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ID	1051356769514	**Proceeding**	OET 19-226
Name of Filer	Andrea Mercier		
Type of Filing	COMMENT	**Filing Status**	DISSEMINATED
Viewing Status	Unrestricted		
Total Pagecount	6		
Date Received	May 13, 2020	**Date Posted**	May 14, 2020
Address	6626 Sproul Lane	**City**	Colorado Springs
State	CO	**ZIP**	80918

The FCC's repeated refusal to consider biological effects from exposure to all types of wireless radiation shows a clear and dangerous intention to disregard the emerging science which must inform its decisions regarding public health.

The agency's reliance on organizations of physicists and engineers for advice on human exposures has resulted in a sole focus on "thermal" effects, despite thousands of published, peer-reviewed studies showing biological harm, even at non-thermal levels, for various frequency ranges.

The FCC's own admission that it is unaware of any other types of effects demonstrates a failure to actively investigate the issue by proactively engaging with the scientific community studying the short and long-term biological impacts of exposure to humans and possible interference with systems of the natural world. Failure to seek out and consider the latest science makes decisions of the FCC suspect.

Moreover, the complex comment process used by the FCC virtually ensures that most commenters will be those who follow the activities of the agency closely and have a financial interest in the agency's decisions.

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I do not support the proposed change to allow manufacturers to produce wireless devices that govern their own radiation power output, especially for notebooks and tablets frequently used by children who, according to the International Agency for

Research on Cancer (IARC), are more vulnerable to RF radiation than adults.

Since the justification for this proposed rule change is that manufacturers want to be able to deliver more data to notebooks and tablets, it seems obvious that this change would result in higher exposures for users.

I object to the practice of allowing exposures to be averaged over time to comply with FCC exposure limits. There is no scientific basis to support the notion that short, periodic bursts of RF radiation are not biologically harmful, or that only cumulative effects over time may have an impact. The FCC should establish temporal limits for both Specific Absorption Rate (SAR) and power density.

Further, I agree with the American Academy of Pediatrics that the FCC's current method of testing wireless devices is not reflective of the way people actually use technology today. Given the increasing use of wireless devices by children and adolescents, we encourage the FCC to seek out and utilize testing protocols that reflect real-world situations.

I recommend that before the agency considers even tentative approval of WPT devices operating at ranges in excess of 5o cm, it requires manufacturers to conduct pre-market testing to demonstrate the safety of such devices when used in all possible “worst case” scenarios, including mitigation techniques to avoid inadvertent or collateral damage to the public. Such an analysis must include consideration of biological impacts.

The issues here are very significant. How will this impact an older person with an implanted cardiac pacemaker who uses a remote charger to charge his cell phone while he is moving around with the phone in his shirt pocket? Or consider the couple trying to get pregnant if the man's phone is frequently being charged wirelessly in the front pocket of his pants, with the beam irradiating his testicles?

What kind of human is the FCC considering protecting? What size, shape, age, and with what kind of underlying medical problem or weakness? I urge the agency to consider updating its standard anatomical models to reflect the wide variety of possible users.

Our special needs child is impacted by wireless radiation of various frequencies and combined frequencies. I began to document his journey of impacts as well as his journey of dysfunction. I began to notice changes in baseline neurological, neuroimmune, and neuropsychiatric symptoms when our son was playing next to a smart meter, when our son was under power lines with combined fields, and when our son’s condition grew worse in public schools (and other places) where wireless is utilized. At the beginning of this I did not realize that a smart meter emitted anything.

No warning is placed on smart meters, and no disclosure or informed consent is provided to the public. The meter was mounted on the outside of the nursery. These meters emit lower frequencies on power lines and create transient spikes and harmonics. Current research is showing that there is a prominence of calcium signal dysregulation in certain special needs populations (Wen, Alshikho, & MR, 2016).

Other research is showing that non-ionizing radiation is shown to release extra Calcium ions from the cells through voltage-gated calcium channels (Pall, 2013).

These rapidly released calcium ions into the extracellular space creates a great deal of peroxynitrite that the body has to mitigate. This increases oxidative stress (Igor, et al., 2016).

Developing populations alongside developing populations with dysfunctions in calcium regulation, metabolic dysfunction, and or differences in the immune system and biome function are trying to adapt to these variances and combined frequencies with adaptive differences (Sage & Burgio, 2017).

Statistically in autism populations, it is common to find that 50 percent of cell signaling issues are related to cell signaling metabolism and 12 percent is related to Neurosignaling dysfunction (Wen, Alshikho, & MR, 2016).

Already research exists showing the harms of lower RF, ELF, and EMF frequencies and combined frequencies that exist.

I am witnessing not only neurological effects, but immunologic exaggerated mast cell responses in relation to these exposures which presents with dermal effects as well as neuroimmune and neuropsychiatric effects. I believed that existing metabolic and immunologic differences in individuals predispose an individual to heightened sensitivities to these frequencies. The concern I have with adding further frequencies is the use of the lower frequencies with the higher frequencies. The densification of masts and the inability to avoid secondary exposures from neighbors and secondary exposures in neighborhoods.

It is common in children with certain special needs to have a difficult time self-regulating and elevations in histamine in the biome and brain are known to set off neuropsychiatric behaviors, changes in focus. Elevations in brain inflammation are known to create

encephalopathies with functional adaptive impairments (Thomas, 2009) (Repacholi, 2005).

I have evidence to indicate that wireless utilized in schools exacerbated our son's baseline function where he experienced elevations of C reactive protein, and dermal reactions (Johansson, 2009).

Over time I began to notice a loss of motor function and an effect on motor function that occurred over time and I have laboratory evidence of a difference in myelination in our son's case. Differences in certain special needs populations exist in regards to myelination (Phan, Bohlen, & Davis, 2020). Case reports exist that show that when these non-ionizing frequencies in the wireless range are removed that it has a benefit on those with myelination differences (Johansson & Redmayne, 2016).

After removal from the school environment his motor function improved, his neuropsychiatric behavior improved, and his baseline function improved. Children absorb more microwave radiation than adults (L, S, & DL, 2014).

Often when you have individuals with a chronic impairment another variable in that chronic impairment is the microbiome and the HPA axis and Gut Brain Axis. These inflammatory conditions are further exacerbated by non-ionizing radiation exacerbating the symbiont and systems biology inter-network function.

Over time and with continued exposure the variables involved are related to the mechanisms within an individual, inverse square law, and adaptive functional differences of individuals.

Inadequately regulated and promulgated technology reins without consideration of many other scientific variables and population variables such as:

* Children absorb more microwave radiation than adults (L, S, & DL, 2014)

* Lack of current reality of use scenarios applied to existing safety standards and the upcoming installation of higher frequency infrastructure (Naren, Anubhav, Vinay, & Mohsen, 2020)

*Non-thermal exposure safety standards need to be adopted

*Lack of understanding of individual differences in safety and data models

*Implementing biologically harmful products without concern for special populations or

*Assumptions of safety without combined cross examination

*Inability to examine non thermal effects before the technology reaches the market

*Ignoring non-industry funded research in regards to non-ionizing radiation

*Lack of conscious concern for principles of precaution

*Lack of safe building guidelines across industries, systems, and markets

*Lack of utilization of current scientific understanding of growth and development in pediatric populations and the impact of exposures within these populations.

*Lack of utilization of precautionary principles within systems, marketing, and institutions.

Links hereby incorporated by reference:

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