

Before the  
Federal Communications Commission  
Washington DC 20554

In the Matter of:	)	SB Docket No. 25-180; GN Docket No.
	)	22-352; WT Docket No. 23-158; GN
Satellite Spectrum	)	Docket No. 14-177
	)	
	)	

**COMMENTS OF WIRED BROADBAND, INC.  
ON BEHALF OF AMERICANS INJURED AND DISABLED  
FROM ELECTROMAGNETIC RADIATION  
(ELECTROMAGNETIC RADIATION SYNDROME – EMR-S)**

**July 28, 2025**

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**FILING PARTIES**

**The parties listed in Addendum A (attached hereto and incorporated herein by this reference) collectively constitute the “Filing Parties,” have granted permission to submit these Comments on their behalf, and join together to submit these Comments.**

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## **1) Executive Summary**

Wired Broadband, Inc., on behalf of Americans injured or disabled by electromagnetic radiation, and the Filing Parties set forth in Addendum A, respectfully submit these comments. Addendum A is incorporated herein by reference. Wired Broadband, Inc. is a not-for-profit corporation. The Filing Parties and partner groups have a reach of about one-hundred fifty thousand people across the country. We advocate for the safe deployment of communications infrastructure.

The FCC, in its stated efforts “to promote technological innovation, to grow the nation's economy, and to facilitate increased connectivity for all Americans,”<sup>1</sup> should include in its calculus a cost/benefit analysis to determine whether the true costs to Americans outweigh the purported benefits.

We oppose any additional spectrum being made available for satellite communications, especially within the high GHz ranges being proposed by the FCC<sup>2</sup> until it has determined, in compliance with the 2021 court remand order,<sup>3</sup> safe levels of radiofrequency exposure for humans, plants, animals, and microbes and has updated its exposure limits and concomitant regulations to protect the public. The amount of environmental pollution that this will introduce is exponential. This will increasingly expose Americans to RF radiation on a constant, 24/7, basis from which there is no escape. This will also exponentially increase the amount of environmental pollution: satellite debris with more satellite launches being facilitated, potential collisions with other satellites and space debris, short life-span of satellites of 5 years which then must fall back to earth, with thousands of satellites expiring every 5 years. Rather, the FCC should be focusing on wireline deployment with a once in a lifetime investment of \$42.5 billion from the Infrastructure Investment and Jobs Act, without deflecting it to satellite communications.

## **2) FCC Should Conduct a Cost/Benefit Analysis on the Biological Effects of RF Radiation on the Public and the Environment, Especially Children**

The FCC should conduct a cost / benefit analysis on the biological effects of RF radiation on the public and the environment, especially on children. President Trump’s MAHA Commission

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<sup>1</sup> <https://www.federalregister.gov/d/2025-11966/p-95>.

<sup>2</sup> <https://www.federalregister.gov/documents/2025/06/27/2025-11966/satellite-spectrum-abundance>; NPRM at <https://docs.fcc.gov/public/attachments/FCC-25-29A1.pdf>.

<sup>3</sup> *Environmental Health Trust, et al v. FCC*, 2021 D.C. Circuit Court of Appeals.

Executive Order has made it a national priority to include the study of the **effects of “electromagnetic radiation”** in connection with the **chronic disease epidemic in children**.<sup>4</sup>

Therefore, the proposed rule must include the impact of RF radiation emitted from satellites to people and the environment, especially to children. The FCC needs to acknowledge President Trump’s MAHA E.O. and address the proposed rule’s potential adverse biological effects. Indeed, the FCC should consider the sheer devastation that Americans are experiencing in their daily lives from exposure to RF radiation, from whichever source, and how that will worsen with increased satellite spectrum, and how to mitigate it.

The FCC’s rationale for increased satellite spectrum and spectrum utilization (resulting in increased radiofrequency density in the atmosphere and on earth) is not supported by any demonstrable evidence from Americans, especially those injured or disabled from RF radiation. In fact, the message from a large swath of Americans, including those injured and disabled and those not yet injured or disabled, from wireless radiation, cannot be clearer: they do not want to be exposed to technology that is harming them and their children, devaluing their property, and converting their homes, schools and parks into toxic zones.<sup>5</sup>

Since the NPRM concentrates on the benefits of increased satellite spectrum, here are just some of the costs that the FCC should consider:

a. **Biological effects of RF radiation** acknowledged by the FCC, federal agencies, industry and by independent research, as well as chronic disease clusters caused by RF radiation, as set forth in Section 6, About the Biological Effects of RF Radiation, and Addendum B. In Addendum B, we have cited chronic disease clusters from exposure to RF radiation, e.g., nausea, rashes, stroke, atrial fibrillation and a variety of cancers. Cluster locations: near Duluth, MN (51 strokes), Pittsfield, MA (17 residents fell ill and many evacuated, one resident who remained died), Rippon, CA (4 children and 4 teachers developed cancer; one child died last year) and Eagle, ID (atrial fibrillations from 5G cell towers).

b. **Potential Commerce Clause violations (Art. 1, Sec. 8, Cl. 3)** by not providing the public the choice of abstaining from exposure to RF radiation, but forcing the public to partake in the commerce activity, and suffer the consequences, whether or not they subscribe to that activity, e.g., more terrestrial wireless facilities would be constructed in tandem with more satellite spectrum, such facilities in extreme proximity to one’s front yard even if not subscribing to the wireless service, yet

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<sup>4</sup> See §4a

<https://www.federalregister.gov/documents/2025/02/19/2025-02871/establishing-the-presidents-make-america-healthy-again-commission>

<sup>5</sup> See, e.g., in Addendum B, last section, chronic disease clusters.

forcibly exposed to an ugly, radiating facility, that is energy consumptive, environmentally damaging and property devaluing.<sup>6</sup>

c. **Potential 5th Amendment violations** of the right to just compensation by stripping private rights of ownership without just compensation by authorizing radiation to be emitted from a satellite or wireless facility that invades a property owner's property-based right to exclude.<sup>7,8</sup>

**There is no prosperity for Americans if they are getting sick from RF radiation** – and with more spectrum for satellite systems that will get Americans even more sick, the economy does not grow and American does not lead. America leads only if industry competes on safety. Then Americans will have the choice of safety for themselves and their families, and that is how the economy grows. The FCC's motto should be: **Americans first, then industry follows.**

### **3) Environmental Pollution from Satellite Launches and Space Debris**

On the cost side of the equation, the FCC should also evaluate the environmental pollution caused by increased satellite launches and the attendant space debris. The proposed rule would fast track satellite launch approvals that would exponentially increase satellite launches and space debris.

The FCC has categorically excluded launching a large constellation of satellites; however, the FCC should re-examine this exclusion given the enormous environmental effect this will have. The U.S. Government Accountability Office (GAO) issued a report in November, 2022 entitled "Satellite Licensing - FCC Should Reexamine its Environmental Review Process for Large

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<sup>6</sup> The Electrifying Factor Affecting Your Property's Value, Wall Street Journal, Aug 15, 2018, <https://www.wsj.com/articles/the-electrifying-factor-affecting-your-property-s-value-1534343506> . A study spanning 1984 to 2002 found that the prices for 4,283 residential sales in 4 suburbs were reduced by about 21% (see, Cell Towers and Our Real Estate Values, October 4, 2014, <https://dscelltower.wordpress.com/2014/10/04/cell-towers-and-our-real-estate-values/> ).

<sup>7</sup> Cell towers inflict wireless pollution on private property, reducing the habitability of that property, without just compensation. See memorandum on constitutional considerations, section 1.c, for a discussion of Fifth Amendment case law <https://docs.google.com/document/d/1DBTtngZDuZ9lbnze58gBXsJs1jXzU5dQZx0ycFQumUk/edit#heading=h.6cyqdt7korzl>

Cell towers decrease property values: Wireless Towers and Home Values: An Alternative Valuation Approach Using a Spatial Econometric Analysis, 2017, <https://link.springer.com/article/10.1007/s11146-017-9600-9>.

<sup>8</sup> <https://www.emfanalysis.com/property-values-declining-cell-towers/?iframe=1&iframe=1&iframe=1>.

Constellations of Satellites.”<sup>9</sup> Since 1986, the FCC created a categorical exclusion for satellites. The GAO reported that effects from satellites “could include sunlight reflections, orbital debris, and launch emissions.”<sup>10</sup> Satellite mega constellations did not even exist in 1986, so the FCC could not possibly have considered the impact of these constellations at the time it issued the categorical exclusion.

In 2022, the GAO reported that the FCC had agreed to review whether such launches have environmental effects in addition to constructing wireless facilities in wildlife preserves. However, the GAO states in its report that the FCC (a) “has never reviewed and documented whether it should apply to large constellations of satellites” and (b) “does not have a process or timeline for periodically reviewing its categorical exclusion and publishing the information on its website.”<sup>11</sup>

The number of satellite launches is particularly relevant given that on July 17, 2025, the FCC released a draft Report and Order that would streamline satellite applications processing and related licensing requirements.<sup>12</sup> It has been reported that, since 2016, there have been “more than 70,000 fixed-satellite service applications in the Ku-, Ka-, and/or V-bands alone.”<sup>13</sup>

The crowding of satellites in orbit is also problematic. For example, Starlink recorded 25,000 collision avoidance maneuvers Dec 2022 – May 2023.<sup>14</sup> This is unsustainable for any satellites in orbit or any astronaut missions.

Low Earth Orbit (LEO) Satellites can be destructive to human health and the environment. These satellites are akin to disposable infrastructure. Satellites, along with wireless facilities, have a lifespan of only five years. The thousands of satellites (including LEO satellites) proposed to be launched over the coming years will eventually all fall back to earth. They burn up upon reentry in the atmosphere and breaking into small dust particles, spreading toxic metals across the planet.<sup>15</sup> Mining these metals, many of which are rare earth metals for

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<sup>9</sup> <https://www.gao.gov/assets/730/723690.pdf>.

<sup>10</sup> Ibid.

<sup>11</sup> <https://www.gao.gov/assets/730/723690.pdf>.

<sup>12</sup> <https://www.fcc.gov/document/streamlining-space-bureau-reviews>.

<sup>13</sup> Analysis of Federal Communications Commission Nongeostationary Space Station Applications (2000–2022), 18 Mar 2025, <https://doi.org/10.2514/1.A35987>, citing Butash T., Garland P. and Evans B., “Non-Geostationary Satellite Orbit Communications Satellite Constellations History,” International Journal of Satellite Communications and Networking, Vol. 39, No. 1, 2021, pp. 1–5. <https://doi.org/10.1002/sat.1375>

<sup>14</sup> <https://www.space.com/starlink-satellite-conjunction-increase-threatens-space-sustainability>.

<sup>15</sup> There is a risk that satellites do not disintegrate upon reentry and instead crash in whole pieces into the earth – potentially causing great harm if in a populated area. For satellites licensed by the US government, US taxpayers bear the liability arising from such impacts. See attached fact sheet, footnote 23.

electronics, batteries, and solar panels, often occurs in unbearable conditions, under autocratic governments, and performed by child labor.<sup>16</sup> Once the satellites expire, they are required under FCC rules to fall back to earth so as not to clutter up space with decommissioned satellites.<sup>17</sup> Therefore, expiring satellites will create massive debris with tens of thousands of satellites falling to earth every year.

In addition, getting satellites into space requires burning large amounts of poisonous rocket fuel, which is now present in human food.<sup>18</sup>

The documents set forth in the following links are incorporated herein by reference:

- Comments of Advocates of the EMS Disabled, In the Matter of: Request for Comments on the Design and Implementation of \$2.75 Billion of the Digital Equity Act of 2021 Program submitted on May 1, 2023 at <https://thenationalcall.org/wp-content/uploads/2023/09/NTIA-2023-0002-5-1-23-FINAL.pdf> (also attached)
- Environmental Health Trust, Fact Sheet: Satellite Proliferation: Hundreds of Thousands of US Launches With No Environmental Review at <https://ehtrust.org/wp-content/uploads/Satellite-federal-bills-EHT-factsheet-11-1-23.pdf> (also attached)

#### **4) FCC First Must Comply with 2021 Court Remand Order**

The FCC has been under court order since 2021 to review the records in its docket showing adverse biological effects from radio frequency (RF) radiation. While the FCC seeks to increase commercial use of satellite spectrum, the FCC must also take into consideration the concomitant saturation of RF radiation to which the public would be exposed. With increased

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<https://ehtrust.org/wp-content/uploads/Satellite-federal-bills-EHT-factsheet-11-1-23.pdf>

<sup>16</sup> How 'modern-day slavery' in the Congo powers the rechargeable battery economy. NPR Fresh Air, February 1, 2023

<https://www.npr.org/sections/goatsandsoda/2023/02/01/1152893248/red-cobalt-congo-drc-mining-siddharth-kara>

Mapping the Impact and Conflicts of Rare-Earth Elements, Institute for Policy Studies, November 28, 2023

<https://ips-dc.org/mapping-the-impact-and-conflicts-of-rare-earth-elements/>

<sup>17</sup> FCC Adopts New '5-Year Rule' for Deorbiting Satellites, FCC-22-74, 9/29/22

<https://www.fcc.gov/document/fcc-adopts-new-5-year-rule-deorbiting-satellites-0>

<sup>18</sup> "The New Space Race Is Causing New Pollution Problems" the New York Times, January 9, 2024

<https://www.nytimes.com/2024/01/09/science/rocket-pollution-spacex-satellites.html>

Chemical used in rocket fuel is widespread in food, Consumer Reports finds, CBS News August 7, 2024

<https://www.cbsnews.com/news/consumer-reports-chemical-rocket-fuel-perchlorate/>

satellite spectrum connecting to wireless terrestrial facilities, the FCC must review the adverse biological effects from such increased public exposure.

To refresh the FCC’s recollection, the D.C. Circuit Court of Appeals in 2021 ruled against the FCC’s decision not to update its RF radiation limits for human exposure. In *Environmental Health Trust, et al v. FCC*, the court remanded the limits back to the FCC to examine in the FCC’s docket the 11,000 pages of scientific, peer-reviewed studies showing adverse biological effects from RF radiation, and to examine long-term exposure effects to the public especially to children, and the environment.<sup>19</sup> The court stated that the FCC did not take a “reasoned” approach as required under the Administrative Procedures Act, to conduct a review of the records in its docket showing biological effects.

At the core of the court’s decision was a rejection, as a matter of law, of the FCC’s reliance on the Food and Drug Administration’s (FDA) statement that the FCC’s limits for human exposure did not need to be changed. The FDA was referring to the National Toxicology Program which, nonetheless, concluded clear evidence of cancer in 2018 in lab animals from RF radiation exposure. A letter by then FCC Commissioner Brendan Carr of December 17, 2018 to Senator Blumenthal and Representative Matsui<sup>20</sup> cites the FDA statement that FCC RF radiation limits are safe, which was rejected by the court as “conclusory.”<sup>21</sup> Therefore, current FCC Chair Brendan Carr cannot rely on the FDA’s conclusory statement.

The FCC has not considered the latest science since 1996, as it is obligated to do under the law, despite having **actual notice** of adverse biological effects at its current limits. Current RF radiation exposure standards are based largely on 11 monkeys and 12 rats, which were exposed for less than one hour, over 40 years ago.<sup>22</sup> The GAO first recommended that the FCC revisit these limits back in 2012 and the FCC has not yet done so.<sup>23</sup>

Without evidence to support its approach, the FCC averages exposure levels over 30 minutes,<sup>24</sup> which obscures the effects of the constant peaking and pulsations of RF radiation

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<sup>19</sup> <https://media.cadc.uscourts.gov/opinions/docs/2021/08/20-1025-1910111.pdf>

<sup>20</sup> <https://www.rfsafe.com/wp-content/uploads/2024/11/2018.12.17-FCC-Carr-to-Blumenthal-and-Eshoo-re-RF-Safety.pdf>.

<sup>21</sup> <https://media.cadc.uscourts.gov/opinions/docs/2021/08/20-1025-1910111.pdf>

<sup>22</sup> <https://doi.org/10.1186/s12940-022-00900-9>

<sup>23</sup> Exposure and Testing Requirements for Mobile Phones Should Be Reassessed, GAO-12-771, Jul 24, 2012  
<https://www.gao.gov/products/gao-12-771>

<sup>24</sup> 47 CFR 1.1307(b)(2): “Time-averaging period is a time period not to exceed 30 minutes for fixed RF sources or a time period inherent from device transmission characteristics not to exceed 30 minutes for mobile and portable RF sources,” [https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1307#p-1.1307\(b\)](https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1307#p-1.1307(b)).



which causes adverse health effects, and does not account for 24/7 exposure by the population.<sup>25</sup>

Making more spectrum available while failing to update FCC exposure limits puts all Americans at risk, and is harming millions of Americans.<sup>26</sup> The FCC must do the work that it is required to do under the Telecommunications Act of 1996 and the Communications Act of 1934. Therefore, until the FCC complies with the court remand order of 2021, the FCC should

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<sup>25</sup> Human-made electromagnetic fields: Ion forced-oscillation and voltage-gated ion channel dysfunction, oxidative stress and DNA damage (Review) (2021) Pangopolous DJ, et al. International Journal of Oncology. August 23, 2021.

<https://pubmed.ncbi.nlm.nih.gov/34617575/>.

Computational modeling investigation of pulsed high peak power microwaves and the potential for traumatic brain injury. Sci Adv. 2021 Oct; 7(44).

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8555891/>. "These studies reveal that the MAE threshold depends on the energy in a single pulse (not the average power density) for sufficiently short pulses [e.g., 32  $\mu$ s in (46)], and peak power densities of 102 to 105 mW/cm<sup>2</sup> have been known to cause auditory effects in human participants (45)."

"Diplomats' Mystery Illness and Pulsed Radiofrequency/Microwave Radiation," Dr. Beatrice Golomb. Neural Comput. 2018 Nov; 30(11):2882-2985.

<https://pubmed.ncbi.nlm.nih.gov/30183509/>; "Reported facts appear consistent with pulsed RF/MW as the source of injury in affected diplomats."

"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," Martin L. Pall, PhD, <https://peaceinspace.blogs.com/files/5g-emf-hazards--dr-martin-l.-pall--eu-emf2018-6-11us3.pdf>.

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.

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

<sup>26</sup> A 2019 Bevington study analyzed the prevalence of EMR Syndrome within a given population. Based on a U.S. population of 332.4 million, the numbers are high: (a) Can't work – 0.65%, 2.16 million; (b) Severe symptoms – 1.5%, 4.99 million; (c) Moderate symptoms – 5%, 16.6 million; (d) Mild symptoms – 30%, 99.7 million. "The Prevalence of People with Restricted Access to Work in Manmade Electromagnetic Environments," Journal of Environment and Health Science, <https://mdsafetech.files.wordpress.com/2019/10/2018-prevalence-of-electromagnetic-sensitivity.pdf>.

forebear from making any further spectrum available, or allowing for techniques that result in densification of radiofrequency emissions on existing spectrum.

#### 5) **The FCC’s Jurisdictional Guardrails to Act in the Public Interest and “Promote the Safety of Life and Property”**

The FCC has a regulatory obligation to protect the human environment<sup>27</sup>, but has made no mention of how satellite deployment of increased spectrum will affect human exposure. This neglects its regulatory obligation and unless corrected, will continue to cause irreparable harm to Americans and their children (see, e.g., the chronic disease cluster section in Addendum B).

It is of note that the FCC expresses an abundance of concern over “emissions” in the context of interference (mentioned 19 times in various word choices), but no recognition of interference to human bodies in the form of RF radiation exposure. Similarly, “environment” appears 6 times, but the context is different in 5. The FCC makes reference to the electromagnetic environment and the National Radio Quiet Zone only once, in ¶19. The FCC appears to be more worried about interference between sources of equipment like receivers, rather than interference for humans. The FCC’s obligation is first to ensure the safety of exposure to humans and the environment such as animals, insects including bees, birds, trees and the microbiome.

Under the Communications Act of 1934 and the Telecommunications Act of 1996 (TCA), the FCC’s jurisdictional guardrails are clear: to act in the public interest; and its legal mandate is clear: “to promote safety of life and property **through** the use of wire and radio communication” (emphasis added).<sup>28</sup> By law, communications infrastructure is there to serve the public interest, not industry. **Americans first, then industry follows.**

#### 6) **What the FCC Knows About the Biological Effects of RF Radiation**

The cost side of the equation must include the biological effects of RF radiation. In that equation the FCC must factor in its actual knowledge of records covering the biological effects of RF radiation, including without limitation that which is posted in its Dockets 13-84, 03-137, and 19-226. As the FCC has stated in *Environmental Health Trust, et al v. FCC* and in then Commissioner Carr’s letter of December 18, 2018, the FCC looks at other agencies “that are experts in these health and safety issues,”<sup>29</sup> the FCC should take note of the following

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<sup>28</sup>See 47 USC 151 at <https://www.law.cornell.edu/uscode/text/47/151>; see also 47 USC 332 <https://www.law.cornell.edu/uscode/text/47/332>.

<sup>29</sup> <https://www.rfsafe.com/wp-content/uploads/2024/11/2018.12.17-FCC-Carr-to-Blumenthal-and-Eshoo-re-RF-Safety.pdf>.

conclusions of which it would have actual, or arguably, constructive knowledge given its reliance on other agencies.

#### 1. **Federal Communications Commission (FCC)**

- a) **The FCC admitted** in 2019 that at least some types of RF radiation can cause instantaneous non-thermal adverse effects with RF radiation frequencies ranging between 3 KHz and 10 MHz.<sup>30</sup>
- b) **FCC's Maximum Permissible Exposure Limit (MPEL)** are its outdated limits of RF radiation for human exposure. MPEL allows for a very high human exposure limit of ten million microwatts per square meter.<sup>31</sup> To put the FCC's limits in perspective, when compared with other countries, it is notable that FCC's limits for human and environmental exposure are so extreme that they would be illegal in other countries whose limits are thousands of times lower, e.g., in Switzerland, Italy and Russia.<sup>32</sup>
- c) **The FCC's MPEL** is based on IEEE (Institute of Electrical and Electronic Engineers) guidelines<sup>33</sup> which "have not been changed since 1991 and do not consider children."<sup>34</sup> Testing was performed on "a model head with dimensions based [on] the 90th percentile of U.S. military recruits in the year 1989. The corresponding body of the head would be a six foot, two inches, 220 lb. male."<sup>35</sup> A Specific Absorption Rate (SAR) – rate of absorption of electromagnetic radiation -- is then calculated based on thermal effects (heating tissue) of that model head.<sup>36</sup> This does not take into account most of the American population which does not fit the SAR model, especially women and children who are

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<sup>30</sup> Proposed Changes in the Commission's Rule Regarding Human Exposure to Radiofrequency Electromagnetic Fields, 34 FCC Rcd 11687, 11743-11745, ¶¶122- 124 & nn. 322-335 (2019).

<sup>31</sup> 47 CFR 1.1310(e)(1)(II) shows 1 mW/cm<sup>2</sup>, which is equivalent to 10 million uW/m<sup>2</sup>, <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1310>.

<sup>32</sup> <https://ehtrust.org/policy/international-policy-actions-on-wireless/> .

<sup>33</sup> FCC guidelines are set forth at 47 CFR 1.1310, see note at (d)(4); see also, <https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites#:~:text=In%201996%2C%20the%20FCC%20adopted,lower%2Dpowered%20cell%20site%20transmitters>.

<sup>34</sup> *The Effects of RF-EMF on the Child Brain*, Aaron Skaist, Vol 12, No. 2, 2019, at 2, The Science Journal of the Lander College of Arts and Sciences, <https://touro scholar.touro.edu/cgi/viewcontent.cgi?article=1218&context=sjlcas>.

<sup>35</sup> Ibid at 3.

<sup>36</sup> Ibid.

much smaller, nor does it take into account the non-thermal biological effects from RF radiation.

2. **Food and Drug Administration (FDA).** Despite the FCC's initial reliance on the FDA's statement of public safety, as rejected by the U.S. D.C. Circuit Court of Appeals in 2021, the FCC cannot overlook the fact that the U.S. National Toxicology Program's (NTP) 2018 report concluded **clear evidence of cancer** in lab animals from wireless radiation (similar to 2G and 3G cell phones).<sup>37</sup> NTP found malignant heart schwannomas and malignant brain gliomas.<sup>38</sup> NTP is one of the most prestigious toxicology institutions in the world. In 1999, the FDA nominated the NTP to conduct a \$30 million study of RF radiation "with a high priority," to conduct animal studies, stating that it was "not scientifically possible to guarantee that non-thermal levels of microwave radiation . . . will not cause long-term adverse health effects."<sup>39</sup>
  - a) Dr. Linda Birnbaum, former NIH and NTP director, has stated: "Every agent known to cause cancer in humans will also produce it in animals when adequately tested."<sup>40</sup> "Overall, the NTP findings demonstrate the potential for RFR to cause cancer in humans."<sup>41</sup> [Emphasis added.]
3. **A U.S. Naval Medical Academy Research** report from 1971 by Dr. Zory Glaser<sup>42</sup> linked 23 chronic diseases to RF radiation based on over 2300 studies.<sup>43</sup> A Feb 2025 report correlates Dr. Glaser's findings from 1971 of biological effects of RF radiation and

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<sup>37</sup> See letter of Dr. Birnbaum, former NIH and NTP Director, and hyperlinked amicus brief <https://www.dropbox.com/scl/fi/nc7l00p8zxxk8tj0l2a1yr/Dr.-Linda-Birnbaum-cell-tower-letter.pdf?rlkey=vq1i363i74umg9ybydrhmn5d&st=q9l49h88&dl=0> ; see also, <https://ehtrust.org/former-niehs-director-dr-linda-birnbaum-interviewed-about-cell-phone-radiation/>.

<sup>38</sup> <https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones#studies> *Environmental Health Trust, et al v. FCC*, Motion for Leave to File Brief of Amicus Curiae Joseph Sandri in Support of Petitioners Urging Reversal, Aug. 5, 2020, <https://ehtrust.org/wp-content/uploads/20-1025-Amicus-Brief-Joe-Sandri.pdf>.

<sup>39</sup> Note that the following letter is no longer available at the below URL, although it was originally accessed from there. Letter from the Dept of Health and Human Services to the National Toxicology Program at the National Institute for Environmental Health Studies, May 19, 1999, [https://ntp.niehs.nih.gov/sites/default/files/ntp/htdocs/chem\\_background/exsumpdf/wireless051999\\_508.pdf](https://ntp.niehs.nih.gov/sites/default/files/ntp/htdocs/chem_background/exsumpdf/wireless051999_508.pdf).

<sup>40</sup> Dr. Birnbaum's statement in Attorney Joe Sandri's Amicus Brief filed 8-5-2020 in connection with *Environmental Health Trust, et al v. FCC*, <https://ehtrust.org/fcc-amicus-briefs/> (below the fold, right column) at 9.

<sup>41</sup> Ibid, 11.

<sup>42</sup> About Dr. Zory Glaser, <https://zoryglaser.com/>.

<sup>43</sup> [https://www.magdahavas.com/wp-content/uploads/2010/06/Navy\\_Radiowave\\_Brief.pdf](https://www.magdahavas.com/wp-content/uploads/2010/06/Navy_Radiowave_Brief.pdf).

millimeter wave (5G) technology to reported cases of chronic disease.<sup>44</sup> The 2025 report states that Dr. Glaser reported biological effects and diseases related to the central and autonomic nervous systems, genetic / chromosomal, vascular, blood, metabolic, endocrine and gastrointestinal disorders.<sup>45</sup> In 1976, Dr. Glaser updated the total bibliography to 3700 reports relating to the biological effects of RF radiation.<sup>46</sup>

4. **A U.S. Air Force report** from 1994<sup>47</sup> states that “[i]t is known that electromagnetic radiation [EMR] has a biological effect on human tissue” covering a wide range including adverse cardiovascular, neurological and behavioral effects including the risk of cancer. Since 1956, the Dept. of Defense directed the Armed Forces (Army, Navy, Air Force) to study EMR. The report found that EMR can interact with human tissue’s bioelectrical function and Eastern Europe and the then Soviet Union found that human tissue may be more sensitive to EMR’s non-thermal effects.
5. **Central Intelligence Agency (CIA).** In 2012, the CIA declassified and approved for release a 1977 Russian study on the “Biological Effects of Millimeter Radiowaves” which found that while millimeter waves only penetrate the skin, they trigger a cascade of adverse biological effects within the body.<sup>48</sup>
  - a) The study coins the term “**radiowave disease**” to describe these effects.<sup>49</sup> Adverse effects on the skin included demyelination of sections of nerve fibers (damage or destruction to the insulation around nerve fibers which disrupts normal nerve impulse transmission), fragmented neural conductors, and deformation of sensory receptors, leading to neurological disorders.
  - b) The people observed working with millimeter radio wave generators had disturbances in their blood and immuno-biology.<sup>50</sup>
  - c) Exposure in lab animals caused many disorders including of the liver, spleen, heart and brain, inhibiting “oxygen consumption rate by the mitochondria of those organs.”<sup>51</sup>

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<sup>44</sup> Report: “Safety of Wireless Radiation, a Scientific View, Feb 2025, Richard Lear and Camilla Rees,  
[https://www.researchgate.net/publication/388763046\\_Safety\\_of\\_Wireless\\_Technologies\\_The\\_Scientific\\_View](https://www.researchgate.net/publication/388763046_Safety_of_Wireless_Technologies_The_Scientific_View) at 12-13.

<sup>45</sup> Ibid at 3.

<sup>46</sup> <https://ehtrust.org/wp-content/uploads/Naval-MRI-Glaser-Report-1976.pdf>.

<sup>47</sup> *Radiofrequency / Microwave Radiation Biological Effects and Safety Standards, a Review (1994)*, Scott Bolen, Rome Laboratory, Griffiss Air Force Base, at 1,  
<https://youandemf.com/wp-content/uploads/2025/01/EMR-US-Military-Report.pdf>.

<sup>48</sup> <https://mdsafetech.org/wp-content/uploads/2019/02/biological-effects-of-millimeter-wavelengths.-zalyubovskaya-declassif-by-cia-1977-biol-eff-mm-waves.pdf>.

<sup>49</sup> Ibid at 57.

<sup>50</sup> Ibid at 60.

<sup>51</sup> Ibid at 59.

- d) The degree of adverse effects **increased with more exposure**;<sup>52</sup> the lab animals had been exposed for 15 minutes a day for 60 days. It reported that when exposure ceases, disorders from low millimeter radio waves are reversible.<sup>53</sup> However, if adverse effects depend on duration of exposure, then Americans exposed continuously 24/7, 365 days a year, would suffer adverse biological effects, but without reprieve and without the ability to recover.

**6. Chronology of Federal Agencies** expressing since at least the 1990s that the FCC's wireless limits address only thermal (heating of human tissue), not non-thermal exposure, of RF radiation,<sup>54</sup> despite non-thermal, adverse biological effects.

While the FCC is responsible for setting exposure limits for public safety under the TCA and has preempted the field, it has simultaneously abandoned it, while simultaneously prohibiting states and localities from protecting Americans. Americans have not consented to such exposure, and many have no knowledge of its dangers, leaving Americans at risk and with no opportunity to protect themselves. The FCC must include biological effects in its cost/benefit calculus.

To put the FCC's limits in perspective, when compared with other countries, it is notable that FCC's limits for human and environmental exposure are so extreme, that they would be illegal in other countries whose limits are thousands of times lower, e.g., in Switzerland, Italy and Russia.<sup>55</sup> Yet, Americans would be exposed to even higher levels of radiation beaming down from satellites without the ability to take refuge and without legal recourse. Thus, the importance of including this in the cost calculus.

A robust literature documents the impacts on human health and the environment from RF radiation. See also comments submitted to NTIA by Environmental Health Trust on this subject, which are incorporated herein by reference.<sup>56</sup>

**7) Does Not, but Should, Consider Those Disabled by RF Radiation**

The FCC's proposed rule does not consider, but should consider, those disabled by RF radiation, i.e., Electromagnetic Radiation Syndrome (EMR Syndrome / EMR-S). A growing number of Americans suffer from EMR-Syndrome, essentially experiencing radiation poisoning from exposure to electromagnetic radiation, including radiofrequency emissions from cell towers, terrestrial Wi-Fi networks, unlicensed wireless networks, and satellite networks. A peer-reviewed study from over 6 years ago, found that the prevalence of those disabled by EMR-Syndrome was up to 30% of the population, with up to 1.5% being severe

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<sup>52</sup> Ibid at 59.

<sup>53</sup> Ibid at 58.

<sup>54</sup> <https://ehtrust.org/timeline-of-development-of-safety-limits-for-wireless-radiation-in-us/>.

<sup>55</sup> <https://ehtrust.org/policy/international-policy-actions-on-wireless/> .

<sup>56</sup> Comments submitted January 2, 2024 to NTIA, Office of Spectrum Management  
<https://www.ntia.gov/sites/default/files/environmental-health-trust-written-input.pdf>

cases.<sup>57</sup>

With levels of ambient radiation increasing dramatically in more densely populated areas, EMR-S disabled individuals are often forced to flee urban, suburban, and other populated areas to avoid these higher density electromagnetic radiation environments. This would not only affect those with EMR-S, but also the general public who do not want to be exposed to electromagnetic radiation.

In order to survive, these EMR-S refugees are often forced to up-end their lives and flee to sparsely populated, difficult-to-reach areas to find lower electromagnetic radiation levels. These are the last remaining safe spots for millions of Americans – and are precisely the areas that would be disproportionately affected and further irradiated by these proposed rules, eliminating the last safe harbors from high density radiofrequency.

The proposed ruling needs to consider their plight, an injustice suffered by this vulnerable population, and the economic damages inflicted upon them. There is a disproportionate impact from satellite and terrestrial based wireless facilities on vulnerable populations, such as women, children, people of color, people with lower incomes, and persons with disability. Those with lower incomes are often least able to flee their homes. The EMR-S disabled, and the general public, should have access to broadband that does not harm them.

## **8) NEPA Review Required**

On the cost part of the equation, the FCC must consider the environmental effect of any action granting a license to use the spectrum bands under inquiry. The FCC cannot assume there is none; it should conduct NEPA review now. The review would extend to more than just human effects, but also to the environment and the atmosphere.

NEPA's overarching goal is to protect the human environment,<sup>58</sup> and the FCC's role is to prevent the irresponsible deployment of communications spectrum and infrastructure that would endanger the human environment. The FCC's mandate is "to protect life and property."<sup>59</sup> Therefore, NEPA rules should be rigorously enforced for any satellite deployment of FCC licensed spectrum.

LEO satellites should be treated as a major federal action under the National Environmental

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<sup>57</sup> Journal of Environment and Health Science <https://doi.org/10.15436/2378-6841.19.2402>  
The Prevalence of People with Restricted Access to Work in Man-Made Electromagnetic Environments

<sup>58</sup> 42 USC §4321.

<sup>59</sup> Communications Act of 1934, as amended by the Telecommunications Act of 1996, 47 USC §151 *et seq.*



Policy Act (NEPA) and prepare an environmental impact statement (EIS). The EIS should take into account, without limitation, (a) the radiofrequency impacts from satellites and the accompanying terrestrial infrastructure that is reasonably likely to result from this guidance, (b) other environmental impacts from satellites, many of which are described in this document, including for example impacts from rocket fuel during launches and the dispersion of toxic metals across the planet.

NEPA's purpose is to "stimulate the health and welfare of man," and regulate the safety of the human environment.<sup>60</sup> There is no statutory leeway for the FCC to diminish its NEPA enforcement. Among environmental effects that the FCC is obligated to consider under NEPA are exposure to radiofrequency (RF) radiation. **There is no prosperity for Americans if they are getting sick from RF radiation** – and with such spectrum for satellite systems that will get Americans even more sick, the economy does not grow and American does not lead. America leads only if industry competes on safety. Then Americans will have the choice of safety for themselves and their families, and that is how the economy grows. **Americans first, then industry follows.**

There is no greater proof of the environmental impact of wireless facilities than those people who have been injured, repeatedly, and permanently disabled by exposure to RF radiation, whose symptoms are referred to as Electromagnetic Radiation Syndrome (EMR-Syndrome or EMR-S) and who, self-identified with EMR-S, have joined herein as Filing Parties in Addendum A.

### **9) There are No Exemptions Under NEPA for Major Federal Actions**

Authorizing spectrum use in any given location is already deemed a major federal action.<sup>61</sup> The FCC should strengthen its NEPA procedures and treat any spectrum authorization, auction, or licensure for satellite delivery as a major federal action subject to NEPA review.

Fiscal Responsibility Act of 2023 (FRA) underscores that any major federal action be subject to environmental review. Title III, Permitting Reform, Section 321, "defines a major federal action to be an action that an agency determines is subject to substantial federal control and responsibility."<sup>62</sup> The FCC licenses wireless spectrum and has a statutory obligation to regulate it under the Communications Act of 1934 and the Telecommunications Act of 1996. Therefore, any satellite network that uses FCC licensed spectrum necessitates substantial

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<sup>60</sup> 42 USC §4321

<sup>61</sup> See Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, 11 FCC Rcd 15123 (1996) ("First Order"); Procedures for Reviewing Requests for Relief from State and Local Regulations Pursuant to Section 332(c)(7)(B)(v) of the Communications Act of 1934, 12 FCC Rcd 13494 (1997) ("Second Order").

<sup>62</sup> <https://www.congress.gov/bill/118th-congress/house-bill/3746>.



federal actions without which there would be no such deployment of wireless spectrum. That the FCC is required to regulate wireless spectrum is not an option – it is a statutory obligation.

Moreover, while the FRA “limits the scope of an EIS review to reasonably foreseeable environmental effects of the proposed agency action,” it underscores that:

Under NEPA, agencies must conduct an environmental assessment (EA) to determine if a proposed federal action will have significant environmental impacts. If the EA determines that such impacts will be significant, then the agency must submit an Environmental Impact Statement (EIS). The EIS must include a range of alternatives to the proposed action.<sup>63</sup>

To that end, the environmental effects are not only reasonably foreseeable, the FCC has actual knowledge of the adverse biological effects, the great potential for space debris, collisions and the enormity of the number of required collision avoidance maneuvers. Environmental effects of the wireless spectrum that the FCC licenses have been the subject of the D.C. Circuit Court of Appeals remand order on the FCC’s limits for human exposure since 2021.<sup>64</sup> The FCC is under a court remand to review the studies in its docket and examine RF radiation effects on children, the environment and long-term exposure.

This is further explained in Environmental Health Sciences’ comments, with extensive sources on the consistent adverse biological effects that have been documented for decades.<sup>65</sup>

In Addendum B is a summary of the adverse biological effects of RF radiation. Moreover, a recent April 2025 World Health Organization review concludes that:

[T]here is evidence that **RF EMF exposure increases the incidence of cancer** in experimental animals with the [certainty of evidence] being strongest for malignant heart schwannomas and gliomas” (brain tumors).<sup>66</sup>

FCC remains obligated to follow its statutory regulations under NEPA. In fact, the interim final rule issued by CEQ stated:

NEPA requires Federal agencies to consider the environmental effects of proposed actions as part of agencies' decision-making processes.<sup>67</sup>

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<sup>63</sup> Ibid.

<sup>64</sup> *Environmental Health Trust, et al v FCC*, D.C. Court of Appeals, 2021.

<sup>65</sup> <https://www.fcc.gov/ecfs/document/10501189004404/1>.

<sup>66</sup> <https://www.sciencedirect.com/science/article/pii/S0160412025002338>.

<sup>67</sup> Ibid I.A.

Any FCC actions regulating the use of wireless spectrum can no longer be considered for any categorical exclusion. The FRA defines a "categorical exclusion" as "a category of actions that a Federal agency has determined normally does not significantly affect the quality of the human environment" (42 U.S.C. § 4336e(1)); however, the D.C. Circuit Court of Appeals in 2021 mandated that the FCC review how RF radiation affects the quality of the human environment.

## **10) Cybersecurity Risk**

Another factor on the cost side is security vulnerabilities which are inherent in RF infrastructure, especially 5G architecture and, while 5G is being deployed via satellite, these vulnerabilities have not been resolved.

There are significant security vulnerabilities of 5G networks. 5G is a distributed, software-based network of digital routers with thousands of nodes and access points that a hacker can exploit; there is no choke point control to quarantine security breaches.<sup>68</sup> If a hacker gains control of the 5G software managing the networks, the hacker can also control the 5G network.<sup>69</sup> See, e.g., the story of the Nevada casino whose database was hacked through its Internet-connected thermostat in its fish tank, and the database information was put up in the cloud.<sup>70</sup> The FCC recognized early on the need to address the security vulnerabilities of 5G.<sup>71</sup> Former FCC Chairman and former CTIA CEO Tom Wheeler points out that "5G networks are more vulnerable to cyberattacks than their predecessors."<sup>72</sup>

Accelerating increasing reliance and dependence on wireless-based infrastructure will impair resilience and increase vulnerability at all levels of government—federal, state, and local—to cyberattacks. Local communities are highly vulnerable and prime targets for cyber-attacks.

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<sup>68</sup> *Why 5G Requires New Approaches to Cybersecurity*, Tom Wheeler and David Simpson, Brookings Institute, Sept 3, 2019, <https://www.wita.org/nextgentrade/why-5g-requires-new-approaches-to-cybersecurity/>; see also, *Why 5G Networks Are Disrupting The Cybersecurity Industry*, Oct 29, 2021, <https://www.forbes.com/sites/forbestechcouncil/2021/10/29/why-5g-networks-are-disrupting-the-cybersecurity-industry/?sh=5186fc041fe9>.

<sup>69</sup> *Why 5G Requires New Approaches to Cybersecurity*, Tom Wheeler and David Simpson, Brookings Institute, Sept 3, 2019, <https://www.wita.org/nextgentrade/why-5g-requires-new-approaches-to-cybersecurity/>.

<sup>70</sup> <https://www.forbes.com/sites/leemathews/2017/07/27/criminals-hacked-a-fish-tank-to-steal-data-from-a-casino/>; <https://www.casino.org/news/hackers-stole-las-vegas-casino-high-roller-database-via-its-fish-tank/>.

<sup>71</sup> <https://docs.fcc.gov/public/attachments/DOC-343096A1.pdf>.

<sup>72</sup> *Why 5G Requires New Approaches to Cybersecurity*, Tom Wheeler and David Simpson, Brookings Institute, Sept 3, 2019, <https://www.wita.org/nextgentrade/why-5g-requires-new-approaches-to-cybersecurity/>.

For instance, in NYC, it was pointed out at length in a 2020 letter from the Chief Technology Officer and Chief Information Security Officer of NYC to the National Telecommunications and Information Administration (NTIA).<sup>73</sup> A Brookings Institution report points to the “5G Cyber Paradox,” because as 5G networks “improve the efficiency and capabilities of the communications infrastructure... they introduce new security vulnerabilities that threaten both the networks and those who rely on network connectivity.”<sup>74</sup> This can also imperil national security and homeland security.

## **11) Brief Word on Why Americans Prefer Wired**

Two-thirds of Americans prefer fiber.<sup>75</sup> Even for remote, rural areas, in the long run, wired connections make for more affordable, sustainable, secure, reliable and safe broadband.<sup>76</sup> Communities across the U.S. have invested in wired telecommunications networks for “economic development, improving access to education and health care, price stabilization, etc. They range from massive networks offering multi-gigabit service to hundreds of thousands of households to small towns connecting a few local businesses.”<sup>77</sup> It's reported that there are at least 400 municipal networks serving more than 700 communities, more than

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<sup>73</sup> <https://www.dropbox.com/scl/fi/0cxjktjxstmb825gqih25/NYC-Comments-5G-to-NTIA-6-25-20.pdf?rlkey=dgmc3m04dxd57qfz7z1g12ckh&dl=0>. The letter states, in relevant part: “Such complex systems [5G] present more opportunities for security and privacy breaches. By moving away from firmware-based technology of 4G telecommunication components to software-based 5G telecommunication components that will need to be updated, the opportunity for manipulation exists within the supply chain. Furthermore, movement away from centralized network systems to decentralized network systems increases the attack surface of a network. That increased attack surface is amplified by the anticipated introduction of the increasing number and variety of connected devices (IoT) and big data industries ... The problem of IoT vulnerabilities will only become exacerbated by the increased speeds of 5G and other future wireless broadband technologies ... IoT protection is historically poor and malware distribution is easily scalable, which suggests that the creation of IoT botnets (“robot networks”) for malicious purposes, including large-scale distributed denial of service (DoS) attacks, is likely to increase as well. This poses a significant threat to vital digital infrastructure and resident services at all levels of government, as well as private sector enterprise.”

<sup>74</sup> <https://www.lawfaremedia.org/article/lawfare-podcast-tom-wheeler-and-dave-simpson-making-5g-secure>.

<sup>75</sup> <https://www.fibre-systems.com/article/fiber-connect-2023-two-thirds-us-consumers-prefer-fibre?iframe=1>.

<sup>76</sup> <https://www.benton.org/blog/how-fixed-wireless-technologies-compare-fiber?iframe=1>.

<sup>77</sup> <https://communitynets.org/content/community-network-map>.

200 of such communities “are served by a publicly owned network which blankets the entire city with fiber infrastructure.”<sup>78</sup>

When the Affordable Connectivity Program (ACP) ended, 90% of wireline subscribers retained their service, whereas wireless services lost 80% of their subscribers and satellite services also had losses.<sup>79</sup>

Fiber optics to and through the premises (FTTP) is the preferred and superior method of providing telecommunications connectivity. “Fiber has a minimal ecological impact, reduces waste, consumes very little energy . . .”<sup>80</sup>

“Reinventing Wires: The Future of Landlines and Networks” of the National Institute for Science, Law and Public Policy (NISLAPP) explains that wireless networks and services, compared to wired access, are inherently more complex, more costly, more unstable (subject to frequent revision and “upgrades”), and more constrained in what they can deliver. The former President of Microsoft Canada, Frank Clegg, calls the report “a reasonable voice for our turbulent world.”<sup>81</sup>

Fiber can also be an economic boon,<sup>82</sup> and allows communities with municipal fiber to be self-sustaining into the future without the need for taxpayer subsidies. For example, Chattanooga, TN used fiber optics under a municipal broadband framework covering 600 square miles of fiber, to spring into a clean energy economy and create a vibrant workforce, earning it the accolade of “Gig City,” with the fastest broadband network in the U.S. The economic value of its fiber infrastructure over a 10-year period from 2011 to 2020 exceeded \$2.69 billion and produced 9,516 jobs, beyond expectations.<sup>83</sup>

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<sup>78</sup> <https://communitynets.org/content/community-network-map>.

<sup>79</sup> <https://broadbandbreakfast.com/acp-fallout-wireline-retains-most-wireless-and-satellite-face-major-losses/>.

<sup>80</sup> Fiber Optic Broadband, A Greener Internet Solution, <https://www.otelco.com/a-greener-internet-solution/>.

<sup>81</sup> “Re-inventing Wires: The Future of Landlines and Networks,” by Timothy Schoechle, PhD, Timothy Schoechle, PhD, Senior Research Fellow, National Institute for Science, Law & Public Policy (NISLAPP), <https://gettingsmarteraboutthesmartgrid.org/pdf/Wires.pdf>.

<sup>82</sup> *How Blazing Internet Speeds Helped Chattanooga Shed its Smokestack Past*, Cnet.com, August 20, 2015, <https://www.cnet.com/tech/services-and-software/how-blazing-internet-speeds-helped-chattanooga-shed-its-smokestack-past/>; *Why Chattanooga Has the Fastest Internet in the US*, <https://tech.co/news/chattanooga-fastest-internet-usa-2018-08>.

<sup>83</sup> “Ten Years of Fiber Optic and Smart Grid Infrastructure in Hamilton County, Tennessee,” Bento J. Lobo, Ph.D., CFA First Tennessee Bank Distinguished Professor of Finance, The University of Tennessee at Chattanooga, August 31, 2020, [https://www.researchgate.net/publication/352221978\\_Ten\\_Years\\_of\\_Fiber\\_Optic\\_and\\_Smart\\_Grid\\_Infrastructure\\_in\\_Hamilton\\_County\\_Tennessee](https://www.researchgate.net/publication/352221978_Ten_Years_of_Fiber_Optic_and_Smart_Grid_Infrastructure_in_Hamilton_County_Tennessee);

Chattanooga is able to offer every household with a school-aged child, **free internet service**. Rather than a federal subsidy handout, that is a **dividend** that the city is paying back to its residents for making the decision to go with futureproof technology – municipal fiber.

Wired and wireless technologies are not equivalent technologies and the costs of wireless deployment outweigh the benefits. Satellites depend on terrestrial wireless facilities.

- a. Wireless infrastructure’s lifespan is only five years, making it a poor use of taxpayer subsidies whereas fiber lasts 50-70 years.<sup>84</sup> As between wireless and fiber, fiber has been found to be “the most fiscally prudent expenditure of public funds in most circumstances because of its longevity and technical advantages.”<sup>85</sup>
- b. Billions of dollars in subsidies to wireless have not provided the promised ubiquitous service, according to former CTIA CEO and former FCC Chair, Tom Wheeler.<sup>86</sup>
- c. Wireless suffers from line-of-sight obstructions, slower speed, inclement weather, lack of scalability, lack of cybersecurity, thereby making it unreliable in emergencies.
- d. “[F]ixed-wireless networks have inherent capacity limitations that sharply limit the number of users on a network using a given amount of spectrum.”<sup>87</sup>

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See also, *How Blazing Internet Speeds Helped Chattanooga Shed its Smokestack Past*, Cnet.com, August 20, 2015, <https://www.cnet.com/tech/services-and-software/how-blazing-internet-speeds-helped-chattanooga-shed-its-smokestack-past/>; *Chattanooga Mayor Pushes Back on 5G as Smart Cities Cure All*, MeriTalk, February 13, 2019, <https://www.meritalkslg.com/articles/chattanooga-mayor-pushes-back-on-5g-as-smart-cities-cure-all/>.

See also, for economic benefits of fiber deployment, *In Kansas, Rural Chanute Built Its Own Gigabit Fiber and Wireless Network*, Christopher Mitchell 10-2-21, <https://ilsr.org/chanute-rural-gigabit/>; and <https://www.soar-ky.org/prtc/>.

<sup>84</sup> Tom Wheeler, former FCC chair and former CEO of CTIA, testified in 2021 that fiber is future proof with **wireless only as a last resort**, [https://democrats-energycommerce.house.gov/sites/evo-subsites/democrats-energycommerce.house.gov/files/documents/Witness%20Testimony\\_Wheeler\\_FC\\_2021.03.22.pdf](https://democrats-energycommerce.house.gov/sites/evo-subsites/democrats-energycommerce.house.gov/files/documents/Witness%20Testimony_Wheeler_FC_2021.03.22.pdf)

Fixed Wireless Technologies and Their Suitability for Broadband Delivery, June 2022 <https://www.benton.org/publications/FixedWireless>.

<sup>85</sup> <https://www.benton.org/publications/FixedWireless>.

<sup>86</sup> In testimony to the House Energy and Commerce Committee, March 2021, former FCC Chair and former CTIA CEO Tom Wheeler spoke disappointingly that despite approximately \$40 billion of government subsidies “over the last decade,” those subsidies “have failed to deliver the goal of universal access to high-speed broadband ... because it failed to insist on futureproof technology, ... and focused more on the companies being subsidized than the technology being used or the people who were supposed to be served.”

<sup>87</sup> <https://www.benton.org/blog/how-fixed-wireless-technologies-compare-fiber>.

- e. Upfront capital costs for fiber may be higher, but after 30 years, they are comparable to wireless.<sup>88</sup>
- f. Wired infrastructure is cheaper over the life of the infrastructure.<sup>89</sup> Fixed wireless costs are higher than fiber because of the ongoing need to regularly replace wireless equipment, with 40% to 80% of its capital investment needing to be replaced every five years. In contrast, only 1% to 10% of capital investment in a fiber network needs to be replaced every 10 years (fiber's life span is 50-70 years). Fixed wireless network providers must re-invest every five years to maintain the network. That is not sustainable in the long-run.

## 12) Conclusion

For the foregoing reasons, the proposed rule should be subject to a cost / benefit analysis in determining the cost of satellite spectrum to Americans in terms of adverse biological effects of RF radiation, being compelled to engage in interstate commerce to which they did not consent, the economic cost to their personal lives and the lives of their families, the environmental pollution from expired satellites, and cybersecurity and national security risks of relying on satellite / wireless networks.

The FCC should align itself within its statutory guardrails of “protecting life and property” in the public interest. The role of the FCC is to prevent the irresponsible deployment of satellite communications that would endanger the human environment.<sup>90</sup> Communications infrastructure serves “the purpose of promoting safety of life and property **through** the use of wire and radio communication.”<sup>91</sup> That means:

**Americans first, then industry follows.**

**On behalf of Americans Injured and Disabled  
from Electromagnetic Radiation and the Filing Parties**

Respectfully Submitted,



Odette J. Wilkens

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<sup>88</sup> <https://www.benton.org/publications/FixedWireless>.

<sup>89</sup> <https://www.benton.org/blog/how-fixed-wireless-technologies-compare-fiber>.

<sup>90</sup> Communications Act of 1934, Section 1, Purpose.

<sup>91</sup> Communications Act of 1934, Title 1, Sec. 1, Purpose.

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## ADDENDUM A

The parties listed here collectively constitute the “Filing Parties,” have granted permission to submit these Comments on their behalf, and join together to submit these Comments:

The National Call for Safe Technology, Odette Wilkens, Chair & General Counsel; Charles Frohman, M.Ed, HIA, lobbyist, National Health Federation; EMF Wellness Tucson, Lisa Smith, PhD, Tucson, AZ; Safe Tech Tucson, Tucson, AZ; Fred P. Sinclair, Jr., Alfred, NY; New Yorkers 4 Wired Tech, New York, NY; New York City Alliance for Safe Technology, New York, NY; Rhode Island 4 Safe Tech, Sheila Resseger, M.A., Co-Founder, Cranston, RI; Susan Molloy, M.A., Snowflake, AZ; Coloradans for Safe Technology, Andrea Mercier (mother of a severely disabled child who is adversely impacted various forms of non-ionizing radiation), Colorado Springs, CO; Coloradans for Safe Technology, Nancy VanDover, DVM, OMD, Dipl Acup, disabled by EMR; Deborah Shisler, with EMR-S, CO; La Plata for Safe Technology, Ingrid Iverson, with EMR-S, CO; Virginians for Safe Technology, Jenny DeMarco, Communications Director, and Mary Bauer, retired radio frequency engineer, Fredericksburg, VA; NY4Whales & NY4Wildlife Taffee Williams, President, Tuckahoe, NY; Safe Tech International, Sara Aminoff, Union City, CA; Safe Tech International, Kate Kheel, Taneytown, MD; Safe Tech International, Patricia Burke, journalist, Millis, MA; Safe Tech Westchester, Ruth F. Moss, Westchester, NY; The Soft Lights Foundation, Mark Baker, President, Beaverton, OR; Amy Harlib, Concerned Citizen, New York, NY; Floris R. Freshman, published artist and composer, with EMR-S, Scottsdale, AZ; Virginia Farver, Fort Collins, CO; Gabriela Munoz, with EMR-S, Carmel, NY; EMF Safety Network, Sidnee Cox, Co-director, Windsor, CA; Rosemarie Russell, member of The Women’s State Legislative Council of Utah, Hurricane, UT; Erin McDowell, Registered Nurse, with EMR-S Rocky River, OH, SWORT (Southwestern Ohio for Responsible Technology); Craig McDowell, veteran, Rocky River, OH; Southern EMF Radiation Solutions, Shari Champagne, with EMR-S, Houme, LA; Southwest Pennsylvania for Safe Technology, Mount Pleasant, PA, Susan Jennings, MPA, BA, Founder (son has EMR-S); Jen Goddard, Board Certified Doctor of Natural Health, Thriving Proof Holistic Health Practice, and 2025 United States of America Mrs. Maine Pageant, Brewer, ME; Loraine Uebele, FACHE, Kansas City, MO; Sean Polacik, Automation Control Systems Technician, OH; Linda M. Cifelli, retired Registered Nurse, Williamsburg, VA; Safer Cell Phone and Wi-Fi Project, Marne Glaser, Chicago, IL; Katherine Katzin, Takoma Park, MD; Jan Kiefer, Scottsdale, PA; Fiber First LA, Charlene Hopey, Topanga, CA; Gene Wagenbreth, Topanga, CA; Eva Christina Andersson, E.U., Sweden; Alison McDonough, Canton, MA, with EMR-S; Longmont for Safe Technology, Doe Kelly, Co-Founder, with EMR-S, Longmont, CO; Sharon Behn, Arden, NC; Brenda Shafer, CA with EMR-S; Margaret Holt Baird, Esq, San Diego, CA with EMR-S; Arizonans for Safe Technology; Sustainability Management Consulting, Angela Casler, Chico, CA; Janet Drew, retired Registered Nurse, York, ME; Tammy Lee, with EMR-S, Lincoln, NE; Pennsylvanians for Safe Technology, Donna DeSanto Ott PT DPT MS FMCHC, Founder & President, PA;



Sustainable Upton, Laurie Wodin, Co-Administrator, with EMR-S, Upton, MA; and Martine Victor, VT.

**Abbreviations:**

**EMR** means electromagnetic radiation. **EMR-S** means Electromagnetic Radiation Syndrome.

**ADDENDUM B**  
**BIOLOGICAL HAZARDS OF RF RADIATION**

## Biological Hazards of Wireless Radiation – Executive Summary

The FCC's standards for wireless radiation were established back in 1996, and have not been reviewed, updated or verified despite significant changes in the wireless technology in use today. The FCC's standards relate solely to wireless radiation's thermal impacts on a body (e.g. how the body reacts to being heated), and do not consider other known adverse biological impacts of non-thermal levels of RF radiation (such as damage to DNA or other changes to cells). The FCC's limits were established long before the existence of 2G, 3G, 4G, or 5G technology

Congress eliminated the EPA's funding for electromagnetic research in 1996, knee capping the EPA from studying biological impacts of RF radiation for nearly 30 years. *At the very least, the FCC's standards should be reconsidered (FCC is under federal court order to do so, but has not) given current technology.*

**Wireless radiation, also referred to as radio frequency (RF) radiation, produces biological effects and evidence of its hazards are clear and convincing, yet the hazards are not generally publicized, and the hazards are unnecessary to reap the benefits of wireless technology.**

- **Industry Funded Research** – The wireless industry has funded studies that show adverse biological impacts. A 1990s \$28.5 million study found that RF radiation produces biological effects that are potentially hazardous to humans in ways that have nothing to do with heated tissue. A 2000 study for a major telecom carrier found RF radiation has links to cancer, neurological disorders and cognitive impairment. Insurance companies will not insure for personal injury from RF radiation, reflecting their concerns about the possible magnitude of their liability, e.g., that 5G is a high, “off the leash” risk.
- **Reports from Federal Agencies** – A 2018 \$30 million US National Toxicology Program (NTP) study found “clear evidence of cancer” in lab rats from wireless radiation. In 2019, the FCC admitted that RF radiation can have non-thermal impacts on humans, but it has conducted no studies to determine what those impacts might be or what changes should be made to its RF radiation emission limits. In 2021, the DC Circuit Court of Appeals ruled in *Environmental Health Trust, et al v. FCC* that the FCC's lack of action was arbitrary and capricious for failing to review its emission standards in light of new science and current technology and that it should consider non-cancer health impacts of wireless radiation. So far, the FCC has failed to comply with the Court order. As early as 1971, the US Naval Medical Research Academy concluded from 2300 studies that RF radiation, including millimeter (e.g. 5G), are linked to cardiac, neurological and other disorders.

- **Independent Studies** – Several major independent studies have concluded biological effects from RF radiation, including by the World Health Organization in 2025 (finding increased risk of cancer, along with its initial Class 2B carcinogen classification in 2011), the Ramazzini Institute in 2018 (clear evidence of cancer in lab rats, corroborating the NTP’s results) and the New Hampshire Commission in 2020 (all forms of wireless radiation are harmful). The American Academy of Pediatrics warns that children are disproportionately affected by cell phone radiation. Studies concluded increased risk for ADHD, delayed motor skills, diabetes and demyelination of fetuses’ brain neurons.
- **Chronic Diseases and Clusters near Cell Towers** – Illnesses near cell towers, e.g., nausea, rashes, stroke, atrial fibrillation and a variety of cancers, have been documented near Duluth, MN (51 strokes), Pittsfield, MA (17 residents fell ill and many evacuated, one resident who remained died), Ripon, CA (4 children and 4 teachers developed cancer; one child died) and Eagle, ID (atrial fibrillations from 5G cell towers).

## **BIOLOGICAL HAZARDS OF WIRELESS RADIATION -- SOME HIGHLIGHTS**

**July 1, 2025**

*“The evidence presented to the Board includes well over one thousand peer-reviewed scientific and medical studies which consistently find that pulsed and modulated RFR has bio-effects and can lead to short- and long-term adverse health effects in humans, either directly or by aggravating other existing medical conditions. Credible, independent peer-reviewed scientific and medical studies show profoundly deleterious effects on human health, including but not limited to: neurological and dermatological effects; increased risk of cancer and brain tumors; DNA damage; oxidative stress; immune dysfunction; cognitive processing effects; altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and damage to the blood-brain barrier.”<sup>92</sup>*

~ Board of Health, Pittsfield, MA, Emergency Cease & Desist Order to remove cell tower that was sickening 17 residents simultaneously.

### **What the Industry Knows About the Biological Hazards of RF Radiation:**

1. **Industry Funded Research Finds Biological Effects.** A 1990s research program funded by the wireless industry at \$28.5 million under the independent non-profit, Wireless Technology Research, LLC (WTR), found that wireless radiation (i.e., non-

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<sup>92</sup> <https://ehtrust.org/cease-and-desist-order-against-verizon-cell-tower-by-board-of-health-pittsfield-ma/>, see below the fold for link to the Order at 3, 2<sup>nd</sup> “Whereas” clause, paragraph #1.

thermal radiation) is **biologically active producing biological effects and potentially hazardous to human health**.<sup>93</sup> That means the radiation does not need to heat human tissue. (Note that the FCC limits only account for thermal, not non-thermal, adverse effects.)

- a) The research was peer-reviewed with scientific oversight by both an independent Peer Review Board at the Harvard School of Public Health and a U.S. Government Interagency Working Group, chaired by the FDA, and including EPA, OSHA, NIOSH, CDC, FCC, and NIH.<sup>94</sup>
- b) Abruptly after these findings, the EPA was defunded from doing any further research on the biological effects of wireless radiation.<sup>95</sup>

2. **Industry Commissioned Study Finds Biological Effects.** A study in 2000 commissioned by a major telecom carrier found links to cancer, leukemia, neurological disorders and cognitive impairment, with special caution for children and an acknowledgement of those already disabled from the radiation.<sup>96</sup>
3. **Industry Patents Point to Health Risks.** Telecom and cell phone manufacturers have filed patents to reduce the level of wireless exposure tied directly to health risks such as neurological disorders and cancer.<sup>97</sup>
4. **Risk Warnings of Litigation.** Industry annual reports warn their shareholders of litigation risk from potential personal injury claims from RF radiation and potential financial losses.<sup>98</sup>

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<sup>93</sup> Wireless Phones and Health II: State of the Science 2002 Edition, edited by George L. Carlo; Wireless Phones and Health: Scientific Progress, edited by George L. Carlo.

<sup>94</sup> Ibid.

<sup>95</sup> Overpowered, What Science Tells Us About the Dangers of Cell Phones and Other WiFi-Age Devices, Martin Blank, PhD, 2014 at 110-112.

<sup>96</sup> T-Mobil Deutsche Telekom commissioned study by the Ecolog-Institute, April 2000, "Mobile Telecommunications and Health Review of the Current Scientific Research in View of Precautionary Health Protection," <https://ehtrust.org/wp-content/uploads/ecolog2000.pdf>.

<sup>97</sup> Swisscom patent, 2004 at

[https://www.dropbox.com/scl/fi/nwdfklq7r7j2wwsipv7ws/SwissCom-Patent-application-2003-2004-WO2004075583A1-1-1-1.pdf?rlkey=liuy6175hamj24lbuszpe7vux&st=5p2oy0ji&dl=0](https://www.dropbox.com/scl/fi/nwdfklq7r7j2wwsipv7ws/SwissCom-Patent-application-2003-2004-WO2004075583A1-1-1.pdf?rlkey=liuy6175hamj24lbuszpe7vux&st=5p2oy0ji&dl=0); "Manufacturers Own Patents to Cut Radiation," RCR Wireless, June 4, 2001 at <https://www.dropbox.com/scl/fi/0rfwys743dgeqpifwu3ua/Manufacturer-own-patents-to-cut-radiation-RCR-Wireless-News.pdf?rlkey=e5hm46nyp9an6ugu4y005ldm3&st=xr7ocreh&dl=0>.

<sup>98</sup> AT&T, Inc., 2021 Annual Report, <https://investors.att.com/~media/Files/A/ATT-IR-V2/financial-reports/annual-reports/2021/complete-2021-annual-report.pdf> at 41.

5. **RF Radiation is a Pollutant.** The telecom industry characterizes RF radiation as a pollutant in their device protection plans and disclaim insurance liability.<sup>99</sup>
6. **Insurance Companies Exclude Injury Coverage for RF Radiation.** Insurance companies such as Lloyd's of London will not insure for personal injury from RF radiation because of the high risk of claims, with Swiss Re characterizing "5G" as "high," "off-the-leash" risk.<sup>100</sup>
7. **No 5G Pre-Market Testing.** Telecom executives during a Feb. 2019 Senate hearing confirmed no industry pre-market testing of 5G for public health or safety. Sen. Blumenthal (CT) criticized the FCC and FDA for inadequate answers on questions of public health, and concluded, "We're kind of flying blind here as far as health and safety is concerned."<sup>101</sup>
8. **"Why Tech Leaders Don't Let Their Kids Use Tech."**<sup>102</sup> The article reports that technology executives restrict or forbid their children's use of the very technology that they are providing to the public, including "the makers of smartphones and tablets, of social media channels and game boxes." Technology "titans" such as former Apple's Steve Jobs and Bill and Melinda Gates have admitted to placing restrictions on their children's use of technology. Chris Anderson, former Wired magazine editor and CEO of 3D Robotics, said that his kids "accuse me and my wife of being fascists and overly

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Verizon's 2021 U.S. SEC Form 10-K at 17,  
<https://www.verizon.com/about/sites/default/files/2020-Annual-Report-on-Form-10-K.PDF>.

<sup>99</sup> Exclusions of loss from electromagnetic radiation from insurance coverage:

- Verizon, Sec B "Exclusions," Subsection 16 "Pollution," <https://ehtrust.org/wp-content/uploads/device-protection-brochure-nationwide.pdf>;
- AT&T, Sec II "Exclusions," Subsection H. Loss from "Pollutants," Sec IX.T. Definition of "Pollutants," <https://ehtrust.org/wp-content/uploads/ATT-Multi-Device-Protection-Pack-Insurance.pdf>;
- Sprint, Sec II "Exclusions," Subsection H. Loss from "Pollutants," Sec IX.P. Definition of "Pollutants," <https://ehtrust.org/wp-content/uploads/Sprint-Insurance-Terms-and-Conditions-Downloaded-2019.pdf>.

<sup>100</sup> <https://ehtrust.org/key-issues/electromagnetic-field-insurance-policy-exclusions/>.

<sup>101</sup> <https://ehtrust.org/health-effects-of-5g-wireless-technology-confirmed-at-us-senate-hearing-after-senator-blumenthal-questions-industry/>; see also, <https://mdsafetech.org/2019/02/13/no-research-on-5g-safety-senator-blumenthal-question-answered/>.

<sup>102</sup> "Why Tech Leaders Don't Let Their Kids Use Tech," <https://kidzu.co/health-wellbeing/why-tech-leaders-dont-let-their-kids-use-tech/>.

concerned about tech, and they say that none of their friends have the same rules. That's because we have seen the dangers of technology firsthand. I've seen it in myself, I don't want to see that happen to my kids."<sup>103</sup>

### **What Federal Agencies Know About the Biological Effects of Wireless Radiation and Have Disregarded:**

7. **Food and Drug Administration (FDA).** The U.S. National Toxicology Program's (NTP) 2018 report concluded **clear evidence of cancer** in lab rats from wireless radiation (similar to 2G and 3G cell phones).<sup>104</sup> NTP found malignant heart schwannomas and malignant brain gliomas.<sup>105</sup> NTP is one of the most prestigious toxicology institutions in the world. In 1999, the FDA had nominated the NTP to conduct a \$30 million study of RF radiation "with a high priority," to conduct animal studies, stating that it was "not scientifically possible to guarantee that non-thermal levels of microwave radiation . . . will not cause long-term adverse health effects."<sup>106</sup>
  - a) Dr. Linda Birnbaum, former NIH and NTP director, has stated: "Every agent known to cause cancer in humans will also produce it in animals when adequately tested."<sup>107</sup> "Overall, the NTP findings demonstrate the potential for RFR to **cause cancer in humans**."<sup>108</sup> [Emphasis added.]

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<sup>103</sup> Ibid.

<sup>104</sup> See letter of Dr. Birnbaum, former NIH and NTP Director, and hyperlinked amicus brief <https://www.dropbox.com/scl/fi/nc7l00p8zxk8tj0l2a1yr/Dr.-Linda-Birnbaum-cell-tower-letter.pdf?rlkey=vq1i363i74umg9ybydrhmn5d&st=q9l49h88&dl=0> ; see also, <https://ehtrust.org/former-niehs-director-dr-linda-birnbaum-interviewed-about-cell-phone-radiation/>.

<sup>105</sup> <https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones#studies> *Environmental Health Trust, et al v. FCC*, Motion for Leave to File Brief of Amicus Curiae Joseph Sandri in Support of Petitioners Urging Reversal, Aug. 5, 2020, <https://ehtrust.org/wp-content/uploads/20-1025-Amicus-Brief-Joe-Sandri.pdf>.

<sup>106</sup> Note that the following letter is no longer available at the below URL, although it was originally accessed from there. Letter from the Dept of Health and Human Services to the National Toxicology Program at the National Institute for Environmental Health Studies, May 19, 1999, [https://ntp.niehs.nih.gov/sites/default/files/ntp/htdocs/chem\\_background/exsumpdf/wireless051999\\_508.pdf](https://ntp.niehs.nih.gov/sites/default/files/ntp/htdocs/chem_background/exsumpdf/wireless051999_508.pdf).

<sup>107</sup> Dr. Birnbaum's statement in Attorney Joe Sandri's Amicus Brief filed 8-5-2020 in connection with *Environmental Health Trust, et al v. FCC*, <https://ehtrust.org/fcc-amicus-briefs/> (below the fold, right column) at 9.

<sup>108</sup> Ibid, 11.

## 8. Federal Communications Commission (FCC).

- a) The FCC admitted in 2019 that at least some types of RF radiation can cause instantaneous non-thermal adverse effects with RF radiation frequencies ranging between 3 KHz and 10 MHz.<sup>109</sup> The FCC averages exposure levels over 30 minutes,<sup>110</sup> which completely obscures the effects of the constant peaking and pulsations of RF radiation which causes adverse health effects, and does not account for 24/7 exposure by the population.<sup>111</sup>

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<sup>109</sup> Proposed Changes in the Commission's Rule Regarding Human Exposure to Radiofrequency Electromagnetic Fields, 34 FCC Rcd 11687, 11743-11745, ¶¶122- 124 & nn. 322-335 (2019).

<sup>110</sup> 47 CFR 1.1307(b)(2): "Time-averaging period is a time period not to exceed 30 minutes for fixed RF sources or a time period inherent from device transmission characteristics not to exceed 30 minutes for mobile and portable RF sources," [https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1307#p-1.1307\(b\)](https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1307#p-1.1307(b)).

<sup>111</sup> Human-made electromagnetic fields: Ion forced-oscillation and voltage-gated ion channel dysfunction, oxidative stress and DNA damage (Review) (2021) Pangopolous DJ, et al. International Journal of Oncology. August 23, 2021. <https://pubmed.ncbi.nlm.nih.gov/34617575/>.

Computational modeling investigation of pulsed high peak power microwaves and the potential for traumatic brain injury. Sci Adv. 2021 Oct; 7(44). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8555891/>. "These studies reveal that the MAE threshold depends on the energy in a single pulse (not the average power density) for sufficiently short pulses [e.g., 32  $\mu$ s in (46)], and peak power densities of 102 to 105 mW/cm<sup>2</sup> have been known to cause auditory effects in human participants (45)."

"Diplomats' Mystery Illness and Pulsed Radiofrequency/Microwave Radiation," Dr. Beatrice Golomb. Neural Comput. 2018 Nov; 30(11):2882-2985. <https://pubmed.ncbi.nlm.nih.gov/30183509/>; "Reported facts appear consistent with pulsed RF/MW as the source of injury in affected diplomats."

"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," Martin L. Pall, PhD, <https://peaceinspace.blogs.com/files/5g-emf-hazards--dr-martin-l-pall--eu-emf2018-6-11us3.pdf>.

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.



- b) The FCC received in its docket, when requesting public comment on the adequacy of its 1996 RF radiation emission limits, 11,000 pages of peer-reviewed, scientific studies showing biological effects from RF radiation and a couple hundred personal submissions of injury. When the FCC closed the docket, it declined to update its limits. The FCC was sued and in 2021 the D.C. Circuit Court of Appeals ruled against the FCC and remanded the case back to the FCC because the FCC failed to provide a reasoned explanation for not updating its limits and ignoring the current science.<sup>112</sup> The FCC has not yet complied.
- c) **FCC's Maximum Permissible Exposure Limit (MPEL)** are the limits of RF radiation for human exposure. MPEL allows for a very high human exposure limit of ten million microwatts per square meter.<sup>113</sup> The FCC has acknowledged a "worst-case" scenario of transmitters "operating simultaneously and continuously" at the MPEL with an individual "in the main transmitting beam and within a few feet of the antenna for several minutes or longer."<sup>114</sup> While the FCC dismisses this scenario as "extremely remote," it is allowing 4G and 5G cell towers to be installed<sup>115</sup> just feet from a home, business or school where individuals and children are in the main transmitting beam for many hours a day.

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

<sup>112</sup> <https://media.cadc.uscourts.gov/opinions/docs/2021/08/20-1025-1910111.pdf>

<sup>113</sup> 47 CFR 1.1310(e)(1)(II) shows 1 mW/cm<sup>2</sup>, which is equivalent to 10 million uW/m<sup>2</sup>, <https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1310>.

<sup>114</sup> FCC's *Guidelines for Cellular Antenna Site Calculations*, <https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites#:~:text=In%201996%2C%20the%20FCC%20adopted,lower%2Dpowered%20cell%20site%20transmitters.>

<sup>115</sup> *In re Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Inv.*, 33 F.C.C.R. 9088, 9104-05 (2018).

- d) The FCC's MPEL is based on IEEE (Institute of Electrical and Electronic Engineers) guidelines<sup>116</sup> which "have not been changed since 1991 and do not consider children."<sup>117</sup> Testing was performed on "a model head with dimensions based [on] the 90th percentile of U.S. military recruits in the year 1989. The corresponding body of the head would be a six foot, two inches, 220 lb. male."<sup>118</sup> A Specific Absorption Rate (SAR) – rate of absorption of electromagnetic radiation -- is then calculated based on thermal effects (heating tissue) of that model head.<sup>119</sup> However, biological effects from RF radiation are also non-thermal, documented by the studies cited herein, yet neglected in FCC testing.
- e) The FCC failed to disclose that in 2019 when it tested cell phones next to the body (which is the way that the public typically uses cell phones), the cell phones exceeded the limits of RF radiation for human exposure.<sup>120</sup>

9. **A U.S. Naval Medical Academy Research** report from 1971 by Dr. Zory Glaser<sup>121</sup> linked 23 chronic diseases to RF radiation based on over 2300 studies.<sup>122</sup> A Feb 2025 report correlates Dr. Glaser's findings from 1971 of biological effects of RF radiation and millimeter wave (5G) technology to reported cases of chronic disease.<sup>123</sup> The 2025 report states that Dr. Glaser reported biological effects and diseases related to the central and autonomic nervous systems, genetic / chromosomal, vascular, blood,

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<sup>116</sup> FCC guidelines are set forth at 47 CFR 1.1310, see note at (d)(4); see also, <https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites#:~:text=In%201996%2C%20the%20FCC%20adopted,lower%2Dpowered%20cell%20site%20transmitters.>

<sup>117</sup> *The Effects of RF-EMF on the Child Brain*, Aaron Skaist, Vol 12, No. 2, 2019, at 2, The Science Journal of the Lander College of Arts and Sciences, <https://touro scholar.touro.edu/cgi/viewcontent.cgi?article=1218&context=sjlcas>.

<sup>118</sup> Ibid at 3.

<sup>119</sup> Ibid.

<sup>120</sup> <https://ehtrust.org/press-release-concealed-fcc-cell-phone-radiation-tests-show-human-exposure-limits-were-exceeded/>.

<sup>121</sup> About Dr. Zory Glaser, <https://zoryglaser.com/>.

<sup>122</sup> [https://www.magdahavas.com/wp-content/uploads/2010/06/Navy\\_Radiowave\\_Brief.pdf](https://www.magdahavas.com/wp-content/uploads/2010/06/Navy_Radiowave_Brief.pdf).

<sup>123</sup> Report: "Safety of Wireless Radiation, a Scientific View, Feb 2025, Richard Lear and Camilla Rees, [https://www.researchgate.net/publication/388763046\\_Safety\\_of\\_Wireless\\_Technologies\\_The\\_Scientific\\_View](https://www.researchgate.net/publication/388763046_Safety_of_Wireless_Technologies_The_Scientific_View) at 12-13.

metabolic, endocrine and gastrointestinal disorders.<sup>124</sup> In 1976, Dr. Glaser updated the total bibliography to 3700 reports relating to the biological effects of RF radiation.<sup>125</sup>

10. **A U.S. Air Force report** from 1994<sup>126</sup> states that “[i]t is known that electromagnetic radiation [EMR] has a biological effect on human tissue” covering a wide range including adverse cardiovascular, neurological and behavioral effects including the risk of cancer. Since 1956, the Dept. of Defense directed the Armed Forces (Army, Navy, Air Force) to study EMR. The report found that EMR can interact with human tissue’s bioelectrical function and Eastern Europe and the then Soviet Union found that human tissue may be more sensitive to EMR’s non-thermal effects.

11. **Central Intelligence Agency (CIA).** In 2012, the CIA declassified and approved for release a 1977 Russian study on the “Biological Effects of Millimeter Radiowaves” which found that while millimeter waves only penetrate the skin, they trigger a cascade of adverse biological effects within the body.<sup>127</sup>

- a) The study coins the term “**radiowave disease**” to describe these effects.<sup>128</sup> Adverse effects on the skin included demyelination of sections of nerve fibers (damage or destruction to the insulation around nerve fibers which disrupts normal nerve impulse transmission), fragmented neural conductors, and deformation of sensory receptors, leading to neurological disorders.
- b) The people observed working with millimeter radio wave generators had disturbances in their blood and immuno-biology.<sup>129</sup>
- c) Exposure in lab animals caused many disorders including of the liver, spleen, heart and brain, inhibiting “oxygen consumption rate by the mitochondria of those organs.”<sup>130</sup>
- d) The degree of adverse effects **increased with more exposure**;<sup>131</sup> the lab animals had been exposed for 15 minutes a day for 60 days. It reported that when exposure ceases, disorders from low millimeter radio waves are reversible.<sup>132</sup> However, if adverse effects depend on duration of exposure, then Americans exposed continuously 24/7, 365 days a year, would suffer adverse biological effects, but without reprieve and without the ability to recover.

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<sup>124</sup> Ibid at 3.

<sup>125</sup> <https://ehtrust.org/wp-content/uploads/Naval-MRI-Glaser-Report-1976.pdf>.

<sup>126</sup> *Radiofrequency / Microwave Radiation Biological Effects and Safety Standards, a Review* (1994), Scott Bolen, Rome Laboratory, Griffiss Air Force Base, at 1, <https://youandemf.com/wp-content/uploads/2025/01/EMR-US-Military-Report.pdf>.

<sup>127</sup> <https://mdsafetech.org/wp-content/uploads/2019/02/biological-effects-of-millimeter-wavelengths.-zalyubovskaya-declassif-by-cia-1977-biol-eff-mm-waves.pdf>.

<sup>128</sup> Ibid at 57.

<sup>129</sup> Ibid at 60.

<sup>130</sup> Ibid at 59.

<sup>131</sup> Ibid at 59.

<sup>132</sup> Ibid at 58.

**12. Chronology of Federal Agencies** expressing since at least the 1990s that the FCC's wireless limits address only thermal (heating of human tissue), not non-thermal exposure, of RF radiation,<sup>133</sup> despite the fact that non-thermal exposure produces biological effects and disease, as documented herein.

## **Independent Research on Biological Effects of RF Radiation, Disregarded by Federal Agencies:**

1. **The World Health Organization's (WHO) International EMF Project Review of April 2025** of animal studies found reliable evidence that RF radiation increases the risk of cancer.<sup>134</sup> This reinforces the 2018 findings of cancer from the National Toxicology Program and the Ramazzini Institute. The WHO's results may lead scientists to call for the IARC to augment its carcinogenicity classification from "possible" Class 2B in humans set in 2011 to "probable" or "known" carcinogenicity in humans in 2025.<sup>135</sup> The objective of the new review was to systematically evaluate the effects of RF EMF exposure on cancer.
  - a. **The WHO's IARC** classified EMF as a **Class 2B possible human carcinogen** in 2011<sup>136</sup> (similar to lead, diesel fuel and gasoline engine exhaust). This was based on "epidemiological observations in humans which exhibited higher risks for the glioma-type of malignant brain cancer and of benign vestibular schwannoma of the vestibulocochlear nerve among heavy or long-term subscribers of cell or mobile phones."<sup>137</sup>
  - b. "[R]esults from animal experiments that the IARC was lacking were later provided by the U.S. National Toxicology Program (NTP) report of two types of cancers in laboratory rats that were exposed, lifelong, to 2G and 3G cell phone RF radiation frequencies below 6 GHz . . . did not exceed 1°C,"<sup>138</sup> i.e., did not heat tissue.

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<sup>133</sup> <https://ehtrust.org/timeline-of-development-of-safety-limits-for-wireless-radiation-in-us/>.

<sup>134</sup> <https://www.sciencedirect.com/science/article/pii/S0160412025002338>.

<sup>135</sup> See, e.g., <https://icbe-emf.org/who-funded-study-reports-high-certainty-of-the-evidence-linking-cell-phone-radiation-to-cancer-in-animals/>.

<sup>136</sup> [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).

<sup>137</sup> J. C. Lin, "RF Health Safety Limits and Recommendations [Health Matters]," in IEEE Microwave Magazine, vol. 24, no. 6, pp. 18-77, June 2023, doi: 10.1109/MMM.2023.3255659. keywords: {Radiation detectors;Human factors;Safety;Radiation effects;Cellular phones;Radio frequency}.

<sup>138</sup> J. C. Lin, "RF Health Safety Limits and Recommendations [Health Matters]," in IEEE Microwave Magazine, vol. 24, no. 6, pp. 18-77, June 2023, doi: 10.1109/MMM.2023.3255659. keywords: {Radiation detectors;Human factors;Safety;Radiation effects;Cellular phones;Radio frequency}.

- c. Since the WHO 2011 IARC cancer finding by independent scientists, other factions within the WHO have sought to produce industry-aligned pronouncements. For example, its website states a lack of causality of harm from wireless radiation.<sup>139</sup> However, over a decade later, a number of the IARC scientists are saying the opposite – that radiofrequency should be upgraded to a group 1 carcinogen (the highest level of evidence).<sup>140</sup> Dr. Miller, a former Senior Epidemiologist and Senior Scientist at the IARC has stated, “[t]here is **sufficient evidence to now classify radiofrequency radiation as a human carcinogen.**”<sup>141</sup> The WHO’s April 2025 review reinforces that conclusion.
- i. The WHO recently commissioned a study by Karpidis, et al, which concluded in 2024 no hazards from wireless radiation,<sup>142</sup> however, the study has been found to be severely flawed with no scientifically valid assessment,<sup>143</sup> and its

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<sup>139</sup> <https://www.who.int/news-room/questions-and-answers/item/radiation-5g-mobile-networks-and-health>.

<sup>140</sup> Hardell, L., Carlberg, M. "Comments on the US National Toxicology Program technical reports on toxicology and carcinogenesis study in rats exposed to whole-body radiofrequency radiation at 900 MHz and in mice exposed to whole-body radiofrequency radiation at 1,900 MHz". International Journal of Oncology 54, no. 1 (2019): 111-127.  
<https://doi.org/10.3892/ijo.2018.4606>

<sup>141</sup> Professor Miller, MD, FRCP, FRCP (C), FFPH, FACE, is an eminent physician and expert in preventative medicine, a scientific advisor to various scientific and health authorities, and a former Senior Epidemiologist and Senior Scientist at the World Health Organization’s (WHO) International Agency for Research on Cancer (IARC), <https://phiremedical.org/2020-nir-consensus-statement-press-release/>; see Prof. Miller’s statement at 00:15:06 at <https://www.youtube.com/watch?v=S16QI6-w9I8>; see also Proceedings from a Symposium on the Impacts of Wireless Technology on Health, Prof. Miller at 8, [https://www.womenscollegehospital.ca/wp-content/uploads/2022/06/Symposium\\_Document\\_Final\\_Jan\\_12.pdf](https://www.womenscollegehospital.ca/wp-content/uploads/2022/06/Symposium_Document_Final_Jan_12.pdf).

<sup>142</sup> K. Karipidis, D. Baaken, T. Loney, M. Blettner, C. Brzozek, M. Elwood, C. Narh, N. Orsini, M. Rösli, M.S. Paulo, S. Lagorio, The effect of exposure to radiofrequency fields on cancer risk in the general and working population: A systematic review of human observational studies - Part I: Most researched outcomes  
Environ Int., 191 (2024), Article 108983, 10.1016/j.envint.2024.108983.

<sup>143</sup> John W. Frank, Joel M. Moskowitz, Ronald L. Melnick, Lennart Hardell, Alasdair Philips, Paul Héroux, Elizabeth Kelley, *The Systematic Review on RF-EMF Exposure and Cancer by Karipidis et al. (2024) has Serious Flaws that Undermine the Validity of the Study’s Conclusions*, Environment International, Vol. 195, 2025, 109200, ISSN 0160-4120, <https://doi.org/10.1016/j.envint.2024.109200>.  
(<https://www.sciencedirect.com/science/article/pii/S0160412024007876>)

conclusion contradicted scientific evidence and was drawn from data showing hazards.<sup>144</sup> Researchers have called for a retraction of the study.<sup>145</sup>

- ii. Another WHO study in 2024 on RF-induced oxidative stress identified 11,599 studies on oxidative stress within the 800-2450 MHz range, but discarded more than 99% of those studies.<sup>146</sup> Researchers have called for a retraction of that study, as well.<sup>147</sup>

- 2. **The Ramazzini Institute** in Italy in 2018 found increased malignant heart schwannomas and malignant brain gliomas in lab animals from cell tower base stations, similar to what the NTP found from 2G/3G.<sup>148</sup>

**Note:** “Since the IARC evaluation in 2011, the evidence on human cancer risks from RF radiation has been strengthened based on human cancer epidemiology reports [IARC Class 2B designation for RF radiation], animal carcinogenicity studies [NTP study finding clear evidence of cancer] and experimental findings on oxidative mechanisms [associated with

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<sup>144</sup> “WHO to build neglect of RF-EMF exposure hazards on flawed EHC reviews? Case study demonstrates how ‘no hazards’ conclusion is drawn from data showing hazards,” 7/10/24, <https://www.degruyter.com/document/doi/10.1515/reveh-2024-0089/html>;  
“WHO’s EMF Project’s Systemic Reviews on the Association between RF Exposure and Health Effects Encounter Challenges,” James Lin, IEEE Microwave Magazine, Jan 2025, [https://www.dropbox.com/scl/fi/xq492i5ha6f2431vyxn3g/World\\_Health\\_Organizations\\_EMF\\_Projects\\_Systemic\\_Reviews\\_on\\_the\\_Association\\_Between\\_RF\\_Exposure\\_and\\_Health\\_Effects\\_Encounter\\_Challenges\\_Health\\_Matters.pdf?rlkey=o77i19den485rdo2k4ktdzhgj&st=842p0rbv&dl=0](https://www.dropbox.com/scl/fi/xq492i5ha6f2431vyxn3g/World_Health_Organizations_EMF_Projects_Systemic_Reviews_on_the_Association_Between_RF_Exposure_and_Health_Effects_Encounter_Challenges_Health_Matters.pdf?rlkey=o77i19den485rdo2k4ktdzhgj&st=842p0rbv&dl=0).

<sup>145</sup> Lennart Hardell, Mona Nilsson. A Critical Analysis of the World Health Organization (WHO) Systematic Review 2024 on Radiofrequency Radiation Exposure and Cancer Risks. Journal of Cancer Science and Clinical Therapeutics. 9 (2025): 09-26., <https://cdn.fortunejournals.com/articles/a-critical-analysis-of-the-world-health-organization-who-systematic-review.pdf>.

<sup>146</sup> Frank, John W., Melnick, Ronald L. and Moskowitz, Joel M.. "A critical appraisal of the WHO 2024 systematic review of the effects of RF-EMF exposure on tinnitus, migraine/headache, and non-specific symptoms" Reviews on Environmental Health, 2024. <https://doi.org/10.1515/reveh-2024-0069>; “Another WHO RF Review Challenged, More than 99% of Studies on Oxidative Stress Discarded,” Microwave News, 8/21/24, <https://www.microwavenews.com/short-takes-archive/another-who-rf-systematic-review-challenged>.

<sup>147</sup> Ibid.

<sup>148</sup> <https://pubmed.ncbi.nlm.nih.gov/29530389/>; see also J. C. Lin, "RF Health Safety Limits and Recommendations [Health Matters]," in IEEE Microwave Magazine, vol. 24, no. 6, pp. 18-77, June 2023, doi: 10.1109/MMM.2023.3255659. keywords: {Radiation detectors;Human factors;Safety;Radiation effects;Cellular phones;Radio frequency}.



increased DNA damage]<sup>149</sup> and genotoxicity [associated with increased DNA damage]<sup>150</sup>. Therefore, the IARC Category should be upgraded from Group 2B to Group 1, a human carcinogen<sup>151</sup>. ”<sup>152</sup> [Some internal footnotes omitted]

3. **International Commission on the Biological Effects of Electromagnetic Fields**

**(ICBE-EMF).** “Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G.”<sup>153</sup>

- a. The FCC wireless radiation limits for human exposure are based **largely** on 1980s experiments “**involving 40-60 minute exposures in 5 monkeys and 8 rats**, and then applying arbitrary safety factors to an apparent threshold specific absorption rate (SAR) of 4 W/kg . . . Adverse effects observed at exposures below the assumed threshold SAR include non-thermal induction of reactive oxygen species, DNA damage, cardiomyopathy, carcinogenicity, sperm damage, and neurological effects . . . ”<sup>154</sup>

4. **Panagopoulos, et al, Review on human-made EMF's ion forced-oscillation and**

**voltage-gated ion channel dysfunction, oxidative stress and DNA damage (2021).** “[E]xtremely low frequency (ELF) band, and the microwave/radio frequency (RF) band which is always combined with ELF, may lead to DNA damage [which is] connected with cell death, infertility and other pathologies, including cancer.”<sup>155</sup>

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<sup>149</sup> Yakymenko I, Tsybulin O, Sidorik E, Henshel D, Kyrylenko O, Kyrylenko S. Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. *Electromagn Biol Med*. 2016;35:186–202. doi: 10.3109/15368378.2015.1043557.

<sup>150</sup> Smith-Roe SL, Wyde ME, Stout MD, Winters JW, Hobbs CA, Shepard KG, Green AS, Kissling GE, Shockley KR, Tice RR, 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;61:276–290. doi: 10.1002/em.22343.

<sup>151</sup> Carlberg M, Hardell L. Evaluation of mobile phone and cordless phone use and glioma risk using the Bradford Hill viewpoints from 1965 on association or causation. *BioMed Res Int*. 2017;2017:9218486. doi: 10.1155/2017/9218486.

<sup>152</sup> Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest, LHardell, MCarlberg, *Oncol Lett*. 2020 Jul 15;20(4):15. doi: 10.3892/ol.2020.11876.

<sup>153</sup> *EnvironHealth* 21, 92 (2022). <https://doi.org/10.1186/s12940-022-00900-9>.

<sup>154</sup> Ibid.

<sup>155</sup> [https://pmc.ncbi.nlm.nih.gov/articles/PMC8562392/](https://pmc.ncbi.nlm.nih.gov/articles/PMC8562392/Dr.DimitrisJ.Panagopoulos)Dr. Dimitris J. Panagopoulos is an EMF-biophysicist at the Choremeion Research Laboratory, Medical School, University of Athens, Greece, <https://www.researchgate.net/profile/Dimitris-Panagopoulos-3>.

5. **New Hampshire Commission** studied the biological effects of wireless radiation and issued a report Nov. 2020<sup>156</sup> with former commissioner Dr. Kent Chamberlain explaining a “key finding being that exposure to wireless communication radiation is harmful to the health of humans and the environment. Those findings apply to all forms of wireless radiation, which include all generations of cellphone radiation.” (see Appendix A, Dr. Chamberlin’s letter explaining their findings).
6. **Thousands of scientific and medical studies** show neurological disorders; increased risk of cancer<sup>157</sup> and brain tumors; DNA damage; oxidative stress; immune dysfunction; cognitive processing effects; altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and damage to the blood-brain barrier.<sup>158</sup>
7. **Eight case studies** since Jan 2023 in Sweden show adverse health impacts from exposure to 5G towers. Previously healthy individuals developed typical “microwave syndrome” symptoms shortly after the towers were installed: headaches, abnormal fatigue, heart arrhythmia, burning skin, trouble concentrating.<sup>159</sup> The significance of

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<http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>.

<sup>157</sup> *Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen (Review)*, Journal of Oncology, <https://www.spandidos-publications.com/10.3892/ijo.2015.2908>.

<sup>158</sup> A Rationale for Biologically-based Exposure Standards for Low-Intensity Electromagnetic Radiation, 2022, <https://bioinitiative.org/conclusions/>; see also, Adverse health effects of 5G mobile networking technology under real-life conditions, May 1, 2020, <https://pubmed.ncbi.nlm.nih.gov/31991167/>; Wireless Radiation (RFR) – Is U.S. Government Ignoring Its Own Evidence for Risk? March, 28, 2019, <https://electromagnetichealth.org/electromagnetic-health-blog/u-s-gov-ignoring-own-evidence/>; Oxidative Mechanisms of Biological Activity of Low-Intensity Radiofrequency Radiation, *Electromagnetic Biology and Medicine*, 35(2), 186-202, Yakymenko, I., Tsybulin, O., Sidorik, E., Henshel, D., Kyrylenko, O., & Kyrylenko, S. (2016), <https://pubmed.ncbi.nlm.nih.gov/26151230/>.

<sup>159</sup> <https://mdsafetech.org/2023/11/20/5g-health-effects-5-case-reports-of-health-symptoms-after-5g-cell-towers-placed-in-sweden/>; e.g., Jan 2023 study of 63 year old man and 62 year old woman where 5G antennas were installed on the rooftop of their home, [https://www.gavinpublishers.com/assets/articles\\_pdf/Case-Report-The-Microwave-Syndrome-after--Installation-of-5G-Emphasizes-the-Need-for--Protection-from-Radiofrequency-Radiation.pdf](https://www.gavinpublishers.com/assets/articles_pdf/Case-Report-The-Microwave-Syndrome-after--Installation-of-5G-Emphasizes-the-Need-for--Protection-from-Radiofrequency-Radiation.pdf) and <https://childrenshealthdefense.org/defender/5g-radiation-microwave-syndrome-symptoms/>; Feb 2023 study of two previously healthy men where 5G antennas were installed on the rooftop of their business, <https://www.anncaserep.com/open-access/development-of-the-microwave-syndrome-in-two-men-shortly-after-9589.pdf>; April 2023 study of 52 year old woman whose apartment was 60 meters from a 5G base station, <https://acmcasereport.com/pdf/ACMCR-v10->



these reports is that non-ionizing radiation<sup>160</sup> from 5G — well below levels allowed by authorities — can cause health problems in individuals who had no prior history of electromagnetic sensitivity.<sup>161</sup> Dr. Lennart Hardell, lead author of the reports and world-renowned scientist on cancer risks from radiation, affirms these reports as “groundbreaking” because they serve as the “first warning of a health hazard.”<sup>162</sup>

8. **One-third of Americans suffer from symptoms from RF radiation**, based on a 2019 Bevington study which analyzed the prevalence of symptoms from RF radiation within any given population.<sup>163</sup> Based on a population of 332.4 million people in the U.S.,<sup>164</sup> 120 million have symptoms, 2% of which (7 million) have severe symptoms or can’t work.
9. **The Bioinitiative Report’s** review of 1800 studies found biological effects of RF radiation which can occur within minutes of exposure,<sup>165</sup> and recommends no more than 0.1 microwatts per centimeter squared for human exposure<sup>166</sup> (compared to the FCC’s MPEL of 580 microwatts per centimeter squared). Chronic or prolonged exposure to cell towers can result in biological effects; RF radiation exposures “prevent the body from healing damaged DNA, produce immune system imbalances, metabolic disruption . . . lower resistance to disease . . . pervasive impairment of metabolic and reproductive functions.”<sup>167</sup>

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[1926.pdf?fbclid=IwAR2J-mE3XeBxqaXPQdFxsIf9Q23bMCer9vgUBHnCvJXBrgBv-w7YdRUDwF0](#); see also, “The microwave syndrome or electro-hypersensitivity: historical background,” <https://pubmed.ncbi.nlm.nih.gov/26556835/>.

<sup>160</sup> <https://childrenshealthdefense.org/emr/emf-key-terms-descriptions/>.

<sup>161</sup> <https://childrenshealthdefense.org/emr/emf-wireless-health-impacts/>.

<sup>162</sup> <https://www.stralskyddsstiftelsen.se/two-studies-show-that-5g-caused-the-microwave-syndrome-in-healthy-persons/>.

<sup>163</sup> “The Prevalence of People with Restricted Access to Work in Manmade Electromagnetic Environments,” Journal of Environment and Health Science, <https://mdsafetech.files.wordpress.com/2019/10/2018-prevalence-of-electromagnetic-sensitivity.pdf>.

<sup>164</sup> <https://www.commerce.gov/news/blog/2022/01/us-population-estimated-332403650-jan-1-2022#:~:text=As%20our%20nation%20prepares%20to,since%20New%20Year's%20Day%202021>.

<sup>165</sup> *Key Scientific Evidence and Public Health Policy Recommendations*, Supplement 2012, at 4, David O. Carpenter, MD, Director, Institute for Health and the Environment University at Albany, Cindy Sage, MA, Sage Associates, [https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2012\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2012_Key_Scientific_Studies.pdf). <https://bioinitiative.org/>; see also, BioInitiative 2012 Conclusions, <https://bioinitiative.org/conclusions/>.

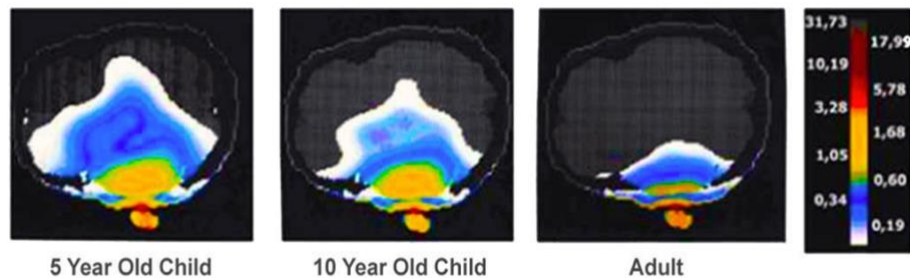
<sup>166</sup> *Key Scientific Evidence and Public Health Policy Recommendations* 2007, at 22-23, [https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2007\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2007_Key_Scientific_Studies.pdf).

<sup>167</sup> *Key Scientific Evidence and Public Health Policy Recommendations*, Supplement 2012, at 4, <https://bioinitiative.org/wp->

10. **Children absorb more RF radiation and are at greater risk than adults.**<sup>168</sup>

a. **From cell phones:**<sup>169</sup>

Children are more vulnerable  
to RF microwave radiation.



Depth of absorption of cell phone radiation in a 5-year old child, a 10-year old child, and in an adult from GSM cell phone radiation at 900 MHz. Color scale on right shows the SAR in Watts per kilogram. Source: [Exposure limits: the underestimation of absorbed cell phone radiation, especially in children](#)

- b. **American Academy of Pediatrics:** children are disproportionately affected by cell phone radiation due to their lower bone density and amount of fluid in the brain allowing for absorption of greater quantities of RF radiation than in adults.<sup>170</sup>

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[content/uploads/pdfs/sec24\\_2012\\_Key\\_Scientific\\_Studies.pdf](#).<https://bioinitiative.org/>; see also, BioInitiative 2012 Conclusions, <https://bioinitiative.org/conclusions/>.

<sup>168</sup> Wireless technologies, non-ionizing electromagnetic fields and children: Identifying and reducing health risks,” Devra Davis PhD, MPH, Linda Birnbaum PhD, Paul Ben-Ishai PhD, Hugh Taylor MD, Meg Sears MEng, PhD, Tom Butler PhD, MSc, Theodora Scarato MSW, bCurr Probl Pediatr Adolesc Health Care, 2023 Feb;53(2):101374 <https://doi.org/10.1016/j.cppeds.2023.101374>; see also, *Children and Wireless Radiation*, <https://ehtrust.org/educate-yourself/children-and-wireless-faqs/>.

<sup>169</sup> Exposure limits: the underestimation of absorbed cell phone radiation, especially in children, Gandhi, Morgan, Augusto de Salles, Han, Heberman, Davis, October 14, 2011, <https://pubmed.ncbi.nlm.nih.gov/21999884/>.

<sup>170</sup> *Key Scientific Evidence and Public Health Policy Recommendations*, Supplement 2012, at 21, David O. Carpenter, MD, Director, Institute for Health and the Environment University at Albany, Cindy Sage, MA, Sage Associates, [https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2012\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2012_Key_Scientific_Studies.pdf).<https://bioinitiative.org/>.

- c. **Greater risk for fetuses:** risk of “degeneration of the protective myelin sheath that surrounds brain neurons.”<sup>171</sup>
- d. **School-age children:** risk of “[d]igital dementia.”<sup>172</sup>
- e. **Childhood leukemia,** increased risk.<sup>173</sup>
- f. **Potential dangers of cell towers near schools.**<sup>174</sup>
  - i. **Elementary school children** exposed to high RF radiation from mobile phone base stations 200 meters from their schools “had a significantly higher risk of type 2 diabetes mellitus” than those exposed to lower RF radiation.<sup>175</sup>
  - ii. **Adolescent school children** exposed to high RF radiation from mobile phone base stations within 200 meters from their schools had “delayed fine and gross motor skills, spatial working memory and attention” than those exposed to lower RF radiation.<sup>176</sup>

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<sup>171</sup> *Why children absorb more microwave radiation than adults: The consequences*, Morgan, Kesar and Davis, Journal of Microscopy and Ultrastructure, Vol. 2, Issue 4, December 2014, 197-204, <https://www.sciencedirect.com/science/article/pii/S2213879X14000583>.

<sup>172</sup> *Why children absorb more microwave radiation than adults: The consequences*, Morgan, Kesar and Davis, Journal of Microscopy and Ultrastructure, Vol. 2, Issue 4, December 2014, 197-204, <https://www.sciencedirect.com/science/article/pii/S2213879X14000583>.

<sup>173</sup> *Key Scientific Evidence and Public Health Policy Recommendations*, 2007, at 19, David O. Carpenter, MD, Director, Institute for Health and the Environment University at Albany, Cindy Sage, MA, Sage Associates, [https://bioinitiative.org/wp-content/uploads/pdfs/sec24\\_2007\\_Key\\_Scientific\\_Studies.pdf](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2007_Key_Scientific_Studies.pdf).

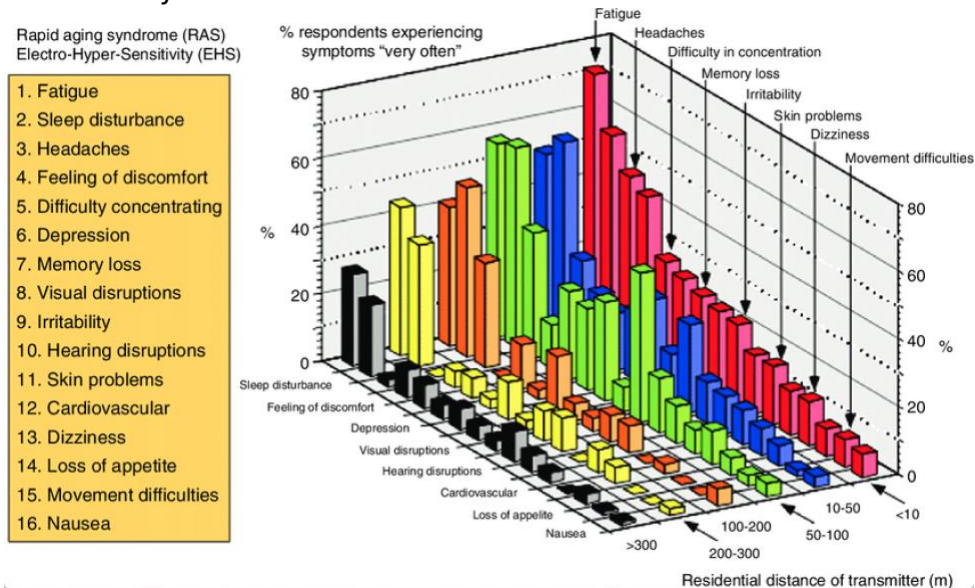
<sup>174</sup> Dr. Magda Havas: WiFi in Schools is Safe. True or False? <https://www.youtube.com/watch?v=6v75sKAUFdc>.

<sup>175</sup> *Association of Exposure to Radio-Frequency Electromagnetic Field Radiation (RF-EMFR) Generated by Mobile Phone Base Stations (MPBS) with Glycated Hemoglobin (HbA1c) and Risk of Type 2 Diabetes Mellitus*, Sultan Ayoub Meo et al, International Journal of Environmental Research and Public Health, 2015; [https://www.researchgate.net/publication/283726472\\_Association\\_of\\_Exposure\\_to\\_Radio-Frequency\\_Electromagnetic\\_Field\\_Radiation\\_RF-EMFR\\_Generated\\_by\\_Mobile\\_Phone\\_Base\\_Stations\\_with\\_Glycated\\_Hemoglobin\\_HbA1c\\_and\\_Risk\\_of\\_Type\\_2\\_Diabetes\\_Mellitus](https://www.researchgate.net/publication/283726472_Association_of_Exposure_to_Radio-Frequency_Electromagnetic_Field_Radiation_RF-EMFR_Generated_by_Mobile_Phone_Base_Stations_with_Glycated_Hemoglobin_HbA1c_and_Risk_of_Type_2_Diabetes_Mellitus).

<sup>176</sup> Meo, S. A., Almahmoud, M., Alsultan, Q., Alotaibi, N., Alnajashi, I., & Hajjar, W. M. (2018). *Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health*, American Journal of Men's Health; <https://pubmed.ncbi.nlm.nih.gov/30526242/>.

- iii. **A ten-year old child** testified of his cardiac condition being caused by exposure to RF radiation from a router in the library where he was being tutored.<sup>177</sup>

**11. Neurobehavioral Symptoms Near Cell Towers.** The following chart shows a worsening of symptoms when closer to a cell tower but a lessening of symptoms when farther away from a cell tower.<sup>178</sup>



Symptoms experienced by people near cellular phone base stations; RF radiation affects the blood, heart and autonomic nervous system.<sup>179</sup> Source: Santini, et al (France): Pathol Biol. 2002;50:S369-73; Dr. Magda Havas, PhD.

**12. RF Radiation Effects.** A group of toxicology researchers from multiple universities concluded that overall, high frequency RF radiation even below the FCC limits "can result in: carcinogenicity (brain tumors/glioma, breast cancer, acoustic neuromas, leukemia, parotid gland tumors), genotoxicity (DNA damage, DNA repair inhibition, chromatin structure), mutagenicity, teratogenicity, neurodegenerative diseases (Alzheimer's Disease, Amyotrophic Lateral Sclerosis), neurobehavioral problems, autism, reproductive problems, pregnancy outcomes, excessive reactive oxygen species/oxidative stress, inflammation, apoptosis, blood-brain barrier disruption, pineal gland/melatonin production, sleep disturbance, headache, irritability, fatigue, concentration difficulties, depression, dizziness, tinnitus, burning and flushed skin,

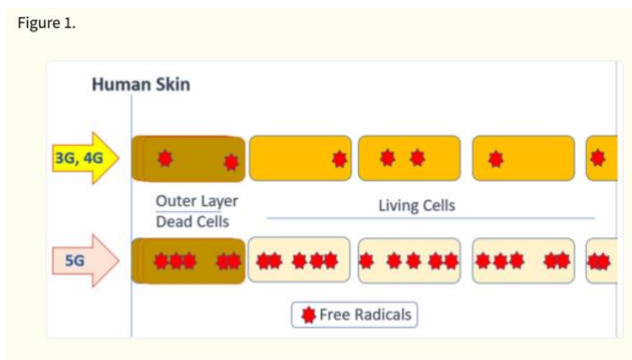
<sup>177</sup> Child With Heart Problems From Wireless: 5G Health Risks California SB 649 Hearing, [https://www.youtube.com/watch?v=OgNLR9fQOX4&list=PLT6DbkXhTGoDakSqp1i\\_7milpwGx4xMFq](https://www.youtube.com/watch?v=OgNLR9fQOX4&list=PLT6DbkXhTGoDakSqp1i_7milpwGx4xMFq).

<sup>178</sup> *Cell Tower Health Effects*, Physicians for Safe Technology, <https://mdsafetech.org/cell-tower-health-effects/>.

<sup>179</sup> Dr. Magda Havas, [https://www.researchgate.net/figure/Symptoms-experienced-by-people-near-cellular-phone-base-stations-based-on-the-work-of\\_fig2\\_258313941](https://www.researchgate.net/figure/Symptoms-experienced-by-people-near-cellular-phone-base-stations-based-on-the-work-of_fig2_258313941).

digestive disturbance, tremor, cardiac irregularities, adverse impacts on the neural, circulatory, immune, endocrine, and skeletal systems” and “from this perspective, **RF is a highly pervasive cause of disease.**”<sup>180</sup>

- 13. 5G's Biological Effects.** Contrary to claims that 5G's higher frequencies (millimeter waves) simply "bounce" off the skin, researchers have documented that the coiled portion of the skin's sweat duct can be regarded as a helical antenna in the sub-THz band and the skin, our largest organ, can intensely absorb the higher 5G frequencies.<sup>181</sup> The millimeter wave technology of 5G will not only directly and adversely affect the skin and eyes [e.g., skin cancer, cataracts], but will, in turn, cascade into systemic signaling effects within the body, “on the nervous system, heart and immune system.”<sup>182</sup> The free radicals accumulating on the skin from 5G (see figure below) cause oxidative stress which can lead to DNA strand breaks, cancer and atherosclerosis.<sup>183</sup>



<sup>180</sup> Ronald N. Kostoff, Paul Heroux, Michael Aschner, Aristides Tsatsakis, “Adverse health effects of 5G mobile networking technology under real-life conditions,” *Toxicology Letters*, Vol 323, 2020, pp. 35-40, ISSN 0378-4274, <https://doi.org/10.1016/j.toxlet.2020.01.020>.

<sup>181</sup> N. Betzalel, Y. Feldman and P. B. Ishai, "The Modeling of the Absorbance of Sub-THz Radiation by Human Skin," in *IEEE Transactions on Terahertz Science and Technology*, vol. 7, no. 5, pp. 521-528, Sept. 2017, doi: 10.1109/TTHZ.2017.2736345, <https://ieeexplore.ieee.org/document/8016593>.

<sup>182</sup> Ronald N. Kostoff, Paul Heroux, Michael Aschner, Aristides Tsatsakis, “Adverse health effects of 5G mobile networking technology under real-life conditions,” *Toxicology Letters*, Vol 323, 2020, pp. 35-40, ISSN 0378-4274, <https://doi.org/10.1016/j.toxlet.2020.01.020>; J J B, A R M, S M J M. A New Look at Three Potential Mechanisms Proposed for the Carcinogenesis of 5G Radiation. *J Biomed Phys Eng*. 2020 Dec 1;10(6):675-678. doi: 10.31661/jbpe.v0i0.2008-1157. PMID: 33364204; PMCID: PMC7753259, <https://pmc.ncbi.nlm.nih.gov/articles/PMC7753259/#ref7>.

<sup>183</sup> J J B, A R M, S M J M. A New Look at Three Potential Mechanisms Proposed for the Carcinogenesis of 5G Radiation. *J Biomed Phys Eng*. 2020 Dec 1;10(6):675-678. doi: 10.31661/jbpe.v0i0.2008-1157. PMID: 33364204; PMCID: PMC7753259, <https://pmc.ncbi.nlm.nih.gov/articles/PMC7753259/#ref7>; Russell C L. 5 G wireless telecommunications expansion: Public health and environmental implications. *EnvironMental Research*. 2018;165:484–95. doi: 10.1016/j.envres.2018.01.016.



14. **Clumping of blood cells.** A Feb 2025 study found that when an otherwise healthy person is in close proximity to a cell phone red blood cells clumped together (rouleaux formation), which leads to blood abnormality, less oxygen transport, and potentially blockages, stroke and heart problems.<sup>184</sup>
15. **“The 5G Appeal”** to the United Nations to halt the proliferation of 5G, warning of potential biological effects, was signed by 252 scientists and professionals from 43 countries, 40 scientists of which are from 15 U.S. states, including scientists and medical professionals from Columbia and Harvard.<sup>185</sup> Other scientists have joined in consensus statements.<sup>186</sup>
16. **International Association of Fire Fighters** passed a resolution in 2004 that disapproved of cell towers on or near fire stations until safety can be proven.<sup>187</sup>
17. **Increases in brain cancer** in the U.S. have been reported, with scientists attributing a high probability on RF radiation from cell phone use.<sup>188</sup>
18. **Comprehensive overview** of the adverse biological effects on people and the environment is provided at [https://ehtrust.org/wp-content/uploads/EHT-5G-Health-and-Environment-Open-Letter-3\\_2021-3.pdf](https://ehtrust.org/wp-content/uploads/EHT-5G-Health-and-Environment-Open-Letter-3_2021-3.pdf).

## Chronic Disease Clusters Near Cell Towers

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<sup>184</sup> “Hypothesis: ultrasonography can document dynamic in vivo rouleaux formation due to mobile phone exposure,” Robert R. Brown, Barbara Biebrich, *Front. Cardiovasc. Med.* , 10 February 2025 Sec. Atherosclerosis and Vascular Medicine, Volume 12 - 2025 | <https://doi.org/10.3389/fcvm.2025.1499499>; see also, <https://ehtrust.org/cellphones-and-your-blood-what-you-need-to-know/>.

<sup>185</sup> <http://www.5gappeal.eu/the-5g-appeal/>; see also, Dr. Martin Blank, PhD, Dept of Physiology and Cellular Biophysics, Columbia University, announcing the appeal early on and warning on wireless radiation, <https://www.youtube.com/watch?v=HgECRrabuZQ>; see also, <https://childrenshealthdefense.org/defender/5g-rollout-harm-regulation-profit/>.

<sup>186</sup> <https://phiremedical.org/wp-content/uploads/2020/11/2020-Non-Ionising-Radiation-Consensus-Statement.pdf>.

<sup>187</sup> <https://www.iaff.org/cell-tower-radiation/>.

<sup>188</sup> See, e.g., [Brain Tumor Rates Are Rising in the US: The Role of Cellphone & Cordless Phone Use](#); [The Incidence of Meningioma, a Non-Malignant Brain Tumor, is Increasing in the U.S.](#); [New review study finds that heavier cell phone use increases tumor risk](#); [Expert report by former U.S. govt. official: High probability RF radiation causes brain tumors](#); [Cell phone and cordless phone use causes brain cancer: New review](#); and <https://ehtrust.org/scientific-documentation-cell-phone-radiation-associated-brain-tumor-rates-rising/>.

1. **Near Duluth, MN**, a woman suffered 51 strokes after a nearby cell tower was “upgraded,” in addition to experiencing nausea, blind spots in her vision, orientation and balance difficulties.<sup>189</sup>
2. **Clusters of sickness near cell towers (not exhaustive).**
  - a. **The Board of Health of Pittsfield, MA** issued an emergency cease and desist order in April 2022 to turn off a 4G cell tower that injured 17 residents, most of whom evacuated their homes.<sup>190</sup> One of those who remained has since died of cancer. The order cited residents having reported “headaches, ringing in the ears, dizziness, heart palpitations, nausea, and skin rashes,” and, e.g., a child who had “to sleep with a bucket next to her bed in case she needs to throw up.”<sup>191</sup> Because the telecom carrier threatened to sue, the Board of Health was compelled to rescind the order. The residents filed suit against the city but lost on federal preemption, i.e., no legal recourse for health claims.
  - b. **In Ripon, CA** when a cell tower was placed near an elementary school, 4 children (ages 6-11) got cancer (brain, liver, kidney) and 4 teachers got breast cancer.<sup>192</sup> One of the children who contracted brain cancer (glioblastoma) when he was 10 years died in Aug 2024.<sup>193</sup> After the 4<sup>th</sup> student was diagnosed with cancer, the tower was removed.<sup>194</sup> Since the tower was removed, it was reported that there were no more instances of cancer at the school.<sup>195</sup>
  - c. **In an Idaho town** after 5G cell towers were installed, it was reported that a cluster of residents developed atrial fibrillation (a-fib). One of those residents who had undergone surgery for a-fib is a plaintiff in a lawsuit against the telecom carrier which refuses to provide accommodation under the Americans with Disabilities Act.<sup>196</sup>

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<sup>189</sup> <https://childrenshealthdefense.org/defender/marcia-haller-cell-tower-rf-radiation-sickness/>.

<sup>190</sup> <https://ehtrust.org/cease-and-desist-order-against-verizon-cell-tower-by-board-of-health-pittsfield-ma/>, see below the fold for link to the Order, p.12.

<sup>191</sup> <https://ehtrust.org/family-injured-by-cell-tower-radiation-in-pittsfield-massachusetts/>.

<sup>192</sup> See beginning of video at [https://www.youtube.com/watch?v=-9TMTexPb\\_0&t=128s](https://www.youtube.com/watch?v=-9TMTexPb_0&t=128s).

<sup>193</sup> See the lists of treatments and surgeries that this child endured before he died, <https://www.gofundme.com/f/support-the-ferrulli-family-in-memory-of-mason>.

<sup>194</sup> <https://mdsafetech.org/2019/03/25/cell-tower-to-be-removed-after-4th-ripon-student-diagnosed-with-cancer/>.

<sup>195</sup> See beginning of video at [https://www.youtube.com/watch?v=-9TMTexPb\\_0&t=128s](https://www.youtube.com/watch?v=-9TMTexPb_0&t=128s).

<sup>196</sup> <https://childrenshealthdefense.org/press-release/chd-files-in-series-of-lawsuits-seeking-disability-accommodation-for-people-injured-by-rf-radiation-from-cell-towers/> and <https://childrenshealthdefense.org/defender/henry-hank-allen-chd-verizon-lawsuit-radiofrequency-radiation-cell-towers/>.

## APPENDIX A



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February 13, 2023

Queens Community Board No. 12  
90-28 161<sup>st</sup> Street  
Jamaica, New York 11432

Dear Community Board Members:

I am writing you as a former member of the New Hampshire State Commission that was tasked with exploring the Environmental and Health Effects of Evolving Wireless and 5G Technology. This Commission was formed through [bipartisan legislation](#) and was supported by the governor. The Commission was comprised of unbiased experts in fields relating to health and radiation and were highly qualified to evaluate the issue in a fair and in-depth manner. The Commission submitted its [final report](#) in November 2020, with a key finding being that exposure to wireless communication radiation is harmful to the health of humans and the environment. Those findings apply to all forms of wireless radiation, which include all generations of cellphone radiation.

My purpose in writing is to alert you to the dangers of siting a cell tower near to where people, particularly young people, live, work or recreate. I provide relevant details about the New Hampshire Commission's findings on this issue in a [presentation](#) I gave to the Lenox, MA Board of Health. Please know that the International Association of Fire Fighters (IAFF) in 2004



adopted a [position statement](#) still in effect today forbidding wireless communication facilities on or near fire stations as firefighters were being injured by the radiation. Many of the firefighters exposed to the wireless radiation could not remember where they were going during emergencies, nor how to administer CPR. As Dr. Gunnar Heuser indicates at the [EMF Medical Conference](#), functional MRIs showed damage to the gray matter of their brains from the radiofrequency radiation exposure.

Scientists, physicians, environmental and public health physicians, epidemiologists, pediatricians along with engineers such as myself have been calling for state and local governments to be proactive in protecting your citizens against radiation exposure. I realize that providing such protection may seem challenging. However, initiatives such as the New Hampshire Commission and the [successful lawsuit](#) brought about by the Environmental Health Trust and others are exposing the dubious claims by the FCC that wireless radiation is harmless. Given the mounting evidence regarding the clear harm of radiation, it is only a matter of time before meaningful protective regulations are put in place.

While telecom companies currently have the upper hand in that they seem to be able to force communities to accept whatever tower sites they mandate, there are actions that those communities can take to delay or stop installations where people will be excessively exposed. For example, citizens in York, Maine have delayed the installation of antennas positioned close to a neighborhood. The Board of Health in Pittsfield, Massachusetts issued a [cease-and-desist order](#) against Version regarding a cell tower that was causing illness in a surrounding neighborhood. There are many other examples where citizens and administrators have worked together to protect people against cell tower radiation. Those examples can be used to strengthen your ordinances to help protect against inappropriate cell tower siting.

I am currently working with my state legislators to pass legislation that would provide protections against excessive radiation exposure. The original legislation called for a 1,640-foot setback for all new cell towers; this setback is one of the recommendations made by the New Hampshire Commission, and the rationale for picking that distance is explained [here](#). The legislation is currently being revised so that it can be acted on in the next legislative session.

Wireless radiation dangers are real, and they can be significant in their impact on human health and the environment. I encourage you to do whatever is within your power to protect your constituents against it.

Sincerely,



**Kent Chamberlin, PhD**

**Professor & Chair Emeritus**

**Fulbright Distinguished Chair**