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Sent: Monday, July 11, 2016 5:39 PM

Subject: Opposition to FCC Implementation of 5G Vote on July 14, 2016

Dear House Subcommittee on Communication & Technology,

I am a mother of 2 boys, ages 8 and 11, and also a chemical engineer and Six Sigma Black Belt.

I am writing today to let you know of my opposition to the FCC's plan to speed 5G to market which would require a "massive" increase in infrastructure in FCC Chairman Tom Wheeler's own words, which will be voted on July 14, 2016. **Currently, there is more than enough infrastructure to provide cellular services to everyone in the US** – as of December 2015, there are 308,000 cell antenna facilities for 378 million wireless subscribers (current US population is 321 million), which is 116% market penetration. We exceeded 100% market penetration in 2013 – per the CTIA, the number of cell towers in the US increased from 66,000 in 1998 to 300,000 in 2013, providing cell service to more than 335 million cell phones in 2013 (104% market penetration). This exceeds 1 cell phone per person in this country <http://www.ctia.org/your-wireless-life/h...>

Now the push for cell antennas is for 5G, which is fast data transmission (i.e. pictures, videos, etc) will require "**massive infrastructure**" of small cell antenna sites beyond the 308,000 cell antenna facilities already in place. <https://www.fcc.gov/document/remarks-cha...>

Because the frequency used in 5G will be much higher than what has been used for 2G, 3G and 4G, transmission distances will be much shorter and the number of small cell sites required will be SEVERAL TIMES greater than the 308,000 macro cell towers already in place across the country. This proposal is similar to what was proposed by CA Assembly Bill 2788 in June, in which CA Assemblyman Mike Gatto gutted a natural gas storage bill intended to help the Porter Ranch residents and turned it into a bill to install small cell antenna facilities (for 5G) **on every public school, government building (except fire stations), and light and telephone poles without approval by local government.**

http://celltowersites.com/wp-content/uploads/2016/06/20150AB2788_97.pdf

Californians were outraged by this proposal which forced Gatto to withdraw the bill fortunately.

FCC Chairman Tom Wheeler is pushing for 5G in the name of "national priority". **How is the ability to watch videos and download pictures at fast speeds a "national priority"?** While the ability to do this wirelessly is a huge convenience, I disagree with this being a "national priority".

“National priority” is addressing the astounding increases in autism, ADHD, neurological disorders in children and adults, autoimmune disease and dementia/Alzheimer’s which has been occurring in the last couple decades which coincided with the massive deployment of cell antenna facilities, which began with the 1996 Telecommunications Act. We went from 66,000 cell towers in 1998 to 300,000 in 2013 per the CTIA as mentioned above. **Is someone close to you afflicted with autism, ADHD, neurological diseases, autoimmune disease, dementia or Alzheimer’s?**

- Feb. 24, 2016: [the American Brain Tumor Association has found that brain cancer is the highest cause of cancer deaths in ages 15-39 and the most common cancer among 15-19 year olds.](#) There's also been an [increase in Malignant Brain and Central Nervous System Tumors in American children.](#) For ages 0-14 between 2000-2010, it has increased annually 0.6%/yr. In ages 15-19, between 2000-2008, it has increased annually 1.0%/yr.
- October 2010: [Autism has increased 600% in prevalence over the last two decades.](#)
- [ADHD has increased 53% in the US over the last decade](#) per the CDC. For ages 14 to 17, 19 % of boys and 10% of girls now have ADHD.
- August 2015: Washington Post reports **people are developing dementia a decade earlier compared to 20 years ago (2010 vs. 1990) The disease is now regularly diagnosed in people in their late 40s and death rates from early onset dementia are soaring.** The study found that **deaths caused by neurological disease had risen significantly in adults aged 55 to 74 and more than doubled in the over-75 population overall. The problem was particularly acute in the United States, where neurological deaths in men aged over 75 have nearly tripled and in women increased more than fivefold.** *“The rate of increase in such a short time suggested a silent or even a hidden epidemic, in which environmental factors must play a major part, not just aging.”* The environmental factors cited included chemical pollution and increased background electromagnetic fields (which includes wireless radiation) https://www.washingtonpost.com/world/people-are-developing-dementia-earlier-and-dying-of-it-more-a-study-shows/2015/08/06/599b16b8-3c0a-11e5-8e98-115a3cf7d7ae_story.html?wprss=rss_world.
- October 2013: **The NIMH (National Institute of Mental Health) reported 25-30% of kids between ages 13-18 will experience an anxiety disorder. This is an increase of 20 fold (i.e. 1900%) over the last 30 years** <http://health.usnews.com/health-news/health-wellness/articles/2013/10/10/how-to-cope-when-school-anxiety-lingers>
- November 2013: Time Magazine reports that the **rate of reported anxiety disorders among U.S. troops jumped 327% between 2000 and 2012.** <http://swampland.time.com/2013/11/05/anxiety-disorders-on-the-rise-in-the-ranks/>
- **September 2007: The number of American children and adolescents treated for bipolar disorder increased 40-fold [that's 3900%!] from 1994 to 2003** The senior author of the study, Dr. Mark Olfson of the New York State Psychiatric Institute at the Columbia University Medical Center, said, *“I have been studying trends in mental health services for some time, and this finding really stands out as one of the most striking increases in this short a time.”* The increase makes bipolar disorder more common among children than clinical depression, the authors said. http://www.nytimes.com/2007/09/04/health/04psych.html?_r=1

- **Severe, disabling mental illness has dramatically increased in the United States.** “The tally of those who are so disabled by mental disorders that they qualify for Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI) increased nearly two and a half times between 1987 and 2007 **For children, the rise is even more startling — a thirty-five-fold [i.e. 3400%!] increase in the same two decades,**” as Marcia Angell **summarizes** In 1998, Martin Seligman, then president of the American Psychological Association, **spoke** to the National Press Club about an American depression epidemic: “We discovered two astonishing things ... The first was **there is now between 10 and 20 times as much of it [depression] as there was 50 years ago. And the second is that it has become a young person’s problem. When I first started working in depression 30 years ago ... the average age of which the first onset of depression occurred was 29.5 ... Now the average age is between 14 and 15.**”
- In 2011, the **U.S. Centers for Disease Control and Prevention (CDC)** reported that **antidepressant use in the United States has increased nearly 400 percent in the last two decades, making antidepressants the most frequently used class of medications by Americans ages 18-44 years.**
http://www.salon.com/2013/08/26/how_our_society_breeds_anxiety_depression_and_dysfunction_partner/
- In May 2013, **CDC** reported in “**Mental Health Surveillance Among Children—United States, 2005–2011,**” the following: “**A total of 13%–20% of children living in the United States experience a mental disorder in a given year, and surveillance during 1994–2011 has shown the prevalence of these conditions to be increasing.**”

There are many independent research studies that have shown an effect on nervous and immune systems from RF radiation. Here are just a few
<http://ehtrust.org/science/cell-towers-and-cell-antennae/>

I, like most people, was unaware of the research around cell phones and cell towers. I had assumed, like most people, that our government (FCC) standards were adequate to protect us and the proper research had been done by our government in setting these standards before releasing these products to the public. However, I was shocked to learn the following **FACTS:**

1) Our government standards for cell phone radiation is NOT based on protection against all harmful effects but only based on thermal limits, i.e., if there is not enough microwave radiation coming from a device or cell tower to cause your tissues to warm up (i.e. cook you), then FCC standards considers it to be a "safe" level. For cell towers, that limit is 1000uW/cm² for 30 minutes for frequencies 1.5GHz and above <http://www.gpo.gov/fdsys/pkg/CFR-2002-ti...> This was not intended to be a chronic exposure limit, but a short-term one intended to protect people from burns. For cell phones and personal devices, the amount allowable is a SAR of 4.0 W/kg to the hands, feet, ears and 1.6W/kg to the head and any other part of the body.

2) Areas within the immediate range of a cell tower (i.e. less than 1000ft) are about 1000 times higher than background levels of RF radiation. Ambient (background) levels of microwave radiation, i.e. levels not immediately close to a cell tower, is around 0.0003uW/cm² (cell phone calls can be made at this level and reception is around 4 bars). However, within the immediate range of a cell tower, i.e. within the first 1000 ft, it can be as high as 0.1-1.0uW/cm². While both these levels are lower than 1000uW/cm², realize that this means that the levels within the immediate vicinity of a cell tower is around 1000 times higher than areas not next to a cell tower. So for people living close to a cell tower or kids attending school next to a cell tower, this exposure which is about 1000 times higher than ambient levels is for many hours every day for years, not just 30 minutes. If you don't believe

this, please purchase a meter and measure for yourself. The Cornet ED78S is a very basic meter that you can purchase for ~\$140, less than cost of your smart phone

Health effects at 0.1uW/cm2 include neurological problems (headaches, insomnia, feelings of nervousness) **and immune problems** (allergies, cancer). You can see the list here for levels below and above 0.1uW/cm2 per the 2012 Bioinitiative Report, which is a compendium of 3800 peer reviewed studies from around the world.<http://www.bioinitiative.org/rf-color-ch...>

Firefighters union IAFF succeeded in 2004 in stopping more cell towers from being erected on fire stations for health reasons, citing neurological and immune system effects. <http://www.iaff.org/hs/facts/CellTowerFi...>

3) **FDA exempted cell phones from product testing in 1984** on the presumption that if there is not enough RF radiation emitted to cause tissue heating, then it was safe. However, there has been a lot of research showing that even levels of radiation below thermal thresholds have negative health effects. Some even done by our own military

NASA Report, 1981

A NASA report published in April 1981, titled “Electromagnetic Field Interactions with the Human Body: Observed Effects and Theories,” discussed EMF and microwave RF radiation caused to humans. Effects of microwave radiation reported: headaches, sleep problems, neurological symptoms, cardiac symptoms, memory problems, increased cholesterol, gastritis, ulcers, increased fasting blood glucose, irritability, inability to concentrate, apprehension, and cataracts (clouding of posterior part of lens in those caused by microwave radiation instead of anterior clouding as seen with regular types). Information for the NASA report was collected from over 1,000 written sources that “included journals, conference proceedings, technical reports, books, abstracts, and news items,” <http://ntrs.nasa.gov/archive/nasa/casi.n...>

Navy Report, 1971

On October 4, 1971, the Naval Medical Research Institute published a research report, “Bibliography of Reported Biological Phenomena (‘Effects’) and Clinical Manifestations Attributed to Microwave and Radio-Frequency Radiation,” which was a compilation of over 2000 references on the biological responses to RF microwave radiation. It lists well over 100 negative biological effects caused by RF microwave radiation - here's a partial list: corneal damage, tubular degeneration of testicles, brain heating, alteration of the diameter of blood vessels, liver enlargement, altered sex ratio of births, decreased fertility, sterility, altered fetal development, decreased lactation in nursing mothers, altered penal function, death, cranial nerve disorders, seizures, convulsions, depression, insomnia, hand tremors, chest pain, thrombosis, alteration in the rate of cellular division, anorexia, constipation, altered adrenal cortex activity, chromosome aberrations, tumors, altered orientation of animals, birds and fish, loss of hair, and sparking between dental fillings.<http://www.magdahavas.com/wordpress/wp-c...>

Air Force Report, 1994

A June 1994 US Air Force document, titled, “Radiofrequency/Microwave Radiation Biological Effects and Safety Standards: A Review,” **acknowledges the non-thermal health effects.** Stated in its abstract, ***“It is known that electromagnetic radiation has a biological effect on human tissue.”*** The introduction of the report states that ***“researchers have discovered a number of biological dysfunctions that can occur in living organisms”*** and that ***“exposure of the human body to RF/MW [radio frequency/microwave] radiation has many biological implications”*** that range from “innocuous sensation of warmth to serious physiological damage to the eye,” and added that ***“there is also evidence that RF/MW radiation can cause cancer.”*** Biological impacts: ***“damage to major organs, disruption of important biological processes, and the potential risk of cancer,”*** among many others which include ***“mutagenic effects,” “cardiovascular effects,”*** negative effects on chromosomes, and notes that “Soviet investigators claim that exposure to low-level radiation can induce serious CNS [central nervous system] dysfunctions.”

<http://www.emfacts.com/2014/09/us-air-fo...><https://electroplague.files.wordpress.co...>

4) FCC's priority is faster speeds, not human health and safety.

The 1996 Telecommunications Act was passed by Congress despite these reports from US government agencies that document negative health effects from microwave RF radiation that were all published before 1996. Section 704 of the TCA disallowed siting decisions for cell tower facilities based on health considerations as long as they don't exceed FCC's (thermal) limits. Aesthetics is the only valid reason for rejection; so many cell towers are camouflaged and disguised. This is how cell towers have ended up on school property and next to residential areas without people's awareness.

Even though doctors, scientists, and various groups have made about 1000 submissions asking the FCC to revisit limits since 2012, little has been done by the FCC. (See Proceeding Number 13-84 on the FCC web site. It is hard to navigate, but you can see the ~1000 submissions here, http://www.saferemr.com/2015_08_01_archi...)

FCC changed the Telecom Act to encompass wireless internet in March 2015 (wireless internet was not included in the 1996 TCA prior to that). **There have been only a handful of incidents where the FCC has fined wireless companies for exceeding FCC's thermal limits even though 1 in 10 cell antenna sites exceeded FCC's thermal limits** per Wall Street Journal report in 2014 <http://www.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055> , **and the fines are paltry (\$50,000) for exceeding FCC's thermal limits.** <http://www.journalinquirer.com/connectic...> **Yet if speeds are slow, FCC will fine millions.** **FCC fined AT&T a record \$100 million in June 2015 for not providing speeds as fast as advertised** <http://finance.yahoo.com/news/fcc-seeks-...> **Clearly FCC's priorities are not human health and safety, and they have not been considered in 5G's implementation.**

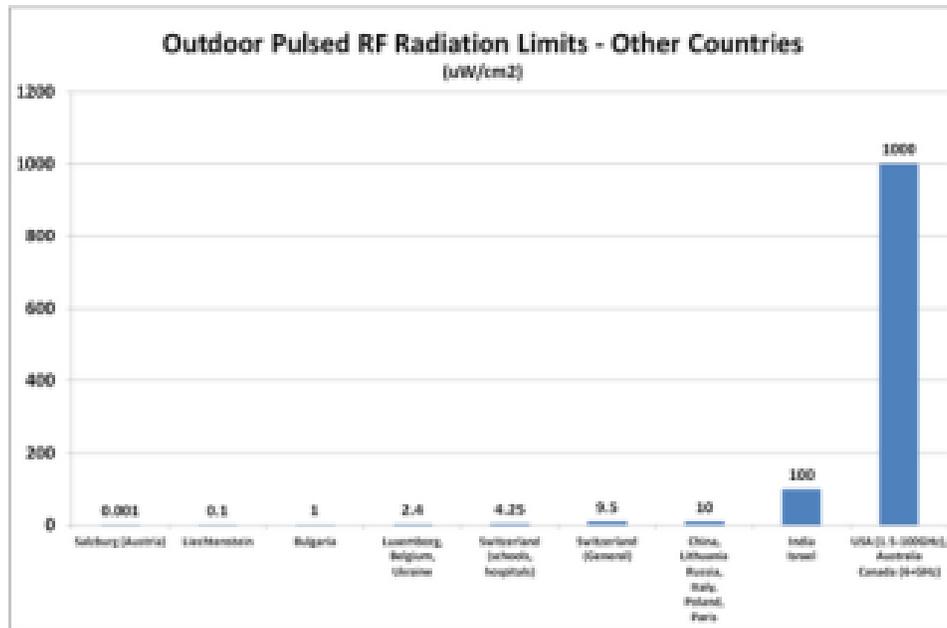
Exceeding FCC's thermal limits (which causes bodily harm) only received a \$50,000 fine? But slow download speeds received a \$100 million fine? AM Best, an insurance rating company, said this about the risks of wireless radiation. ***"what is known is the risk that cell tower workers face. Thermal effects include eye damage, sterility, and cognitive impairments."*** <http://www.ambest.com/directories/bestco...>

5) **The only study of effects of chronic exposure to cell phone radiation by our government was reported in May by the NTP (National Toxicology Program), which showed a statistical increase in brain and heart cancer in rats.** Cancer showed up in a small but statistically significant portion of the rats who were exposed to below thermal levels of cell phone radiation at 1.5W/kg for 2 years (below FCC SAR limit of 1.6W/kg – iphone 6 plus has a SAR rating of 1.6W/kg with all antennas on | <https://www.sarchecker.com/apple-iphone-6-sar-rating-level-edges-extremely-close-to-legal-limits/>)

The significance of this study is that it is proof (from a US government study) that RF levels below thermal thresholds cannot be assumed to be "safe".

In medicine, non-thermal levels of microwave radiation have been used for therapeutic uses to treat pain and edema, heal bones, and chronic wounds https://en.wikipedia.org/wiki/Pulsed_radiofrequency – this fact in itself also disproves the claim that there are “no biological effects” from non-thermal levels of microwave radiation. Anything that has a therapeutic effect can also have a negative effect in a different dose or under different conditions. [insert email on water, microwaves, etc.](#)

6) **Other countries** – China, Russia, France, India, Switzerland, Italy, Luxemborg, Bulgaria – **have stricter RF exposure limits than the US** (see chart below) In January 2015, France forbade Wi-Fi in preschools and ordered it be turned off in elementary schools when not in use. In April 2016, Haifa, Israel has also removed Wi-Fi in schools. You can read more here on Schools and teacher unions around the world taking action on wireless <http://ehtrust.org/policy/schools-unions-and-pta-actions/>



In summary, there are many reasons not to approve the “massive infrastructure” required for 5G at this time. The reasons:

- 1) NTP studies demonstrating a statistical increase in brain and heart cancer in rats following chronic exposure at 1.5W/kg (which is below the FCC SAR limit of 1.6W/kg) ;
- 2) reports by our own military and other branches of the US government demonstrating biological effects from RF radiation at below thermal levels;
- 3) the fact that non-thermal levels of microwave radiation are used for medical purposes because there is a biological effect;
- 4) the near 1000 submissions by doctors, scientists, and others asking the FCC to revise their limits in FCC proceeding 13-84;
- 5) the fact that the higher millimeter frequencies to be used in 5G (as well as 3G, 3G, 4G), have NEVER been studied for its long-term effect on humans by our government; and
- 6) **the fact that there are enough cell tower facilities ALREADY in existence to service more than one cell phone to everyone in this country**

Cell phones are important for safety – their original intention was to provide emergency help. However, since then, they have morphed beyond uses for safety. They are now used more for entertainment by adults and children alike. Now is the time for prudent caution on this issue and slow down any “massive deployment” of cellular infrastructure.

If you don't believe these facts, please do the research for yourself, your families, your constituents, and for everyone in this country. It was not until my children became ill from two cell towers next to their school that I researched this issue. I have physician diagnosis and medical records to corroborate.

FCC's job is to regulate the telecom industry for the protection of this nation's citizens, not pushing a program for private industry's gain in the name of national priority when there are serious health risks and unknowns to consider.

Sincerely,

Angela Tsiang

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