

November 24, 2021

The Honorable Jessica Rosenworcel, Commissioner  
Acting Chairwoman  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, DC 20554

Dear Chairwoman Rosenworcel,

We write to you as scientists and public health experts deeply committed to protecting public health and the environment. As authors of numerous publications and reports in the field we urge that the FCC ensure a robust review of the latest science and expert recommendations in the FCC's upcoming reexamination of its Inquiry on human exposure limits for wireless radiation. The major scientific developments of the last two years must be included in the FCC review- especially in the new 5G environment where wireless is ubiquitous.

We request the FCC reopen Docket #13-84 "Reassessment of FCC Radiofrequency Exposure Limits and Policies" and Docket #03-137 "Proposed Changes to the Commission Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields" in order to refresh the record before issuing a final response to the recent August 13, 2021 [judgment](#) by the U.S. Court of Appeals for the District of Columbia Circuit, in *Environmental Health Trust et al. v. the FCC*.

Furthermore, as the FCC does not have expertise in interpreting scientific studies, it relies on input from federal health agencies and knowledgeable expert organizations to evaluate the scientific evidence and the adequacy of FCC limits. However the relevant US health and safety agencies have not reviewed the research on impacts to flora and fauna; long-term exposures from cell towers; children's unique vulnerability; and health effects such as damage to the brain and reproduction. The court noted that the "silence" of federal agencies such as the National Cancer Institute, the Environmental Protection Agency, the Centers for Disease Control and Prevention, and the National Institute for Occupational Safety and Health does not mean these agencies agree with the FCC's 1996 limits. In fact, none of these agencies has systematically reviewed the totality of science in their respective area of expertise both to develop safety standards and to offer an analysis of the adequacy of FCC's 1996 wireless exposure limits.

Accordingly, we recommend that the FCC record be reopened with ample time to allow for new substantive comments. U.S. safety limits for cell phones and cell towers must rest on sound science to ensure the public and wildlife are protected.

Importantly, we also recommend a full environmental impact review to evaluate 5G and the rapid proliferation of 4G wireless antennas in the USA. A [three part review](#) published in *Reviews in Environmental Health* found the scientific evidence showing adverse effects is sufficient to trigger new regulatory action to protect wildlife, yet the US does not have regulations that were ever designed to protect flora and fauna (1). Instead, the FCC is fast tracking small cell deployment and opening new

spectrum disregarding recent research which finds, for example, that the higher frequencies of 5G can result in higher absorption rates into the bodies of pollinators.

In addition, experts are warning that 5G will contribute to climate change and have [documented](#) the exponentially increasing energy demands of 5G networks, “smart” wireless devices, and other new communication technologies. As the FCC has projected hundreds of thousands of new wireless facilities, we recommend a full environmental assessment for the 5G rollout and 4G wireless network densification.

The [scientific evidence](#) has substantially increased over the last two years (2). In 2020 scientists of the National Institute of Environmental Health Sciences National Toxicology Program published their animal-study findings of “significant increases in DNA damage” in groups of mice and rats after just 14 to 19 weeks of exposure to cell phone radiation (3). A 2021 [analysis](#) published by the Environmental Working Group concluded FCC limits should be 200 to 400 times more protective than the whole-body exposure limit set by the FCC in 1996 (4). Unaware of the scientists calling for caution, school districts nationwide are deploying high-capacity Wi-Fi networks in school buildings, testing out 5G networks with students, and signing leases with companies to install cell towers on school property, relying on these outdated FCC limits. As the American Academy of Pediatrics and numerous other specialists [have noted](#), children are [uniquely vulnerable](#) to wireless radiation (5).

Health risks should be assessed by experts with no conflicts of interest. The FCC should not rely on the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a small 14 member privately constituted invite only Commission lacking in transparency whose self-appointed membership has conflicts of interest and industry ties (6). ICNIRP has rejected the NTP and Ramazzini Institute animal studies with unfounded criticisms (7). Further, ICNIRP has not shown any systematic review of the totality of the research such as impacts to the developing brain and damage to reproduction. It has never conducted a comprehensive evaluation of human health and environmental risks associated with RF radiation. Their exposure guidelines are based solely on protecting against heating effects, with no change of concept since 1998, two years after the FCC adopted human exposure guidelines in 1996.

Broadband internet provides the connectivity that enables Americans to do their jobs, to participate equally in school learning and health care, and to create a fairer playing field by eliminating the digital divide. The United States must bridge the digital divide with a “future-proof” broadband infrastructure with wired *rather than wireless* connections to and through homes, schools and businesses that is affordable, reliable, high-speed, and sustainable.

Wherever possible, we urge that the broadband system rely on wired connections, rather than wireless connections. Wired connections are safer, faster, more secure, more energy efficient, and more reliable. Wired connections are especially important for schools and other institutions where they will save money and reduce exposure to wireless radiation.

Our experts stand ready to provide more detailed information to you on this important issue, including elaborating on materials and assistance with evaluating the science and impacts on humans, climate, animals, and wilderness.

Sincerely,

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3. Smith-Roe, SL., et al. (2020) ["Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure."](#) Environmental and molecular mutagenesis, Feb;61(2):276-290
4. Uche, U.I., Naidenko, O.V. (2021) ["Development of health-based exposure limits for radiofrequency radiation from wireless devices using a benchmark dose approach."](#) Environmental Health 20, 84 (2021)

5. [American Academy of Pediatrics Letter to the FCC on “Reassessment of Exposure to Radiofrequency Electromagnetic Fields Limits and Policies”](#) August 29, 2013; Fernández, C., de Salles, A., Sears, M., Morris, R., & Davis, D. (2018). “[Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality.](#)” Environmental Research, 167, 694-699. <https://doi.org/10.1016/j.envres.2018.05.013>
6. James C. Lin. [Science, Politics, and Groupthink \[Health Matters\]](#). IEEE Microwave Magazine. 22(5):24-26. May 2021; Lennart Hardell, Michael Carlberg, [Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest.](#) Oncol Lett. 2020 Oct;20(4):15.; Lennart Hardell, Mona Nilsson, Tarmo Koppel, Michael Carlberg. [Aspects on the International Commission on Non-Ionizing Radiation Protection \(ICNIRP\) 2020 Guidelines on Radiofrequency Radiation.](#) J Cancer Sci Clin Ther. 2021; 5(2): 250-285; Hardell L. “[World Health Organization, radiofrequency radiation and health – a hard nut to crack \(Review\)](#)” Int J Oncol 51 (2017): 405-413; Hans van Scharen, Tomas Vanheste, Erik Lambert for European Members of Parliaments Michèle Rivasi and Dr. Klaus Buchner “[The International Commission on Non-Ionizing Radiation Protection: Conflicts of Interest, Corporate Capture and the Push for 5G.](#)” (PDF)
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Know your environment.  
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November 19, 2021

The Honorable Jessica Rosenworcel  
Chairwoman  
Federal Communications Commission  
445 12<sup>th</sup> Street, SW  
Washington, D.C. 20554

Dear Chairwoman Rosenworcel,

The Environmental Working Group, a nonprofit public health research and advocacy organization with offices in Washington, D.C, Minneapolis, and Sacramento, Calif., requests that the Federal Communications Commission reopen Docket #13-84, “Reassessment of FCC Radiofrequency Exposure Limits and Policies,” and Docket #03-137, “Proposed Changes to the Commission Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields,” to allow robust review and consideration of scientific evidence published in the past two years and in response to the court ruling in *Environmental Health Trust et al. v. the FCC*.

Since 2009, the Environmental Working Group has extensively researched the topic of the human and environmental health impacts of radiofrequency radiation emitted from wireless communication devices. EWG also closely follows regulatory approaches and recommendations on radiofrequency radiation made by authoritative health agencies around the world. The World Health Organization states on its website:

*... during the 20th century, environmental exposure to man-made sources of EMF steadily increased due to electricity demand, ever-advancing wireless technologies and changes in work practices and social behaviour. Everyone is exposed to a complex mix of electric and magnetic fields at many different frequencies, at home and at work, and concern continues to grow over possible health effects from overexposure.<sup>1</sup>*

Extensive research literature points to the potential health risks of radiofrequency radiation, particularly for the developing child. Peer-reviewed studies show that the

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<sup>1</sup> World Health Organization, web page not dated, “Supporting the development of national policies on electromagnetic fields”. <https://www.who.int/activities/supporting-the-development-of-national-policies-on-electromagnetic-fields> Accessed Nov. 16, 2021.



bodies of children absorb more radiofrequency radiation, compared to adults, putting children at greater health risk as a result to such exposure.<sup>2</sup>

Scientists and public health advocates have raised concerns for decades about the adverse health effects of exposure to electromagnetic radiation. Recent research publications highlight the severity of these impacts, especially among vulnerable populations, and the need for more stringent health-based exposure standards. In 2011, the International Agency for Research on Cancer (IARC), an agency of the World Health Organization, classified radiofrequency electromagnetic fields as “possibly carcinogenic to humans.”<sup>3</sup>

For today’s generation of children, exposure to radiofrequency radiation from wireless communication devices starts from the fetal development period as a result of wireless devices in the pregnant person’s everyday environment. Following birth, today’s children will be exposed to radiofrequency radiation throughout their lives – an exposure scenario that is drastically different from the very limited consumer use and exposure to wireless radiation of the 1980s and 1990s, when the basis for current FCC standards was established.

This comment letter highlights two key considerations that point to the need for the FCC to reassess existing radiofrequency exposure limits and policies:

1. A 2021 peer-reviewed publication we authored that uses Environmental Protection Agency methodology to determine protective health-based exposure limits for radiofrequency radiation, based on the U.S. government’s landmark 2018 laboratory study; and
2. Recent literature that documents a range of effects of non-ionizing electromagnetic radiation on different body systems that current FCC standards do not take into account.

## **1. Health-based limits developed with consideration for children’s health**

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<sup>2</sup> Fernández C, de Salles AA, Sears ME, Morris RD, Davis DL. Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality. *Environ Res.* 2018; 167:694-699. <https://doi.org/10.1016/j.envres.2018.05.013>; Gandhi OP, Morgan LL, de Salles AA, Han YY, Herberman RB, Davis DL. Exposure limits: the underestimation of absorbed cell phone radiation, especially in children. *Electromagn Biol Med.* 2012; 31(1):34-51. <https://doi.org/10.3109/15368378.2011.622827>

<sup>3</sup> International Agency for Research on Cancer. IARC classifies radiofrequency electromagnetic fields as possibly carcinogenic to humans. Press Release N: 208. 2011. [https://www.iarc.who.int/wp-content/uploads/2018/07/pr208\\_E.pdf](https://www.iarc.who.int/wp-content/uploads/2018/07/pr208_E.pdf) Accessed Nov. 16, 2021.



Know your environment.  
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A peer-reviewed article published by our organization in 2021 (Uche & Naidenko, 2021)<sup>4</sup> documented how the current FCC exposure limit for radiofrequency radiation is not sufficient to protect the general population, especially children, against the adverse impacts associated with radiofrequency radiation exposure. The current limit, last revised a quarter-century ago – well before wireless devices became ubiquitous – needs to be updated with the latest science to be fully health protective for all users of wireless communication technologies.

Our study, published in the journal *Environmental Health*, recommends strict, lower health-based exposure standards for both children and adults for radiofrequency radiation emitted from wireless devices. This recommendation draws on data from a landmark 2018 study from the National Toxicology Program, one of the largest long-term laboratory studies on the health effects of radiofrequency radiation exposure.<sup>5</sup>

EWG's study used an approach similar to the methodology that the U.S. EPA developed to assess human health risks arising from toxic chemical exposures. EWG study recommends a whole-body specific absorption rate (SAR) limit of 0.2 to 0.4 mW/kg for children, which is 200 to 400 times lower than the current federal whole-body exposure limit. For adults, EWG recommends a whole-body specific absorption rate limit of 2 to 4 mW/kg, which is 20 to 40 times lower than the federal limit (Uche & Naidenko, 2021).<sup>4</sup>

EWG's analysis and recommendation for a much stricter limit for radiofrequency radiation exposure is a step toward advancing a re-evaluation of the existing federal limit for radiofrequency radiation exposure while reviewing the latest research on radiofrequency radiation exposure.

## **2. Wide range of potential impacts of non-ionizing electromagnetic radiation on human health not accounted for in the current FCC standard**

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<sup>4</sup> Uche UI, Naidenko OV. Development of health-based exposure limits for radiofrequency radiation from wireless devices using a benchmark dose approach. *Environ Health*. 2021; 20(1):84.

<https://doi.org/10.1186/s12940-021-00768-1>

<sup>5</sup> National Toxicology Program. 595: NTP Technical Report on the Toxicology and Carcinogenesis Studies in Hsd: Sprague Dawley SD Rats Exposed to Whole-Body Radio Frequency Radiation at a Frequency (900 MHz) and Modulations (GSM and CDMA) Used by Cell Phones. National Toxicology Program, US Department of Health and Human Services. 2018.

[https://ntp.niehs.nih.gov/ntp/htdocs/lt\\_rpts/tr595\\_508.pdf?utm\\_source=direct&utm\\_medium=prod&utm\\_campaign=ntpgolinks&utm\\_term=tr595](https://ntp.niehs.nih.gov/ntp/htdocs/lt_rpts/tr595_508.pdf?utm_source=direct&utm_medium=prod&utm_campaign=ntpgolinks&utm_term=tr595)



The current FCC standard was based on the 1986 recommendations of the National Council on Radiation Protection and Measurements<sup>6</sup> and 1991 recommendations of the Institute of Electrical and Electronics Engineers,<sup>7</sup> which chose an exposure level based on behavioral changes observed in laboratory animals exposed to radiofrequency radiation for a duration of minutes to hours in studies conducted in the 1970s and 1980s. With extensive current research linking radiofrequency exposure to adverse impacts, even at exposure levels below the current federal limit, the FCC needs to review the latest science and update the allowable exposure limits.

Among the reported biological effects of electric and magnetic fields are harm to fetal growth and development (Ozgun et al., 2013);<sup>8</sup> changes in brain activity (Wallace and Selmaoui, 2019);<sup>9</sup> changes in heart rate variability (Wallace et al., 2020);<sup>10</sup> DNA damage (Smith-Roe et al., 2020);<sup>11</sup> cognitive effects (Azimzadeh and Jelodar);<sup>12</sup> and increased risk of cancer, including gliomas,<sup>3</sup> parotid gland tumors (Sadetzki et al., 2008),<sup>13</sup> thyroid cancers (Luo et al., 2019).<sup>14</sup> These adverse health effects may be associated with different mechanistic pathways, such as changes in the activity of voltage-gated calcium

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<sup>6</sup> National Council on Radiation Protection and Measurements. Biological effects and exposure criteria for radiofrequency electromagnetic fields: NCRP Report No. 86; 1986. Available from: <https://ncrponline.org/shop/reports/report-no-086-biological-effects-and-exposure-criteria-for-radiofrequency-electromagnetic-fields-1986/>

<sup>7</sup> Institute of Electrical and Electronics Engineers. (Revision of ANSI C95.1–1982). IEEE standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz. IEEE Std C95. 1991. <https://doi.org/10.1109/IEEESTD.1992.101091>

<sup>8</sup> Ozgur E, Kismali G, Guler G, Akcay A, Ozkurt G, Sel T, et al. Effects of prenatal and postnatal exposure to GSM-like radiofrequency on blood chemistry and oxidative stress in infant rabbits, an experimental study.

Cell Biochem Biophys. 2013;67(2):743–51. <https://doi.org/10.1007/s12013-013-9564-1>

<sup>9</sup> Wallace J, Selmaoui B. Effect of mobile phone radiofrequency signal on the alpha rhythm of human waking EEG: a review. Environ Res. 2019; 175:274–86. <https://doi.org/10.1016/j.envres.2019.05.016>

<sup>10</sup> Wallace J, Andrianome S, Ghosn R, Blanchard ES, Telliez F, Selmaoui B. Heart rate variability in healthy young adults exposed to global system for mobile communication (GSM) 900-MHz radiofrequency signal from mobile phones. Environ Res. 2020; 191:110097. <https://doi.org/10.1016/j.envres.2020.110097>

<sup>11</sup> Smith-Roe SL, Wyde ME, Stout MD, Winters JW, Hobbs CA, Shepard KG, et al. Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure. Environ Mol Mutagen. 2020; 61(2):276–90. <https://doi.org/10.1002/em.22343>

<sup>12</sup> Azimzadeh M, Jelodar G. Prenatal and early postnatal exposure to radiofrequency waves (900 MHz) adversely affects passive avoidance learning and memory. Toxicol Ind Health. 2020;36(12):1024–30. <https://doi.org/10.1177/0748233720973143>

<sup>13</sup> Sadetzki S, Chetrit A, Jarus-Hakak A, Cardis E, Deutch Y, Duvdevani S, et al. Cellular phone use and risk of benign and malignant parotid gland tumors – a nationwide case-control study. Am J Epidemiol. 2008;167(4):457–67. <https://doi.org/10.1093/aje/kwm325>

<sup>14</sup> Luo J, Deziel NC, Huang H, Chen Y, Ni X, Ma S, et al. Cell phone use and risk of thyroid cancer: a population-based case-control study in Connecticut. Ann Epidemiol. 2019; 29:39–45. <https://doi.org/10.1016/j.annepidem.2018.10.004>



channels (Blackman et al., 1991);<sup>15</sup> changes in the concentrations of reactive oxygen species and redox homeostasis (Ertlav et al., 2018);<sup>16</sup> changes in intracellular enzymes and gene expression (Fragopoulou et al., 2018);<sup>17</sup> and changes in membrane permeability (Perera et al., 2018).<sup>18</sup>

**Table 1.** Extensive research points to effects of non-ionizing electromagnetic radiation on individual body systems that are not considered by the current FCC standards for cell phone radiation.

Reported health effects	Key studies
Elevated risk of brain cancer, breast cancer, parotid gland tumors, and thyroid cancer	<p>Choi YJ, Moskowitz JM, Myung SK, Lee YR, Hong YC. Cellular Phone Use and Risk of Tumors: Systematic Review and Meta-Analysis. <i>Int J Environ Res Public Health</i>. 2020; 17(21):8079.</p> <p>West JG, Kapoor NS, Liao SY, Chen JW, Bailey L, Nagourney RA. Multifocal Breast Cancer in Young Women with Prolonged Contact between Their Breasts and Their Cellular Phones. <i>Case Rep Med</i>. 2013; 2013:354682</p> <p>Sadetzki S, Chetrit A, Jarus-Hakak A, Cardis E, Deutch Y, Duvdevani S, et al. Cellular phone use and risk of benign and malignant parotid gland tumors – a nationwide case-control study. <i>American journal of epidemiology</i> 2008; 167(4):457-67.</p> <p>Luo J, Li H, Deziel NC, Huang H, Zhao N, Ma S, et al. Genetic susceptibility may modify the association between cell phone</p>

<sup>15</sup> Blackman C, Benane S, House D. The influence of temperature during electric-and magnetic-field-induced alteration of calcium-ion release from in vitro brain tissue. *Bioelectromagnetics*. 1991;12(3):173–82. <https://doi.org/10.1002/bem.2250120305>

<sup>16</sup> Ertlav K, Uslusoy F, Ataizi S, Nazıroğlu M. Long term exposure to cellphone frequencies (900 and 1800 MHz) induces apoptosis, mitochondrial oxidative stress and TRPV1 channel activation in the hippocampus and dorsal root ganglion of rats. *Metab Brain Dis*. 2018;33(3):753–63. <https://doi.org/10.1007/s11011-017-0180-4>

<sup>17</sup> Fragopoulou AF, Polyzos A, Papadopoulou MD, Sansone A, Manta AK, Balafas E, et al. Hippocampal lipidome and transcriptome profile alterations triggered by acute exposure of mice to GSM 1800 MHz mobile phone radiation: an exploratory study. *Brain Behavior*. 2018; 8(6):e01001. <https://doi.org/10.1002/brb3.1001>

<sup>18</sup> Perera PGT, Nguyen THP, Dekiwadia C, Wandiyanto JV, Sbarski I, Bazaka O, et al. Exposure to high-frequency electromagnetic field triggers rapid uptake of large nanosphere clusters by pheochromocytoma cells. *Int J Nanomed*. 2018;13:8429. <https://doi.org/10.2147/IJN.S183767>



	use and thyroid cancer: A population-based case-control study in Connecticut. <i>Environmental Research</i> . 2020; 182:109013.
Eye strain, damage to eye tissues cataracts	Bormusov E, P Andley U, Sharon N, Schächter L, Lahav A, Dovrat A. Non-thermal electromagnetic radiation damage to lens epithelium. <i>Open Ophthalmol J</i> . 2008; 2:102-6
Cardiomyopathy, heart rate variability	National Toxicology Program. 2018. Technical Report on the Toxicology and Carcinogenesis Studies in Hsd: Sprague Dawley SD Rats Exposed to Whole-Body Radio Frequency Radiation at a Frequency (900 MHz) and Modulations (GSM and CDMA) Used by Cell Phones.  Wallace J, Andrianome S, Ghosn R, Blanchard ES, Telliez F, Selmaoui B. Heart rate variability in healthy young adults exposed to global system for mobile communication (GSM) 900-MHz radiofrequency signal from mobile phones. <i>Environmental Research</i> 2020; 191:110097
Damage to sperm, decreased male fertility	Kesari KK, Agarwal A, Henkel R. Radiations and male fertility. <i>Reprod Biol Endocrinol</i> . 2018; 16(1):118
Changes in brain activity	Volkow ND, Tomasi D, Wang G-J, Vaska P, Fowler JS, Telang F, et al. Effects of cell phone radiofrequency signal exposure on brain glucose metabolism. <i>JAMA</i> 2011; 305(8):808-13
Changes in blood- brain barrier	Wallace J, Selmaoui B. Effect of mobile phone radiofrequency signal on the alpha rhythm of human waking EEG: A review. <i>Environmental research</i> . 2019; 175:274-86
Changes in the immune system function	Piszczyk P, Wójcik-Piotrowicz K, Gil K, Kaszuba-Zwoińska J. Immunity and electromagnetic fields. <i>Environ Res</i> . 2021; 200:111505.

As documented in Table 1, exposure to non-ionizing electromagnetic fields can harm a variety of organs and body systems, highlighting the urgency of a public-health-focused reassessment of existing exposure limits for radiofrequency radiation. Further, exposure to non-ionizing electromagnetic fields during pregnancy has been associated with an



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increased risk of miscarriage (Li et al., 2017)<sup>19</sup> and an increased frequency of hyperactivity and inattention during early childhood (Birks et al., 2017).<sup>20</sup>

In conclusion, the Environmental Working Group urges the FCC to open its record for a more comprehensive evaluation of radiofrequency radiation and update its standard to ensure the safety of wireless radiation devices for everyone, especially young children.

Submitted on behalf of the Environmental Working Group,

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Environmental Working Group

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Vice President, Science Investigations  
Environmental Working Group

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<sup>19</sup> Li DK, Chen H, Ferber JR, Odouli R, Quesenberry C. Exposure to Magnetic Field Non-Ionizing Radiation and the Risk of Miscarriage: A Prospective Cohort Study. *Sci Rep.* 2017; 7(1):17541. <https://doi.org/10.1038/s41598-017-16623-8>

<sup>20</sup> Birks L, Guxens M, Papadopoulou E, Alexander J, Ballester F, Estarlich M, Gallastegi M, Ha M, Haugen M, Huss A, Kheifets L, Lim H, Olsen J, Santa-Marina L, Sudan M, Vermeulen R, Vrijkotte T, Cardis E, Vrijheid M. Maternal cell phone use during pregnancy and child behavioral problems in five birth cohorts. *Environ Int.* 2017; 104:122-131. <https://doi.org/10.1016/j.envint.2017.03.024>

November 9, 2021

The Honorable Jessica Rosenworcel, Commissioner  
Acting Chairwoman  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, DC 20554

Dear Chairwoman Rosenworcel,

I am writing to request that the FCC re-open Docket #13-84 “Reassessment of FCC Radiofrequency Exposure Limits and Policies” and Docket #03-137 “Proposed Changes to the Commission Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields- in order to refresh the record before responding to the mandate of the August 13, 2021 [judgment](#) by the U.S. Court of Appeals for the District of Columbia Circuit, in Environmental Health Trust et al. v. the FCC.

I am Professor and Chair Emeritus at the University of New Hampshire Department of Electrical & Computer Engineering and served on the New Hampshire State Commission on 5G Technology. After a year of investigation we issued our [final report](#) on November 1, 2020.

I want to ensure the fifteen recommendations of the expert New Hampshire State Commission are considered by the FCC. If the FCC does not re-open the record, the Report will not be available to the Commission as it was finalized in 2020.

Sincerely



Digitally signed by Kent  
Chamberlin  
Date: 2021.11.09 21:21:17 -05'00'

Kent Chamberlin, PhD  
Professor & Chair Emeritus

## **New Hampshire State Commission on 5G Technology Final Report Recommendations**

### **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.

### **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.

### **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.

### **RECOMMENDATION 4**

Schools and public libraries should migrate from RF wireless connections for computers, laptops, pads, and other devices, to hardwired or optical connections within a five-year period starting when funding becomes available.

### **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.

#### 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.

#### RECOMMENDATION 7

Require that any new wireless antennas 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.

#### RECOMMENDATION 8

Upgrade the educational offerings by the NH Office of Professional Licensure and Certification (OPLC) for home inspectors to include RF intensity measurements.

#### 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.

#### 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.

#### 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.

#### 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. 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.

#### 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.

#### 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.



November 24, 2021

The Honorable Jessica Rosenworcel  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, DC 20554

Dear Chairwoman Rosenworcel,

I am a physician in France and for the past fifteen years I have been working on the documented health issues related to cell phone radiation as well as the cell phone SAR test procedures.

In regards to the recent U.S. DC Circuit Court of Appeals' ruling in EHT v FCC, we are writing to request that the FCC re-open Dockets #13-84 and #03-137 to allow new, significant policy developments and research be included for consideration because of its relevance to the FCC examining its cell phone SAR testing procedures.

I am President of the Phonegate Alerte Association, formed in 2018 and our efforts to ensure transparency have led to the French government's actions to withdraw or update at least 23 models of cell phones from different manufacturers (Xiaomi, Nokia, Huawei, Wiko, Alcatel, etc.) because they were found to exceed European Union regulatory SAR limits for human exposure to radiofrequency radiation.

Similar to the FCC's regulations on cell phone test procedures, European Union regulations allow manufacturers to test cell phones at 5 mm separation distance from the body. They do not force companies to test cell phones or wireless devices at positions that are directly against the body (0 mm separation distance) *despite the reality that billions of people are using cell phones close to the body.*

### **The French Government is Requesting 0 mm Cell Phone Radiation Testing**

In late 2019, the French government health agency ANSES issued a [report](#)<sup>1</sup> on the possible health effects associated with high radiation from mobile telephones carried close to the body and recommended that cell phones be tested at 0 millimeters, instead of 5 mm as the European Commission regulations require. Subsequently, France submitted a [formal objection](#)<sup>2</sup> to the European Commission in regards to the

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<sup>1</sup> <https://www.anses.fr/en/content/exposure-mobile-telephones-carried-close-body>

<sup>2</sup> <https://ec.europa.eu/docsroom/documents/43448>

current compliance test separation distance requirements of only 5 mm. The authorities have requested that compliance test distances be revised to 0 mm

*“Developments in the use of mobile telephones have led to a wide variety of situations in which telephones are no longer exclusively held close to a person’s ear in order to hold a conversation, since they are now also used to send and receive data through various applications for listening to music, playing video games or making video calls, which means that the equipment is used in ways which were not previously foreseen. There is also a growing trend for telephones to be networked with numerous connected objects, such as headsets or watches, which tend to result in lengthy connections between a telephone and the mobile network without the telephone being held in the hand, since it is often carried in clothing and is therefore closer to – or in contact with – the trunk.*

*For this reason, the French authorities believe that it is necessary to revise the harmonised standard EN 50566: 2017 concerning measurements of the SAR of devices that are hand-held or body-mounted in close proximity to the human body so that a maximum distance of 0 mm from the body is taken into consideration.”*

The FCC should ensure that cell phones are tested in body contact positions at 0 mm.

For background, in 2016, the French National Frequency Agency (ANFR) officially tested various models of cell phones and found that the majority exceeded regulatory limits when tested in body contact positions - with 0 mm between the phone and simulated body testing device (aka “phantom”).

### **Cell Phones Violate Radiation Limits**

Since December 4, 2019 ANFR has posted *143 new cell phone SAR test reports*. Despite the fact that the European Union strengthened their requirements to ensure cell phones were tested at 5 mm from the body, many cell phone models are still violating the limit of 2.0 W/kg for trunk SAR when tested by ANFR (10 g of tissue). All of the test results are [posted online](#)<sup>3</sup>.

Examples of smartphones that **violated the EU limits of 2.0 W/kg as well as the FCC limit of 1.6 W/kg when SAR radiation tested by the ANFR at 5mm include:**

- February 26, 2020: Sony Xperia 5 violated the limit at 2.64 W/kg.
- November 12, 2020: Essential Heyou 40 violated the limit at 2.54 W/kg<sup>4</sup>
- September 9, 2020: Essential Heyou 60 violated the limit at 2.86 W/kg<sup>5</sup>
- February 26, 2020: Xiaomi Mi Note 10 violated the limit at 2.45 W/kg<sup>6</sup>

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[https://data.anfr.fr/explore/dataset/das-telephonie-mobile/table/?disjunctive.marque&disjunctive.modele&dataChart=eyJxdWVyaWVzIjpbeyJib25maWciOnsiZGF0YXNldCI6ImRhcY10ZWxlGhvbmlLLW1vYmIsZSIsIm9wdGlbnMiOnsiZGZanVuY3RpdmUubWVycXVlIjpb0cnVILCJkaXNqdW5jdGl2ZS5tb2RlbGUiOnRydWV9fSwiY2hhcnRzIjpbeyJ0eXBlljoibGluZSIsImZ1bmMiOiJlBVkciLCJ5QXhpcyl6ImRhc190ZXRIIX25vcmlX25mX2VuXzUwMzYwliwic2NpZW50aWZpY0Rpc3BsYXkiOnRydWUsImNvbG9yIjoilzY2YzJhNSJ9XSwieEF4aXMiOiJkYXRlX2R1X2NvbRyb2xlX3Bhcl9sX2FuZnliLCJtYXhwb2ludHMlOiIiLCJ0aW1lc2NhbGUiOiJ5ZWYliwic29vdCI6IiJ9XX0%3D&sort=das\\_tronc\\_au\\_contact](https://data.anfr.fr/explore/dataset/das-telephonie-mobile/table/?disjunctive.marque&disjunctive.modele&dataChart=eyJxdWVyaWVzIjpbeyJib25maWciOnsiZGF0YXNldCI6ImRhcY10ZWxlGhvbmlLLW1vYmIsZSIsIm9wdGlbnMiOnsiZGZanVuY3RpdmUubWVycXVlIjpb0cnVILCJkaXNqdW5jdGl2ZS5tb2RlbGUiOnRydWV9fSwiY2hhcnRzIjpbeyJ0eXBlljoibGluZSIsImZ1bmMiOiJlBVkciLCJ5QXhpcyl6ImRhc190ZXRIIX25vcmlX25mX2VuXzUwMzYwliwic2NpZW50aWZpY0Rpc3BsYXkiOnRydWUsImNvbG9yIjoilzY2YzJhNSJ9XSwieEF4aXMiOiJkYXRlX2R1X2NvbRyb2xlX3Bhcl9sX2FuZnliLCJtYXhwb2ludHMlOiIiLCJ0aW1lc2NhbGUiOiJ5ZWYliwic29vdCI6IiJ9XX0%3D&sort=das_tronc_au_contact)

<sup>4</sup> <https://www.anfr.fr/das/COM054200035>

<sup>5</sup> <https://www.anfr.fr/das/COM054200035>

<sup>6</sup> <https://www.anfr.fr/das/COM006200006/>

Examples of smartphones **that would be compliant with the EU limit but would violate the FCC limits of 1.6 W/kg when SAR radiation tested by the ANFR at 5mm include:**

- September 16, 2020 Logicom Le Fleep 178 violated FCC's limit at 1.94 W/kg<sup>7</sup>
- September 16, 2020: Sky 55 Konrow violated FCC's limit at 1.91 W/kg<sup>8</sup>
- September 30, 2020: Wiki Lubi 5 Plus violated FCC's limit at 1.9 W/kg<sup>9</sup>
- September 29, 2020: Nokia 5.1 violated FCC's limit at 1.82 W/kg<sup>10</sup>
- April 8, 2021: Wiko F 300 violated FCC's limit at 1.8 W/kg<sup>11</sup>

As European Union and FCC test procedures utilize different averaging volumes, one cannot directly compare the measurements. However, FCC test procedures could result in even higher SAR violations ([Gandhi 2019](#))<sup>12</sup>.

Unfortunately ANFR no longer tests cell phones in body contact positions with 0 mm distance from the phone to the body phantom. If they did, far more of the 143 cell phones tested in the last two years would violate FCC and EU limits because every millimeter can significantly increase exposure. Further, due to the averaging volume differences between the FCC and EU limits, several of the phones that ANFR finds are compliant with the 1.6 W/kg limit would violate the FCC's test procedures.

The FCC presently allows manufacturers to SAR test cell phones with a separation distance between the phone and body (which can be up to approximately one inch from the body in some models of phones still in use in the USA) inaccurately measuring SAR levels into the body. Actual SAR exposure in direct body contact positions would be much higher than FCC test measurements.

### **New Research on Metal and Radiation Levels**

Studies on SAR in human tissue published since 2019 related to cell phone test procedures need to be included in the FCC re-examination. Metal can reflect and refocus cellular radiation, resulting in much higher absorption rates. The FCC, states, "Electrically conductive objects in or on the body may interact with sources of RF energy in ways that are not easily predicted. Examples of conductive objects in the body include implanted metallic objects. Examples of conductive objects on the body include eyeglasses, jewelry, or metallic accessories."

- In January 2021 the study "Experimental Validation for Temperature Rise in Human Tissue Due to Implanted Metal Plates with Screw Holes Using Translucent Solid Phantom" was published in 2020 International Symposium on Antennas and Propagation (ISAP), Osaka, Japan IEEE, 2021 and found increases in SAR enhancement due to the implanted metallic plates observed at specific frequencies.<sup>13</sup>
- On December 2020, the study The effect of metal objects on the SAR and temperature increase in the human head exposed to dipole antenna (numerical analysis) published in Case Studies in Thermal Engineering found "the presence of metal objects in proximity to the head alters SAR and temperature increase within the tissues. In most cases, metal objects redistribute the EM

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<sup>7</sup> <https://www.anfr.fr/das/COM044200035>

<sup>8</sup> <https://www.anfr.fr/das/COM044200036>

<sup>9</sup> <https://www.anfr.fr/das/COM046200002>

<sup>10</sup> <https://www.anfr.fr/das/COM085200003>

<sup>11</sup> <https://www.anfr.fr/das/COM057210009>

<sup>12</sup> <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8688629>

<sup>13</sup> <https://ieeexplore.ieee.org/document/9391129>

field incident upon them to a smaller region increasing power absorption, thereby increasing SAR and temperature in that region. The power absorption in head layers is found to be sensitive to metal object's size and shape, and distance of the antenna from the objects".<sup>14</sup>

These are just a few of the published studies on radiation levels will not be included in the FCC's examination of cell phone test procedures *unless the FCC refreshes the record*.

### **Investigative Reports on Telecom Influence**

In September 2020, the editor-in-chief of the Program 66 minutes interviewed Chicago Tribune journalist and Pulitzer Prize winner Sam Roe and myself discussing how FCC's cell phone test procedures allow violations of FCC limits because they do not require cell phones to be tested at 0 mm.<sup>15</sup>

On November 12, 2020, France Télévisions Complément d'Investigation "5G A Wave of Doubt" directed by investigative journalist Nicolas Vescovacci was broadcast on France 2<sup>16</sup>. The investigation described how cell phones exceed radiation thresholds when tested against the body and how cell phones are being taken off the market in response. Importantly, the industry ties of members of International Commission on Non-Ionizing Radiation Protection (ICNIRP) were revealed. In June 2020, a report released by European Members of Parliament Michèle Rivasi (Europe Écologie) and Dr. Klaus Buchner (Ökologisch-Demokratische Partei) found that ICNIRP has long ignored the science on non thermal effects<sup>17</sup>.

This 2020 investigative research must be included in the FCC's record review so that the FCC does not inadvertently allow the wireless industry to influence its review of the record and decision.

### **There is Not a 50-Fold Safety Factor for Cell Phone Local SAR**

Furthermore, we would like to importantly note that after we questioned ICNIRP President Rodney Croft and Vice President Eric Van Rongen, we received confirmation that there is not a 50 fold safety factor when it comes to ICNIRP's cell phone local SAR limit.

Here is what Mr. Van Rongen wrote about this:

"Anyone who states that a reduction factor of 50 applies to local exposures obviously misinterprets the guidelines, although the 1998 guidelines might not have been very clear in that respect the 2020 ones provide more clear information."

On December 17, 2019 Environmental Health Trust and Phonegate Association write members of Congress a letter<sup>18</sup> and Background and Facts document<sup>19</sup> on the urgent need for a hearing regarding cell phone radiation test procedures, due to the excessive radiation the phone can expose the user to in body contact positions.

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<sup>14</sup> <https://www.sciencedirect.com/science/article/pii/S2214157X20305311?via%3Dihub>

<sup>15</sup> [Phonegate : entretien avec le journaliste américain et prix Pulitzer Sam Roe](#)

<sup>16</sup> [https://www.francetvinfo.fr/replay-magazine/france-2/complement-d-enquete/complement-d-enquete-5g-londe-dun-doute\\_4152949.html](https://www.francetvinfo.fr/replay-magazine/france-2/complement-d-enquete/complement-d-enquete-5g-londe-dun-doute_4152949.html)

<sup>17</sup> <https://ehtrust.org/wp-content/uploads/ICNIRP-report-FINAL-JUNE-2020.pdf>

<sup>18</sup> <https://ehtrust.org/wp-content/uploads/Signed-Letter-to-US-Congress-phonegate-.pdf>

<sup>19</sup> [Background and Facts Documenting PhoneGate and Our Call for Congressional Action  
https://ehtrust.org/wp-content/uploads/Background-and-Facts-on-PhoneGate-1-1.pdf](https://ehtrust.org/wp-content/uploads/Background-and-Facts-on-PhoneGate-1-1.pdf)

We have a significant amount of new data on SAR test methods from 2020 and 2021 to share with the FCC in order to ensure the protection of cell phone users, especially children. SAR tests are thermally based and they are an inadequate measurement to ensure safety. Stronger regulations which protect users from thermal and non-thermal effects are needed.

### **New Law To Require Radiation Testing of Wi-Fi Laptops, Router and Electronics**

In addition, there has been new legislation regarding transparency on wireless radiation in France. Starting in July 2020, the wireless industry must label tablets, laptops, Wi-Fi routers, DECT phones and other wireless connected electronics with the radiofrequency radiation SAR exposure levels for consumers **at point of sale and for all advertising**. This includes the SAR for the head, trunk and extremities. All equipment used close to the head, hand-held or carried close to the body is potentially covered. From the [SAR Regulation Guide](#) provided by [ANFR](#), you can find a non-exhaustive list of equipment qualified as radio equipment that required SAR testing.

Note: For years [France law](#)<sup>20</sup> has ensured cell phones were SAR radiation labeled, banned the sale of cell phones designed for young children, prohibited advertising to children under 14 years of age<sup>21</sup> and [warned](#)<sup>22</sup> users to keep devices away from the body.

It is imperative that the two above-mentioned dockets are re-opened to allow recent developments to be submitted for a proper assessment of FCC's testing protocol.

Sincerely,

Marc Arazi, M.D.

A handwritten signature in blue ink, appearing to be 'M. Arazi', written over a light blue horizontal line.

President, PhoneGate Alert Association  
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[www.phonegatealert.org/en/](http://www.phonegatealert.org/en/)

A book on Phonegate was published by Massot Editions on this international health scandal. An English version is planned and we will be sure to send it to you when it is released in the United States.

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<sup>20</sup> [Article 183 - LOI n° 2010-788 du 12 juillet 2010 portant engagement national pour l'environnement \(1\)](#)

<sup>21</sup> [Law on sobriety, transparency, information and consultation for exposure to electromagnetic waves](#)

<sup>22</sup> [Order of November 15, 2019 relating to the display of the specific absorption rate of radioelectric equipment and to consumer information NOR: SSAP1834792A](#)



November 18, 2021

The Honorable Jessica Rosenworcel, Commissioner  
Acting Chairwoman  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, DC 20554

Dear Chairwoman Rosenworcel,

We are writing to request that the FCC re-open the relevant Dockets to ensure the latest science be included in the FCC's reexamination of the adequacy of its human exposure limits and regulations for radiofrequency radiation exposures.

We urge the Commission to look at new scientific evidence published since December 4, 2019. Of 39 new genetic effect studies, 79 % (31 studies) showed effects and 21 % (8 studies) did not show significant effects. Of 33 new neurological effect studies, 85 % (28 studies) showed effects and 15 % (5 studies) did not show significant effects. Of 30 new oxidative effect studies, 93% (28 studies) showed effects and 7 % (2 studies) did not show significant effects. The preponderance of scientific research on RFR continues on an upward trend.

There is a broad consensus among those in the scientific research community who are knowledgeable on the published literature, that new, biologically-based public safety limits for chronic exposure to radiofrequency radiation (RFR) are warranted now. The available evidence for health risks due to low intensity radiofrequency radiation exposures from wireless technology applications is sufficient and compelling. Research published over the last two years has added significant additional weight to the body of evidence which indicates that FCC public safety exposure limits are grossly inadequate to protect public health given the proliferation of RFR-emitting devices now in common usage.



The evidence for health risks comes directly from hundreds of published scientific and public health studies reporting that low-intensity RFR is capable of producing health harm across very large populations of exposed people.

The BioInitiative Working Group has been gathering and evaluating hundreds of such studies since 2006, and has published two large reports detailing this evidence. The group concluded that the scientific evidence was more than sufficient in 2007, and certainly in 2012 ([www.bioinitiative.org](http://www.bioinitiative.org)) to establish new biologically-based exposure safety standards. Further, we have submitted numerous comments to the FCC since 2013 advising that the Commission has not struck the right balance between the wireless technologies rollout and managing resulting health impacts for Americans, particularly for children. The increased risk for cancers, neurological diseases, fertility and reproduction, immune dysfunction, memory and learning impairment, and other serious medical problems associated with exposure to low-intensity RF are documented and analyzed for the Commission to review at: <https://bioinitiative.org/research/summaries/>

When the cumulative body of evidence is assessed over the last decades of research, the overall picture for studies on radiofrequency radiation effects shows clear and consistent patterns of effects on living tissues. Chronic RFR exposures at environmental levels common today can reasonably be presumed to produce health harm at and below current FCC safety limits for humans and should be substantially lowered.

Genetic effects: Effect= 67% (259 studies); No Effect= 33% (129 studies) (literature up to November 12, 2021)

Neurological effects: Effect= 74% (271 studies); No Effect= 26% (97 studies) (literature up to November 12, 2021)

Oxidative effects: Effect= 92% (258 studies); No Effect= 8% (23 studies) (literature up to November 12, 2021)



Respectfully submitted on behalf of the BioInitiative Working Group by:

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## **Consumers for Safe Cell Phones**

November 24, 2021

The Honorable Jessica Rosenworcel  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, DC 20554

Dear Chairwoman Rosenworcel,

As one of the petitioners who recently sought the DC Circuit Court of Appeal's review of the FCC's December 4<sup>th</sup>, 2019 decision to maintain their outdated 25 year old wireless exposure guidelines, we write to urge the Commission to follow the Court's directive to properly review the evidence that had been submitted into Dockets #13-84 and #03-137. A proper review requires that the two dockets be re-opened to allow newly published research and documents (made public over the past 2 years) to be included in the analysis. This will provide the FCC with up-to-date information to use in undertaking the Court's required thorough analysis.

The Court's ruling stated that the Commission "*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...*"

Of particular concern to the Court is the failure of the FCC to review the evidence in the record related to assessing their inadequate cell phone testing guidelines. Since the GAO released their 2012 report<sup>1</sup> stating, "*The Federal Communications Commission's (FCC) RF energy exposure limit may not reflect the latest research, and testing requirements may not identify maximum exposure in all possible usage conditions... 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.*" - we have been calling on the FCC to test phones directly against the body with zero separation to simulate the manner in which they are typically used by consumers.

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<sup>1</sup> "Telecommunications: Exposure and Testing Requirements for Mobile Phones Should Be Reassessed" - GAO-12-77:  
Published: Jul 24, 2012

FCC's current testing protocol allows a separation distance between the phone and the torso simulating use in a holster or belt clip, enabling a phone to pass the FCC compliance test when in fact, the exposure from phones used in real life usage positions will likely exceed the federal "safety" limit. This is because it is commonplace for today's consumer to carry a transmitting phone in a pants or breast pocket or tucked into a bra with no separation between the antennas and the body.

Here are some examples of the RF warnings for wireless devices currently on the market in 2021:

- The Apple [iPhone 13 Pro Max RF Exposure statement](#)<sup>2</sup> reads, "iPhone is evaluated 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." [Users will likely carry and use transmitting phones in pockets and bras against their body unaware because the RF "safety" warning is located in the small print of the legal section deep within menus on the phone where it is not likely to be found.]
- The [Miku Pro Smart Baby Monitor manual states](#)<sup>3</sup>, "RF EXPOSURE WARNING: ....This equipment should be installed and operated with minimum distance 20cm between the radiator and your body." [Yet many parents will locate these RF transmitting monitors close to the crib or in a child's playroom unaware that these RF warnings are in the manual.]
- The [AT&T DECT 6.0 Home Cordless Phone manual](#)<sup>4</sup> states, "The telephone base shall be installed and used such that parts of the user's body other than the hands are maintained at a distance of approximately 20 cm (8 inches) or more." [Yet many people install the base unit on the desk just inches from their head or on their bedside table unaware of these instructions.]

Key evidence has been published in the past two years that indicates cell phones directly in body contact (as when worn and used in a pants or shirt pocket or sports bra) are associated with an increased risk for breast tumors and sperm damage.

As examples, these 2020 and 2021 published studies referenced below must be included in a thorough FCC assessment of their cell phone testing protocol in order to perform a more "reasonable analysis" of the testing protocol:

I. "The Association Between Smartphone Use and Breast Cancer Risk Among Taiwanese Women: A Case-Control Study" - Cancer Manag Res 2020 Oct 29;12:10799-10807 doi: 10.2147/CMAR.S267415.

Results: "Participants who carried their smartphone near their chest or waist-abdomen area had significantly increased 5.03-fold and 4.06-fold risks of breast cancer"

II. "Effects of mobile phone usage on sperm quality - No time-dependent relationship on usage: A systematic review and updated meta-analysis" - 2021 Nov; 202:111784. doi: 10.1016/j.envres.2021.111784. Epub 2021 Jul 30

Results: "Exposure to mobile phones is associated with reduced sperm motility, viability, and concentration." 18 studies were evaluated including 4280 samples.

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<sup>2</sup> <https://www.apple.com/legal/rfexposure/iphone14,3/en/>

<sup>3</sup> [https://cdn.shopify.com/s/files/1/2621/9254/files/mikucare.com\\_quick\\_setup-guide.pdf?v=1589825520](https://cdn.shopify.com/s/files/1/2621/9254/files/mikucare.com_quick_setup-guide.pdf?v=1589825520)

<sup>4</sup> [https://att.vtp-media.com/products/CL/CL82X07/CL82X07\\_WEBCIB\\_i5.0\\_20201217.pdf](https://att.vtp-media.com/products/CL/CL82X07/CL82X07_WEBCIB_i5.0_20201217.pdf)

If the past two years of important research and evidence are not allowed to be included in the re-assessment of the FCC's cell phone testing protocol, it is certain that the public's distrust of the safety of phones and other wireless consumer devices will become even more widespread. The public's trust is dependent upon the FCC's thorough evaluation of the current, up to date body of research, especially with the advent of the novel and more powerful exposures expected with 5G.

Respectfully submitted,

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