's not just the average power you're exposed to but it has to do with the transient nature of that and the summative effects. The way the measurements are performed now, if you were looking at a particular frequency, you would get a single value. It wouldn't see the contributing effects of nearby transmitters. The way I am proposing it here is that you look at the signals differently. You look at summative, the transient nature, the peak value which as I understand it, are not being looked at right now.

Wells: I am just noticing in this version, the second sentence after the bold section talks about focusing building terrain and antennas, but does not mention beam forming, which I think we discussed in one of the earlier sessions.

Abrami: I think you are right. Where are you?

Wells: The second non bolded sentence. You can put it after building, terrain, beam forming and antenna.

Heroux: Kent, this recommendation is very long. I wonder if somehow it could be a little bit remodeled to make it crisper to understand. All the other recommendations could almost be used in a commercial. Whereas this one, needs some wind to go through.

Abrami: I think you are right. Perhaps, some should be in the discussion part not the bold.

Gray: My objection to this recommendation is that it ought to be a subset of the study that you are requiring in recommendation one. If you found there is a problem, then how do you mitigate that problem?

Sherman: I kind of agree with Jim that this may be the cart before the horse. I don't disagree with this recommendation. I will vote for it but it would be great to have some parenthetical phrase somewhere in there that says depending on results of section one, or something like that.

Abrami: Ok. Why don't we say we are voting on the essence of this? Then we will vote again. I just want a sense of this. Is that ok with everybody?

Wells: You can streamline it by taking the first and last sentence in the bold and relegating the rest to the last paragraph.

Heroux: I would like to mention that this is very critical in the sense that this question is not something that will come out of a new investigation. It has been around for fifty years. The point here is that if you only look at biological effects over a gram and over averages, you blind yourself to reality. This is essentially what this very important recommendation says.

Abrami: I think that's why we have it here actually. I am ok with trimming it down and taking the middle part and moving it down below.

Woods: Just to clarify. We are trying to work this which is fairly complicated. Are we going to have another work session before the next full session?

Abrami: Yes. The work group is going to meet one more time because we have to talk about the rest of the report and get that going. Let's get the essence of a yes or no on this. If it's a no, we won't bother reworking it. We will have another vote specifically on this recommendation at the next full meeting.

Cooley: I will be voting no on this just because the FCC has its regulations in place here and they occupy the field. That's clear in both federal statute and federal regulation. Also, this is seemingly implying that wireless radiation is unsafe. Thank you.

Juvet: Mr. Chair, I would also like to let the commission that I will also be voting no on this. Again, this is making New Hampshire and outlier. This is a regulation that should be handled at the federal level. I think it sends a bad message about New Hampshire being serious about embracing the latest technologies for economic development.

Woods: As far as the consideration for New Hampshire being an outlier, I would like to point out that New Hampshire is the only state that does not have a mandatory safety belt law resulting in the loss of about 27 lives per year because of disuse. We have no trouble being an outlier in that regard. So I think that is perhaps something to consider the argument by itself to be an outlier perhaps should be put in a broader context.

Abrami: We all have our opinions. Ok. I move recommendation 6. This is just the essence, not the final words. We will vote on it one more time.

Chamberlin: I will second it.

Abrami: I am going to call the roll: Tom Sherman (yes), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (abstain), Denise Ricciardi (yes), Dave Juvet (no), Beth Cooley (no), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no), Patrick Abami-Chair (yes). There are 7 (yes); 3(no); 3 (abstain). The motion passes.

RECOMMENDATION 7- Require that any new wireless antennae located on a state or municipal right-of-way or on private property be set back from residences, businesses, and schools. This should be enforceable by the municipality during the permitting process, unless the owners of residences/business or school districts waive this restriction. Given these are local public rights-of-way and under the jurisdiction of a municipality, the Commission feels empowering individuals impacted by these antennae to be within states' rights to legislate such standards. This statute would return personal freedoms back to the individual in being involved with decisions as to non-essential devices that are being placed in front of their property.

Siting restrictions for cell phone towers already in force in the world were intended to ensure the safety of vulnerable populations, like children and those with illnesses. India already prohibits placement of

cell phone towers near schools or hospitals, and Canada (Standing Committee on Health), as well as many European countries, are looking into similar restrictions. In California, firemen have been exempted from the forced placement of towers on their stations, because of radiation health concerns.

There are plans to use higher frequencies in the future. These higher frequency transmitters have to take into account:

1. Less signal penetration into structures
2. The atmospheres oxygen and water absorption of radiation
3. The shrinking antenna apertures
4. The noise from multiple extraneous sources

For human users, this means increased power density exposures. In addition, exposures will become more irregular and originate from multiple sources (Multiple-Input-Multiple Output Architecture). As vulnerable individuals are exposed ever day in society to RF-radiation, limits should be universally applied, and set according to the Largest Observed Adverse Effect Distance (LOADE) using the experience from the past and current uses of 2G, 3G, and 4G technology, since there is no epidemiological experience with 5G.

An engineering practice would use a set-back requirement for new base-station cellular towers, including 5G micro-towers. A conservative LOAED should include all observed health effects. From the 18 papers abstracted in Appendix XX, shown in historical order, this set-back for all new cell towers should be 500 meters which translates to 1,640 feet. The actual set-back requirement should be established by the municipality based upon a balance of the science and reasonable accommodation for these antennae.

Abrami: Recommendation seven has to do with setbacks. I will let Paul speak to this one.

Heroux: There has been a lot of evidence in epidemiology that the proximity of cell phone towers enhances cancer effects that happen at the maximum within two years of installation as well as a variety of neurological effects that have been documented and so we believe that to bring densification to New Hampshire represents by itself a risk. Cell phone towers should be distanced from where people live whether they are vulnerable or not.

The non-bold section relays this information and says that there is evidence of health effects until 500 meters. In terms of best practice, this is what should happen.

Gray: This recommendation does not take into consideration any power level that is going out, beam forming or other things. If we are going to do this, it can't be all cell towers have to be .31 miles away. These new 5G are much less power. Unless you start to talk about power density and other measurements in recommendation 6, then this really has no meaning.

Cooley: As I expressed prior, this likely runs afoul of federal law. A state and locality cannot dictate where a wireless network can or cannot be built particularly if it creates holes in coverage and that is a barrier to entry. I will be voting no for that reason. I will also point out that there is a reference to California and that firemen were exempted from "forced" placement of towers. That is actually an incorrect statement. I have the legislative analysis that shows why the California firefighters were exempt from AB 57 many years ago. I would just submit for the commission that that is an incorrect statement. Thank you.

Heroux: 5G is something that is not yet defined and it will have beam forming which although the individual towers consumes less power, it has a higher effective radiated power because of antenna gain. So in the face of a new method of transmission, that is 5G that has yet to be defined by most people who deploy it, we can only rely on the past to assess the health impacts of cellular systems. In other words, we cannot be twenty years in the future to gauge as Senator Gray does suggest the health impacts of 5G. We can only use our experience of the past and this is what this distance is based on.

Sherman: I have to agree with Beth on this one. If we are going to leave this intact and I know it's weakening your recommendation, but I would change the word "require "to "encourage" because I don't think you can do this kind of siting or require it. It's just a non-starter. I know that in Rye when we talk about a new cell tower coming in, which there needs to be and will be, that is a very productive negotiation between the town and Verizon and so I think "encourage" would be a way I could vote for this. Correct me if I am wrong, but I think Beth had it right that this is federal statute and we can't do this. So, it's a non-starter to put a recommendation that we can't do.

Abrami: I don't have a problem with encourage.

Sherman: I also want to make sure that we are accurate where Beth pointed out we were inaccurate. Maybe at the next subcommittee work session, be absolutely confident that you are correct in what you are talking about with California. If it's not clear, I would remove it.

Abrami: Beth, can you send us your documentation on that please and I will share it with the whole group?

Cooley: Absolutely. It's directly from the California legislature.

Juvet: Mr. Chair, in light of changing that first word in the bold from "require" to "encourage", doesn't that make the entire second sentence unnecessary? I don't understand how the municipality will have the ability to enforce this.

Sherman: Dave, I think they can't anyway. I would get rid of the second sentence. I just don't think they have the ability to do this.

Woods: I agree with the comments about what is currently available legalistically. However, I think part of the concept of this report is what we think we would like to see obtained, a sort of wish list if you like. Then the actual application or translation into legislation would take these factors into consideration. I

have no trouble with the changes in view of honoring the legal aspect. But by the same token, I don't think we should shy away from stating what we think should be the standard and let that be heard.

Sherman: One way to do that would be to state the goal in your first sentence and then state in your second sentence how you would hope to get there.

Heroux: This could be done by the municipality.

Sherman: Well, as Gary said, you would need to have a statutory change probably at the federal level. So you could encourage. That's what we are doing in my town because we arer working with the industry and it's actually going to be fine. So, one way is to encourage. The other way is to ask for Congress to change the law.

Heroux: I just proposed to say that this could be done by the municipality during the permitting process.

Sherman: I don't think they can do that right now.

Abrami: We will take that last sentence out and move forward with this.

Garod: I think I have to agree with Beth and Senator Sherman. I don't think there is anything wrong with encouraging municipalities to consider these factors when they are negotiating the placement of towers and when they are having a conversation about where it makes the most sense. But I think if you do anything that is seen as encouraging them to require a certain placement, the commission would be encouraging them to do something that is preempted by federal statute. I think the commission should stay away from any type of recommendation that suggests that municipalities have the ability to simply restrict where these towers are placed because I don't think they have the ability to do that.

Wells: Perhaps, when we revisit this in the workgroup, we can see whether this recommendation should be linked to recommendation one which calls for the delegation to look at the federal law.

Sheman: I think we are tight on time. Should we move to recommendation eight and agree that this needs work?

Abrami: Ok. No vote on number seven. The workgroup will work on it and maybe integrate it with another recommendation. The next time the full commission meets, we will vote on it.

RECOMMENDATION 8- Upgrade the educational offerings by the NH Office of Professional Licensure and Certification (OPLC) for Home Inspectors to include RF intensity measurements. Home Inspectors currently operate as private contractors who may be hired by citizens or enterprises to measure such things as radon, to collect water quality samples, or search for mold or insect damage. Home inspectors routinely supply test results to both their clients and government entities.

The majority of the Commission believes the public has the right to discover the RF power intensity related to radio frequencies at a property which they will be purchasing or renting before the

transaction is closed. Also, the proprietors of publicly accessible venues may wish to reassure the public about the RF power intensity within their establishments, by posting the data collected by a state-approved inspector. In addition, such testing should be paid for by the party requesting it and the testing itself should be performed by a professional who owns or rents the test equipment and has met the state requirements for training of Home Inspectors regarding RF measurements.

The majority of the Commission proposes that Home Inspectors be offered training by NH OPLC on how to measure on-site peak and 24-hour average RF intensities. Measurements of frequencies and intensities will be performed using low-cost equipment (such as GQ-390 meters). [Description of existing Home Inspector training offered for radon, mold, etc. may be seen at https://oplc.nh.gov/home-inspectors/index.htm]

Wells: This recommendation puts in place training for home inspectors that is offered then by the Office of Professional Licensure and Certification. Just as homeowners can request testing for radon or mold, they should be able to request testing for RF exposure on their property or prospective property and expect that the person doing the measurement has had training on the use of the equipment.

Abrami: the point is, we are not talking about making it mandatory. It deals with training inspectors to be able to do the measurements. So if someone has concern, if they are RF sensitive or whatever and they want they can go to somebody that's trained on how to do the measurements. This is totally different than the original recommendation eight. Several people had concerns with the original recommendation, myself included. If someone bought their home decades ago and cell towers were put up, there is nothing they can do to mitigate that problem. If an inspector found lead paint or a water problem, there are things they can do before the house is sold to mitigate that problem. This addresses that if someone wanted testing done, that inspectors are trained.

Gray: With this one, I am sure that Beth is going to tell me that this assumes that radiation is bad and all that. Again, non-mandatory, a state approved way to license. I don't have a problem with. They should have a reliable place to go to get those measurements from a qualified person might be a better way to go might be better.

Chamberlin: This is mostly on wording. In the second paragraph, the majority of the commission believes the public has the right to discover etc., and it says "at a property that they will be purchasing or renting before the transaction is closed". You know, that could be read as almost being a requirement before the sale, which it isn't. Also, it implies that the time when you could get testing done is when you are buying or selling something. I would like to keep it more general and that any citizen that wants this done, can call upon this service. Can we reword this so it makes it clear that it is voluntary and it is not necessarily tied to buying and selling of properties?

Wells: It should also be an option if you want as part of a building inspection as part of an agreement on something you don't own yet. There is nothing about requirement in there. The seller could say no. I refuse to have it inspected and go away and I will find another buyer.

Heroux: I might have been the one to have suggested this and the actual intention was to avoid bursts of demand as a result of some article and make the requirements for testing more evened out over time. I recognize that it's true, if you are buying or selling something, this might be a variable of interest.

Abrami: We are running out of time. I know a few of you have to go but I would like to vote on this one. Maybe the workgroup can work on the wording to make it clear it's voluntary. Is that okay?

Chamberlin: Yes. That addresses my concern.

Abrami: Then we can come back for another vote. Any workgroup changes will come back to the group for another vote. I move to vote.

Wells: second.

Abrami: I am going to call the roll: Tom Sherman (yes), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (abstain), Denise Ricciardi (yes), Dave Juvet (abstain), Beth Cooley (abstain), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no), Patrick Abami-Chair (yes). There are 7 (yes); 1 (no); 5 (abstain). The motion passes and will be revisited.

RECOMMENDATION 8A- The State of New Hampshire should begin an effort to measure RF intensities within frequency ranges throughout the state, with the aim of developing and refining a continually updated map of RF exposure levels across the state, using data submitted by state-trained Home Inspectors. The data should be collected in such a way as to identify geographic areas of notably high RF exposure, places where RF signal for wireless communication is inadequate (dead spots), and places where RF is unusually low (white spots) sought by people who wish to minimize their RF exposure. One possible use of this data will be buyers/renters of property or the public in general using benchmark values to make comparisons and make their own decisions based on their comfort level with RF exposure. After a while, an extensive New Hampshire RF database will exist to provide useful maps and data for future public health investigations. Appendix XX outlines in more detail the technical aspects of this recommendation.

Wells: So 8A is what we would do with the data that home inspectors come up with. One of the things would be that the State of New Hampshire would begin an effort to collect that data in such a way that we can identify geographic areas of notably high RF exposure and places where RF exposure is unusually low and this would be published in a database or a map. It could be used for future health investigations or for people who are looking for places with lower RF exposure.

Abrami: We are also talking about the state taking this on to actually do some measurements,itself. Am I correct on that Ken?

Wells: Yes. That could be a part of it. We talked about the way that Vermont did it. For the most part, this recommendation talks about a low cost way of assembling the data by collecting the data from licensed home inspectors.

Abrami: I can see that being added to the data. That would probably take a long time to get a real picture. The one thing we agreed on was we didn't want the general public taking their own measurements because there is no control.

Wells: It says here that the state of New Hampshire should begin an effort to measure RF intensities throughout the state. That does not preclude the state from having someone from the proper agency go around and take measurements.

Abrami: The essence is we want the state to look at the mapping of RF radiation and if recommendation 8 goes through, that data would be collected as well. These would likely be part of the same legislation.

Gray: My objection to this goes back to the state having to go through this. We haven't proven that there is a big problem yet. I would suggest that Kent work through the University system, get some grant funding and fund this thing. They can do all the studying and data recording and all the measurements that they want to but I don't believe that the state should be required to put together the organization to go do this. Thank you.

Cooley: I will be opposing this 8A as it tries to undermine safety standards that are set by the federal government with the potential to mislead residents that somehow RF within legal limits, is dangerous. So, I will be voting no. Thank you.

Sherman: Just to respond to Beth's comments. Actually, I don't think that's the case at all. Suppose if we find RF levels within the state that are exceeding federally acceptable levels. I am Chair of the Commission on chronic illness that has been standing since 2014 or 2015, looking at the link between human health and chronic illness. This kind of map is something we've been envisioning on all sorts of things. DES and DHHS are actually looking at this in relation to arsenic and bladder cancer and we've talked about expanding this. So these ideas of maps are not new. I think right now, it's a huge unknown. If the state of New Hampshire were to do this or if somebody were to develop a map, I think it would be very helpful. We may be surprised that we may have various RF exposure that far exceeds federal limits but right now, we don't have any clue what those levels are.

So, I don't think that is correct, Beth. I think that this would be useful information making sure that people are not unwittingly being exposed to levels that are beyond what our federal industry accepted levels.

Abrami: Again, we don't say in this recommendation that we are setting different levels.

Roberge: I would just echo what I have said previously. If this intention is that this recommendation be implemented by a state agency, then funding would be necessary. I don't know if you can build language in there similar to recommendation three.

Abrami: The state of New Hampshire "should fund an effort"…how is that?

Wells: I think this could be done in conjunction with the training of the home inspectors. If it's part of their training to do half a dozen measurements in locations the state is interested in.

Juvet: Mr. Chair, starting out that statement with the state of New Hampshire clearly implies it's the state.

Abrami: "The state of New Hampshire should fund or find resources to support the beginning of an effort to measure RF…"

Wells: I am not comfortable with that. One of the advantages of having the state do it, is that the state does not have a conflict of interest. I can imagine if there were entities that would have a conflict of interest and the data collected may not be believed by everyone.

Abrami: Right. We talked about this last time Michelle. Obviously, this isn't going anywhere unless legislation is passed. And if we want the state to do this, there would have to be funding as part of the legislation. It would have to have budget dollars associated with it. Again, this is more of a statement of what we would like to see happen.

Roberge: understood.

Abrami: I am going to say, just keep it the way it is. Is there any other discussion? I move recommendation 8A.

Wells: second.

Abrami: I am going to call the roll: Tom Sherman (yes), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (abstain), Denise Ricciardi (yes), Dave Juvet (abstain), Beth Cooley (no), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no), Patrick Abami-Chair (yes). There are 7 (yes); 2 (no); 4 (abstain). The motion passes.

RECOMMENDATION 9- Require all new cell phones sold in New Hampshire come equipped with updated software that can stop the phone from radiating when positioned against the body. The Commission has been made aware that cell phones contain proximity sensors that will allow a cell phone to only radiate signals when a certain distance from the body, for example, held in the fingers, or placed on a table. This does not change the functionality of the device, only the way it is used, specifically not held against the head or body. Implementation is a software update in the cell phone, as these phones already have a proximity detector to turn off the screen and soft keys when an obstacle is present. With this change, the screen and the RF circuit are automatically turned off. This removes the problems of brain cancers (glioblastomas and acoustic neuromas) and the issue of SAR limits for the industry. See Appendix XX for more detail references to the science behind this recommendation. Cell phones should come set with this inhibition, with instructions in the manual on how to disable it. There should be a soft button on then unit to easily re-enable the radiation inhibition, for example if the unit is handed to a child. In all cases, it should be easier to enable the restriction than to disable it. Cellular phones marketed specifically for children should stop radiating when positioned against the body under all circumstances. The installation of such proximity sensors is also encouraged in laptops and tablets.

Abrami: Number nine has to do with cell phones and I will let Paul explain it.

Heroux: Essentially, there is in cell phones a system that blanks out the screen when it's close to the head. This was originally intended to prevent the soft keys from being activated and the battery from being spent unnecessarily. This software could also interrupt the radiofrequency radiation so that when you bring it against your head so that half of the radiation that was previously broadcast into your head does not exist. In other words, you could use your cellphone exactly as before but you would need to hold it a certain distance from your head as instructed in most manuals sold with the cell phone. Or you could place it in front of your face or place it on the table for example.

Abrami: So the internals of the cellphone can do this with an app, is that correct?

Heroux: Either an app or a modification in the embedded code that is in the phone.

Cooley: since I had to drop early from our last meeting, I didn't get to speak on this recommendation. We are strongly opposed to this. Not only does science not require any of this. This is not necessary. The FCC has a 50 fold safety factor and there is no safety risk. I would be remiss not to point out Berkeley. The decision from last week in terms of compelled speech and First Amendment issues and I will just leave it at that and I will be voting no on this.

Sherman: I am just concerned that when we carve out New Hampshire as a different market from the rest of the entire world. To me, it's a little concerning. I am wondering if the intent here was to have this software that could be enabled by the user rather than something that would be inflicted on them. In other words, you go into your phone and you say I want this to automatically turn off when it's a certain distance of my body. You have activated that software and that keeps it a choice issue. I think that might be a little more doable. I worry about this one. I understand the intent and agree with the intent. But I wonder if making it enabling rather than mandating might be a better way to go.

Heroux: As it is, it is a choice of the user, you have to realize. Of course if you don't have the software in there to do this, you can't do it. In other words, every individual has the choice to accept this radiation when it's against their head or to reject it. We have discussed this issue of choice before. I believe Rep. Abrami brought it up and it was decided that adults should have the choice to use the phone and irradiate their brain if they wish but that the facility to subtract themselves from this radiation should be provided because it is technically very easy to do. In a sense, it is a negligence of industry not to have provided this before.

Heroux: So, Paul what you are saying is that this would have the software not activated but present so if the consumer chooses to use it.

Heroux: That is entirely right. If I may take off the gloves here…. The first thing that will happen from industry is that when the software is included, they will instruct all their sales force to do a favor to the buyer and say I will undo this for you. That's what I expect would happen because they do not want even this capability to be known. I think this is unfair to users.

Gray: If we continue to debate all of these instead of just accepting comments, we are never going to get out of here. My comment on this one is that on recommendation three, we are already putting out information on a site and using this as a hands free device which most cellphones do.

Abrami: the real essence of this recommendation is that it is possible to do this. I kind of agree with Tom. If it's true that most phones can do this, do we encourage entrepreneurs to come up with apps that allow people to buy and do this on their own? My understanding was that this existed in the phones, sensors. The question becomes would an app be allowed by a third party to be put on a phone to turn it off? There are many apps that go on phones, so I don't know. Do we need the cell phone industry to bless this or not?

Again, we are making a statement here. I would almost say "encourage"

Sherman: How about this wording? "Encourage that all new cell phones sold, come equipped with updated software that allows the user to automatically stop the phone from radiating when positioned against the body.

Abrami: It would be a tough sell in NH now that I think about it. There are some states with different emissions limits than others. The auto industry actually does comply with those different limits. California has different fuel standards.

Sherman: But California has a slightly different market share then New Hampshire.

Abrami: you got that right. We are the rounding error. But we like to be first in stuff though. So, with those two changes, any more discussion? I move recommendation nine.

Sherman: I will second.

Abrami: I am going to call the roll: Tom Sherman (yes), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (abstain), Denise Ricciardi (yes), Dave Juvet (no), Beth Cooley (no), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no), Patrick Abami-Chair (yes). There are 7 (yes); 3 (no); 3 (abstain). The motion passes.

Abrami: I know that Denise has to leave at a quarter after. A couple of hers are coming up here at the end. I know Gary has to leave too. I think what we may do …

Woods: Mr. Chair I have number eleven and I think that should be pretty straight forward if you want to do it that way.

Abrami: I think we will do it that way. We will do one more, number eleven. I will just have to call another meeting. I said a potential of two more meetings so before I lose everybody, can we meet in two weeks? The 8th or the 9th?

Sherman: Why don't we do 10-11:30 on Thursday, October 8th?

Abrami: Ok. Subgroup I will reach out to you

Garod: I am sorry to be the one who jams everything up but I have a prescheduled meeting on the 8th at 11. I will be available for the first hour.

Abrami: We will book 1.5 hours but let's say it's going to be an hour meeting. If we just do the recommendation votes, we should be able to get that done in an hour. Let's just do number eleven.

RECOMMENDATION 11- Further basic science studies are needed in conjunction with the medical community outlining the characteristics of expressed clinical symptoms related to radio frequency radiation exposure. Further studies are just beginning to explore the quantum mechanical mechanisms which are the fundamental basis for understanding the biological changes occurring during the interaction of radio frequency radiation and molecules. These mechanisms can affect cells, tissues and whole organs, as well as accumulate over time.

The majority of the Commission feels the medical community is in the ideal position to clarify the clinical presentation of symptoms precipitated by the exposure to radio frequency radiation consistent with the Americans with Disabilities Act (ADA) which identifies such a disability. The medical community can also help delineate appropriate protections and protocols for affected individuals.

All of these endeavors (basic science, clinical assessment, epidemiological studies) must be completely independent and outside of commercial influence.

Woods: Basically, this just addresses the issue of further studies needed and addresses the issue of transitioning from what are called in the physics world, bulk materials to the actual quantum mechanical effects. We discuss these in a little bit of a peripheral way but have addressed such as proton tunneling and other similar quantum mechanical effects which really represents the way that all radiation interacts with molecular entities. That interaction is a base for cellular activity and as a consequence, also organ and overall systems activity. Those are really needed and they are just now coming on line. I think the bulk studies that have been done in the past, point out that we do need to look at this further. They were inconclusive for a variety of reasons. That's the inherent difficulty with bulk material studies especially when they are as complex as cells and organs. We need to encourage further looking at this.

Secondly, as this comes to the fore, there is a push in the medical community to identify exposure to these frequencies as a clinical entity. The State Medical Society and National Medical Societies are looking at this to try and colleague information in a way that will identify these as a potential designation of a syndrome. Indeed, the ADA already recognizes the exposure as a disability. I think it behooves the medical community to be thoroughly and completely engaged in this process to identify that dimension. So everything from the study, from the quantum mechanical effects which we've addressed to the clinical designation is needed.

Abrami: this is calling for the medical community to work on this. This one really has to do with RF sensitivity more than anything else. Gary is already beginning to reach out to the medical community to start addressing this in a more thorough way.

Woods: This is primarily meant for the readers of this report to identify that in fact there are other things in the works and we need to pay attention to those. The person reading the report will not only understand the other dimensions outlined in the other recommendations but that we as a commission recognize that this is a direction that we need to go and this is a direction that we need to go.

Sherman: I just had one little wordsmith in the first line. Gary would you object to after the word further" basic science and clinical studies are needed" so that it captures the full spectrum of basic science up to the clinical.

Woods: you could put it that way. The second portion of that, the medical community outlined that studies are needed in conjunction with clinical studies.

Sherman: Ok.

Cooley: I will be voting no on this. Take a look at the World Health Organization statement on this. That is why I will be voting no. Thank you.

Abrami: Any more discussion? Ok. I move recommendation eleven.

Heroux: I second.

Abrami: I am going to call the roll: Tom Sherman (yes), Ken Wells (yes), Kent Chamberlin (yes), Carol Miller (abstain), Denise Ricciardi (yes), Dave Juvet (no), Beth Cooley (no), Brandon Garod (abstain), Michelle Roberge (abstain), Paul Heroux (yes), Gary Woods (yes), James Gray (no) because I think it should be a sub of recommendation one, Patrick Abami-Chair (yes). There are 7 (yes); 3 (no); 3 (abstain). The motion passes.

Abrami: thank you all. As far as the Minority Report, Jim and I traded emails back and forth about whether a subcommittee is needed on the Minority Report. Joel doesn't think it's necessary but I know you had some concerns Jim about 91A stuff.

Gray: If you form a group, then I have to follow 91A and publicize the meetings and all those other things. If we don't have a quorum of the group then it can be informal. We can email back and forth and then present it to the group as a recommendation.

Abrami: those who want to sign onto the Minority Report, you can give your suggestions to Jim and correspond back and forth but there can't be meetings.

Gray: right. Forming a group would hinder me from writing the report. As long as I don't have quorum of the whole group or any committee of the group, then we can get together and talk about it because that small group cannot make decisions that are binding on anyone. Everyone should have a copy of what I wrote to begin with. I think Beth would like me to put at least a paragraph in there about the FCC and their requirements and I have no problem doing that. If other people want to communicate with me, just use my legislative email: *james.gray@leg.nh.us*. We will certainly publish it out through Pat to the rest of the group.

Abrami: I am ok with that. Joel's counsel to me was it was ok if you guys interact. I just wanted to make sure that was your understanding Jim.

Thank you everyone. I know some of you had to leave early. You know these commissions we have people from industry, it's very difficult to get unanimous on any of this stuff. That's why we are doing it the way we are doing it with the Minority Report. The legislature has recognized this and I ran into similar things with the Marijuana Commission. There were differences of opinion that could not be reconciled. The resolution that the legislature has is a Minority Report built into the total report so people don't miss it in fairness. So that is where we are at. We will see everybody in a couple of weeks.

V. Next meeting via Zoom: October 8th 10-11:30 am

Meeting Adjourned at 11: 27 am

Text chat during Zoom meeting:

Chat from HB522 5G Commission Meeting, Sept 22, 2020

From Rick Maynard to Everyone: 09:02 AM Morning All.

From Deb Hodgdon to Me: (Privately) 09:04 AM thank you

From Cece Doucette to Me: (Privately) 09:08 AM Morning, Kent. If the Recommendations document has changed from the one you sent me dated 9/17 in the file name, would you mind sending it to me? Thanks.

From Me to Cece Doucette: (Privately) 09:09 AM We will be discussing the version that I sent you.

From Cece Doucette to Me: (Privately) 09:12 AM Supah, thanks!

From Cece Doucette to Me: (Privately) 09:29 AM Rec. 1, non-bold paragraph, first line: (TTA) should be (TCA)

From Cece Doucette to Me: (Privately) 09:42 AM Rec. 2 bold section, line two, in parentheses, (there) should be (their). Also, line 5, after "cell phones" might you consider adding, "and other wireless devices"?

From Helene to Everyone: 09:47 AM We are very concerned about having a cellphone tower being installed in less than 1/4 mile from the front of our home. We are listening to this meeting today so that we can be active in this process to ensure that residents of NH have a seat at the table to ensure that we have representation to protect our health and rights

From Rick Maynard to Everyone: 09:48 AM Thank-you all. Take care, I have to go.

From EH Trust to Everyone: 09:49 AM Published research o cell towers here https://ehtrust.org/cell-towers-and-cell-antennae/compilation-of-researchstudies-on-cell-tower-radiation-and-health/ research on 5G https://ehtrust.org/scientific-research-on-5g-and-health/

From Helene to Everyone: 09:49 AM considering that we are currently in the process of dealing with our Town and a Wireless Tower company that gained approval in a way that we feel was not appropriate. None of the neighbors were included in the meeting and we are being told by the Town committee that we never would have had any say in the tower being approved because of the current laws in our State, regardless of our concerns

From EH Trust to Me: (Privately) 09:51 AM Can I record please . It is a public meeting. I requested to record

From Cece Doucette to Everyone: 09:52 AM Rec. 3, at the end of the bolded section, please consider adding after "pregnant women" the other vulnerable populations, "the elderly and those with existing health compromises."

From Me to EH Trust: (Privately) 09:54 AM I'm not able to grant permission to record during an active meeting. However, verbatim minutes will be posted on our public website.

From EH Trust to Me: (Privately) 09:56 AM Thank you, I thought it was an open meeting so we could From Helene to Everyone: 10:01 AM The biggest concern is that they are allowed to put numerous antennae on top of the towers which can increase the emf emissions greatly. Please consider this.

From Cece Doucette to Everyone: 10:13 AM Do we have long-term studies on Li-Fi? Perhaps we can modify the bold where it says, "optical connections" to "optical connections if proven biologically safe." Rec. 5, second unbold paragraph, please be careful about recommending LEDs, many suffer negative biological effects from them today.

From Helene to Everyone: 10:17 AM Here is a caveat; we have a cell tower going up in less than one mile from 2 schools. What good is converting over to broadband or fiber optic technology (which is not only better, but less risky for security purposes) when there is a cell tower with 10 - 20 antennae located so close and children are exposed 5 days/week for 6-8 hours per day. Health concerns are not only for children, but all people are susceptible to emissions. Many towns are now electing to not install towers due to the findings from many studies and the notable increased health risks

From EH Trust to Everyone: 10:32 AM You can watch a news investigation that shows it was lobbying from firefighters here https://www.youtube.com/watch?v=61h_vuBujw0&feature=emb_title Affidavit of Susan foster https://ecfsapi.fcc.gov/file/7022117660.pdf

From Helene to Everyone: 10:32 AM Should we remind everyone that the FDA has approved numberous medications in the past as SAFE, but they were not. Tobacco and asbestos were considered safe and they were not. We have evidence from other countries that this technology is not safe, yet it is being

shoved down our throats and to comment that NH would be an outlier is wrong and uninformed. Thank you Dr. Heroux for pointing that information out. There should be several regulations implemented keeping towers from close proximity to residential homes, schools and businesses. There are OTHER safe options available and people should have the right to say NO to unsafe technology, especially until it is found to be made safer.

From EH Trust to Everyone: 10:35 AM Resources on firefighters here https://ehtrust.org/firefighter-unions-opposing-cell-towers/

antennas on forestations were carved out of the bills Fire stations AB57- Firefighters have gotten an exemption to have cell towers on or adjacent to their facilities. This was codified in California's 2015 legislation AB57 . CA AB57 (2015) Legiscan Text of Bill. " Section 65964.1. (f) Due to the unique duties and infrastructure requirements for the swift and effective deployment of firefighters, this section does not apply to a collocation or siting application for a wireless telecommunications facility where the project is proposed for placement on fire department facilities. " SB649- They also received an exemption in California's SB649 (2018), a bill which was vetoed by GovernorBrown. SB 649 California (2017) Wireless Telecommunications Facilities – 65964.2. "(a) A small cell shall be a permitted use subject only to a permitting process adopted by a city or county pursuant to subdivision (b) if it satisfies the following requirements: ….(3) The small cell is not located on a fire department facility."

From Cece Doucette to Everyone: 10:35 AM You can replace the firefighter passage with: Please note, in 2004 the International Association of Fire Fighters adopted a formal Position on the Health Effects from Radio Frequency/Microwave (RF/MW) Radiation in Fire Department Facilities from Base Stations for Antennas and Towers for the Conduction of Cell Phone Transmissions. They oppose them, "until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is proven that such sitings are not hazardous to the health of our members." They reaffirmed that stance in California's 2017 Senate Bill 649 which would take away municipal home rule to place more wireless infrastructure in our communities, on poles in the public rights of way, at street level every 4 to 12 homes. They included an exemption in the bill: Section 2 "65964.2. (a)...(3) The small cell is not located on a fire department facility." Every citizen should have the same protections.

From EH Trust to Everyone: 10:36 AM The news investigation details the fire fighter position. You can watch it all here https://www.youtube.com/watch?v=61h_vuBujw0&feature=emb_title

From NR to Everyone: 10:38 AM New Hampshire does have the legal right to "require" those setbacks. According to the TCA of 1996 -- 47 U.S.C. § 332(c)(7)(B)(i)(I) is very clear: in only prohibiting discrimination between "providers of functionally equivalent services." "Functionally equivalent services" are defined as those wireless services functionally equivalent to those being provided by the "personal wireless service facilities" for which approval is sought. Therefore, a county zoning ordinance that imposed different and stricter procedural requirements (e.g., conditional use) on wireless service facilities than on facilities used for providing fiber to the home, cable TV, utilities, or other services would not be in violation of the law. Moreover, 47 U.S.C. § 253 does not prohibit the county from

imposing stricter procedural requirements on WTFs than on cable or other uses of facilities. Section 253 has three relevant parts. Section 253(a) creates the general rule that "[n]o State or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service". In turn, subsections (b) and (c) are "savings clauses" that provide safe harbors to protect the ability of states and localities to regulate zoning and construction of wireless facilities:

From NR to Everyone: 10:38 AM (b) State Regulatory Authority

Nothing in this section shall affect the ability of a State to impose, on a competitively neutral basis and consistent with section 254 of this title, requirements necessary to preserve and advance universal service, protect the public safety and welfare, ensure the continued quality of telecommunications services, and safeguard the rights of consumers. (c) State and Local Government Authority Nothing in this section affects the authority of a State or local government to manage the public rights-of-way or to require fair and reasonable compensation from telecommunications providers, on a competitively neutral and nondiscriminatory basis, for use of public rights-of-way on a nondiscriminatory basis, if the compensation required is publicly disclosed by such government. From Helene to Everyone: 10:41 AM Yes, Rep Abrami. Exactly what we are going through right now. From GARY WOODS to Me: (Privately) 10:41 AM will you be able to forward the "chat" to us? From Helene to Everyone: 10:42 AM Cell tower will be erected within the hot zone of our home and we are being told that we have NO rights

From Deb Hodgdon to Me: (Privately) 10:46 AM kent see chat on state rights

From EH Trust to Everyone: 10:49 AM You can see how Switzerland measures RF and posts it fr all to see here https://map.geo.admin.ch/?topic=funksender&lang=en&bgLayer=ch.swisstopo.pixelkartefarbe&layers=ch.bakom.mobil-antennenstandorte-5g,ch.bakom.radio-fernsehsender,ch.bakom.mobilantennenstandorte-gsm,ch.bakom.mobil-antennenstandorte-umts,ch.bakom.mobil-antennenstandortelte&catalogNodes=403,408

From Me to GARY WOODS: (Privately) 10:51 AM Yes, I'll forward the chat after the meeting.

From Cece Doucette to Everyone: 11:03 AM

Most kids don't use cell phones against head, but they do have their cell phones, tablets and laptops on their bodies. Please expand this to all wireless devices, not just cell phones.

From EH Trust to Everyone: 11:05 AM Phones exceed RF limits at body contact My daughter uses the phone to her head. I think it should be for al wireless devices as well. Many lawyers and politicians and coaches use cell phones to their head. and most people carry phones touching their body and in bras

From Cece Doucette to Everyone: 11:17 AM Doctors, nurses and others can be trained January 28-31 at the EMF Medical Conference. There are IDC codes already established and in use today. There is an EMF primer offered October 23-24. Health care providers and the general public are invited to register for both. https://emfconference2021.com/

WHO has reopened their investigation into in 2020 based on recent science showing cancers, reproductive issues and other effects: https://www.who.int/peh-emf/research/rf_ehc_page/en/index1.html

From EH Trust to Everyone: 11:20 AM The Who EMF Project has no transparency as published research shows here https://www.spandidospublications.com/10.3892/ijo.2017.4046 Whereas The Who IARC is independent and scientists are vetted for conflicts of interest Our scientists letter to the EHO about the "factsheets" they post online was never answered https://ehtrust.org/scientists-call-for-transparency-at-the-world-health-organization-emf-project/ The Who refuses to answer these questions

From Cece Doucette to Everyone: 11:22 AM Yes, just like the FCC refuses to answer this Commission's questions.

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
10/8/20
10:00 am-12:00 pm EST
Via Zoom (https://unh.zoom.us/j/8760768986)
Via telephone-US (1 312 626 6799 (US Toll) ID: 876 076 8986)

In attendance: (13)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee
Dr. Paul Heroux- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Senator Tom Sherman-president of the senate appointee
Brandon Garod-AG designee, Asst. AG Consumer Protection
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Carol Miller-NH Business & Economic Affairs Dept
David Juvet-Business and Industry Association

Not present: (0)

Meeting called to order by Rep Abrami at 10:03 am

Abrami: Due to the Covid 19 virus and the Executive order signed by the Governor this public meeting is allowed to be conducted via Zoom. It is open to the public for viewing and was duly posted as a zoom meeting. With that said, if you are not a member of the Commission, can you please turn your cameras off and mute yourselves? That would be much appreciated. In addition the meeting is being recorded as an aid to doing the minutes. All chat room discussions will be included in the minutes.

I. Approval of minutes from 9-22-20:

I have not received any changes to the minutes that I sent out about a week ago. Are there any changes that anyone wants to make? Seeing none, I will say …without objection, we approve the minutes from that meeting.

II: Agency Disclaimer:

I sent out the agency disclaimer that will be in the report. That is there especially for the agencies. I think I heard back from two of you. I can't recall if I heard from all three of you. My sense is that the language is okay with your leadership. I think most of you took it up the pole to your leadership. I think you are all okay with that language. I am looking at Michelle, Carol and Brandon. Yes? Ok. So, we are good there. That language will appear in the report.

III: Vote on Recommendations (6,7,8,10,12,13,14):

Some of these recommendations we voted on but said we would change some of the wording so we are going to go back to them, discuss them and take another vote. We may have to revisit #9 as well. The work group changed some of the wording.

I would like to work backwards so Brandon can at least hear the discussion on the ones we have not discussed before and be involved in that vote. I sent the updated document out. It's the document dated October 5th in the upper right hand corner. We will start with Recommendation #14. Denise,that was yours.

RECOMMENDATION 14- The State of New Hampshire should engage our Federal Delegation to legislate that under the National Environmental Policy Act (NEPA) the FCC do an environmental impact statement as to the effect on New Hampshire and the country as a whole from the expansion of RF wireless technologies. Concern comes from the fact that the FCC is projecting that 140,300 low orbit satellites, 800,000 5G small cell antennae plus many additional macro towers will be required for these networks to function.

The majority of the Commission is concerned that any new large-scale project that will densify antennae networks to this extent truly requires an environmental impact study. The NEPA statute requires that the agency consider environmental concerns in its decision-making process. NH should be provided documentation of such considerations. Until there is Federal action, NH should take the initiative to protect its environment.

Ricciardi: We had discussed doing something about the environmental impact with the expansion of wireless technology. The reason I addressed it is because we have an act: the National Environmental Policy Act (NEPA). That statute requires that the agency consider environmental concerns in their decision making process. New Hampshire should be able to request for documentation to be provided of such considerations for the impacts on our environment. That's why I wanted to use this NEPA to reflect that.

Abrami: Any discussion? I don't see anyone. Ok. Without any discussion, I will move to vote. We will take the votes as we did the other day. Is there a motion to accept the recommendation?

Cooley: Mr. Chair, before we do that. Are you guys getting feedback?

Abrami: Yes. Someone is not muted. Please mute yourselves. Thank you, Beth. I was hearing that as well. The static is gone now.

Ok. I need a motion that we accept the recommendation.

Ricciardi: I make the motion that we accept recommendation #14.

Chamberlin: I second it.

Sherman: Are we going to have discussion on this, Patrick?

Abrami: Yes. I did ask for discussion.

Sherman: I just want to clarify one word and that is "fact" in the second sentence. We have seen the citation that the FCC is projecting 140,300 low orbit satellites. Is that from an FCC publication? I just want to be sure that that is a verified fact and that the FCC has stated that.

Ricciardi: It is a fact that Ajit Pai stated that the FCC estimated 800,000 wireless facilities for 5G. That, I know for sure.

Wells: Yes, the 14,300 is the number I have heard associated with the SpaceX operations. There is a citation for the 800,000 in the chat.

Sherman: I just want to make sure that we have the documentation if someone asks, is that truly a fact? This has come up on other recommendations. If you have the documentation that the FCC has projected that, then I am fine with it the way it is.

Ricciardi: Yes and I am sending it. I am trying to make sure I don't miss anybody.

Gray: The relevance of this…are we saying that the radiation from those satellites are going to cause damage to people, DNA, heating, all of those things? Yes. There may be that many satellites but what relevance does that have to our committee? It's like the thing that you sent out the other day about Van Halen having a metal guitar pick and he attributing that to his cancer and discounting all of the smoking that he did for years and years. A lot of this stuff, although may be interesting, it is just anecdotal. It is not a fact. It is not good science. It is not worthy of being talked about and reported in the minutes of these meetings. Thank you.

Woods: I understand the Senator's comment on the relationship and how this recommendation #14 does not make that direct connection. This is basically an assessment of the degree to which the level of radiation is increasing. The rest of the report relates to the basic science. This does not address basic science and its relationship to cellular or organism impact. But, just a documentation of the prevalence and so in that sense, I think it should remain.

Abrami: The third piece of this was additional macro towers to make the networks function. I would imagine without much stretch of the imagination, there would be more macro towers. I know we got

the low orbit satellites from somewhere because originally we had 140,000 and Ken, I think it was you who said, it's 140,300.

Wells: I can look for a link on the satellite numbers.

Heroux: the point of the recommendation is that the FCC is avoiding a NEPA review, while modifying the environment substantially. It doesn't qualify the consequences, it just says that the US formality is that is normally fulfilled, has not been, by the FCC.

Abrami: Ok. While Ken is looking for that, let's hold on the motion and move to #13.

Wells: I found a news article from March of this year that the FCC has approved up to a million small cell antennae for the Starlink network.

Woods: If I could clarify that Ken said antennae but the question was about satellites.

Abrami: Ken you keep looking. We will skip this one for now. Denise, please speak to #13.

RECOMMENDATION 13- The State of New Hampshire should engage agencies with appropriate scientific expertise, including ecological knowledge, to develop RF-Radiation safety limits that will protect the natural environment; trees, plants, birds, insects, and pollinators.

The majority of the Commission understands that current Federal safety limits set twenty-four years ago with the intention of only protecting humans from short term effects, but not protecting flora or fauna from harm. The State of New Hampshire needs to ensure our natural environment and wildlife are protected by effective safety standards. Tree limbs, birds, and pollinators will be closer than humans to 5G cell antennae and associated 4G densified infrastructure. In fact, the wireless radiation from cell antennae could exceed safe limits when leaves of trees and flying birds and, since they may have higher exposure being in direct line of sight of wireless RF beams. When pollinators are impacted so are all forms of vegetation that depend on them for reproduction. Research on this issue is shown in Appendix XX.

Ricciardi: We all discussed that the State of New Hampshire should engage agencies with the appropriate scientific expertise including ecological knowledge to develop RF radiation safety limits that will protect the natural environment: trees, plants, birds, insects and pollinators. I like this recommendation.

Abrami: I prefer that we have a discussion before we move to vote in case there are some slight modifications that we can agree to. I will open this up to discussion.

Heroux: I thought we had agreed to remove the word "environment" and use the word "ecology".

Abrami: Yes. We did. What we agreed to was " including ecological knowledge".

Heroux: I think you should remove environment from there entirely and put: trees,plants, birds, insects and pollinators.

Abrami: get rid of “natural environment” is that what you are suggesting?

Heroux: yes.

Gray: One of the key things you cited is data from twenty three years ago. There is also both FDA and FCC guidance that have been promulgated on this that’s dated in “18,’19 and ’20 where they state that they have reviewed the current science and nothing like that is even mentioned in this recommendation. Again, I think you are giving the opposing argument short shrift on this and not considering all the science that is out there.

Sherman: could I say something? Senator Gray and I and everyone in the legislature, understands that federal limits and regulations may not necessarily reflect the latest science. The most recent example of this is the EPA and their regulations on PFAS, which still is at 70 ppt. No scientist worldwide would say that is adequate protection. So, we actually had a bill that we passed asking the DES through their science and toxicology to go ahead and come up with maximum contaminant levels.

I, for one, always find it a little fascinating for us to say: well let’s just trust the federal government to do the right thing when we know they are not necessarily doing it. If we want to wordsmith the second paragraph, that’s fine but I think there is absolutely zero harm having the scientists that are part of our state already and we have great ones at DHHS and DES to take a look at the science and perhaps come up with their own recommendations for guidelines. Not only is there legislative and statutory precedent for this kind of thing, we have selective trust of the federal government when it comes to these scientific matters. We have generally erred on the side of saying: well, let’s take a look at it ourselves. I would say, let’s vote on this one and move on.

Ricciardi: Thank you, Senator Sherman.

Gray: Again, I am not saying you are not going to put this recommendation in. I am saying that you say the guidance out there is 23 years old, but you don’t mention the documents from ’18,’19 and ’20 that affirm that they have conducted reviews that are of the current data that is out there. Unless you are going to treat both sides fairly, then the report you get at the end has no meaning.

Abrami: If you read on, it says with the intention of only protecting humans from short term effects. Obviously the first studies were done on humans, not birds, plants, insects and pollinators. I am ok taking the 24 years out but as Tom said, even with that, the state doesn’t necessarily trust what the federal government has done.

Sherman: Mr. Chair, I have a fairly straightforward wordsmith that hopefully addresses Jim’s concern. It could say: “the majority of the commission understands that current federal safety limits were made with the intention of only protecting humans from short term effects” They have looked at subsequent science but they are the same so we don’t have to get into that. We can just capture that by saying the intention.

Abrami: right. Thank you for helping with that one. That was my feeling.

Sherman: If there is no further discussion, we should move. We have to keep moving.

Abrami: we are up against a time clock here. That's why it may appear that I am rushing.

Roberge: Just a recommendation. In recommendation #1, we are asking our federal delegation to require the FCC to look at the standards with respect to human health. I am wondering why we wouldn't ask for them to look at the environmental impacts as well. An example of that was in my previous job at DES, that at the EPA looking at the Clean Air Act and standards set by EPA, there is a primary health based standard and a secondary environmental standard on things like sulfur dioxide and nitrogen oxide. I am just suggesting that we add this on for recommendation #13.

Abrami: We had it separate to highlight that only human effects have been considered and I would like to keep it separate.

Cooley: Just a comment and I don't me to belabor the point but this is more so for the minutes. States do not have jurisdiction to set their own RF safety limits. That is the exclusive jurisdiction of the FCC. For that reason, I will be voting no on this recommendation.

Abrami: Again, this is only to have the state study if it so wishes. This would be just like Tom was saying; the state took the initiative to look at PFAS a little more closely. That's what we are doing here. We are trying to add to the knowledge base.

Ricciardi: in 2018 and 2019, statements by the FDA are not about the birds, trees, and bees. If you look at the FDA reports, they are only about tumors not environmental effects. As we said before, these are just recommendations by our commission. Recommendations, do not go against the law as Senator Sherman said, you would put legislation forward. With all due respect to everyone here, there is the minority report. I don't feel that we should be constantly changing the one that the majority feels when there will be a minority report. Thank you.

Gray: Again, Denise has her opinion. The thing is that this report should have the fair and equal treatment of both sides of this issue. In paragraph one, you claim to have a fair and equal treatment of both sides. Yet, on this recommendation before it was modified, you spoke to the 23 years and ignored recent documentation issued by both the FCC and FDA. The FDA as far as I know is not in the business of protecting the environment. I agree with that. But, then we didn't go look at other guidance out there to see if it was relevant. All we are asking for is fair and equal treatment. There are experts that we would like to present but we have not been able to do that because of time considerations and scheduling problems with those experts.

If you are going to just put through recommendations on this issue that I feel are far and above what should be done without looking at both sides of the science, then I might as well sign off this call and resign from the commission because it's not doing me any good and it's not doing the citizens of New Hampshire any good. You guys rail road this thing through. Fine. But we are not protecting the citizens of New Hampshire and not providing the economic opportunities that a good and useful cell phone system will provide them. It's just very frustrating.

Abrami: Again, we lost four months due to the virus. I had a lot more speakers lined up and I kept saying to Beth, come up with more speakers. There is no changing our end date on this.

Sherman: Mr. Chair, I just want to make sure the Jim knows that I hear what you are saying and the way these commissions work is we try to be very respectful to everyone's opinion. We move forward as much as we can together and the minority report is for any additional dissent or altering opinion. But Denise, I think it's very appropriate for us to modify the final recommendations to fit as many people on the commission as possible. I fully support making the change that Jim wanted which was getting rid of the years and the timeline in the comment below. I hope we can move forward and bring this to a vote.

Ricciardi: I appreciate that and I understand. It's just the subcommittee has worked over and over again all these iterations. But I do thank you for your comments.

Abrami: any other questions or comments on this? I would like to take this one to a vote.

Sherman: I am happy to move it to a vote.

Heroux: I second.

Abrami: It's going to be as shown and taking out the "natural environment" in bold and taking out "set 24 years ago" and adding "limits were made with the intention", in its place. We will go over all these changes and do a final vote before we do a vote on the report. I will call the roll:

Tom Sherman: yes

Ken Wells: yes

Kent Chamberlin: yes

Carol Miller: abstain

Denise Ricciardi: yes

David Juvet: No, and I would like to comment. This implies that the state is going to be implementing its own RF radiation safety limits which I think will invite a lawsuit. I can't support it.

Beth Cooley: no

Brandon Garod: abstain

Michelle Roberge: abstain

Paul Heroux: yes

Gary Woods: yes

Jim Gray: no

Pat Abrami: yes

Abrami: The motion passes, 7 yes, 3 no, 3 abstain.

Any information on the numbers for satellites, Ken?

Wells: Elon Musk has approval for 42 thousand but there are other satellite companies like OneWeb but I don't know what the total number is. I would be fine if you want to remove that number of satellites or just talk about the 42 thousand that SpaceEx has been approved for their Starlink project.

Abrami: I remember seeing articles when we first started this that there were two or three companies, I think. If somebody could help me with that, I would appreciate it.

Heroux: You could put that the exact number will be updated by FCC documents. We know it's going to be at least forty three thousand and it may be higher but I don't think that people will vote yes or no on the basis of the exact number of satellites but rather on the impact of all these things.

Abrami: We can vote on the number as written with the intention that we find and have documentation for it and all of these in the appendix and we can modify 140,300 low orbiting satellites before the last meeting.

Sherman: I would recommend the following: I would take the sentence that starts with concern and un-bold it and put it in the discussion. And change the part: concern comes from the FCC projection of numerous low orbit satellites and 5G small cell antennae plus additional macro towers that will be required for these networks to function. You still need documentation in there.

Wells: Citation 53 and 57 talk about FCC license approved.

Heroux: The satellite network is something very fluid. Some of these companies go bankrupt. Essentially, there is a large uncertainty but I think that when the FCC mentions 800 thousand, it is their number and it brings home the impact on the environment because "numerous" could be five. Five is not equal to 800 thousand. When we have a number that originates with the FCC, maybe it shouldn't be in bold because it doesn't refer to a principle but at least it should be in the text underlying, in my opinion.

Gray: Again, the purpose of this commission is to study health and environmental impact. Are we saying that every one of those satellites is affecting health or the environment? No. That's not possible. The FCC has issued further guidance about whether there is a health effect and has said that they have studied the current science out there and current reports that have been done by other people. Not including a reference in this and many of the others to the fact of what the current position of the FCC is, is one sided and not a fair and balanced part of the report. You can say whatever you want but we need to present the facts on both sides, not the facts on one side. Trying to use the number of satellites, the number of antennae, the number of this, the number of that and saying that that is going to affect your health or the environment is purely trying to do fear mongering. Present the facts on both sides.

Abrami: Let's not forget that we wrote to the FCC and the FDA questions that they did not answer. We would love to have had them testify before us as well but that was not going to happen. They would not even answer our questions.

Gray: the guidance is already there on the internet. I went and found it when I was preparing the current minority report.

Ricciardi: It's a captive agency.

Sherman: I would just point out that if you look at the recommendation, it is not drawing any conclusions, Jim. It's asking for further study. I don't think it's necessary that you have to say anything when all you are asking is for further study so I disagree with you on this one. I do agree with Paul that if you want to put a number in there that is a little more dramatic then numerous, you just need to be sure that you have the source of that number documented. I am fine with a number as long as its source is documented.

Woods: I agree that we should move forward with this. This is basically an assessment tool of identifying prevalence. It's probably no different than the technology of putting roads in a hundred or so years ago. We didn't' have roads or bridges and did not have to repair them. But now, we need to assess roads and identify how many bridges we have that need repair. We are now in a different technology, wireless and like roads and bridges we are trying to identify how many we have. We are not saying bridges or roads are bad. We are trying to do an assessment of the prevalence of these items so that when we look at whether they need attention or not, we will have some idea. Again, it's like trying to assess how many bridges we have not whether they are good, bad or indifferent.

Wells: From a physics point of view, the number of antennas is relevant because if you have tens of thousands of satellites and hundreds of thousands of small cell antennas and they are all emitting energy, the energy density is increased by a factor of the number of antennas.

Abrami: Tom's suggested language moving it from the bold section to the explanation portion. Why don't we do that and between now and the next meeting, if we can verify hard numbers we can put them in the report. Is there any other discussion? Kent made motion to move the recommendation. Denise seconded it. I will call the roll:

Sherman: no vote (not on screen)

Wells: yes

Chamberlin: yes

Miller: abstain

Juvet: no

Cooley: no

Garod: abstain

Roberge: abstain

Heroux: yes

Wells: yes

Gray: no

Abrami: yes

I don't see Tom on the screen, so I will not count him. 6- yes, 3 -no, 3 -abstain. Motion passes.

RECOMMENDATION 12- Recommend the use of exposure warning signs to be posted in commercial and public buildings. In addition, encourage commercial and public buildings, especially healthcare facilities, to establish RF-radiation free zones where employees and visitors can seek refuge from the effects of wireless RF emissions.

Many NH citizens are sensitive to electromagnetic radiation emitted from devices used in the delivery of in-building cellular, and fixed wireless services. A majority of the Commission suggests owners of commercial and public buildings, especially healthcare facilities, voluntarily place signage at entrances concerning RF-levels and RF-free zones within these structures so those entering the building are aware.

Miller: It's a simple recommendation for exposure signs to be posted in commercial and public buildings especially in healthcare facilities. This is also to establish RF radiation free zones where employees and visitors can seek refuge from the effects of the emissions. It's a pretty simple recommendation. Some folks are doing it already. I can say that dentist's office tell you to shut your cell phones because it does disturb the equipment. There it is and ready for discussion.

Gray: Are we going to include the report from the World Health Organization that says exposure to this low level of radiation is not a factor and has not been scientifically tied to any syndrome? Is that going to be included at all?

Miller: I don't know. If you think that would balance off this recommendation and would like it in the appendix, I have no problem with that at all. Regardless of whether it's based in science or not, there are many citizens that are sensitive to it. It's as simple as that, for me anyway.

Gray: Again, I am just trying to be fair. There are people out there who say they are sensitive to it but there is no scientific tie in double blind studies that confirm that these people are actually suffering effects of the radiation.

Heroux: and these people don't believe that.

Miller: Right and it's just a recommendation. It's not required. We can add some NH citizens are sensitive…. Regardless of the study and add the appendix note with that. However, you think the justification for the bolded statement addresses both sides. You could put after the words: fixed wireless services…. even though not substantiated through the World Health Organization Report.

Abrami: The lead in to all these recommendations is we are following the Precautionary Principle. All of these would need NH legislative approval. The work group thought this was a reasonable recommendation to make, understanding that it's a high lift to get it through the legislature and the Governor to sign. We can add a line or two but Jim, you have the minority report. I know what you are going to say about this one. You already told us.

Juvet: Just a question for people more knowledgeable about this than me. What exactly is involved with businesses establishing RF free zones? What do they have to do in order to create that?

Miller: We had some examples where hospitals have rooms available for folks that were bothered by the electromagnetic radiation. It's not just from antennas. It comes from computers and a variety of places. I have experienced a customer coming into my business going, "whoa, I can feel everything in here". That was one of hundreds that come in.

Juvet: I am just asking for clarification. You could use hospitals as an example. What did they have to do to create that RF free zone?

Wells: From the physics point of view, you build a Faraday Cage. It's a lightweight metal lined box. It could be similar to a screened porch with metal screening or aluminum foil. Repaper the wall with aluminum foil and you are good.

Heroux: What you can do is survey the environment for the place where the fields are lowest and post signs that you don't want active sources that are controlled by individuals and you may do this at a very low cost. As Ken mentioned, you could also actively try to shield if you have some sources that are very powerful that you want to get rid of in that location.

Abrami: We have somebody who is RF sensitive who says, my oral surgeon was very happy to move me to a lower RF room and make sure no one had devices in the room.

Sherman: I think there is an easy fix on the sentence but I just want to caution Jim or others about citing any traditional or organized medical site like WHO or otherwise… that because they say it isn't so, that it isn't so. I am old enough to have been and I know others will recognize this but when I was growing up in Madison, people who had fibromyalgia syndrome or symptoms or irritable bowel symptoms were actually told by doctors, it's all in your head and come to find out, it's not. Studies were inadequate. They missed the boat. Eventually, when we got the studies together, we recognized not only that the symptoms real and reflected a true syndrome, but now they are mainstream diagnoses. The fact that RF sensitivity is not fully recognized nationally or internationally, doesn't mean a thing to me.

What I would say is "many NH citizens report sensitivity to electromagnetic radiation" and leave it at that. That's the reality. I suspect this will turn out to be a real well-documented syndrome eventually.

The science is so much in its infancy right now. I would be very cautious about saying it doesn't exist. I suspect that it does and we don't have the studies yet to prove it.

Abrami: Our recommendation #11 directs the medical community to start looking at this more rigorously. I am ok with that change.

Gray: It still does not recognize that there have been scientific experiments conducted by the WHO that was supposedly double blind and all the great things we are supposed to do when we do one of these studies that said they cannot, and not to be insensitive to people who are suffering, but they couldn't attribute it to electromagnetic radiation.

Sherman: I would just respond to that Jim, no physician in their right mind would depend upon a single study to say that something does or does not exist or that a treatment does or does not work. Would you agree with that, Gary?

Woods: Absolutely, we have seen as Tom has outlined time and again over the course of hundreds of years, theories have been thrown out on a regular basis for a variety of reasons. This is just one more in that long term step. We went through this with tobacco and we are doing the same thing again. In the chat there are some references for the WHO organization the Jim refers to. The people in the chat seem to be more familiar with it than I. There are two portions of the WHO organization. Some are associated with industry and some are not. It has been pointed out, as we have pointed out in this commission, one of the WHO organization provided the conclusion that radio frequency radiation was indeed a Class II carcinogen. So to say that a WHO organization says there are no effects, would not be inclusive of all the WHO organization findings.

Gray: Saying that it is a carcinogen, it doesn't take into consideration what the level of that radiation is. The FCC's recommendations are 50 times less than what has been demonstrated in various studies. To say that it's a carcinogen, yes at certain levels it is. When we treat cancer and have multiple doses of radiation going into a patient, we do it at different aspects so the tissue in between is not affected. To make that statement without some kind of a radiation limit, doesn't bode well for me.

Sherman: Mr. Chair, can we move the question?

Abrami: Are there any other comments? Ok, let's move the question. The only change is in the descriptor, "many NH citizens report sensitivity". Tom, are you making the motion?

Sherman: yes.

Abrami: second?

Heroux: yes.

I will call the roll:

Sherman: yes

Wells: yes

Chamberlin: yes

Miller: abstain

Ricciardi: yes

Juvet: abstain. I appreciate that this is a recommendation and not a mandate. On the other hand, I am uncomfortable with sentences like “many NH citizens”. I don’t know what “many” means in the context of the overall state population so I am on both sides of this one.

Cooley: abstain.

Garod: Brandon had to leave. He is gone.

Roberge: abstain.

Heroux: yes

Woods: yes

Gray: no

Abrami: yes

7- yes, 1-no,4- abstain. Motion passes.

We are going to go to #10.

RECOMMENDATION 10- Promote and adopt a statewide position that would strongly encourage moving forward with the deployment of fiber optic cable connectivity, internal wired connections, and optical wireless to serve all commercial and public properties statewide.

The majority of the Commission believes that fiber optic transmission is the infrastructure of the future. When compared, RF wireless transmission lacks fiber optic characteristics: speed, security, signal reliability and biological effects on humans and the environment.

The State should encourage partnerships between towns to make this happen and encourage our Federal Delegation to support grant money to assist with such deployments when it comes to funding fiber optic cable deployment especially in rural locations.

Abrami: This is really a shout out to fiber optic connectivity.

Miller: It is simply adopting a statewide position, not a body but a position that strongly encourages moving forward with deployment of fiber optic connectivity, internal wired connections and optical

wireless to serve commercial and public properties statewide. That would just mean hard wired connections or optical wireless as opposed to Wifi. Open for discussion.

Heroux: I am very in favor of this. I think in the modern world, having fast access to the internet is a human right nowadays. This should be done in the most technologically advanced way, which is optical fiber. There is both a technological aspect to this and a human aspect. I think this is very important.

Juvet: just a quick comment. I am actually prepared to vote for this recommendation because the BIA believes in an "all of the above" approach for technology and communication. My question is in the text, when you talk about comparisons with RF wireless transmissions, we are only mentioning things that don't compare well with fiber optics. I am wondering if there are any advantages to wireless and if there are, shouldn't that also be mentioned?

Abrami: The advantage would be mobility.

Miller: Well, not only mobility but cost. Being able to distribute wireless connections is a lot cheaper than hardwiring connections.

Wells: The recommendation talks about fiber optic cable and in other recommendations, we talk about wireless optical transmission. The major advantage RF has is its not tethered. It is possible to do optical without being tethered. But that's not built into this recommendation but appears elsewhere.

Abrami: Well, yes it is in here.

Wells: oh yes. Now I see it. You are right.

Heroux: Lifi (optical wireless) has advantages of privacy over radio frequency or microwave (Wifi) which is very leaky from the privacy point of view.

Cooley: I just want to note for the record that I will be voting no on this. We see this as discriminatory and it doesn't take into account the realities of geography, topography and economic realities that may limit the ability to provide fiber. By removing one type of technology altogether like wireless, you could be exacerbating the digital divide and removing options for consumers to connect. Thank you.

Sherman: I just found one tiny point. I feel like the grammar police here but in the sentence with "biologic effects in the human environment, doesn't make sense to me. The way I would say that is, "RF wireless transmission lacks fiber optic characteristics including speed, security and signal reliability while avoiding potential biologic effects on humans and the environment.

Abrami: Yes, you are right. I agree with you.

Gray: I have less of a problem with this recommendation with that change but it still assumes there is an effect on humans and the environment. We are picking one technology over another that I am not sure I am comfortable with.

Sherman: I would just add Jim, you are not picking it, but the majority of the commission feels this way.

Gray: and as Senator Sherman knows, the people who elected me elected me to voice my opinion and speak strongly in their defense.

Abrami: we respect that Jim.

Woods: This doesn't say anything about the biological being good or bad. It just says avoids it. Because when you have radiation in the environment, there will be an effect on humans. It's like measuring the bridges. We are just being cognizant that in fact, this is an exposure.

Juvet: Just a request from the commission. In my reading of this, the promotion of fiber is not meant to exclude the development of Wifi but Beth makes a good point. Is there some way in the recommendation that we could add the words, "where practical"? This would recognize that a lot of areas of this state, we recognize the benefits of that but it's just not a practical option.

Abrami: I have no problem with that.

Juvet: I would insert "where practical" and delete, "to serve all commercial and public properties statewide".

Wells: I just want to note, is it practical to put electricity I commercial and public properties? You are talking about exactly the same type of installation for fiber optic.

Abrami: I think the practical consideration David was talking about was cost.

Wells: I am thinking of the Rural Electrification Act. You know it's surely more expensive to supply service in low density areas, yet broadband is as necessary these days as electricity and running water. I don't see that adding "where practical" in here is a necessary or a desirable qualifier.

Miller: Even though I will abstain from the vote on this and have written this, I think the idea behind this… as far as cell service and all of that, everything has its place. This particular recommendation really starts to get at the infrastructure of the future which regardless of mobile technology and everything else is where New Hampshire needs to go. However you decide to wordsmith it, I would not like to see the essence of that recommendation be diluted by it. That's my thought even though I will be abstaining.

Heroux: I agree with Carol and I would like to point out that in some recommendations we talk about the majority of the commission. We start the recommendation this way. I wonder if this wording is appropriate. Why is it in some recommendations and not others when we will probably report how many people voted for it and how many voted against? I don't see any recommendation in this report that will be unanimous.

Sherman: I am just reflecting. As Ken was saying, maybe rather than using "where practical", and say "wherever possible" captures what Carol was saying. It also captures the idea that if you can get electric in there, you can get fiber optic in there. Even the top of Cannon Mountain has it. If you are on top of Mount Washington and all you have is cell service and there is no electric and you are living on kerosene

lamps, then maybe it's not possible. Practical can mean if it is $10 more to put in fiber optic, maybe it's not practical because you already have cell. I think putting in "possible" captures the spirit of what Carol was saying and also captures what Ken was saying. I am just putting it out there.

Abrami: I guess the one I have to ask is Dave.

Juvet: I would prefer practical. The senator says possible and what if it's ten thousand dollars more? Anything is possible if you want to devote enough financial resources to it.

Miller: I wanted to go back and respond to Paul's comment about the majority of the commission. I think we coined that phrase because of Senator Gray and the fact that we don't have 100% consensus on a lot of these recommendations. It's nothing more than that.

Abrami: we have three options. Either don't change it; possible; or practical.

Juvet: Mr. Chair maybe I can make it easier on the commission and perhaps we should just be voting on the original wording because I think it's going to get difficult if we are trying to find out which wordsmithing we are more comfortable with. I am not sure it will change people's votes, ultimately. I would like to withdraw my recommendation and we can just vote on the original wording.

Abrami: Ok. Thank you for that. What we are changing is, "while avoiding potential effects".

Wells: I would like to move that.

Woods: second.

We are voting on recommendation #10.

Sherman: yes

Wells: yes

Chamberlin: yes

Miller: abstain

Ricciardi: yes

Juvet: no

Cooley: no

Garod: absent

Roberge: abstain.

Heroux: yes

Woods: yes

Gray: no

Abrami: yes

7- yes, 3-no, 2- abstain. Motion passes.

Juvet: Mr. Chair, I do need to drop off the zoom meeting now because I am leading one that starts in about two minutes. Thanks everyone for all their work on this but I do need to leave at this point.

Abrami: Before you go, we are thinking of a meeting on Tuesday, the 27th one o'clock for at least two hours.

Juvet: I am available on the 27th.

Abrami: Can anyone not make that? I will check with Brandon.

Ok moving backwards now to #8.

RECOMMENDATION 8- Upgrade the educational offerings by the NH Office of Professional Licensure and Certification (OPLC) for Home Inspectors to include RF intensity measurements.

Home Inspectors currently operate as private contractors who may be hired by citizens or enterprises to measure such things as radon, to collect water quality samples, or search for mold or insect damage. Home inspectors routinely supply test results to both their clients and government entities.

The majority of the Commission believes the public has the right to discover, on a voluntary basis, the RF power intensity related to radio frequencies at a property which they will be purchasing or renting before the transaction is closed. Also, the proprietors of publicly accessible venues may wish to reassure the public about the RF power intensity within their establishments, by posting the data collected by a state-approved inspector. In addition, such testing should be paid for by the party requesting it and the testing itself should be performed by a professional who owns or rents the test equipment and has met the state requirements for training of Home Inspectors regarding RF measurements.

The majority of the Commission proposes that Home Inspectors be offered training by NH OPLC on how to measure on-site peak and 24-hour average RF intensities. Measurements of frequencies and intensities will be performed using low-cost equipment (such as GQ-390 meters). [Description of existing Home Inspector training offered for radon, mold, etc. may be seen at https://oplc.nh.gov/home-inspectors/index.htm]

Cooley: Mr. Chair, my notes say that language was supposed to be inserted making this voluntary.

Gray: My objection to this one is that we are putting it on the Office of Professional Licensure and Certification to go and do something. I don't think we need the State of New Hampshire to do that at all.

Abrami: Beth, we did add that if you go to the second paragraph…"on a voluntary basis".

Gray : if it's a voluntary program then OPLC shouldn't have to do that, take some advocacy group and develop the thing and get certified through the advocacy group. I don't think it needs to be a function of the state.

Sherman: Mr. Chair, I move that we adopt this recommendation as written.

Ricciardi: I second it.

Abrami: Ok. Let's go to the vote:

Sherman: yes

Wells: yes

Chamberlin: yes

Miller: abstain

Ricciardi: yes

Juvet: absent

Cooley: abstain

Garod: absent

Roberge: abstain.

Heroux: yes

Woods: yes

Gray: no

Abrami: yes

7- yes, 1-no, 3- abstain. Motion passes.

RECOMMENDATION 7- Require that any new wireless antennae located on a state or municipal right-of-way or on private property be set back from residences, businesses, and schools. This should be enforceable by the municipality during the permitting process, unless the owners of residences/business or school districts waive this restriction.

Local public rights-of-way are under the jurisdiction of municipalities, and the Commission feels that municipalities should uphold the rights of individuals impacted by antennae. The Commission also supports the right property owners to manage decisions on non-essential devices being placed in front of their property.

The Commission believes that it is important to prioritize citizen safety, particularly as 5G is an upgrade, rather than the provision of wireless service to unserved areas. Additional rationale for this recommendation shown in Appendix XX.

Abrami: #7 was rewritten after objections by Beth on the California firefighters. That was in the write up.

You sent us all the California Senate amendments. They say that "due to the unique duties and infrastructure requirements for swift and effective deployment of firefighters, those provisions do not apply to co- location or siting application for telecommunication facility where the project is proposed for placement of fire department facilities." This is my read on this, they are carving out the fire stations and the reason that they give is totally different from all the background history that says health effects.

They said it had to do with them interfering with their duties, not that it's health effects. They basically said having towers on top of the building is going to interfere with the swift and effective deployment of firefighters. To me, that's a sleight of hand what they are saying here. They are trying to skirt the federal law with this. To me, it's a wink and a nod. Is that the way you read this, Beth?

Cooley: You can just read the statute itself. You can imply intention or read into it all you want but the statute itself says it's got the FCC language in there that you know that states and localities cannot consider RF emissions or the alleged health effect as a reason to deny a facility. You have to read the statute as is. You can rely on innuendo or fake news coverage all you want but that's really all I have to say.

Abrami: What I don't understand is how does the cell tower on the roof impact the duties for swift and effective deployment of firefighters? I don't understand the logic.

Cooley: you have to read the statute in conjunction with the fact they are honoring federal law,

Abrami: That's the only way they can honor federal law. They are not going to say what the real issue was. The real reason was fire fighters fought hard because of health effects. We don't have the time digging into the logic of California legislature on this other than to get around the federal law and appease the firefighters. I would ask that question.

Ricciardi: If you want, I can send you documents on how they lobbied on health effects.

Abrami: we know there are documents on health effects but this is the only way they could skirt federal law. If the FCC really wanted to take this on, they could. How does a cell tower on your roof impact the swift deployment of firefighters?

Cooley: Mr. Chair, I don't think it changes the essence of the recommendation. I will be voting no and you guys all know that. Your setback requirements are unlawful and essentially a prohibition of service. Even if you conceded the California topic, which I am not, you read the statute as it's written. You still have the underlying recommendation which is incredibly problematic.

Gray: The bottom line of this is that there is a federal preemption. Whether or not there is a California law to do something, it doesn't matter. There is a federal prohibition against us doing that. That's the bottom line and this recommendation should not be in the report.

Abrami: California proves that you can do a carve-around. That's what I am seeing here. They have carved out a certain set of people. That's the way I view it.

Sherman: I just want to move to accept the recommendation as written.

Chamberlin: I will second it.

Sherman: yes

Wells: yes

Chamberlin: yes

Miller: abstain

Ricciardi: yes

Juvet: absent

Cooley: no

Garod: absent

Roberge: abstain

Heroux: yes

Woods: yes

Gray: no

Abrami: yes

7- yes, 2-no, 2- abstain. Motion passes.

Abrami: Ok. We took number six and split it into 6A and 6B.

RECOMMENDATION 6A- Signal strength measurements must be collected at all wireless facilities as part of the commissioning process and as mandated by state or municipal ordinances. Measurements are also to be collected when changes are made to the system that might affect its radiation, such as changes in the software controlling it. Signal strength is to be assessed under worst-case conditions in regions surrounding the tower that either are occupied or are accessible to the public, and the results of the data collection effort is to be made available to the public via a website. In the event that the measured power for a wireless facility exceeds radiation thresholds, the municipality is to be empowered is to be immediately have the facility taken off line. The measurements are to be carried out by an independent contractor and the cost of the measurements will be borne by the site installer.

It is recognized that theoretical calculations show that existing FCC guidelines will be met by standard cell tower configurations. However, there are cases where the radiation from towers can be focused by buildings, terrain, and beamforming antennas, causing signal levels to be considerably higher than would be expected in theoretical calculations unless those effects are taken into account. Collecting field measurements provide the only valid approach for determining whether exposure guidelines have been met. It is to be noted that some municipalities (e.g., the town of Burlington, MA [1]) have ordinances requiring measurements at cell towers.

Federal Law and NH law grant to municipalities the power in enact zoning rules regulating the placement of personal wireless service facilities within the geographic boundaries of the municipalities. Municipalities should be proactive in this area and through the exercise of zoning power establish where, how, and a process for compliance with existing FCC guidelines for signal strength in the surrounding coverage area. Municipalities should establish a hierarchy of siting values and compliance acknowledgements so that the siting most favored by the municipality is the easiest siting for the wireless applicant to obtain and conversely the siting which is least desirable should be the most difficult siting for the applicant to obtain. The zoning ordinance should lay out the compliance requirement as part of the zoning approval.

[1] Burlington, MA zoning Bylaw Wireless Facilities Section 8.4.6.2 "Annual RF emissions monitoring is required for all sites by an independent RF engineer to be hired with Planning Board approval and at the applicant's expense. Test results will be submitted to the Town as soon as available, and not later than the close of the calendar year. Annual testing of electromagnetic emission shall be required to ensure continual compliance with the FCC regulations.

Chamberlin: We split this into two separate recommendations. The change made to 6A was to add that municipalities can take the antenna off line if it exceeds thresholds. It's one thing to take measurements but what do you do about it if it's an issue? It also mentions that these measurements will be taken by an independent contractor with the cost to be borne by the site installers. This only addresses requirements that measurements be performed on the facility. We might want to discuss that first because there is a part that Carol put in also talking about the control of the facility by the municipality.

This part was added by Carol.

Federal Law and NH law grant to municipalities the power in enact zoning rules regulating the placement of personal wireless service facilities within the geographic boundaries of the municipalities. Municipalities should be proactive in this area and through the exercise of zoning power establish where, how, and a process for compliance with existing FCC guidelines for signal strength in the surrounding coverage area. Municipalities should establish a hierarchy of siting values and compliance acknowledgements so that the siting most favored by the municipality is the easiest siting for the wireless applicant to obtain and conversely the siting which is least desirable should be the most difficult siting for the applicant to obtain. The zoning ordinance should lay out the compliance requirement as part of the zoning approval.

Miller: This language comes from some presentations and attorney recommendations for towns. It simply says that federal law and NH law grant to municipalities the power to enact zoning rules regulating the placement of personal wireless service facilities within the geographic boundaries of their municipalities. The municipalities should be proactive in this area. Through the exercise of zoning power establish where and how and a process for compliance with existing guidelines for signal strength in the surrounding coverage area. They can establish a hierarchy of siting values and compliance acknowledgements so that the siting most favored by the municipalities is easiest siting for the wireless applicant to obtain. Conversely, deciding which is least desirable should be the most difficult siting for the applicant to obtain. The zoning ordinance should lay out those compliance requirements as part of that zoning approval. It's just legalese legal speak for what the municipalities can indeed control within their realm. Is there any discussion about that? It comes from Donahue, Tucker and Ciandella which does a lot of work for municipalities across the state with regard to cable franchises and wireless siting and all of the above.

Cooley: That new language is concerning to me because it's a clear outline of how to put up obstacles for deployment. So a municipality is saying we want this site here over this one but the municipality has no idea where coverage is needed or where there are coverage holes. That language is quite concerning to me.

Gray: the problem I have with this one is you start off by talking about signal strength and being able to shut down a site. If the facility is operating within the FCC goals, I don't think you have the ability to do anything after that site has been established. And then we moved to this paragraph which talks about siting the thing. That's very concerning. I can't think of powers here in the city of Rochester that have gone through the planning and zoning process that haven't gotten a favorable decision because of the strength of the law giving the FCC certain responsibilities.

Abrami: It assumes that the limits are above the FCC guidelines.

Heroux: Cultural acceptability of these installations and social acceptability to the people who use them is very important and critical in my opinion.

Abrami: I don't see anything wrong with us saying the municipality can measure whether sites are within federal guidelines. If they are not, we are saying action can be taken by the municipality. That's all it is saying.

Ricciardi: I just want to remind everyone that we are here to make recommendations based on what we have learned over the course of all of these months and that is what we are doing. We wrote long questions to the FCC, FDA, EPA. We did not get answers. They did not want to present. So we are using from the presenters, from the science and from what we read, to make recommendations to help residents in the state of New Hampshire. That's our job of this commission. This is just a recommendation based on our findings. It's not a law.

Abrami: my concern is that right now, we put three or four cell towers near each other, how do we know, who is the policeman on this? Maybe Beth knows this answer. Is the industry out there taking measurements making sure they are within federal limits?

Cooley: I don't have a clear picture on that so I don't want to say publicly. I have heard different things from different members of mine but I can look into that. I can follow up.

Gray: I wanted to comment on Denise's comment about the questions that were sent to the FCC. Many of the issues she raised are already available on the FCC and FDA website. For a commission member to send a letter off that did not even come from the whole commission in an approved list of questions to the FCC doesn't meet the common sense test in this instance. That information is available. Maybe they did not respond to Denise's letter…ok? Is the information that Denise asked for available on their website? Yes. I went in and found it. We are not citing a lot of that information anywhere in our report.

Ricciardi: "We" gave specific questions that are not answered on the website. They did not answer them and those are the answers to the question we were truly seeking to find.

Abrami: I did review them before she sent them out and we shared them with everyone. We can go round and round on this one. Let's bring it to a vote. I need a motion.

Heroux: yes.

Wells: second.

Abrami: Ok. We are voting on 6A.

Sherman: yes but I have five minutes and then I have to leave at noon.

Wells: yes

Chamberlin: yes

Miller: abstain

Ricciardi: yes

Juvet: absent

Cooley: no for the hierarchy siting language and I also need to leave at noon.

Garod: absent

Roberge: abstain.

Heroux: yes

Woods: yes

Gray: no

Abrami: yes

7- yes, 2-no, 2- abstain. Motion passes.

Abrami: let's try to do 6B. Were there any changes to this one?

Chamberlin: the only change that was made addresses taking new measurements that takes into account the impulsive nature of radiation and the summative effects. What was asked for in the last meeting of this group was that we take some of the references and put them in the appendix and that's all that we really did on this one. I also mentioned that the development of those funding protocols should be funded by the appropriate federal agency like NIH, FCC etc. We are in the process of creating more references that support the statement that it's impulsive radiation more than continuous radiation that has the deleterious effect on humans. That's the change and is in compliance with what was asked in our previous meeting.

Gray: again the FCC I believe in the spring of 2019 addresses a lot of these topics in there. They reviewed the science and found these effects are not true. You don't have any of that information in this report that is anti to the opinion of the majority of the group.

Abrami: if no more discussion, I would like to get a motion on this one and vote before the two leave.

Chamberlin: So moved.

Heroux: Second.

Sherman: yes

Wells: yes

Chamberlin: yes

Miller: abstain

Ricciardi: yes

Juvet: absent

Cooley: no because of the alleged assumption of negative health effects.

Garod: absent

Roberge: abstain.

Heroux: yes

Woods: yes

Gray: no

Abrami: yes

7- yes, 2-no, 2- abstain. Motion passes.

Abrami: I think that's it. I am going to have to pull this all together. I will rely on Joel to help me pull pieces from one place to another and I will get it to you as soon as I can. I asked the work group to pull together the appendices that go with these recommendations. The work group will meet once before the final meeting and possibly reorder these in some logical way without losing the numbering.

Jim: as soon as I know the order, I will tell you and give you a map.

Gray: It doesn't appear we will have time if you aren't meeting until the 27th. We only have a few days to do the minority report.

Abrami: I was assuming you would be working on the minority report in parallel based on the recommendations.

Gray: we have been trying to do that but every time we get changes getting it back through the people on the minority report is becoming a problem. Again, we will do our best.

Abrami: ok. The date is November 1st. If we need a little wiggle room we might be able to get it. Just because we are meeting on that date does not mean we won't have the report out to everybody before that date. Ok Jim? A lot of this is going to fall on me and Joel to get it pulled together. I will try to get it to you a week ahead of that date so you can see what it looks like before then.

Gray: and I will do my best to get the thing to you as soon as I can.

Abrami: I know Jim. We are all under pressure having to campaign at the same time.

Workgroup next meeting: Monday, the 12th 10am-12 pm. Kent, will you set that up and the other one as well?

Chamberlin: yes.

Abrami: ok very good. Thank you.

IV. Next meeting via Zoom: October 27th 1-3pm

Meeting Adjourned at 12:03 pm

Chat from HB522 Commission October 8, 2020 Meeting

From EH Trust to Everyone: 10:15 AM

800,000. We'll need an estimated 800,000 new cell sites by 2025.
https://docs.fcc.gov/public/attachments/DOC-354323A1.pdf

REMARKS OF FCC CHAIRMAN AJIT PAI
WHITE HOUSE 5G SUMMIT
WASHINGTON, DC
SEPTEMBER 28, 2018
Research showing impacts to trees sent to fcc here Testimony of Albert M. Manville, II, Ph.D., C.W. B., and Principal, Wildlife and Habitat Conservation Solutions, LLC, on Behalf of Friends of Amazon Creek, Before the City of Eugene City Planning Department in Opposition to AT&T/Crossfire's Application for a "Stealth" Cellular Communications Tower in the Upper Amazon Creek Corridor / Testimony-of-Albert-M.-Manville-for-Amazon-Creek.pdf Testimony of Albert M. Manville, II, Ph.D., C.W. B., and Principal, Wildlife and Habitat Conservation Solutions, LLC, on Behalf of Friends of Amazon Creek, Before the City of Eugene City Planning Department in Opposition to AT&T/Crossfire's Application for a "Stealth" Cellular Communications Tower in the Upper Amazon Creek Corridor / Testimony-of-Albert-M.-Manville-for-Amazon-Creek.pdf

From EH Trust to Everyone: 10:20 AM

https://ecfsapi.fcc.gov/file/10718080685516/Testimony-of-Albert-M.-Manville-for-Amazon-Creek.pdf
Trees https://ecfsapi.fcc.gov/file/1001669617135/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf

more on trees damaged https://ecfsapi.fcc.gov/file/1001669617135/RF-Radiation%20injures%20trees%202016.pdf

Published study A review of the ecological effects of radiofrequency electromagnetic fields / A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF)
https://ecfsapi.fcc.gov/file/7520939746.pdf

Published study Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem
and ecosystem – a review
https://ecfsapi.fcc.gov/file/7520943486.pdf
Impacts to insects from higher frequencies that are to be used in 5G. Here is a paper
https://ecfsapi.fcc.gov/file/1210030663890/Exposure%20of%20Insects%20to%20RadioFrequency%20Electromagnetic%20Fields%20from%202%20to%20120GHz%205g%20.pdf

From Cece Doucette to Everyone: 10:21 AM

Rec 13: Line 5, need to insert the word "were" between the words "limits" and "set".

From EH Trust to Everyone: 10:26 AM

The FDA info does not include ANY review of impacts birds or bees
in fact the FDA only looked at tumors and their "literature review" was only on tumors, not bees, not trees, not birds
See the details on the FDA here https://ehtrust.org/expert-physicians-surgeons-and-scientists-call-for-fda-to-retract-biased-anonymous-report-of-cancer-impacts-of-cell-phones/

These documents by the FDA have nothing to do with trees or birds or wildlife.
No, the EPA was defunded in 1996 AND never looked at environment
The letter I sent you from the EPA shows thats pollinators and trees and plants have NEVER been looked at

From Ken Wells to Everyone: 10:28 AM

"Starlink " wiki cites reports of FCC approvals for up to 42,000 Starlink satellite antennas:
https://en.wikipedia.org/wiki/Starlink

From EH Trust to Everyone: 10:29 AM

Statement from Dr. Albert Manville on the FDA Report on Cell Phone Radiation
https://ehtrust.org/press-statement-from-dr-albert-manville-on-the-fda-report-on-cell-phone-radiation-2/

From Cece Doucette to Everyone: 10:30 AM

The FCC is being sued for not addressing the scientific literature submitted to them showing biological affects: The Environmental Health Trust and a coalition of other commentators in 2020 also filed a court appeal challenging the FCC's order terminating its evaluation of the adequacy of FCC RF radiation limits.
https://ehtrust.org/action-alert-lawsuit-against-the-fcc/

Robert F. Kennedy, Jr.'s Children's Health Defense is also suing the FCC for negligence:

https://childrenshealthdefense.org/news/robert-f-kennedy-jr-s-childrens-health-defense-submitted-historic-case. Additionally, Dr. Jeffrey Shuren of the FDA has serious conflicts of interest, his wife is a partner in a law firm that represents the wireless industry: https://www.5gcrisis.com/shuren-petition

From EH Trust to Everyone: 10:40 AM

The EPA letter that is on your record shows there is no standard for the environment. See it here the EPA letter https://ehtrust.org/epa-birds-bees-trees-5g-wireless-effects/

Environmental Health Trust is suing the FCC . Read the brief here https://ehtrust.org/eht-takes-the-fcc-to-court/

Please be sure to read the NRDC brief that showcases the lack of review regarding environmental impacts here https://ehtrust.org/wp-content/uploads/20-1025-NRDC-amicus-brief.pdf

This Amicus brief also has the letter from the EPA that says What US agency has reviewed the research on damage to trees from cell phone radiation? If so, when was it issued and send a link to the review. Note this study showing damage from long term exposure to cell antennas. EPA Response: The EPA does not have a funded mandate for radiofrequency matters, and we are not aware of any EPA reviews that have been conducted on this topic. We do not know if any other US agencies have reviewed it. Published research can be found here https://ehtrust.org/environmental-effects-of-wireless-radiation-and-electromagetic-fields/

From Cece Doucette to Everyone: 10:41 AM

Senator Gray and others, you may wish to review the Mobile Communications and Health study commissioned in 2000 by T-Mobil, the German parent company of T-Mobile. It concluded there are many non-thermal biological effects well below public radiation exposure limit levels. They recommended specific precautionary measures should have been taken, but they were not and the industry continued to market hazardous products: https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnx1bmRlcnN0YW5kaW5nZW1mc3xneDo3MTE4NThkYmY3NmUzMzc0

From EH Trust to Everyone: 10:43 AM

Theodora Scarato of EHT asked "What US agency has reviewed the research on impacts to birds and bees? If so, when and send a link to the review. I will note the latest research showing possible impacts to bees from higher frequencies to be used in 5G." July 8, 2020, Lee Ann B. Veal Director, Radiation Protection Division Office of Radiation and Indoor Air, Environmental Protection Agency of the United States of America responded "EPA Response: The EPA does not have a funded mandate for radiofrequency matters, and we are not aware of any EPA reviews that have been conducted on this topic. We do not know if any other US agencies have reviewed it." Link to letter here https://ehtrust.org/epa-birds-bees-trees-5g-wireless-effects/

Statement by Wildlife Biologist Alfonso Balmori, BSc on the FDA Review of Cell Phone Radiation and Cancer
The FDA review omits an evaluation of the science on wireless radiation impacts to trees and wildlife. Electromagnetic radiation is a form of environmental pollution which may hurt wildlife. I am providing examples of my published research below as examples of this scientific evidence. Read the letter with studies at https://ehtrust.org/26684-2/

From EH Trust to Everyone: 10:47 AM

The FCC has NOT studied the issue. In fact they are using the lack of response by agencies to "prove' there are not effects.

From Jen White to Everyone: 10:47 AM

I second the comment above!!

From Cece Doucette to Everyone: 10:48 AM

Senator Gray and others, please read Harvard Law School's Center for Ethics report, "Captured Agency: How the FCC is Dominated by the Industries it Presumably Regulates." It likens FCC and industry approach to the tobacco industry tactics: https://ethics.harvard.edu/news/new-e-books-edmond-j-safra-research-lab

From EH Trust to Everyone: 10:53 AM

Research shows that the levels of RF will be increased with 5G infrastructure 4G densification . As an example of how rapidly RF is increasing from wireless antennas, a 2014 published study looked at RF in three European cities and found in just one year (between April 2011 and March 2012) that the total RF-EMF exposure levels in all outdoor areas in combination increased by 57.1% in Basel by 20.1% in Ghent and by 38.2% in Brussels (Urbinello 2014). "Exposure increase was most consistently observed in outdoor areas due to emissions from mobile phone base stations."
https://www.sciencedirect.com/science/article/pii/S0013935114002254

2018 study published in Annals of Telecommunications found increased RF-EMF exposure from small cell LTE networks in two urban cities in France and the Netherlands. Researchers measured the RF-EMF from LTE (Long-Term Evolution) MC (macro cells meaning large cell towers) and SC networks (low-powered small cell base stations) and found that the small cell networks increased the radio emissions from base stations (called downlink) by a factor of 7–46 while decreasing the radio emissions from user equipment exposure (called) by a factor of 5–17. So while the devices themselves could emit less radiation, the cell antennas will increase the levels from cell antennas (Mazloum et al., 2019). This study shows the increased exposures would be involuntary. We can turn our phones off, but we cannot turn off the antennas in the neighborhood. https://link.springer.com/article/10.1007%2Fs12243-018-0680-1

From EH Trust to Everyone: 10:54 AM

An Australian study published in the Journal of Exposure Science & Environmental Epidemiology also found that children in kindergartens with nearby antenna installations had nearly three-and-a-half times higher RF exposures than children with installations further away by more than 300 meters (Bhatt et al., 2016). https://www.ncbi.nlm.nih.gov/pubmed/27759027

From Cece Doucette to Everyone: 10:57 AM

Rec. 12: Can we include other essential services? These have been well defined for COVID-19, and the public should be able to access those services too.
Senator Gray and others, the WHO determined RF is a Group 2B Possible Human Carcinogen in 2011. Now that the animal studies have been completed and show cancerous tumors and DNA damage, the WHO has re-opened its investigation in 2020: https://www.who.int/peh-emf/research/rf_ehc_page/en/index1.html

From EH Trust to Everyone: 10:58 AM

Research shows low level RF is tied to harm such as promoting tumors. And more

From Cece Doucette to Everyone: 10:58 AM

Please also note there are two WHO groups for EMFs, one is populated with those with industry ties, the other has independent scientists: https://ehtrust.org/scientists-call-for-transparency-at-the-world-health-organization-emf-project/

From EH Trust to Everyone: 11:00 AM

The science shows it IS substantiated
https://www.researchgate.net/publication/305689940_EUROPAEM_EMF_Guideline_2016_for_the_prevention_diagnosis_and_treatment_of_EMF-related_health_problems_and_illnesses

https://www.sciencedirect.com/science/article/abs/pii/S0013935120303388?via%3Dihub

Electromagnetic hypersensitivity (EHS, microwave syndrome) – Review of mechanisms
Peterborough, Canada
The City has an information sheet to help organizations accommodate individuals who have electromagnetic hypersensitivity. They recommend – among other things:
Temporarily disable City owned WAP devices.
Turn off or minimize fluorescent and LED.
Notify attendees to set mobile phones to airplane mode. https://ehtrust.org/wp-content/uploads/EHS-Tip-Sheet-Peterborough-5-8-2018.pdf

From Brandon.H.Garod to Everyone: 11:00 AM

I apologize but I have to leave for another meeting starting at 11:00

From Deb Hodgdon to Everyone: 11:00 AM

my oral surgeon was very happy to move me to a low rf room and make sure no one had devices in the room.

From EH Trust to Everyone: 11:03 AM

International
France: 13 Plaintiffs Win: The Tribunal de Grand Instance of Bordeaux ordered in favor of 13 of the 206 plaintiffs who had initiated a lawsuit against the installation of the electric meter created by Enedis.
https://www.femmeactuelle.fr/sante/news-sante/compteur-linky-la-justice-donne-raison-a-13-plaignants-electrosensibles-2077743

The word "unsubstantiated" should not be used.
Plus The WhO site being referenced is industry loyal and that is well documented in published research
https://www.spandidos-publications.com/10.3892/ijo.2017.4046

Actually it IS recognized and has been in several ada cases

From Jen White to Everyone: 11:03 AM

Both myself and 10 year old son are RF sensitive. It's very real and not to be discredited. Thank you. - Thank you Tom for saying that, much appreciated!

From EH Trust to Everyone: 11:04 AM

Austrian Medical Association
The Austrian Medical Association has developed a guideline for differential diagnosis and treatment of health problems associated with outdoor and indoor electrosmog.
Guidelines of the Austrian Medical Association for the diagnosis and treatment of EMF related health problems and illnesses (EMF syndrome) https://ehtrust.org/wp-content/uploads/The-Austrian-Medical-Association-Guidelines-for-Diagnosis-and-Treatment-of-EMF-related-Health-Problems.pdf

Exposure to Nonionizing Radiation ICD 10 Medical Codes for Exposure to nonionizing radiation – ICD-10-CM W90
"The ICD-10 code is the standard diagnostic tool for epidemiology, health management & clinical purposes. It is used for medical code lookups by physicians, nurses, researchers, health information managers, medical billing coders, health information technology workers, insurers & patient organizations to classify diseases and other health problems recorded on many types of health records, including death certificates. ICD 10 codes are also used by medical billers & payers for reimbursement purposes."
Medicare Accepted ICD-10 codes under W90 for Exposure to other nonionizing radiation. These codes can be used for all HIPAA-covered transactions.

From Cece Doucette to Everyone: 11:04 AM

The public is welcome to join health care practitioners for the continuing medical education-accredited EMF Medical Conference in January where you will learn the science. We do have the studies already to prove wireless is harmful: https://emfconference2021.com/

From EH Trust to Everyone: 11:05 AM

2014:US Resident Provided Accomodations in Housing Case Regarding "Smart" Water Meters: Mechanical Meter For Resident PLUS Neighbors
Not only was a resident provided a mechanical meter after filing in court and coming to an agreement with the water authority; but in addition the neighbors of three adjacent properties also were provided free opt outs for the switch to mechanical meters.
That is correct- this switch AWAY from water meters was made with NO charges- NO FEES. The legal filing says that the Fair Housing Act prohibits discrimination based on disability.
Click here to see redacted HUD water meter agreement. https://ehtrust.org/wp-content/uploads/HUD-meter-settlement-Redacted.pdf

2014; Los Angeles Unified School District Accommodated a Teacher Who Fell Ill After Wireless Installation.
On September 18, 2014, LAUSD, the second largest public school district in the US, officially accommodated teacher Ms. Anura Lawson by approving her request to have the Wi-Fi turned off in her classroom during the 2014-2015 school year and alternatively approving a reassignment to a different school site where Wi-Fi has yet to be installed.
Watch the video of her testimony to the LAUSD School District Here. Read her letter of accommodation here. https://ehtrust.org/wp-content/uploads/LA-Teacher-Accomodation.pdf

From EH Trust to Everyone: 11:06 AM

We, physicians, acting in accordance with the Hippocratic Oath, we, scientists, acting in the name of scientific truth, we all, medical doctors and researchers working in different countries worldwide, hereby state in full independence of judgment,
that a high and growing number of persons are suffering from EHS and MCS worldwide; that EHS and MCS affect women, men and children;
that on the basis of the presently available peer-reviewed scientific evidence of adverse health effects of electromagnetic fields (EMFs) and various chemicals, and on the basis of clinical and biological investigations of patients, EHS is associated with exposure to EMFs and MCS with chemical exposure…"
Excerpt from the 2015 Brussels International Scientific Declaration on Electromagnetic Hypersensitivity and Multiple Chemical Sensitivity. Download http://www.ehs-mcs.org/fichiers/1441982143_Statement_EN_DEFINITIF.pdf

Magda Havas PhD at the National Institute of Environmental Health Sciences
"Electrosmog, the missing link as it relates to cancer, reproductive problems and electrohypersensitivity." https://www.youtube.com/watch?v=fqMCjEs9oxE&feature=emb_logo

From EH Trust to Everyone: 11:09 AM

The Who EMF project was started by industry funddscientist.
See EHT and others letter to The WHO EMF Project . They refuse to answer our letter and we have asked numerous times about that factsheet on The Who site . https://ehtrust.org/scientists-call-for-transparency-at-the-world-health-organization-emf-project/

There is no 50 times safety margin. This is a false statement because research on FCC record shows it. Read it here https://ecfsapi.fcc.gov/file/7520958286.pdf

From Cece Doucette to Everyone: 11:09 AM

The FCC limits are only based on heat exposure. The peer-reviewed non-industry funded independent science shows there is significant harm at the non-thermal level. Please see the Bioinitiative Color Charts for a summary of the science and findings of biological effects: https://bioinitiative.org/rf-color-charts/

From EH Trust to Everyone: 11:11 AM

The 50 times margin was based on a study of rodents with a thermometer in their rectum and it has been well disproved by science. Plus it is only about heating effects so it has nothing to do with cancer. https://ecfsapi.fcc.gov/file/7520958286.pdf

In fact for carcinogens the safety limit can be up to 10,000 times the level that cancer was found
So even if there was a 50 times safety margin- it is not adequate protection.

From Cece Doucette to Everyone: 11:11 AM

Rec. 10: Can we expand this to bring hard-wired to residential premises too?

From Jen White to Everyone: 11:14 AM

https://www.emfanalysis.com/fiber-optics-increasing-electrical-sensitivity/ - Will low EMI fiber optics be explored or discussed at some point?

From Cece Doucette to Everyone: 11:15 AM

Reliability is a factor too, in emergencies from storms, fires, etc., cell antennas often go down which leaves the public vulnerable to not being able to call for emergency services.

From Jen White to Everyone: 11:17 AM

We have a wired internet system that is not fiber optic. This is preferred and residents should have a choice, especially RF sensitive people such as myself.

From EH Trust to Everyone: 11:20 AM

There are no protections at the federal level to stop companies from using fiber for wireless purposes. Remember that if fiber optic is laid on a road, then a company can use it for their small cell. There should be federal protections in place to stop this.

Wireless companies like fiber because then they can attach wireless antennas.
It should be wired to and through the premises. Please see this study on how to hardwire in buildings
https://www.sciencedirect.com/science/article/pii/S0360132319305347

From EH Trust to Everyone: 11:31 AM

Please read about how wired technology uses more energy consumption compared to wired.
https://ehtrust.org/science/reports-on-power-consumption-and-increasing-energy-use-of-wireless-systems-and-digital-ecosystem/

The California Association of Realtors' Property Sellers Questionnaire specifically "cell towers" listed on the disclosure form for sellers of real estate. The seller must note "neighborhood noise, nuisance or other problems from.. " and includes cell towers and high voltage transmission lines on the long list problems. Click here to see the California Association of Realtors' Property Sellers Questionnaire (p. 3-4 under K. Neighborhood) https://ehtrust.org/wp-content/uploads/Real-Estate-Seller-Property-Questionaire-reduced-12-17-1.pdf

From Paul Bloede to Everyone: 11:32 AM

I show a vote was taken on both 8 and on 8A, at the 9/22 meeting. Both were approved, with slightly different tallies. 8 was voted in with 7 yes, 1 no, and 5 abstain.

From EH Trust to Everyone: 11:33 AM

2014 Survey by the National Institute for Science, Law and Public Policy (NISLAPP) in Washington, D.C., "Neighborhood Cell Towers & Antennas—Do They Impact a Property's Desirability?"
Home buyers and renters are less interested in properties located near cell towers and antennas, as well as in properties where a cell tower or group of antennas are placed on top of or attached to a building. 94% said a nearby cell tower or group of antennas would negatively impact interest in a property or the price they would be willing to pay for it.
Read the Press Release: Survey by the National Institute for Science, Law & Public Policy
https://electromagnetichealth.org/electromagnetic-health-blog/survey-property-desirability/

Best Best and Krieger Letter to Ms. Marlene H. Dortch, Secretary Federal Communications Commission September 19, 2018 "RE" Smart Communities and Special Districts Coalition – Ex Parte Submission: Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment, WT Docket No. 17-79; Accelerating Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment, WC Docket No. 17-84" "A good example lies in the Commission's discussion of undergrounding.62 The Commission at once appears to recognize that communities spend millions of dollars on undergrounding projects, and that allowing poles to go up in areas where poles have been take down has significant impacts on aesthetics (not to mention property values)."

From EH Trust to Everyone: 11:34 AM

https://www.montgomerycountymd.gov/cable/Resources/Files/Towers/cellTowerInfo/Ex%20Parte-Smart%20Communities%20and%20Special%20Districst%2009-19-18-c2%20(1).pdf

"Appraiser: Cell Tower Will Affect Property Values" New Jersey Patch on T Mobile Cell Tower "Properties that are approximately close to the tower will suffer substantial degradation to their value based on the nature of the unusual feature in the residential neighborhood." https://patch.com/new-jersey/bridgewater/appraiser-t-mobile-cell-tower-will-affect-property-values

From Deb Hodgdon to Everyone: 11:34 AM

I know a home inspector who is very interested in being trained and licensed to do that

From EH Trust to Everyone: 11:37 AM

ConsumerWatch: 5G Cellphone Towers Signal Renewed Concerns Over Impacts on Health
In this news report below- California investigative reporter Julie Watts interviews firefighters and California officials on the SB649 exemption for firefighters. It is very clear this is about health effects as the firefighters state it

From Deb Hodgdon to Everyone: 11:37 AM

sounds like it interferes because you can't think quickly and efficiently

From EH Trust to Everyone: 11:39 AM

Read it here https://sanfrancisco.cbslocal.com/2018/01/25/consumerwatch-5g-cellphone-towers-signal-renewed-concerns-over-impacts-on-health/

you can simply say that the firefighters lobbied because of health effects
Which is documented in numerous documents
The CBS story say So, following lobbying by firefighters, assemblyman Quirk and his co-author exempted fire stations from their bill, making them one place cell companies couldn't put a tower."
read it here https://sanfrancisco.cbslocal.com/2018/01/25/consumerwatch-5g-cellphone-towers-signal-renewed-concerns-over-impacts-on-health/

you could quote the CNS report https://sanfrancisco.cbslocal.com/2018/01/25/consumerwatch-5g-cellphone-towers-signal-renewed-concerns-over-impacts-on-health/

From Cece Doucette to Everyone: 11:39 AM

Rec 7: There is a private property owner in Pittsfield, MA who just opted for a cell tower on the edge of the property, which abuts a neighborhood of eights streets. Only three of the proposed 46 antennas have been turned on, and children and adults are already experiencing headaches, insomnia, cognitive impairment, and one little girl described it as, "Mommy, I feel all buzzy inside." The public needs to be protected from all cell antennas regardless of whose property they are on. The epidemiological studies

show similar biological effects within 1,500 or so feet from a cell antenna:
https://sites.google.com/site/understandingemfs/cell-towers

From Deb Hodgdon to Everyone: 11:40 AM

yes pat.

From EH Trust to Everyone: 11:42 AM

““This is the first piece of legislation that anyone is aware of where somebody got an exemption because they were concerned about health. Did they tell you at all about the study?” we asked the assemblyman.

Quirk’s response: “All I know is that when the firefighters ask, I do what they ask me to do.”
https://sanfrancisco.cbslocal.com/2018/01/25/consumerwatch-5g-cellphone-towers-signal-renewed-concerns-over-impacts-on-health/

This is a study- although a few years old- details why restricting cell towers from schools is a human rights issue https://ecfsapi.fcc.gov/file/1070795887708/Roda%26Perry_EnvSci%26Policy_.pdf

From EH Trust to Everyone: 11:54 AM

The FCC is not actively taking measurements.
In fact a Wall Street Journal shows many sites exceed FCC limits
https://www.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055 One in 10 sites violates the rules, according to six engineers who examined more than 5,000 sites during safety audits for carriers and local municipalities, underscoring a safety lapse in the network that makes cellphones hum, at a time when the health effects of antennas are being debated world-wide.
No, the FDAdoes not say anything about bees and trees

From Cece Doucette to Everyone: 11:54 AM

6A: Minor typo on the bold line, "...be empowered is to be immediately..." remove the words "is" and "be".

From EH Trust to Everyone: 11:59 AM

If you go to the website by the FDA
you will see that in fact they have not looked at all the data
The FDa did not look at impacts to sperm or impacts to brain damage. That is all on the record
https://ehtrust.org/scientistsletter-calling-for-a-retraction-to-the-fda-report-on-cell-phone-radiation-and-cancer/

From Jen White to Everyone: 11:59 AM

If 5G moves forward in NH, Will there be any RF "safe zones" in residential areas where RF sensitive residents live? If we have a 5G repeater outside of our home.....that is literally a sick sentence for my 10 year old son!

From EH Trust to Everyone: 12:03 PM

For the record https://www.sciencedirect.com/science/article/pii/S2542519618302213?via%3Dihub Ronald N. Kostoff, Paul Heroux, Michael Aschner, Aristides Tsatsakis, Adverse health effects of 5G mobile networking technology under real-life conditions, Toxicology Letters, Volume 323, 2020, Pages 35-40, https://www.sciencedirect.com/science/article/abs/pii/S037842742030028X

Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective, Environmental Pollution, Volume 242, Part A, 2018, Pages 643-658, ISSN 0269-7491, https://doi.org/10.1016/j.envpol.2018.07.019 . https://www.ncbi.nlm.nih.gov/pubmed/30025338

NH COMMISSION TO STUDY THE ENVIRONMENTAL AND HEALTH EFFECTS OF EVOLVING 5G TECHNOLOGY

Meeting held:
10/27/20
1:00 -1:47pm EST
Via Zoom (https://unh.zoom.us/j/8760768986)

Via telephone-US (1 312 626 6799 (US Toll) ID: 876 076 8986)

In attendance: (13)
Rep. Patrick Abrami-speaker of the house appointee
Rep. Ken Wells- speaker of the house appointee
Kent Chamberlin, Phd.-UNH-appointed by the chancellor
Denise Ricciardi-public-appointed by the governor
Michele Roberge-DHHS- Commissioner of DHHS appointee
Paul Heroux,Phd.- Professor of Toxicology, McGill University- speaker of the house appointee
Rep. Gary Woods-speaker of the house appointee
Senator Jim Gray-president of the senate appointee
Senator Tom Sherman-president of the senate appointee
Brandon Garod,Esq.-AG designee, Asst. AG Consumer Protection
Bethanne Cooley-CTIA , trade association for wireless industry and manufacturers
Carol Miller-NH Business & Economic Affairs Dept.
David Juvet-Business and Industry Association

Not present: (0)

Meeting called to order by Rep Abrami at 1:03 am

Abrami: Due to the Covid 19 virus and the Executive order signed by the Governor this public meeting is allowed to be conducted via Zoom. It is open to the public for viewing and was duly posted as a zoom meeting. With that said, if you are not a member of the Commission, can you please turn your cameras off and mute yourselves? That would be much appreciated. In addition the meeting is being recorded as an aid to doing the minutes. All chat room discussions will be included in the minutes.

I. Approval of minutes from 10-8-20

Let's start with the minutes from the October 8th meeting. I have not received any changes to the minutes that I sent out about a week ago. Are there any changes that anyone wants to make? Seeing none, I will say …without objection, we approve the minutes from that meeting.

II: Agreed to Recommendation changes

Sherman: Pat, I think you need to do the "right to know" script and a call of the roll, don't you? Maybe it's different for the House than the Senate.

Abrami: I am doing it with what I just read. The last meeting we voted on many of the recommendations in the report and I want to go through to show you. Kent, can you pull up Page 9? I am not going to be able to see you all as Kent will be sharing his screen. So members just jump in if you have something to say.

Fourth line from the bottom, "principle" was spelled incorrectly and was corrected.

Recommendation #1 is the old 1. We agreed after the bold where you see Telecommunication Act, to delete "TTA".

Recommendation #2 is the old 3. We changed "attachment" to "appendix". "There is" in the last line was taken out as it made no sense.

Recommendation #3 is the old 4.The word "harm" was taken out three lines from the bottom as that made no sense.

Recommendation #4 is the #5, the next to the last paragraph: five lines up: is required for "data".

Recommendation #5 is the old 6A. In the bold where it says, the municipality is… "to be" was deleted. "in " was changed to "to".

Recommendation 6 is the old 6B: should show "as having" instead of "to have" significant impact. Joel, please change that.

Recommendation 7 is the old 7. The "of" was inserted between right and property.

Recommendation 8 is the old 8.

Recommendation 9 is the old 8A.

Recommendation 10 is the old 9. "detailed" replaced detail.

Recommendation 11 is the old 10,

Recommendation 12 is the old 11,

Recommendation 13 is the old 12.

Recommendation 14 is the old 13.

Recommendation 15 is the old 14.

Those are the changes. Does anybody recall anything differently about any of these changes?

III: Report walk through

Abrami: Kent, can you put the report back up? On this first page, Beth contacted me. We have Beth as representing cell phone/wireless technology industry. We are going to put CTIA, representing the wireless industry. Is that okay with you Beth?

Cooley: That's fine. Thank you.

Abrami: The next page is the disclaimer that all three agencies were okay with.

Miller: Before we move on, my title is incorrect as well. I am not representing the High Tech Council. That no longer exists. It's the Tech Alliance but I am not representing them either. I am from the New Hampshire Dept. of Business and Economic Affairs.

Abrami: Any others on title changes? Ok. Next we have the Table of Contents. We have a bit of introductory discussion then a summary of observations and the recommendations that we went over. We have chosen to insert the Minority Report in the report. We will get to the Minority Report in a while. Then we have the Appendices and the Minutes, which are extensive. They are basically a total recording of what happened in our meetings. As far as the introduction, I talk about the Commission responsibilities and my view that it's an evolving role as we learned about the different technologies and how 5G works with 4G and 3G. Our discussions evolved over time. Basically, it became all things RF radiation. We talked about the various meetings that we had and who the main presenters were and our big hiatus for four months. Then we have Questions posed by HB522. Then we have a section on Summary and Observations. We actually got the reference to the 800,000 small cell towers from the CTIA website.

IV:Discussion

Abrami: Any discussion?

Sherman: Pat, I just want to thank people both on the Majority and the Minority side for all the work they put in. I think everybody in spite of their differences of opinion or their different interpretations of the science. I think everybody has approached this with incredible fairness and collegiality. Thank you for leading it and for all the work that everybody has done.

Abrami: I was going to say when we got to the Minority Report, Jim I think you did a great job on it. To me, it makes the report even better having both sides represented in the report. The majority of the members yielded to the precautionary principle because there are still a lot of unanswered questions. Is there any other discussion?

V: Report Vote

Let's vote on the majority report: Yes, No or Abstain.

Sherman: yes

Wells: yes

Chamberlin: yes

Miller: abstain

Ricciardi: yes

Juvet: no

Cooley: no

Garod: abstain

Roberge: abstain

Heroux: yes

Woods: yes

Gray: no

Abrami: yes

7-yes, 3-no, 3-abstain. This will be considered the Majority Report.

VI. Minority Report:

Abrami: Jim, we have to have a lead in. For example, Jim Gray and the others who want to sign on have to let us know who they are. Jim do you want to go through this?

Gray: I am not going to go through a lot. One of the reasons that we got the report to you twenty four hours before this meeting is so that you could look at it. It's the same things that I have been talking about in the various meetings. The FCC and the FDA have on their websites a plethora of information about the safety of 5G and 4G and 3G as they are used for the cell phone industry. The first page starts off as a quick summary about the 50x safety factor that's in there and the rest. There are a lot of references in there because we were trying to say that we are not making these things up. There is stuff that is available on the FCC and the FDA websites. I can't remember if we left the WHO in there or not at the end. Things tend to get a little confused right now with campaigning and everything else. You have had a little time to review it. If anyone has questions, they can forward them to me. What I would do

rather than having anyone on this zoom meeting say they support or don't support. It would certainly be fine with me if someone wanted to notify you as the chair at some other point. I think I will leave it at that.

Abrami: Any questions for Jim?

Juvet: no questions, Mr. Chair. I think you said those who want to sign onto the Minority Report that they need to let you know. I wish to be signed on to the Minority Report.

Cooley: As would CTIA as well.

Abrami: Ok. Fine. So you don't have objection at the beginning to say the three of you are the Minority members? Is that ok?

Gray: either at the beginning or at the end.

Abrami: I am going to yield to Joel.

Anderson: I think it is just as well to put it at the beginning. People will know upfront who the Minority Report is from.

Gray: It can be as simple as, the undersigned not being able to agree with the majority, offer the following report and then list the three names. Does that work for everyone?

Abrami: yes.

Anderson: Can it be instead that you endorse the report? Because you won't actually be signing it.

Abrami: House Commissions don't require signatures.

Juvet: Whatever the appropriate wording is, I am good with.

Abrami: Joel, after we do it, we can share it with the three Minority members.

Ricciardi: is it acceptable to read my comments?

Abrami: yes. It's appropriate.

Ricciardi: I genuinely appreciate everybody's point of view.

First, on foot note two, it addresses only thermal effects but if you see appendix D of the Majority Report there is science showing harmful effects at the non-thermal level. I just wanted to draw attention to that. In the Minority Report, it cites the IEEE papers but the IEEE does not have medical or biological expertise. However even the IEEE has acknowledged harm at the non-thermal level in two papers which I have sent to you. In 2016 IEEE acknowledged biological effects of non-ionizing microwaves in the IEEE Power and Electronics magazine article. I wanted to also mention that the Minority Report makes several references to the American Cancer Society but fails to provide links to the sources. Furthermore, the American Cancer Society in 2016 called the NTP study a paradigm shifting of good science. The

public should also note that the American Cancer Society reports a sharp rise in colon and rectal cancer among young adults at the very locations where many carry their cell phones. In footnotes 11 and 12, the World Health Organization citations are out of date. In 2020, the WHO reopened its investigation into the biological effects. Additionally, there are two groups at the WHO that report on EMFs. One is represented by the industry. The other is represented by independent scientists with credentials appropriate to weigh in on the biological effects. In footnotes 18 and 19, the Minority Report indicated the rate of brain tumors in humans as being flat for the last twenty years. This is not true. Cancer registries are typically five years behind and while overall cancer cases are not rising as they once did. The following show dramatic growth where cell phones and wireless devices are used or stored on the body or cell tower emissions. The incidence of glioblastoma is the deadliest type of brain tumor and I have links to all of this that I have mentioned which I am going to forward to you. The last thing I want to say is that industry tends to focus on the cancer rates as cancer takes the longest time to develop during which time the industry can continue to promote toxic products. Other diseases are developing more rapidly as shown in the Majority Report,in Appendix D, including infertility, neurological harm and especially to children. With regard to the section on 5G mm waves, the IEEE is referenced yet again. These are industry engineers who do not have the biological expertise. I just wanted that for the record.

Abrami: Ok. It will be in the minutes.

Heroux: Essentially, one thing I regret is I am addressing primarily the people of the Minority Report, is that there was not more discussion between us. What I mean by this is technical discussion in looking at the actual issues. I know that probably most of the people of the Minority Report felt very solid in their opinions relying on legislation that was passed and I can understand that. In spite of our differences, I do respect your opinion because this is your opinion. One last comment is that we were not provided the material that would have led to this discussion. Perhaps the people who were in the Majority Report could assemble more energy to present. In fact, the same amount of enthusiasm was not apparent on the other side. I would like to remind the Commission that on January 10th meeting, there were promises by the CTIA to provide us with reports that support the positive health impacts of cellphone deployment. These reports did not materialize. Essentially, I think that the lopsidedness that is quoted in the Minority Report is more a result of energy and initiative in providing evidence. Thank you.

Abrami: Ok. Any other comments at this point?

VII: Minutes of this Meeting:

Abrami: Let's talk about the minutes of this meeting. They will be in the report. Deb Hodgdon is going to work very hard and we will get the minutes out to everybody. We will not have a meeting to approve them. If you see something you think is incorrect, please email me. We want to get this report in by November 1st with the minutes of this meeting included. Is that okay with everybody? Ok. Thank you.

VIII: Submission Process

Abrami: I talked to Jim about this. I think he is okay with us putting the Minority Report in the same style type as the rest of the report. There will be a letter of transmittal. The report goes to the Governor, the Speaker and the Senate President. There is a letter of transmittal that the House staff will put together. There are no signatures on it just the letter of transmittal that goes on top of the report and it's sent out. This report will be posted online on the Commission's website. We added that website to the report so if anybody wanted to see the additional information or papers we posted there, things like that will be available for the public. It's all about the minutes. No pressure Deb. If I stop talking, we can get the minutes done sooner right?

IX. Commission Farewells

Abrami: First I want to say, it's been a pleasure working with all of you. We had a great group. There were a lot of scientific minds in the room, legal, business. We didn't agree on everything as Tom said but I think we all got along very well. I want to specifically point out Kent Chamberlin for coming to the rescue. When we couldn't get bandwidth from the state to continue this Commission, he volunteered. Or I asked him to volunteer! UNH's zoom capacity was great as well as setting up all those meetings and being behind the scenes making the meetings go smoothly.

I want to thank Joel Anderson for his support behind the scenes. It was a lot of work especially when it came to the report and I think I hinted at this when I sent something out. There was one night he worked until ten o'clock at night to get the report ironed out. He proofed a lot of the report and found links that were outdated or not working and corrected those. Thank you, Joel for going beyond the call of duty.

And of course I want to point out Deb Hodgdon who has been doing our minutes since the beginning. These minutes are more like a court transcription. I know she spends a lot of time going through and preparing those.

I also want to thank the audience. I know we never formally opened it to the public which I had promised. That has to do with the fact that we closed down for four months. We missed five meetings. We were just cramped for time or we would have opened this up more to the public. But with zoom, we were able to open it up to more than just ten or so people that would gather at the onsite meetings at the statehouse. We have people from all over participating. Their comments in the zoom chat were captured and added to the minutes.

I thank you all again. Does anybody want to make any closing comments?

Ricciardi: I just want to say that it was an honor to work with all of you. It really was and I am so proud of the work that we have all done. So, thank you.

Heroux: To me, this commission is extremely memorable. I would like to congratulate the Chair on bringing this difficult boat to port. I want to ensure all of you, especially those of the Minority Report

that you can contact me at any point in the future and you will have my full cooperation if you need my help. Thank you.

Cooley: Will we be notified when the letter of transmittal is sent? Will the Commission know?

Abrami: We will make sure everyone gets notified. It will be out there electronically and we will let you know where to go to find it.

Cooley: Thank you.

Abrami: Stay well. We are formally adjourned (1:47 pm)

Chat from HB522 5G Commission Meeting, October 27, 2020

From Beth Cooley to Me: (Privately) 01:23 PM

Should Herman's video be shown? just curious. I've directed my members to turn their videos off

From Theodora Scarato to Everyone: 01:27 PM

The World Health Organization EMF Project The World Health Organization EMF Project says "There is no consensus."

Dr. Emilie van Deventer, Head of the World Health Organization's EMF Project was quoted in The Daily Princetonian, "The data is gray. It's not black and white...There is no consensus, it's true."

"Furthermore, as I see it, the WHO EMF Project was not only hijacked by the ICNIRP but, from the inception, it was set up as a front for the ICNIRP agenda of unifying exposure standards to RF-EMF, " stated Dariuz Leszczynski PHD (a member of the EMF working group of the WHO/IARC who stated in 2020," ICNIRP is a private club. Its new members are selected by the current members where the prerequisite of selection is the very close similarity of opinions on non-ionizing radiation health effects. There are no published criteria for the selection of new members. Nobody checks whether the selected experts are sufficiently good experts."
https://betweenrockandhardplace.wordpress.com/2020/09/08/leszczynski-there-is-something-utterly-wrong-with-the-icnirp-membership/

From Theodora Scarato to Everyone: 01:27 PM

Fact: There is no 50 times safety margin. The FCC is ignoring the science and promoting the myth of the 50 times safety factor despite being informed that it is not based on scientific fact.
Scientific data refutes the claim. The FCC says this factor is based on studies that show behavioral disruptions to animals at 4 w/kg. However the EPA found thermal harm at 1 W/kg. The EPA stated in 2020 that the last time the agency did a research review was in 1984 as detailed in the 1984 EPA Report The Biological Effects of Electromagnetic Fields. The EPA 1984 Report concludes with the summary that

“It has been concluded from this review that biological effects occur at SAR up to about 1 W/kg some of them may be significant under certain environmental conditions.” Therefore the level of harm of 4W/kg used by IEEE and adopted by FCC is inaccurate. See the 1984 EPA report, Comments of Pong Research Corporation, Environmental Working Group and Environmental Health Trust.
https://ehtrust.org/epa-1984-report-biological-effects-of-emfs/

From Theodora Scarato to Everyone: 01:28 PM

Furthermore, the Environmental Protection Agency typically uses safety factors in the 100s or 1000s range for noncancer endpoints and for carcinogens, a threshold or nonthreshold approach is used (National Research Council (US) Committee on Improving Risk Analysis Approaches Used by the U.S. EPA).
https://www.ncbi.nlm.nih.gov/books/NBK214619/

Of key importance, even if there were a slim safety factor, the level chosen is about heating harm only. It is thermally based and has nothing to do with biological harm from non thermal exposures that can occur at far far lower RF exposures.
Furthermore these limits were not based on protecting trees, birds, insects or the natural environment. Thus, flora and fauna are entirely unprotected.
The EPA 1984 Report concludes with the summary that “It has been concluded from this review that biological effects occur at SAR up to about 1 W/kg some of them may be significant under certain environmental conditions.” Therefore the level of harm of 4W/kg used by IEEE and adopted by FCC is inaccurate.

From Theodora Scarato to Everyone: 01:30 PM

There is no 50 times safety factor as a fact of science. The FCC is ignoring this science - ignoring the EPA
Ignoring facts
Despite the fact that the WHO EMF Project website seems to imply the research shows no harm, such statements are unsubstantiated and are based on a house of cards. The fact is the WHO EMF Project has yet to do a full evaluation of the recent research and the last monograph was in 1993. This is stated on their website quite clearly “The World Health Organization is undertaking a health risk assessment of radiofrequency electromagnetic fields, to be published as a monograph in the Environmental Health Criteria Series. This publication will..update the monograph on radiofrequency fields (1993).”
https://www.who.int/peh-emf/research/rf_ehc_page/en/
Do not confuse the World Health Organization EMF Project with the The World Health Organization International Agency for the Research on Cancer.

These are two separate entities. Unlike the WHO EMF Project (started by a scientist found to be funneling industry money though a university), the WHO International Agency for Research on Cancer (WHO/IARC) which is vetted for conflicts of interest and for whom scientists cannot be financially connected to Telecom.

From Theodora Scarato to Everyone: 01:34 PM

In 2011, the WHO/IARC classified RF as a Class 2 B "possible" human carcinogen based primarily on evidence from human studies that long-term users of mobile phones held to the head resulted in an elevated risk of developing brain cancer. One major reason that the IARC rating was not at "probable" or "known" was the lack of clear evidence from animal studies for exposure leading to cancer.
https://www.iarc.fr/wp-content/uploads/2018/07/pr208_E.pdf
In 2019, the advisory group of the International Agency for Research on Cancer (IARC) of the World Health Organization released new recommendations to reassess as a "high priority" the cancer risks of radiofrequency (RF) radiation between 2020–2024. The recommendations were published in The Lancet Oncology on April 18, 2019.
https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(19)30246-3/fulltext
CDC shows tumors increasing in children. Read it here https://ehtrust.org/cdc-finds-brain-liver-and-thyroid-cancers-increasing-among-us-children-2001-2014/

From Theodora Scarato to Everyone: 01:35 PM

http://aspho.org/uploads/meetings/2018annualmeeting/Abstracts_for_Website.pdf
Centers for Disease Control and Prevention, Atlanta, Georgia, United States
link: http://aspho.org/uploads/meetings/2018annualmeeting/Abstracts_for_Website.pdf
"increased for non-Hodgkin lymphomas (except Burkitt lymphoma), central nervous system neoplasms, renal tumors , hepatic tumors , and thyroid carcinomas…"
http://aspho.org/uploads/meetings/2018annualmeeting/Abstracts_for_Website.pdf
From EHT- Recently a reporter told EHT that this data seemed to be in contradiction to information posted on the National Cancer Institute (NCI) website. The reporter asked how EHT could be stating that CDC says brain cancers are rising in pediatrics when the reporter went online and found information stating "the brain cancer rates were stable." He sent this link.
So we wrote the CDC scientist and the CDC scientist responded to EHT that that the NCI link sent by the reporter refers to statistics that represent only 13.4% of the US population, whereas the new CDC report uses the USCS database representing 98% of the US population.

From Theodora Scarato to Everyone: 01:37 PM

The European Scientific Committee on Health, Environmental, and Emerging Risks' "Potential effects on wildlife of increases in electromagnetic radiation statement identified emerging issues (including 5G, E-cigarette, and chronic diseases.) The Committee prioritized 5G impact as "high" noting the lack of adequate research and citing studies documenting harmful effects such as Pall 2018, Di Ciaula 2018 and Russell 2018. The report concluded "the lack of clear evidence to inform the development of exposure guidelines to 5G technology leaves open the possibility of unintended biological consequences."
https://ec.europa.eu/health/sites/health/files/scientific_committees/scheer/docs/scheer_s_002.pdf
The 2020 Executive Summary of the Health Council of the Netherlands said clearly that there is no information on mm-waves and human health:"…There has been almost no research into the effects of exposure to frequencies around 26 GHz…"And they recommended against using higher frequencies stating "…The committee recommends not using the 26 GHz frequency band for 5G for as long as the potential health risks have not been investigated…"

From Theodora Scarato to Everyone: 01:37 PM

https://www.healthcouncil.nl/documents/advisory-reports/2020/09/02/5g-and-health

From Cece Doucette to Everyone: 01:39 PM

When will the report be posted?

From Theodora Scarato to Everyone: 01:39 PM

Numerous governments also educate their citizens with recommendations to reduce cell phone radiation, especially to the heads of children. Governments with policy and/or recommendations by health authorities include Belgium, Switzerland, French Polynesia, Finland, Ireland, Germany, Greece, Israel, Turkey, Singapore, France, United Kingdom, Russia, Denmark, India, Australia, Austria, Cyprus, Canada, Italy, Korea and Croatia. In 2011 the Parliamentary Assembly of the Council of Europe issued Resolution 1815: "The Potential Dangers of Electromagnetic Fields and Their Effect on the Environment." A call to European governments to "take all reasonable measures" to reduce exposure to electromagnetic fields "particularly the exposure to children and young people who seem to be most at risk from head tumours" and numerous municipalities have issued resolutions to follow Resolution 1815. https://ehtrust.org/policy/international-policy-actions-on-wireless/

From Cece Doucette to Everyone: 01:43 PM

Sincere gratitude to all for your dedication in seeking the truth and laying the path to transition to safe, sustainable, fiscally responsible technology.

From Theodora Scarato to Everyone: 01:44 PM

Thanks beyond words for your incredible effort in putting forward scientific facts in a transparent fashion.