



March 5, 2025

TO:

Hon. Brett Guthrie, Chair
House Committee on Energy & Commerce

Hon. Frank Pallone, Ranking Member
House Committee on Energy & Commerce

Hon. Richard Hudson, Chair
House Subcommittee on Communications &
Technology

Hon. Doris Matsui, Ranking Member
House Subcommittee on Communications &
Technology

CC:

Hon. Ted Cruz, Chair
Senate Committee on Commerce, Science &
Transportation

Hon. Maria Cantwell, Ranking Member
Senate Committee on Commerce, Science &
Transportation

Submitted to:

Noah Jackson
House Energy & Commerce Committee Clerk
Communications & Technology Subcommittee
Noah.Jackson@mail.house.gov
United States House of Representatives
Washington DC 20510

Re: Written Testimony for the Hearing on Rural Broadband on March 5, 2025

Dear Chairs Guthrie and Hudson, Ranking Members Pallone and Matsui, and Members of the Committee,

We are a national coalition of groups advocating for the safe deployment of communications and electrical infrastructure in the U.S. Our membership, together with the members of our partners and groups supporting our coalition, includes close to one hundred fifty thousand people across the country.

Our current moment is focused on ending the scourges of chronic disease in America. **The White House’s Make America Healthy Again (MAHA) Commission on chronic disease expressly includes electromagnetic radiation as a “potential contributing cause,”** together with the American diet and corporate influence.¹ Your Committee now has an historic opportunity to address and mitigate the harms of electromagnetic radiation on Americans’ health by preserving and enhancing local rights of Americans to determine where and how they want to deploy telecommunications infrastructure, rather than setting up roadblocks for Americans by mislabeling their rights to local rule or to protect their health and safety as “red tape.” If wireless is going to be such a panacea, then why not allow the free market to sort it out?

Your Committee is at the crossroads of the convergence between broadband connectivity and health. **You can’t “Make America Healthy Again (MAHA),” without also its corollary,**

“Make America Wired Again (MAWA).”

We urge the committee throughout the 119th Congress not to pass legislation that increases wireless deployments until a) US government agencies with relevant expertise have determined safe limits for these exposures and b) Congress has restored free-market principles for wireless technology, which includes product liability for wireless exposure and local government discretion over its infrastructure. Therefore, we urge the committee to:

- Restore liability for manufacturers to allow the free market to operate
- Restore states’ rights to make decisions about their infrastructure
- Create safety limits and oversight to protect the public
- Ensure taxpayer broadband funding is spent only on futureproof wired broadband

The opportunity begins now, with this hearing on rural broadband. The monies provided under the Infrastructure Investment and Jobs Act (IIJA), providing \$42.45 billion for Broadband Equity, Access and Deployment (BEAD) are to expand high-speed internet access across the United States. BEAD monies should not be used to supplant free-market principles, squash states’ rights, jeopardize public health or waste taxpayer monies.

The majority of Americans want wired connections. Wired connections would also protect Americans, especially children, from the hazards of electromagnetic radiation as a “potential contributing cause” of chronic disease.

Former FCC Chair and former CTIA CEO Tom Wheeler, in testimony to the House Energy and Commerce Committee in March 2021, spoke disappointingly that despite approximately \$40 billion of government subsidies “over the last decade,” those subsidies “have failed to deliver the goal of

¹ Executive Order 14212, see section 4a <https://www.federalregister.gov/documents/2025/02/19/2025-02871/establishing-the-presidents-make-america-healthy-again-commission>

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.”² Let us not make the same mistake.

BEAD has been sold as a “generational” investment to bridge the digital divide once and for all.

A. BEAD monies should not be diverted to wireless, or, relatedly, to satellite deployment for the following reasons:

1. Huge waste of taxpayer funding

Billions of dollars in subsidies to wireless have not provided the promised ubiquitous service.³ Fiber infrastructure’s lifespan is fifty years (or more); wireless infrastructure’s lifespan is only 5 years making it a poor use of taxpayer subsidies.⁴ Tom Wheeler also testified in March 2021 that fiber is future proof with **wireless only as a last resort**.⁵

Wireless and wired are not functionally equivalent technologies and therefore are **not “technology neutral:”** wireless suffers from line-of-sight obstructions, slower speed, inclement weather, and lack of scalability, whereas fiber is sustainable, renewable and futureproof.⁶ A principle of the Telecom Act of 1996 is nondiscrimination among functionally equivalent services. Correlatively, treating as the same such services that are not functionally equivalent is discriminatory against services with superior service characteristics – in this case, discriminatory against wired broadband.⁷ Moreover, wireless is not futureproof.

Disposable infrastructure. Fiber infrastructure has a lifespan of at least 50 years – perhaps longer – qualifying as a generational investment. Existing BEAD rules rightfully favor fiber deployment. Wireless infrastructure however, including satellites, has a lifespan of only five years. The hundreds of thousands of satellites (including Low Earth Orbit (LEO) satellites) proposed to be

² https://democrats-energycommerce.house.gov/sites/evo-subsites/democrats-energycommerce.house.gov/files/documents/Witness%20Testimony_Wheeler_FC_2021.03.22.pdf.

³ https://democrats-energycommerce.house.gov/sites/evo-subsites/democrats-energycommerce.house.gov/files/documents/Witness%20Testimony_Wheeler_FC_2021.03.22.pdf

⁴ 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.

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

⁵ 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>

⁶ <https://www.benton.org/blog/how-fixed-wireless-technologies-compare-fiber>.

⁷ For example, see 47 USC §160, §224(e)(1), §253(c), §332(c)(7)(B)(i)(I).

launched over the coming years will eventually all fall back to earth. In fact, they are required under FCC rules to fall back to earth so as not to clutter up space with decommissioned satellites.⁸ Google tried a similarly quixotic project to float balloons over underserved countries to provide Internet service. The project was shut down after “failing to find a sustainable business model.”⁹ BEAD funding is not intended for short-lived, disposable infrastructure with a lifespan of only a few years.

Operating expenses cloaked as “deployment.” BEAD funding is intended to fund capital expenditures (capex) to build networks.¹⁰ Capital expenditure in this context is a one-time upfront expense to deploy infrastructure. The rationale for BEAD is that service providers are not investing in such capex because it would take too many years to recoup the investment. Therefore, BEAD’s purpose is not to use BEAD (capex) grants to pay for *operating expenses* (i.e. the monthly subscription cost) of satellite capacity, such as the reservation of capacity on LEO networks, i.e., reserving capacity on an already existing network. To emphasize this point: the satellite networks are **already built** and BEAD funding would be used to pay their operating costs. This is not capex. This is operating expense. There are already a number of programs that pay for individual subscribers’ broadband operating expenses on a means-tested basis, such as the Universal Service Fund and others.¹¹ Paying operating expenses for disposable infrastructure that has a five-year lifespan is a never-ending treadmill of taxpayer funding. The **cost per gigabyte over fiber will continue to decrease** while those stuck with poor quality wireless or satellite service will continue to need subsidies to pay a higher cost for lower quality service. The point of BEAD is to invest in capital expenditure with future proof infrastructure, which is faster for users, more reliable, and cheaper for taxpayers. BEAD funding should not be used for operating expenses, or reservation of capacity on satellite networks.

2. **Wireless will perpetuate the digital divide, not solve it.**

The US Government Accountability Office (GAO) stated that 5G deployment is likely to exacerbate disparities in accessing telecommunications services.¹² Testimony in Congress from January 2020 states that “5G will not solve the digital divide” and 5G service will require 5G capable cell phones,

⁸ 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>

⁹Alphabet shuts down Loon internet balloon company

<https://techcrunch.com/2021/01/21/google-alphabet-is-shutting-down-loon-internet/>

¹⁰ Infrastructure Investment and Jobs Act, §60102(f)(1)

¹¹ Red Light Report by Sen. Ted Cruz, Ranking Number, Senate Commerce Committee

<https://www.commerce.senate.gov/services/files/0B6D8C56-7DFD-440F-8BCC-F448579964A3>

¹² GAO 2020 Report “FCC Needs Comprehensive Strategic Planning to Guide Its Efforts,”

<https://www.gao.gov/products/gao-20-468> (p.3). Full report <https://www.gao.gov/assets/gao-20-468.pdf> (p.14). The GAO is the highest audit institution of the federal government. House Energy & Commerce Committee, 1/29/20 testimony <https://docs.house.gov/meetings/IF/IF16/20200129/110416/HHRG-116-IF16-Wstate-SieferA-20200129.pdf>.

which the underserved, low-income households, will likely not be able to afford.¹³ The CEO of an organization representing low-income communities states that 5G is creating the digital divide because in order to use 5G one needs a 5G phone, which is expensive and out of reach of the low-income and unserved communities it purports to serve.¹⁴

The Land of Sky Council servicing residents in Appalachia testified at the House Energy & Commerce Committee in 2023 that "[f]iber is the most scalable, reliable, long-term, future proof strategy we have," explaining that the FCC standard of 25 Mbps download / 3 Mbps upload (i.e., characteristic of wireless speeds), is not sufficient, and should be a symmetrical Gigabit speed achievable through fiber.¹⁵

3. Wireless perpetuates the cycle of obsolescence.

To generate future revenue, tech companies generally plan for, and build in, obsolescence, including for wireless services, such as 5G, to compel consumers to buy new and more expensive devices and services.¹⁶ Consumers are unable to get 3G service (voice only) because, as the FCC has announced, telecom has sunsetted 3G,¹⁷ thereby eliminating consumer choice especially if they cannot afford the next generation of wireless services and devices. To make matters worse, as to the longevity of a 5G phone, telecom carriers have been advising their customers to turn off 5G on their cell phones to save battery life on their devices.¹⁸ Wireless perpetuates the cycle of obsolescence.

4. Eliminating environmental and historic preservation reviews will be disastrous to human health and our environment

The purpose of the National Environmental Policy Act is to protect the environment and human health. It is to protect us against air pollution, and anything that destroys the environment that allows us to live productively on this planet. The NEPA requirements and regulations are in place for

¹³ House Energy & Commerce Committee, 1/29/20 testimony <https://docs.house.gov/meetings/IF/IF16/20200129/110416/HHRG-116-IF16-Wstate-SieferA-20200129.pdf>.

¹⁴ Testimony of Clayton Banks, CEO of Silicon Harlem at NYC Council Hearing, June 2023, <https://www.youtube.com/shorts/iPlG9yfeaeM>.

The National Digital Inclusion Alliance (NDIA) testified in Congress that "5G will not solve the digital divide" and 5G service will require 5G capable cell phones, which the underserved, low income households, will likely not be able to afford. Testimony of Angela Siefer, NDIA Executive Director, before the U.S. House of Representatives, Subcommittee on Communications and Technology, Committee on Energy and Commerce, Jan 29, 2020, <https://www.congress.gov/116/meeting/house/110416/witnesses/HHRG-116-IF16-Wstate-SieferA-20200129.pdf>;

video of testimony at https://givingcompass.org/nonprofit/national-digital-inclusion-alliance?gclid=CjwKCAjw67ajBhAVEiwA2g_jEMPJ3ET3xWZhbcb8BCH9_FluP4nXRSue_6oPyMDyvxO9uysvJfELRoC5XgQAvD_BwE at 2:27 and 2:50.

¹⁵ Testimony of 9/21/23, https://www.youtube.com/watch?v=ptQJ_wbtHYc&t=6029s.

¹⁶ <https://cellularnews.com/mobile-phone/planned-obsolescence/>.

¹⁷ <https://www.fcc.gov/consumers/guides/plan-ahead-phase-out-3g-cellular-networks-and-service>.

¹⁸ "Why are Carriers Telling Us to Turn Off 5G?" PC Magazine, March 5, 2021, <https://www.pcmag.com/opinions/why-are-carriers-telling-us-to-turn-off-5g>.

a reason, namely, to “assure for all people safe, healthful, productive, and aesthetically and culturally pleasing surroundings.”¹⁹ The National Historic Preservation Act’s (NHPA) stated purpose is to preserve and protect the heritage and historical resources of the U.S. from ever-growing commercial expansion,²⁰ which is what we are dealing with here regarding wireless expansion.

If Congress waters down or eliminates NEPA requirements, it will **endanger** every man, woman and child in the U.S. and subject them to a life of chronic (24/7, 365) exposure to electromagnetic radiation without relief and without legal recourse. Many in Congress may not realize the deleterious effects; e.g., a sponsor of a federal bill in the House last term that was to water down or eliminate NEPA requirements to get rid of “red tape,” did not realize that it would do away with reviews for human exposure to wireless radiation that was making constituents in his district suffer severe injuries from the wireless radiation (5G towers).

These requirements should be **rigorously enforced** regarding a technology such as wireless where no federal agency is reviewing the safety of human exposure to wireless radiation (EPA was defunded from doing so in the mid 1990s, the FCC has stated that it is not a health agency, the National Toxicology Program (NTP) has recently stated that it will no longer study the effects of exposure to electromagnetic radiation,²¹ and the NIH has redacted nearly 2500 pages of wireless radiation studies²²).

See **Addendum A** which provides a summary of the biological effects of wireless radiation.

5. Federal rules trample on states’ rights and local government on cell tower zoning and placement

- Tenth amendment issues: preempts states from regulating cell towers on the basis of radiofrequency emissions, while the federal government is not doing so.²³

¹⁹ 40 CFR 1500.1, <https://www.ecfr.gov/current/title-40/chapter-V/subchapter-A/part-1500>.

²⁰ <https://www.achp.gov/sites/default/files/2018-06/nhpa.pdf> .

²¹ <https://childrenshealthdefense.org/defender/national-toxicology-program-stop-research-cellphone-radiation-human-health/>.

²² <https://childrenshealthdefense.org/defender/nih-redact-records-wireless-radiation-studies-ntp/>.

²³ Murphy v. NCAA US 2018, https://www.supremecourt.gov/opinions/17pdf/16-476_dbfi.pdf.

- Fifth Amendment takings issues: federal preemption is a regulatory and physical taking of private property and public property in rights-of-way, and drops property values without compensation^{24,25}
- Commerce clause overreach: while one can choose to abstain from a regulated activity,²⁶ federal policy essentially commands that all Americans suffer involuntary exposure to wireless radiation from wireless infrastructure and property devaluation.²⁷

6. 5G Poses Data Privacy Risks – the “5G CyberParadox”

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.²⁸ If a hacker gains control of the 5G software managing the networks, the hacker can also control the 5G network.²⁹ 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.³⁰ The FCC recognized early on the need to address the security vulnerabilities of 5G.³¹ Former FCC Chairman and former CTIA CEO Tom

²⁴ 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/1DBTngzDuZ9lbnze58gBXsJs1jXzU5dQZx0ycFQumUk/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>.

²⁵ <https://www.emfanalysis.com/property-values-declining-cell-towers/?iframe=1&iframe=1&iframe=1>.

²⁶ *Nat’l Fed’n of Indep. Bus. v. Sebelius*, 567 U.S. 519, 553-54, 573-74 (2012).

²⁷ 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/>).

²⁸ *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>.

²⁹ *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/>.

³⁰ <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/>.

³¹ <https://docs.fcc.gov/public/attachments/DOC-343096A1.pdf>.

Wheeler points out that “5G networks are more vulnerable to cyberattacks than their predecessors.”³²

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. 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).³³ 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.”³⁴ This can also imperil national security and homeland security.

7. Wireless outages can leave consumers stranded without wireline alternatives

Any cellular network outage in areas that solely rely on cell service to make calls or to make an emergency call, will leave consumers stranded. For example, the FCC reported on an AT&T outage in February 2024 that blocked more than 92 million calls, more than 25,000 of which were 911 calls.³⁵ The FCC is also investigating “a massive data breach in which call logs and numbers of millions of [AT&T] subscribers were leaked,” pointing to the cybersecurity threat of wireless networks.³⁶

8. LEO Satellites can be destructive to human health and the environment

LEO satellites have only a 5-year lifespan. Subsequently, the satellites are directed to crash into the earth, burning up upon reentry in the atmosphere and breaking into small dust particles, spreading

³² *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/>.

³³ <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.”

³⁴ <https://www.lawfaremedia.org/article/lawfare-podcast-tom-wheeler-and-dave-simpson-making-5g-secure>.

³⁵ <https://broadbandbreakfast.com/february-at-t-outage-blocked-92-million-calls-fcc-says/>.

³⁶ <https://broadbandbreakfast.com/february-at-t-outage-blocked-92-million-calls-fcc-says/>.

toxic metals across the planet.³⁷ Mining these metals, many of which are rare earth metals for electronics, batteries, and solar panels, often occurs in unbearable conditions, under autocratic governments, and performed by child labor.³⁸ In addition, getting the satellites into space requires burning large amounts of poisonous rocket fuel, which is now present in human food.³⁹

LEO satellites should be treated as a major federal action under the National Environmental 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. A recent industry report estimated that this guidance could result in \$316 million of BEAD funding going to satellite and wireless deployments.⁴⁰ The NTIA draft guidance from the last Congress would help enable satellite and/or terrestrial deployment across millions of acres of land in the United States.⁴¹ In addition, the 10-year time horizon for satellite infrastructure contemplated in the draft guidance, means that at least 2 generations of satellites will be launched and then burned up over the atmosphere, because each satellite only has a lifespan of 5 years.⁴²

A robust literature documents the impacts on human health and the environment from radiofrequency radiation. Please see comments previously submitted to NTIA by Environmental Health Trust, which are incorporated herein by reference.⁴³

³⁷ 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.

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

³⁸ 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/>

³⁹ “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/>

⁴⁰ Satellite broadband joins the party for BEAD: What you need to know. 8/27/24

<https://www.fierce-network.com/broadband/satellite-broadband-joins-party-bead-what-you-need-know>

⁴¹ The proposed guidance meets the definition of an MFA under 40 CFR 1508.1(w) for multiple reasons, including without limitation, under subparagraph (1)(ii), by issuing an interpretation of policy, (1)(iv) as part of a concerted action that would implement satellite service, and (1)(vi) by "providing more than a minimal amount of financial assistance.. [for which NTIA] has authority to impose conditions on the receipt of the financial assistance to address environmental effects.”

⁴² <https://www.space.com/spacex-starlink-satellites.html>

⁴³ Comments submitted January 2, 2024 to NTIA, Office of Spectrum Management

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)

9. Does not, but should consider, those disabled by Electromagnetic Radiation Syndrome

A growing number of Americans suffer from Electromagnetic Radiation Syndrome (EMR-S), 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 nearly 6 years ago, found that the prevalence of those disabled by EMR-S was up to 30% of the population, with up to 1.5% being severe cases.⁴⁴ 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. Heavy-handed FCC preemption orders over the past five years have exacerbated the issue, intimidating local governments into the proliferation of cell towers in close proximity to residences across the country. **Federal bills to get rid of “red tape” are being considered that would mandate them into law.** 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.

Federal bills have made no provision for their plight, an injustice suffered by this vulnerable population, nor 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 Infrastructure Investment and Jobs Act (IIJA), which created the BEAD program, also states that “the Attorney General shall ensure that Federal policies promote equal access to robust broadband

<https://www.ntia.gov/sites/default/files/environmental-health-trust-written-input.pdf>

⁴⁴ 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

internet access service by prohibiting deployment discrimination.⁴⁵ The EMR-S disabled, and the general public, should have access to broadband that does not harm them.

Additional considerations:

Close the Wireless Loophole Legal Liability Shield

The legal loophole is the liability shield that wireless carriers have under the Telecommunications Act of 1996, Sec 704 – even if and when Americans are injured or develop chronic diseases associated with wireless infrastructure, remarkably, Americans have **no legal recourse** to protect themselves, their homes or their families. And if they try to protect themselves, their towns are sued by the wireless carriers. See **Addendum A** for the chronic disease cluster in Pittsfield, MA. The telecom carrier had **actual** notice of injuries incurred by 17 residents when its cell tower was turned on, sued the city when the Board of Health issued its findings that the cell tower was causing the residents’ injuries and that the tower should be shut down. The city buckled and the Board of Health was required to rescind its order leaving the residents no recourse but to evacuate, if they were able to do so.

Americans Denied the Right to Protect Themselves

With the push for massive wireless deployment, Americans have been denied the right to protect themselves against the hazards of RF radiation. While the FCC has preempted the field of health effects, it also has **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.

Americans’ right to protect their health and property against involuntary and non-consensual intrusion into their homes, schools and businesses, has been legally denied under federal policy. Telecom has exploited this loophole and the FCC has enabled the industry to do so. We are asking Congress to close this loophole. The current situation has placed Americans between a rock and a hard place.

- (a) The Telecommunications Act of 1996 (TCA) prohibits any legal recourse on environmental effects (or health effects, according to federal courts) of wireless facilities so long as industry operates within the FCC wireless limits for human exposure.
- (b) But those limits have not been updated since 1996 despite a federal appellate court order to review the 11,000 pages of science which the FCC ignored within the FCC’s docket showing biological effects.
- (c) “Eliminating regulatory barriers” and “streamlining regulations” has meant increasing regulations to block Americans from the ever-growing opposition by Americans to stop irresponsible wireless deployment in order to otherwise save their lives and the lives of their families;

⁴⁵ Infrastructure Investment and Jobs Act § 60506(c)
<https://www.congress.gov/117/plaws/publ58/PLAW-117publ58.pdf>

(d) Worse yet, the FCC does not even have enough personnel to monitor the emissions, as stated on its website.

There is a safe way to deploy wireless infrastructure and an unsafe way to do so; it is being done the most unsafe way, placing it in extreme proximity to where we live and work and where our children play. Not tested for safety, as confirmed by industry,⁴⁶ 5G is an experiment to which Americans have not consented. The FCC is enabling irresponsible deployment over the strenuous objections of Americans – nationwide.

While mandating involuntary and non-consensual irradiation of Americans in their homes, businesses, schools and public lands, the collateral damage has been injury, disability and death. We are hoping that you will hear our voices to stop the federal government from taking away Americans' rights to protect their homes, their families and their health.

CONGRESS SHOULD REIGN IN THE FCC TO ADHERE TO ITS PROPER JURISDICTIONAL GUARDRAILS TO ACT IN THE PUBLIC INTEREST AND “PROMOTE THE SAFETY OF LIFE AND PROPERTY”

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.”⁴⁷ The FCC has gone far afield from both. Communications infrastructure is there to serve the public interest, not industry. However, the FCC, by its action and inaction, (a) has usurped state interests, preempting more than is authorized by the TCA and breaching the guardrails of federalism; (b) has endangered “life and property,” while paying lip service to the public interest, thumbing its nose at Americans trying to protect their health and property; and (c) is captured by the very telecom industry that it is supposed to regulate.

(a) FCC Usurps State Interests, Breaching the Guardrails of Federalism

The FCC has wrongly preempted local control over wireless infrastructure deployment. FCC's jurisdiction under the TCA allows for preemption to ensure that everyone can make a telephone call and that carriers fill any gaps in service by the least intrusive means.⁴⁸ Since 5G is a new service [for machine to machine communications, and internet and data transfer services], it is not the subject of preemption under the TCA. Yet, in conflict with the TCA, the FCC issued Order 18-113 in 2018 to reinterpret the TCA to give preemption authority to carriers to provide improvements to an existing service or to offer a new service, such as 5G. This Order negated the gap in service requirement, running roughshod over local governments, with carriers misleading them by saying that their “hands are tied” and threatening them with, or bringing, lawsuits.

This breach in the FCC's jurisdictional guardrails violates TCA § 332 in general and § 332(c)(7)(A) that otherwise serves to preserve federalism and state interests. The TCA explicitly preserves federalism to balance state and federal interests, reserving general authority of state and local governments to

⁴⁶ Blumenthal

⁴⁷ 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>.

⁴⁸ See, e.g., *Sprint Spectrum L.P. v. Willoth*, 176 F.3d. 630 (2nd Cir. 1996).

regulate the siting, placement, construction and maintenance of cell towers and other wireless infrastructure in their jurisdictions.⁴⁹ The FCC has breached the guardrails of federalism.

(b) FCC Endangering Life and Property

First, the FCC has failed to update its outdated RF radiation limits dating back to 1996, thereby placing Americans at risk, despite having **actual notice** of biological effects of RF radiation in its docket. The DC Circuit Court of Appeals ruled against the FCC in 2021 on its decision not to update its limits and on its failure to review in its docket: (a) 11,000 pages of scientific, peer-reviewed, studies showing biological effects within those limits, (b) individual accounts of personal injury, and (c) long-term environmental impacts and impacts on children.⁵⁰ Rather than acting in the public interest, the FCC had to be sued for not complying with its mandate to protect life and property.

Although the court issued a remand order in 2021, the FCC has, to date, failed to comply. In conflict with the court's order, 5G infrastructure continues to be deployed despite FCC's non-compliance, with no assurance of safety. However, there is rising opposition to continued deployment until the FCC complies with the order.⁵¹

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.⁵² Yet, Americans are being exposed to these extreme RF radiation levels without legal recourse.

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, leaving Americans at risk and with no opportunity to protect themselves. The plain text of 47 USC §332(c)(7)(B)(iv) preempts zoning decisions on the placement of cell towers on the basis of environmental effects of RF radiation emissions so long as carriers operate within the FCC limits. This provision was apparently heavily lobbied by industry. The courts have expanded the FCC's preemption by incorporating health effects under "environmental effects."⁵³ That means that state and local governments are **explicitly prohibited** from protecting their residents from the hazards and biological effects of exposure to RF

⁴⁹ 47 USC § 332(c)(7)(A) at <https://www.law.cornell.edu/uscode/text/47/332>.

⁵⁰ <https://media.cadc.uscourts.gov/opinions/docs/2021/08/20-1025-1910111.pdf> .

⁵¹ E.g, Sheffield and Great Barrington, MA residents call a halt to 5G deployment until FCC complies with the 2021 court order, 5-2-23, <https://childrenshealthdefense.org/defender/5g-towers-fcc-court-order-massachusetts/>.

⁵² <https://ehtrust.org/policy/international-policy-actions-on-wireless/> .

⁵³ See, e.g., *Cellular Phone Taskforce v. F.C.C.*, 205 F.3d 82 (2d Cir. 2000) (finding that health effects are included in environmental effects and are therefore the subject of FCC preemption).

radiation, no matter how much they are injured.⁵⁴ The public is also **explicitly prohibited** from filing a private legal suit to protect themselves from those hazards.⁵⁵

A state Board of Health would be powerless to protect its residents from biological effects and adverse health impacts from RF radiation. That also means that a town cannot deny a cell tower or antenna application based on biological effects, despite overwhelming scientific evidence of hazards and despite overwhelming and incontrovertible evidence of sickness that residents are enduring from cell towers or antennas. A striking example is Pittsfield, MA. Seventeen residents became ill, reporting headaches, nausea, brain fog, atrial fibrillation and children vomiting in their beds after a cell tower was installed near their homes. The Board of Health issued a Cease and Desist Order to shut down the tower. Instead of complying, the carrier sued the town despite actual notice of extreme biological effects on the residents. Under pressure of litigation, the town rescinded the Order. Those who could evacuate did so. Of those who stayed, one has already died of cancer. (See Addendum A)

Second, the FCC has promulgated rules that do not protect public safety.

1. FCC 47 CFR 1.1306(c)(1)(i) excludes environmental review of cell towers, except for adverse aesthetic effects on historic structures. There is no exception for adverse biological effects below the FCC's limits.⁵⁶
2. FCC's OTARD rule prohibits laws, regulations, or restrictions imposed by State or local governments or private entities that impair the ability of antenna users to install, maintain, or use over-the-air reception devices.⁵⁷ There is no exception for adverse biological effects.
3. FCC's rules have taken away local control, with short shot-clocks and deemed approved provisions for cell towers. See the FCC's "Accelerating Wireless and Wireline Broadband Deployment by Removing Barriers to Infrastructure Investment" (FCC 18-133) and "Third Report and Order and Declaratory Ruling" (FCC 18-111). To counter the FCC's overreach, Rep. Chris Smith (R-NJ) introduced in the previous Congress HR 8082, Securing Local Communities Input in Broadband Development Act, to restore state and local government control over cell tower placement, by stating in the bill that those FCC orders would have

⁵⁴ A Massachusetts state court found that FCC has preempted the field of biological effects of RF radiation emissions under the TCA, meaning that a state Board of Health is powerless to protect their residents from adverse health impacts from RF radiation, <https://childrenshealthdefense.org/defender/pittsfield-verizon-cell-tower-ruling-against-residents-illness/>.

⁵⁵ Residents of Pittsfield, MA who became ill from a cell tower on their street lost a case in 2024 to shut down the tower to protect their health when the court ruled that the FCC had preempted the field under the TCA, <https://childrenshealthdefense.org/defender/pittsfield-verizon-cell-tower-ruling-against-residents-illness/>.

⁵⁶ [https://www.ecfr.gov/current/title-47/part-1/section-1.1306#p-1.1306\(c\)\(1\)\(i\)](https://www.ecfr.gov/current/title-47/part-1/section-1.1306#p-1.1306(c)(1)(i)).

⁵⁷ <https://www.federalregister.gov/documents/2021/02/25/2021-01304/fcc-modernizes-siting-rule-for-small-hub-and-relay-wireless-antennas#:~:text=The%20Commission's%20OTARD%20rule%20prohibits,%2Dthe%2Dair%20reception%20devices.>

“no force or effect.”⁵⁸ This arose from Belmar, NJ residents opposing the proposed installation of 5G towers on the boardwalks of their oceanfront community.⁵⁹

Third, it has been reported by a former FCC attorney focusing on compliance with the National Environmental Policy Act (NEPA) that the FCC (a) has failed to comply with NEPA, including with the 1978 Council of Environmental Quality (CEQ) rules on NEPA enforcement, (b) does not have the resources or personnel to comply with NEPA, (c) has historically ignored major federal actions triggering NEPA review, (d) has given overly broad and unsupported categorical exemptions from NEPA, and (e) does not exercise oversight or tracking of industry environmental assessments or mitigation.⁶⁰ The FCC has also failed “to provide adequate notice and opportunities for public comment on projects,” or “make environmental documents, such as radiofrequency (RF) emissions studies, readily accessible to the public,” or to “vigorously enforce its NEPA rules so that industry non-compliance is rampant,” and it “routinely ignores or dismisses public comments.”⁶¹ Given this litany of breaches of federal policy and federal law, the FCC is in breach of its mandate to serve the public interest.

The CEQ promulgated a final rule in 2024 that incorporates the new Fiscal Responsibility Act of 2023 that amends NEPA and applies to the FCC.⁶² The CEQ was formed under NEPA to coordinate NEPA compliance across federal agencies. The final rule will require the FCC to dedicate resources and personnel with a designated senior official and chief engagement officer and reverse course on its previous non-compliance. **Congress administration should ensure that the FCC complies with the final rule and NEPA in “promoting the safety of life and property.”**

Fourth, under 47 USC 1455 (The Spectrum Act) which strips local government’s ability to disapprove the colocation of additional wireless antennas on existing cell towers, is usurping Americans’ right to consent. The Act still requires the FCC to conduct NEPA review⁶³ which it is not doing until it complies with the CEQ final rule set forth above.

Fifth, the FCC sought to categorically exclude 5G wireless infrastructure deployment from NEPA (and the National Historic Preservation Act (NHPA)) review, until the DC Circuit Court of Appeals ruled against the FCC in 2019 striking down its categorical exemption.⁶⁴

Sixth, Americans do not want to live near cell towers. Homes near cell towers have been devalued up to 20%, as discussed further in these comments.

⁵⁸ <https://www.congress.gov/bill/118th-congress/house-bill/8082/text?s=2&r=1&q=%7B%22search%22%3A%22HR+8082%22%7D> .

⁵⁹ <https://childrenshealthdefense.org/press-release/chd-intervenes-on-behalf-of-residents-in-belmar-nj-to-fight-verizon-5g-towers-on-jersey-shore/> .

⁶⁰ <https://peer.org/commentary-what-the-fcc-must-do-to-comply-with-new-nepa-rules/> .

⁶¹ <https://peer.org/commentary-fcc-fails-follow-environmental-laws/> .

⁶² <https://www.federalregister.gov/documents/2024/05/01/2024-08792/national-environmental-policy-act-implementing-regulations-revisions-phase-2> .

⁶³ 47 U.S.C.A. § 1455 is known as The Spectrum Act of §6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, codified as 47 U.S.C.A. § 1455,

⁶⁴ Keetoowah Tribe of Cherokee Indians v. FCC (D.C. Cir 2019).

(b) FCC, Captured Agency: Safe Harbor for Industry, Not Safety for the Public

The FCC is an agency influenced and “captured” by the very industry that it is charged by law to regulate, as reported by The Center for Ethics at Harvard.⁶⁵ A former FCC NEPA attorney in the FCC’s Wireless Telecommunications Bureau recently published an article on how the FCC is a captured agency.⁶⁶ Another article on the subject of FCC capture and inaction was published by ProPublica in 2023 entitled “The FCC is Supposed to Protect the Environment. It Doesn’t.”⁶⁷

It is also alleged that FCC employees own telecom stock in the very companies that the FCC is regulating, which does not imbue confidence that the FCC is working in the public interest.⁶⁸

The FCC emission limits serve as a **safe harbor for industry** – if the industry is within those limits, **they are shielded from liability for personal injury. The industry is protected, no matter how many people are injured.** Industry has been operating under this legal loophole that must be corrected. The FCC limits are not safety limits to protect the public.⁶⁹ The TCA prohibits legal claims for environmental, and, as interpreted by federal courts, health effects, when telecom functions within the FCC limits. That places Americans between a rock and a hard place with no legal recourse for being injured from wireless infrastructure.

B. BEAD monies should be used for futureproof technology – WIRED – because:

1. Broadband Freedom of Choice: Americans prefer wired connections.

Two-thirds of Americans prefer fiber.⁷⁰

Even for remote, rural areas, in the long run, wired connections make for more affordable, sustainable, secure, reliable and safe broadband.⁷¹ 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

⁶⁵ “Captured Agency” by Norm Alster, https://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf.

⁶⁶ “Environmental Procedures at the FCC: A Case Study in Corporate Capture,” Erica Rosenberg, 12-12-22, <https://doi.org/10.1080/00139157.2022.2131190>.

⁶⁷ See, e.g., “The FCC is Supposed to Protect the Environment. It Doesn’t.” ProPublica, May 2023, <https://www.propublica.org/article/fcc-environment-cell-towers-failures?emci=9360893b-ebe8-ed11-8e8b-00224832eb73&emdi=8448fcc6-f1e8-ed11-8e8b-00224832eb73&ceid=8208674>.

⁶⁸ <https://arstechnica.com/tech-policy/2023/03/fcc-let-employees-own-stock-in-comcast-and-other-top-isps-watchdog-says/?comments=1&comments-page=1>; see also, 47 USC 154.

⁶⁹ “How the FCC Shields Companies from Safety Concerns,” ProPublica, Nov 2022, https://www.propublica.org/article/fcc-5g-wireless-safety-cellphones-risk?utm_source=sailthru&utm_medium=email&utm_campaign=dailynewsletter&utm_content=feature.

⁷⁰ <https://www.fibre-systems.com/article/fiber-connect-2023-two-thirds-us-consumers-prefer-fibre?iframe=1>.

⁷¹ <https://www.benton.org/blog/how-fixed-wireless-technologies-compare-fiber?iframe=1>.

service to hundreds of thousands of households to small towns connecting a few local businesses.”⁷² It's reported that there are at least 400 municipal networks serving more than 700 communities, more than 200 of such communities “are served by a publicly owned network which blankets the entire city with fiber infrastructure.”⁷³

However, there are states with preemption laws that prohibit municipal networks, and **those bans should be lifted with federal legislation that will allow each community to determine the best free-market solution.**

The Fiber Broadband Association (FBA), the largest fiber optics trade association in the U.S., has shown that consumers prefer the higher upload and download symmetrical speeds that fiber provides (which wireless cannot provide).⁷⁴ The FBA also shows in its report, **“The Market Has Spoken, If it’s not fiber, it’s not broadband,”** that 2/3 of people polled prefer the superior technology of fiber.⁷⁵ E.g., in Los Angeles, a low-income community’s digital divide didn’t get solved until they got fiber.⁷⁶

Note that when the Affordable Connectivity Program (ACP) ended in 2024, ACP subscribers disconnected most of their wireless services, but maintained most of their wireline services – “wireline services retained 90% of ACP subscribers, while wireless [including satellite] face 70-80% losses.”⁷⁷

2. Superior features of wired connectivity which is lacking in wireless

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 and helps decrease greenhouse gas emissions.”⁷⁸ Fiber optics has “[l]ower energy consumption, reduced waste and sustainable architecture, characteristics that make fiber infrastructure an environmentally advantageous choice.”⁷⁹

⁷² <https://communitynets.org/content/community-network-map>.

⁷³ <https://communitynets.org/content/community-network-map>.

⁷⁴ <https://s3.amazonaws.com/files.fiberbroadband.org/download/3555.4237?AWSAccessKeyId=AKIAIZGD7FMLIYLBNIA&Expires=1650065068&Signature=CfFGHmOkZaAovAfuGmXXs2hDpKo%3D>.

⁷⁵ https://5217051.fs1.hubspotusercontent-na1.net/hubfs/5217051/Events/IQGeo%20Meetup%202022%20-%20Denver/Meetup%20Day%201%20presentations/2_FBA%20Keynote_The_market_has_spoken_IQGeo_Meetup_2022.pdf?hsCtaTracking=72374350-4b3e-455a-b8ed-031e09618cd7%7Ced1704fb-9b86-4c4b-a0a6-7f7d6b47b5de

⁷⁶ https://thenationalcall.org/wp-content/uploads/2024/03/fires_telecom-fed-wireless-bills_R13r.pdf, p. 7.

⁷⁷ <https://broadbandbreakfast.com/acp-fallout-wireline-retains-most-wireless-and-satellite-face-major-losses/>.

⁷⁸ Fiber Optic Broadband, A Greener Internet Solution, <https://www.otelco.com/a-greener-internet-solution/>.

⁷⁹ <https://www.cablinginstall.com/cable/fiber/article/16465844/how-fiber-can-help-make-your-network-greener>.

FTTP provides the best capacity for remote learning for children and students and more reliable access to medical and other services for the elderly and disabled during emergencies or severe weather when wireless service is more likely to be interrupted.

Fiber optics is scalable at symmetrical upload and download speeds and the capacity of a fiber network can go quantum, as Chattanooga, TN's municipal fiber network is now implementing its quantum capacity.

In light of the enormous advantage fiber provides over wireless, the recommendations provided in the policy paper "Reinventing Wires: The Future of Landlines and Networks" of the National Institute for Science, Law and Public Policy (NISLAPP) should be followed. The former President of Microsoft Canada, Frank Clegg, calls the paper "a reasonable voice for our turbulent world."⁸⁰

"Reinventing Wires" explains that the public needs publicly-owned and controlled wired infrastructure that is inherently more future-proof, more reliable, more sustainable, more energy efficient, safer, and more essential to many other services. 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.

NISLAPP recommends preserving, renewing, or expanding the use of existing (or new) copper wiring (and rights-of-way), with a policy of resorting to wireless access only at endpoints, **primarily for things that move**, or in situations where wiring is not possible or practical—but not relying on wireless for basic access.

In sum, wireless is a complement to, but not an adequate substitute for, fiber-fed service.

3. Wired is more economically sustainable for communities

Fiber can also be an economic boon,⁸¹ 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.⁸² Chattanooga's city-owned utility, EPB, can be viewed in a town hall discussing their

⁸⁰"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>.

⁸¹ *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>.

⁸² "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

successes and future plans for quantum connectivity, only possible with their fiber optics infrastructure.⁸³

With this economic boom, 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. If Chattanooga can achieve these successes, why can't any other city in the U.S. reap similar successes with a similar municipal fiber optics infrastructure?

A study calculated the estimated realized economic value of fiber optic infrastructure in Hamilton County and the city of Chattanooga, over about a 10-year period from 2011 to March 2020:⁸⁴

“... the economic value of the fiber optic infrastructure, i.e. high-speed broadband and the smart grid, minimally exceeds \$2.69 billion and 9,516 jobs over the study period. The value exceeds the costs of the project by over \$2.20 billion, or by a factor of 4.42. Roughly 40 percent of all jobs created in Hamilton County in the study period can be attributed to the fiber infrastructure. Approximately 52 percent of the value of the infrastructure is manifested in local economic development, i.e. over \$1.4 billion in new investments, startup funding, real estate development and payments-in-lieu of taxes.”⁸⁵

“Each county resident is estimated to have benefited by about \$646 per year due to the incremental value generated by the fiber optic infrastructure.”⁸⁶

Chattanooga, August 31, 2020,

https://www.researchgate.net/publication/352221978_Ten_Years_of_Fiber_Optic_and_Smart_Grid_Infrastructure_in_Hamilton_County_Tennessee;

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/>.

⁸³ Town Hall: “*Gig City Goes Quantum: the Amazing Chattanooga, TN Fiber Network Success Story! A Broadband Blueprint for NYC and for Cities across the U.S.*,” July 19, 2023, featuring Gary Bolton, President of the Fiber Broadband Association, Katie Espeseth, VP New Products, EPB, and Clayton Banks, CEO, Silicon Harlem, <https://thenationalcall.org/resources/>.

⁸⁴ Ten Years of Fiber Optic and Grind Infrastructure in Hamilton County, Tennessee, Bento Lobo, Univ of TN at Chattanooga, Aug. 2020, https://www.researchgate.net/publication/352221978_Ten_Years_of_Fiber_Optic_and_Smart_Grid_Infrastructure_in_Hamilton_County_Tennessee.

⁸⁵ Id.

⁸⁶ Id.

These successes were achieved because the city realized the economic advantages of fiber optics infrastructure and owning its broadband, referred to as municipal broadband.⁸⁷ The successes of Chattoona's fiber optics deployment were reported as far back as 2014.⁸⁸

Another example of digital equity and inclusion which also reaped substantial long term cost savings using fiber broadband is Chanute, KS which "operates a 10 Gbps fiber-optic broadband ring."⁸⁹ This fiber network "connects schools and other community anchor institutions with gigabit networks ... The network generates \$600,000 per year for Chanute's Electric Utility ... This ... has demonstrated that communities can meet their own telecommunications needs with smart public investments — they did not wait for national corporations to solve their problems."⁹⁰ **City Manager J.D. Lester refers to municipal broadband as 'the great equalizer for Rural America' ...**⁹¹

An example of a rural area which achieved access, digital equity and digital inclusion is **rural eastern Kentucky**. Peoples Rural Telephone Cooperative (PRTC) completed a 100% all fiber-to-the-premises buildout in 2014, a Gigabit-capable Internet available to every home and business in the counties of Jackson and Owsley, Kentucky.⁹²

Fiber is being used to bridge the digital divide. Pharr, TX previously known as one of the worst connected cities for broadband decided in 2022 to build fiber to the home (FTTH) municipal broadband with a service goal of 1 Gbps.⁹³ The city found that FTTH was the best solution to bridge the digital divide as most carriers bypassed the city whose residents average a low income. FTTH would give children the ability to do their homework at home rather than seeking connectivity after school at the campus doorstep.

Fiber can provide an opportunity for municipal income streams. Medina County, OH and Fairlawn, OH are part of a statewide coalition of legislators promoting municipal fiber broadband, opposing state efforts to otherwise prevent municipal broadband or fiber access.⁹⁴ Medina County is

⁸⁷ "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/>.

⁸⁸ "Fast Internet is Chattanooga's New Locomotive," New York Times, February 3, 2014, <https://www.nytimes.com/2014/02/04/technology/fast-internet-service-speeds-business-development-in-chattanooga.html#:~:text=Steve%20Clark%2C%20a%20senior%20vice,at%20one%20gigabit%20per%20second.>

⁸⁹ In Kansas, Rural Chanute Built Its Own Gigabit Fiber and Wireless Network," Christopher Mitchell 10-2-21, <https://ilsr.org/chanute-rural-gigabit/>.

⁹⁰ Id.

⁹¹ Id.

⁹² <https://www.soar-ky.org/prtc/>.

⁹³ <https://www.bbcmag.com/economic-development/pharr-texas-takes-diy-approach-to-build-gigabit-fiber.>

⁹⁴ Medina County joins statewide public broadband advocacy group, <https://medina-gazette.com/news/290521/medina-county-joins-statewide-public-broadband-advocacy-board-fiber-construction-hits-spag-in-montville/>.

providing fiber open access meaning that the county owns the fiber and leases it out to businesses. Fairlawn is offering FTTH at up to 10 Gbps and 180 Gbps for businesses.⁹⁵

Utopia Fiber is a group of Utah cities working together and who have chosen to bring fiber optics to the premises in their communities.⁹⁶ They go by the tag line: **FAST FIBER INTERNET: Chosen by YOUtah!**⁹⁷

Additional background

Rationale

Since 2021, the FCC has ignored the US Court of Appeals DC Circuit order, issued in the successful lawsuit *Environmental Health Trust et al. v. FCC*, to provide an explanation for why the FCC decided not to update its human exposure limits for wireless radiation.⁹⁸ The FCC has not considered the latest science since 1996, as it is obligated to do under the law. Legislation that promotes further wireless deployments while the FCC fails to update its exposure limits puts all Americans at risk and is harming millions of Americans.⁹⁹

Current wireless exposure standards are based largely on 11 monkeys and 12 rats, which were exposed for less than one hour, over 40 years ago.¹⁰⁰ GAO first recommended that the FCC revisit these limits back in 2012 and the FCC has not yet done so.¹⁰¹

Complying with laws passed by Congress and a court order is not optional for the FCC – this is an administrative agency acting with impunity while 100% of its budget is paid for by the industry it is supposed to be regulating.¹⁰²

Making spectrum available for commercial use automatically triggers heavy-handed preemption of states' rights over wireless facilities, known as Section 6409.¹⁰³ In fact, as soon as more spectrum is made available, carriers across the country can add almost unlimited additional antenna and additional power output on their existing facilities to emit radiofrequency radiation using the new

⁹⁵ Local Leaders Launch Broadband Access Ohio to advocate municipal broadband services, <https://ohiocapitaljournal.com/2022/02/17/local-leaders-launch-broadband-access-ohio-to-advocate-for-municipal-broadband-services/>.

⁹⁶ <https://www.utopiafiber.com/>.

⁹⁷ <https://www.utopiafiber.com/>.

⁹⁸ <https://media.cadc.uscourts.gov/opinions/docs/2021/08/20-1025-1910111.pdf>

⁹⁹ <https://thenationalcall.org/wp-content/uploads/2024/05/Congressional-Briefing-5-19-24-FINAL.pdf>

¹⁰⁰ <https://doi.org/10.1186/s12940-022-00900-9>

¹⁰¹ Exposure and Testing Requirements for Mobile Phones Should Be Reassessed, GAO-12-771, Jul 24, 2012 <https://www.gao.gov/products/gao-12-771>

¹⁰² <https://docs.fcc.gov/public/attachments/DOC-401129A1.pdf>

¹⁰³ Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112–96, 47 USC 1455 (a).states:

“a State or local government may not deny, and shall approve, any eligible facilities request”

spectrum – despite no US government agency assessing these emissions for safety.¹⁰⁴ Hundreds of localities around the country have sued the FCC over its rules implementing section 6409.¹⁰⁵

Conclusion

Communities are in the **best position** to decide for themselves what is the best internet connectivity for them. Therefore, there should be **no federal legislation** that will “accelerate” wireless deployment or do away with “red tape.” Those are **euphemisms** for taking away local communities’ rights to determine how best to connect to the internet.

Respectfully Submitted,



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¹⁰⁴ Testimony submitted to Senate Commerce Committee, February 19, 2025

https://ehtrust.org/wp-content/uploads/EHT-Testimony-to-Senate-Commerce-Committee-2-19-2025_Final-1.pdf

¹⁰⁵ See, e.g., *Montgomery County et al. v. FCC* (Fourth Circuit, No. 15-1240, 2015)

T-Mobile v. San Francisco 658 F. Supp. 3d 773 (N.D. Cal. 2023)

League of California Cities et al. v. FCC (Ninth Circuit, No. 20-71765, 2024)

ADDENDUM A: 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 Int'l Agency on Research on Cancer (IARC) of the World Health Organization in 2011 (classifying wireless radiation as a Class 2B carcinogen), 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), Rippon, 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

March 3, 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.”¹⁰⁶

~ 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-thermal radiation) is **biologically active producing biological effects and potentially hazardous to human health**.¹⁰⁷ 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

¹⁰⁶ <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, 2nd “Whereas” clause, paragraph #1.

¹⁰⁷ 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.

Working Group, chaired by the FDA, and including EPA, OSHA, NIOSH, CDC, FCC, and NIH.¹⁰⁸

b) Abruptly after these findings, the EPA was defunded from doing any further research on the biological effects of wireless radiation.¹⁰⁹

2. **Industry Commissioned Study Finds Biological Effects.** A study in 2000 commissioned by T-Mobile Deutsche Telekom 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.¹¹⁰
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.¹¹¹
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.¹¹²
5. **RF Radiation is a Pollutant.** The telecom industry characterizes RF radiation as a pollutant in their device protection plans and disclaim insurance liability.¹¹³

¹⁰⁸ Ibid.

¹⁰⁹ Overpowered, What Science Tells Us About the Dangers of Cell Phones and Other WiFi-Age Devices, Martin Blank, PhD, 2014 at 110-112.

¹¹⁰ T-Mobile 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>.

¹¹¹ Swisscom patent, 2004 at <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/Orfwys743dgeqpifwu3ua/Manufacturer-own-patents-to-cut-radiation-RCR-Wireless-News.pdf?rlkey=e5hm46nyp9an6ugu4y005ldm3&st=xr7ocreh&dl=0>.

¹¹² 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.

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>.

¹¹³ 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>.

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.¹¹⁴
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."¹¹⁵
8. **"Why Tech Leaders Don't Let Their Kids Use Tech."**¹¹⁶ 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 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."¹¹⁷

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

1. **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).¹¹⁸ NTP found malignant heart schwannomas and malignant brain gliomas.¹¹⁹ 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

¹¹⁴ <https://ehtrust.org/key-issues/electromagnetic-field-insurance-policy-exclusions/>.

¹¹⁵ <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/>.

¹¹⁶ "Why Tech Leaders Don't Let Their Kids Use Tech," <https://kidzu.co/health-wellbeing/why-tech-leaders-dont-let-their-kids-use-tech/>.

¹¹⁷ Ibid.

¹¹⁸ See letter of Dr. Birnbaum, former NIH and NTP Director, and hyperlinked amicus brief <https://www.dropbox.com/scl/fi/nc7l00p8zrk8tj0l2a1yr/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/>.

¹¹⁹ <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>.

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.”¹²⁰

- 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.”¹²¹
“Overall, the NTP findings demonstrate the potential for RFR **to cause cancer in humans.**”¹²² [Emphasis added.]

2. 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.¹²³ The FCC averages exposure levels over 30 minutes,¹²⁴ 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.¹²⁵

¹²⁰ 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.

¹²¹ 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.

¹²² *Ibid*, 11.

¹²³ 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).

¹²⁴ 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-1/section-1.1307#p-1.1307\(b\)](https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-1/section-1.1307#p-1.1307(b)).

¹²⁵ 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 μs in (46)], and peak power densities of 102 to 105 mW/cm² 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>.

- 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.¹²⁶ The FCC has not yet complied.
3. **A U.S. Naval Medical Academy Research** report from 1971 by Dr. Zory Glaser¹²⁷ linked 23 chronic diseases to RF radiation based on over 2300 studies.¹²⁸ A Feb 2025 report correlates Dr. Glaser’s findings from 1971 of biological effects of RF radiation and millimeter wave (5) technology to reported cases of chronic disease.¹²⁹ 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.¹³⁰ In 1976, Dr. Glaser updated the total bibliography to 3700 reports relating to the biological effects of RF radiation.¹³¹
4. **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.¹³²
- a) The study coins the term “**radiowave disease**” to describe these effects.¹³³ 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

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."

¹²⁶ <https://media.cadc.uscourts.gov/opinions/docs/2021/08/20-1025-1910111.pdf>

¹²⁷ About Dr. Zory Glaser, <https://zoryglaser.com/>.

¹²⁸ https://www.magdahavas.com/wp-content/uploads/2010/06/Navy_Radiowave_Brief.pdf.

¹²⁹ 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_at_12-13.

¹³⁰ Ibid at 3.

¹³¹ <https://ehtrust.org/wp-content/uploads/Naval-MRI-Glaser-Report-1976.pdf>.

¹³² <https://mdsafetech.org/wp-content/uploads/2019/02/biological-effects-of-millimeter-wavelengths.-zalyubovskaya-declassif-by-cia-1977-biol-eff-mm-waves.pdf>.

¹³³ Ibid at 57.

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.¹³⁴
- 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.”¹³⁵
- d) The degree of adverse effects **increased with more exposure**;¹³⁶ the lab animals had been exposed for 15 minutes a day for 60 days. When exposure ceases, apparently disorders from low millimeter radio waves are reversible.¹³⁷ 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.

5. **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,¹³⁸ despite the fact that non-thermal exposure produces biological effects and disease.

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

1. **The World Health Organization’s (WHO) International Agency for Research on Cancer (IARC)** classified wireless radiation (2G and 3G) as a **Class 2B possible human carcinogen** in 2011,¹³⁹ (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.”¹⁴⁰
 - a. “[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,”¹⁴¹ i.e., did not heat tissue.
 - b. Since the WHO 2011 IARC cancer finding by independent scientists, other factions within the WHO have sought to produce industry-aligned pronouncements. For

¹³⁴ Ibid at 60.

¹³⁵ Ibid at 59.

¹³⁶ Ibid at 59.

¹³⁷ Ibid at 58.

¹³⁸ <https://ehtrust.org/timeline-of-development-of-safety-limits-for-wireless-radiation-in-us/>.

¹³⁹ https://www.iarc.who.int/wp-content/uploads/2018/07/pr208_E.pdf.

¹⁴⁰ 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}.

¹⁴¹ 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}.

example, its website states a lack of causality of harm from wireless radiation¹⁴². 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).¹⁴³ 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.”¹⁴⁴

- i. The WHO recently commissioned a study by Karpidis, et al, which concluded in 2024 no hazards from wireless radiation,¹⁴⁵ however, the study has been found to be severely flawed with no scientifically valid assessment,¹⁴⁶ and its conclusion contradicted scientific evidence and was drawn from data showing hazards.¹⁴⁷ Researchers have called for a retraction of the study.¹⁴⁸

¹⁴² <https://www.who.int/news-room/questions-and-answers/item/radiation-5g-mobile-networks-and-health>.

¹⁴³ 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>

¹⁴⁴ 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.

¹⁴⁵ 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.

¹⁴⁶ 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>)

¹⁴⁷ "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=o77i19den485rdo2k4ktdzhgi&st=842p0rbv&dl=0.

¹⁴⁸ 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>.

- ii. Potential conflict of interest: note that the Karpidis study was done by the WHO's EMF Project, not by the IARC, the latter being an advisory group consisting of 29 scientists from 18 countries.¹⁴⁹
 - iii. 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.¹⁵⁰ Researchers have called for a retraction of the study.¹⁵¹
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.¹⁵²

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 increased DNA damage]¹⁵³ and genotoxicity [associated with increased DNA damage]¹⁵⁴. Therefore, the IARC Category should be upgraded from Group 2B to Group 1, a human carcinogen¹⁵⁵." ¹⁵⁶ [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."¹⁵⁷

¹⁴⁹ Health risks from radiofrequency radiation, including 5G, should be assessed by experts with no conflicts of interest, Lennart Hardell, Michael Carlberg. *Oncol Lett.* 2020 Jul 15;20(4):15. doi: 10.3892/ol.2020.11876.

¹⁵⁰ 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>.

¹⁵¹ Ibid.

¹⁵² <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}.

¹⁵³ 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.

¹⁵⁴ 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.

¹⁵⁵ 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.

¹⁵⁶ 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.

¹⁵⁷ *EnvironHealth* 21, 92 (2022). <https://doi.org/10.1186/s12940-022-00900-9>.

- 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 . . . ”¹⁵⁸
4. **New Hampshire Commission** studied the biological effects of wireless radiation and issued a report Nov. 2020¹⁵⁹ 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. Chamberlain’s letter explaining their findings).
5. **Thousands of scientific and medical studies** show neurological disorders; 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.¹⁶⁰
6. **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.¹⁶¹ The significance of these reports is that non-ionizing radiation¹⁶² from 5G — well below levels allowed by authorities — can cause health problems in individuals who had no prior history of electromagnetic sensitivity.¹⁶³ Dr. Lennart Hardell, lead

¹⁵⁸ Ibid.

¹⁵⁹ <https://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>.

¹⁶⁰ 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/>.

¹⁶¹ <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 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-v10-1926.pdf?fbclid=IwAR2J-mE3XeBxqaXPQdFxsIf9Q23bMCer9vgUBHnCvJXBrgBv-w7YdRUDwF0>; see also, “The microwave syndrome or electro-hypersensitivity: historical background,” <https://pubmed.ncbi.nlm.nih.gov/26556835/>.

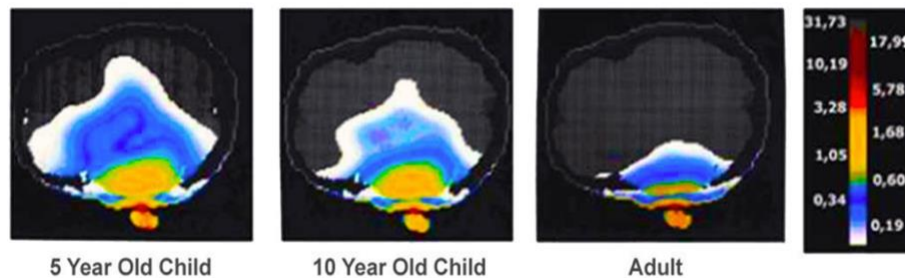
¹⁶² <https://childrenshealthdefense.org/emr/emf-key-terms-descriptions/>.

¹⁶³ <https://childrenshealthdefense.org/emr/emf-wireless-health-impacts/>.

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.”¹⁶⁴

7. **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.¹⁶⁵ Based on a population of 332.4 million people in the U.S.,¹⁶⁶ 120 million have symptoms, 2% of which (7 million) have severe symptoms or can’t work.
8. **Children absorb more RF radiation and are at greater risk than adults.**¹⁶⁷
 - a. **From cell phones:**¹⁶⁸

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](#)

¹⁶⁴ <https://www.stralskyddsstiftelsen.se/two-studies-show-that-5g-caused-the-microwave-syndrome-in-healthy-persons/>.

¹⁶⁵ "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>.

¹⁶⁶ <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>.

¹⁶⁷ 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/>.

¹⁶⁸ 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/>.

- 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.¹⁶⁹
- c. **Greater risk for fetuses:** risk of “degeneration of the protective myelin sheath that surrounds brain neurons.”¹⁷⁰
- d. **School-age children:** risk of “[d]igital dementia.”¹⁷¹
- e. **Childhood leukemia,** increased risk.¹⁷²
- f. **Potential dangers of cell towers near schools.**¹⁷³
 - 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.¹⁷⁴
 - 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.¹⁷⁵

¹⁶⁹ *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/>.

¹⁷⁰ *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>.

¹⁷¹ *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>.

¹⁷² *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.

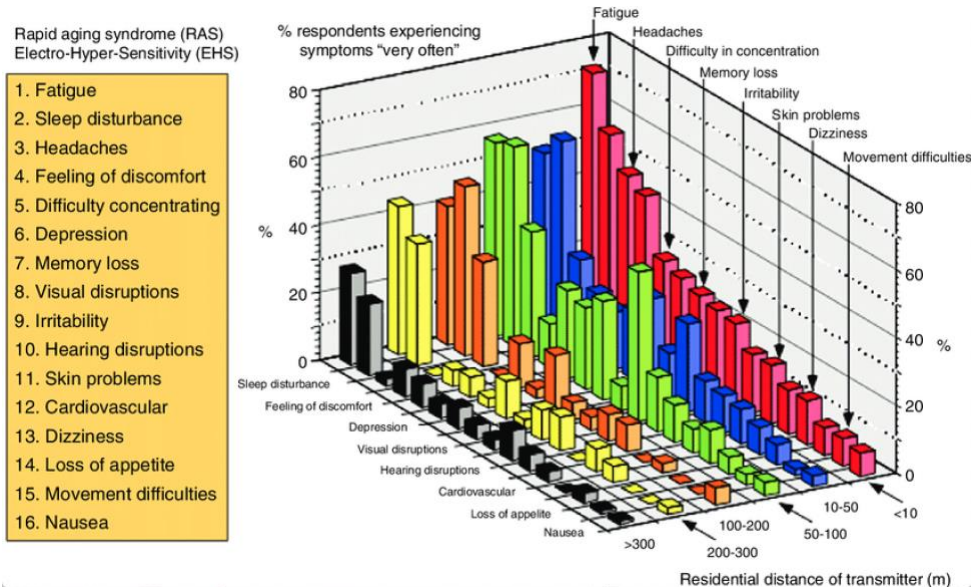
¹⁷³ Dr. Magda Havas: WiFi in Schools is Safe. True or False? <https://www.youtube.com/watch?v=6v75sKAUFdc>.

¹⁷⁴ *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.

¹⁷⁵ 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.¹⁷⁶

9. **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.¹⁷⁷



Symptoms experienced by people near cellular phone base stations; RF radiation affects the blood, heart and autonomic nervous system.¹⁷⁸ Source: Santini, et al (France): *Pathol Biol.* 2002;50:S369-73; Dr. Magda Havas, PhD.

10. **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, digestive disturbance, tremor, cardiac irregularities, adverse impacts on the neural, circulatory, immune,

¹⁷⁶ Child With Heart Problems From Wireless: 5G Health Risks California SB 649 Hearing, https://www.youtube.com/watch?v=OgNLR9fQOX4&list=PLT6DbkXhTGoDakSqp1i_7milpwGx4xMFq.

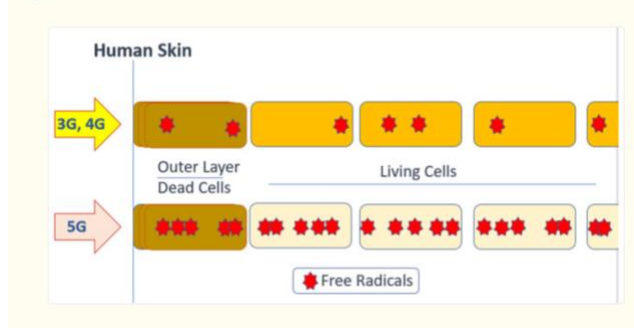
¹⁷⁷ *Cell Tower Health Effects*, Physicians for Safe Technology, <https://midsafetech.org/cell-tower-health-effects/>.

¹⁷⁸ Dr. Magda Havas, https://www.researchgate.net/figure/Symptoms-experienced-by-people-near-cellular-phone-base-stations-based-on-the-work-of_fig2_258313941.

endocrine, and skeletal systems” and “from this perspective, **RF is a highly pervasive cause of disease.**”¹⁷⁹

11. **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.¹⁸⁰ 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.”¹⁸¹ 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.¹⁸²

Figure 1.



12. **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.¹⁸³

¹⁷⁹ 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>.

¹⁸⁰ 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>.

¹⁸¹ 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>.

¹⁸² 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.

¹⁸³ “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

13. **“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.¹⁸⁴ Other scientists have joined in consensus statements.¹⁸⁵
14. **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.¹⁸⁶
15. **Increases in brain cancer** in the U.S. have been reported, with scientists attributing a high probability on RF radiation from cell phone use.¹⁸⁷
16. **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.

Chronic Disease and Clusters Near Cell Towers:

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.¹⁸⁸
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.¹⁸⁹ 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

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/>.

¹⁸⁴ <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/>.

¹⁸⁵ <https://phiremedical.org/wp-content/uploads/2020/11/2020-Non-Ionising-Radiation-Consensus-Statement.pdf>.

¹⁸⁶ <https://www.iaff.org/cell-tower-radiation/>.

¹⁸⁷ 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/>.

¹⁸⁸ <https://childrenshealthdefense.org/defender/marcia-haller-cell-tower-rf-radiation-sickness/>.

¹⁸⁹ <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.

a bucket next to her bed in case she needs to throw up.”¹⁹⁰ 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 Rippon, 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.¹⁹¹ One of the children who contracted brain cancer (glioblastoma) when he was 10 years died in Aug 2024.¹⁹² Since the tower was removed, it was reported that there were no more instances of cancer at the school.¹⁹³
- 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.¹⁹⁴

¹⁹⁰ <https://ehtrust.org/family-injured-by-cell-tower-radiation-in-pittsfield-massachusetts/>.

¹⁹¹ See beginning of video at https://www.youtube.com/watch?v=-9TMTexPb_0&t=128s .

¹⁹² 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>.

¹⁹³ See beginning of video at https://www.youtube.com/watch?v=-9TMTexPb_0&t=128s .

¹⁹⁴ <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
Hon. Rene Hill, Chair of the Transportation Committee
Ms. Yvonne Reddick, District Manager
90-28 161st 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