



December 15, 2025

TO:

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

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

Hon. Deb Fischer, Chair
Senate Subcommittee on Telecommunications
& Media

Hon. Ben Ray Luján, Ranking Member
Senate Subcommittee on Telecommunications
& Media

CC:

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

Submitted to:

Senate Commerce, Science, & Transportation Committee
Subcommittee on Telecommunications & Media
Docs_commerce@commerce.senate.gov

Re: Full Committee hearing on FCC oversight, December 17, 2025

Dear Chair Cruz, Ranking Member Cantwell, and Members of the Committee,

We are writing with regard to the FCC oversight hearing to be held on December 17.¹

We are a national coalition, with a reach across all parts of the country. Together with our coalition partner groups, we have a reach of approximately 2 million people. We advocate for the safe deployment of broadband technology.

We urge all members of the committee to ask the FCC commissioners the following questions:

- 1. What is the status of FCC complying with a court order issued by the US Court of Appeals for the DC Circuit in 2021² to provide a reasoned explanation for retaining its 1996 limits for human exposure to radiofrequency (cell tower radiation)?**
 - a. What steps has the FCC taken to comply with the court order? (See page 6 below for description of the court order, which found that the FCC had ignored record evidence and failed to comply with its statutory obligations issued by Congress)
 - b. What dollar amount in the FCC's budget request is allocated for complying with the DC Circuit order?
 - c. When does the FCC expect to comply with and satisfy the requirements contained in the court's mandate?
2. The FCC notice of proposed rulemaking (docket 25-276)³ would preempt state and local government discretion over the placement of wireless facilities,⁴ essentially mandating increased wireless radiation exposure upon Americans without their consent, without liability for injuries, and without any determination of safety from these exposures. **Will FCC halt this rulemaking until it has updated its exposure regulations for wireless radiation to protect the public?**
3. **Why hasn't the FCC begun a rulemaking based on the latest science⁵ to update its human radiofrequency exposure guidelines?** An up-to-date review would help reassure

¹ <https://www.commerce.senate.gov/2025/12/chairman-cruz-announces-fcc-hearing>

² <https://media.cadc.uscourts.gov/opinions/docs/2021/08/20-1025-1910111.pdf>

³ Notice of Proposed Rulemaking, WT Docket 25-276, FCC 25-67. Adopted September 30, 2025
<https://www.fcc.gov/document/fcc-aims-accelerate-wireless-infrastructure-buildout-0>

⁴ <https://ehsciences.org/fcc-fast-track-cell-towers-25-276/>

⁵ See FCC Docket 13-84 on human exposure to RF scientific submissions

[https://www.fcc.gov/ecfs/search/search-filings/results?q=\(proceedings.name:\(%2213-84%22\)\)](https://www.fcc.gov/ecfs/search/search-filings/results?q=(proceedings.name:(%2213-84%22)))

the public that the technology the FCC is rolling out (by expanding its power of preemption over local zoning authority) is safe for children, families, wildlife and the environment?

Current wireless exposure guidelines are largely based on the results of studies performed over 40 years ago of just 11 monkeys and 12 rats, which were exposed for less than one hour.⁶ GAO first recommended that the FCC revisit these limits back in 2012⁷ and the FCC has not yet done so.

4. **Why is there no measuring and monitoring of ambient cell tower RF levels nationwide?** Many other countries have publicly posted cell tower radiation measurement data⁸ but the US has no RF measurement program, nor any public information on ambient levels.⁹

Proposed legislative text

Instead of the ill-conceived 25-276 rulemaking and the even worse HR 2289¹⁰ passed this month in the U.S. House, we urge the Committee to adopt the legislative text set out below. **We also urge all members to cosponsor this text as an amendment to the NDAA of 2026.**¹¹

Incentivize FCC compliance with Congressional mandates

⁶ International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF), (2022). [Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G.](https://ehjournal.biomedcentral.com/articles/10.1186/s12940-022-00900-9) Environ Health. Oct 18;21(1):92. <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-022-00900-9>

⁷ Exposure and Testing Requirements for Mobile Phones Should Be Reassessed. US GAO, 2012 <https://www.gao.gov/products/gao-12-771>

⁸ Countries with RF limits more stringent than the USA and strict oversight programs <https://ehtrust.org/u-s-government-regulations-on-cell-tower-radiation/>

⁹ Decades ago, the US EPA and FCC measured RF levels in various cities across the country. However the last report on such measurements was issued [by the EPA in 1986](#) in a report entitled “Radiofrequency Radiation Environment Environmental Exposure Levels And RF Radiation Emitting Sources” <http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2000ECTQ.txt>

¹⁰ HR 2289: American Broadband Deployment Act of 2025 https://d1dth6e84htgma.cloudfront.net/H_R_2289_American_Broadband_Deployment_Act_of_2025_825ab0e396.pdf

¹¹ <https://www.congress.gov/bill/119th-congress/senate-bill/2296>

The One Big Beautiful Bill Act (Public Law 119-21) is hereby amended by inserting the following text at the end of Section 40002:

Notwithstanding anything to the contrary in Act, this section 40002 shall have no force or effect and shall not go into effect until the FCC complies with, and satisfies the requirements contained in, the mandate issued October 5, 2021 by the U.S. Court of Appeals D.C. Circuit in case number 20-1025. Such compliance shall consider, without limitation, input from other federal agencies with relevant expertise and materials submitted at any time prior to [the enactment date of this amendment] in FCC Dockets 13-84, 03-137, and 19-226.

The Spectrum and Secure Technology and Innovation Act of 2024 (Public Law 118-159) is hereby amended as follows: by inserting the following text at the end of section 5403:

Notwithstanding anything to the contrary in this Act, subsections (a) and (b) of this section shall have no force or effect and shall not go into effect until the FCC complies with, and satisfies the requirements contained in, the mandate issued October 5, 2021 by the U.S. Court of Appeals D.C. Circuit in case number 20-1025. Such compliance shall consider, without limitation, input from other federal agencies with relevant expertise and materials submitted at any time prior to [the enactment date of this amendment] in FCC Dockets 13-84, 03-137, and 19-226.

Rationale:

Spectrum auction authority was inserted into the One Big Beautiful Bill Act (Public Law 119-21) and the “Spectrum and Secure Technology and Innovation Act of 2024” (Public Law 118-159), which was inserted in the National Defense Authorization Act (NDAA) of 2025 (HR 5009, 118th).¹² These acts granted FCC authority to auction the various bands of spectrum.

Both of these pieces of spectrum legislation had been previously introduced on their own and failed. They passed only thanks to their inclusion in larger, omnibus bills, leaving no opportunity for amendments to this legislation.

Failures of FCC’s NPRM 25-276 and HR 2289:

¹² Public ‘Spectrum and Secure Technology and Innovation Act of 2024, Title LIV <https://www.congress.gov/118/bills/hr5009/BILLS-118hr5009enr.pdf>

- **Will not bridge the digital divide.** Like other wireless preemption measures, the measures will give free reign to the wireless industry to deploy cell towers in areas that are already profitable, but without the “nuisance” of having to engage with local communities and residents to determine the siting of wireless facilities.
- **Trample states’ rights**, despite the majority’s stated commitment to states’ rights and the 10th amendment.
- **Distort the free market**, by suppressing normally functioning demand signals from local governments.
- **Harm and injure millions of Americans**, which is at odds with the White House commitment to Make America Healthy Again.

We refer the committee to our letter on March 5, 2025,¹³ in which we highlighted the White House’s Make America Healthy Again (MAHA) agenda, and its inclusion of electromagnetic radiation (EMR) as a contributing cause of chronic disease. EMR was expressly set out in the Executive Order in February,¹⁴ reiterated in the MAHA assessment in May 2025, and reiterated again in the MAHA strategy on September 2025.¹⁵

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 deploy communications infrastructure, rather than mislabeling their rights to health and safety as “red tape.” Unfortunately, the term “streamlining” has come to mean trampling states’ rights and replacing it with heavy-handed big government in Washington DC.

We urge the committee throughout the 119th Congress not to pass any 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:

¹³ National Call for Safe Technology, Written Testimony for the Hearing on Rural Broadband on March 5, 2025

<https://thenationalcall.org/wp-content/uploads/2025/03/NC4ST-to-House-EC-on-Broadband-Hearing-3-5-25-FINAL.pdf>

¹⁴ See §4a

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

¹⁵ <https://www.whitehouse.gov/wp-content/uploads/2025/09/The-MAHA-Strategy-WH.pdf>

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

Background on FCC radiofrequency exposure limits

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 a “reasoned explanation” for why the FCC decided not to update its human exposure limits for wireless radiation.¹⁶ The FCC has not considered the latest science since 1996, as it is otherwise obligated to do under the law. Making more spectrum available while failing to update its exposure limits puts all Americans at risk, and is harming millions of Americans.^{17,18}

Petitioners in this case have filed multiple follow-on petitions with the FCC to comply with the court order, spelling out exactly what the FCC must do to comply with the court.¹⁹

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, with no control group.²⁰ GAO first recommended that the FCC revisit these limits back in 2012²¹ and the FCC has not yet done so.

¹⁶ *Environmental Health Trust, et al. v. FCC* (DC Circuit, 2021)

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

¹⁷ National Call for Safe Technology, Congressional Briefing, 5/19/24

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

¹⁸ See “Comments of Advocates for the EMS Disabled,” In the Matter of Advance Notice of Proposed Rulemaking-Public Comment on Changes to Requiring Accessibility and Prohibiting Discrimination on the Basis of Disability in HUD -Assisted Programs, Docket FR 6257-A-01. 7/24/23

<https://thenationalcall.org/wp-content/uploads/2023/09/HUD-Submission-7-24-23-Final.pdf>

¹⁹ Petition To Implement D.C. Circuit Judgment And Mandate, Reopen Notice Of Inquiry, And Perform Tasks Ordered By The Court, And Request For Prompt Administrative Action, Filed by Environmental Health Trust, August 6, 2025

<https://www.fcc.gov/ecfs/search/search-filings/filing/10806965028484>

Joinder In Environmental Health Trust Petition To Implement D.C. Circuit Judgment And Mandate, Reopen Notice Of Inquiry And Perform Tasks Ordered By The Court, And Request For Prompt Administrative Action And Renewed Separate Motion For Similar Relief, filed by Children's Health Defense, November 25, 2025

<https://www.fcc.gov/ecfs/search/search-filings/filing/112586420384>

²⁰ 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. *Environ Health* 21, 92 (2022).

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

²¹ Exposure and Testing Requirements for Mobile Phones Should Be Reassessed, GAO-12-771, Jul 24, 2012

The legislative text we propose above would incentivize FCC to follow the law. 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.²²

Making spectrum available for commercial use will automatically trigger heavy-handed preemption of states' rights over wireless facilities, known as Section 6409,²³ a provision that would be dramatically expanded under HR2289. 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 spectrum – despite no US government agency assessing these emissions for safety.²⁴ Hundreds of localities around the country have sued the FCC over its rules implementing section 6409.²⁵

We would be happy to discuss this letter and related matters further with you.

Attachments:

- A. Congressional briefing on wireless infrastructure policy
- B. Science compendium on biological hazards of wireless radiation

Respectfully submitted,



Odette J. Wilkens
President & General Counsel
The National Call for Safe Technology, Inc.
P.O. Box 750401
Forest Hills, NY 11375
www.thenationalcall.org
hello@thenationalcall.org
646.939.6855

<https://www.gao.gov/products/gao-12-771>

²² FCC Budget in Brief, FY 2025. <https://docs.fcc.gov/public/attachments/DOC-401129A1.pdf>

²³ Section 6409 states:

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

See Middle Class Tax Relief and Job Creation Act of 2012, Public Law 112-96, 47 USC 1455.

²⁴ Testimony submitted to Senate Commerce Committee, March 27, 2024

<https://ehtrust.org/wp-content/uploads/EHT-Testimony-to-Senate-Commerce-Committee-on-S3909-03272024.pdf>

²⁵ 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)

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Congressional Briefing: Wireless Infrastructure Policy

Americans are being exposed to the hazards of wireless technology, which are unnecessary to reap its benefits. We advocate for responsible policy.

Hazards of current and proposed policies on wireless deployment:

- 1. Regulatory gap: lack of oversight** no US government agency is protecting Americans from exposure to wireless radiation
 - 1996: FCC issues exposure guidelines,¹ while ignoring input from EPA²
 - 2012: GAO report recommends FCC review its 1996 exposure limits³
 - 2013-19: FCC opens docket and receives 11,000 pages of scientific studies of harm⁴
 - 2019: FCC closes the docket and decides not to update its wireless limits⁵
 - 2021: US Court of Appeals DC Circuit rules that FCC's decision not to update exposure limits was "arbitrary and capricious";⁶ FCC has not yet complied with the court order to address long-term exposure effects, including on children
 - FCC responsible for exposure guidelines despite having no health or safety competency.
 - There is no independent safety body, like NTSB for transportation
- 2. Evidence of biological harm is clear and convincing**, for human health (cancer and noncancer), children, plants, animals, insects, and microbes⁷
- 3. Ignores millions of Americans disabled by wireless radiation⁸**
- 4. Subverts the free market** by imposing federal government mandates that override the free market and force experimental technology on Americans⁹
- 5. Shields industry from liability** rather than encouraging industry to compete on safety¹⁰
- 6. Tramples states' rights and local government on cell tower zoning and placement**
 - 6.1. Tenth amendment issues: preempts states from regulating cell towers on the basis of radiofrequency emissions, while the federal government is not doing so.¹¹
 - 6.2. 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^{12,13}
 - 6.3. Commerce clause overreach: while one can choose to abstain from a regulated activity,¹⁴ federal policy essentially commands that all Americans suffer involuntary exposure and property devaluation.
- 7. Farm yields and cattle lifespan** threatened by wireless radiation¹⁵
- 8. Fire and wildfire risks** from cell towers, which are electrical installations and have already caused disasters, including damage of \$6 billion in one fire¹⁶
- 9. Cybersecurity risks** are far greater with wireless networks, 5G being the least secure, as former FCC Chairman Tom Wheeler refers to "The 5G Cyber Paradox."¹⁷

Solutions: we ask Congress 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

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Wireless interferes with broadband policy goals

10. Waste of public funds:

- 10.1. 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.¹⁸
- 10.2. Billions of dollars in subsidies to wireless have not provided the promised ubiquitous service.¹⁹
- 10.3. Wireless and wired are not functionally equivalent technologies and therefore should not be treated on a "technology neutral" basis:²⁰ wireless suffers from line-of-sight obstructions, slower speed, inclement weather, and lack of scalability, whereas fiber is sustainable, renewable and futureproof.²¹

11. Energy consumption is far higher with wireless networks; 5G expected to increase energy consumption up to 61x between 2020 and 2030.²²

12. Wireless will perpetuate the digital divide, not solve it ²³

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¹ The limits were based largely on just a few animal studies with 11 monkeys and 12 rats, with no control group, in the 1970s and early 1980s.

International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF), (2022). [Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G](#). Environ Health. Oct 18;21(1):92

² See note 7 below, at footnote 31 of Environmental Health Trust testimony, 3/27/24.

³ Exposure and Testing Requirements for Mobile Phones Should Be Reassessed. US GAO, 2012
<https://www.gao.gov/products/gao-12-771>

⁴ <https://ehtrust.org/environmental-health-trust-et-al-v-fcc-key-documents/>

⁵ Resolution Of Notice Of Inquiry, Docket 13-84, 12/4/19 <https://www.fcc.gov/document/fcc-maintains-current-rf-exposure-safety-standards>

⁶ *Environmental Health Trust et al. v. FCC*, 2021, DC Circuit

- The D.C. Circuit Court of Appeals ruled against the FCC for its failure to provide a reasoned explanation under the Administrative Procedures Act to maintain its 1996 wireless exposure limits without addressing extensive evidence of harm. The docket contained 11,000 pages of scientific, peer-reviewed studies showing harm below the FCC limits, including accounts of injury. The court wrote that the FCC failed to respond to "record evidence that exposure to RF radiation at levels below the Commission's current limits may cause negative health effects unrelated to cancer."
- The Court ordered the FCC to address impacts on children, long-term exposure effects on health, and the environment. To date, the FCC has failed to comply with the court order. Therefore, its 1996 limits cannot be relied upon to protect the public.

[https://www.cadc.uscourts.gov/internet/opinions.nsf/FB976465BF00F8BD85258730004EFDF7/\\$file/20-1025-1910111.pdf](https://www.cadc.uscourts.gov/internet/opinions.nsf/FB976465BF00F8BD85258730004EFDF7/$file/20-1025-1910111.pdf)

⁷ See testimony submitted by Environmental Health Trust to Senate Commerce Committee, 3/27/24, regarding spectrum policy and harms from radiofrequency radiation

<https://ehtrust.org/wp-content/uploads/EHT-Testimony-to-Senate-Commerce-Committee-on-S3909-03272024.pdf>

National Toxicology Program 2018: clear evidence of cancer (highest level of evidence)

<https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones#studies>

Woman living near cell tower diagnosed with 51 strokes,

https://www.momsacrossamerica.com/woman_living_near_cell_tower

⁸ See Reply Comments of Advocates for the EMS Disabled, FCC Docket 22-69

<https://thenationalcall.org/wp-content/uploads/2023/09/FCC-Reply-Comments-EMS-Disabled-Docket-22-69-DEI-NPRM-4-20-23-FINAL.pdf>

⁹ If wireless were so safe and desirable, why does the federal government need to trample on local governments to force deployment? As an example of federal preemption mandating deployments, section 6409 of the 2012 Middle Class Tax Relief and Jobs Act (47 USC §1455), under which the majority of wireless facilities are deployed today, mandates that: "a State or local government may not deny, and shall approve, any eligible facilities request."

¹⁰ 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 radiofrequency emissions within FCC regulations. Courts have inappropriately expanded deference to FCC's limits resulting in shielding industry from tort liability, in effect creating a safe harbor for industry, while leaving the public exposed. For example, in *Cohen v. Apple* (2022, Ninth Circuit, No. 20-17307, petition for certiorari denied), the court wrote: "FCC's regulations...preempted state laws that imposed liability premised on levels of radiation below the limits set by the FCC." See amicus brief by Children's Health Defense (2023) https://www.supremecourt.gov/DocketPDF/22/22-698/263539/20230414130203673_22-698%20Amicus%20Brief.pdf

Walker v. Motorola Mobility, 2:21-CV-00923 (W.D. La. 2023). The court wrote (at 22): "state law claims attacking the safety of the SAR Standard are preempted by federal law. Though the **FCC disclaimed any expertise in health**

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or safety, it set the SAR standard under a congressional mandate and in service of its broad statutory mandate to provide a uniform, efficient network.” [Emphasis added] <https://casetext.com/case/walker-v-motorola-mobility-llc> While companies are shielded from tort liability, at the same time the insurance industry does not insure these risks. Swiss Re calls 5G an “off the leash” insurance risk (see p.10-11). Telecoms warn shareholders of potential liability from health effect claims. Companies should compete on safety; some already recognize this. E.g., Swisscom patent to reduce wireless radiation because of the risk of cancer and neurological disorders, Int'l Pub'n No. WO 2004/075583 A1 2 Sept 2004 PCT, <https://www.avaate.org/spip.php?article2061> and by cell phone manufacturers.

¹¹ *Murphy v. NCAA* US 2018, https://www.supremecourt.gov/opinions/17pdf/16-476_dbfi.pdf

¹² 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/1DBTtngzDuZ9lbtmze58gBXsJs1jXzU5dQZx0ycFQumUk/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>

¹³ <https://www.emfanalysis.com/property-values-declining-cell-towers/?iframe=1&iframe=1&iframe=1>

¹⁴ *Nat'l Fed'n of Indep. Bus. v. Sebelius*, 567 U.S. 519, 553-54, 573-74 (2012).

¹⁵ <https://ehtrust.org/wireless-radiofrequency-radiation-effects-on-agriculture/>

European Court shut down a cell tower for 20% reduction in cows’ milk yield and the death of 40 cows.

¹⁶ E.g., Woolsey Fire in CA 2018 caused \$6 billion in damages, destroyed 100,000 acres, 295,000 people evacuated, [three deaths]

<https://ehtrust.org/wp-content/uploads/wildfire-cell-tower-fact-sheet-EHT-2-11-24.pdf>

¹⁷ 5G, as a software based system, is easily hacked.

<https://www.cyber.forum.yale.edu/blog/2021/7/20/cybersecurity-risk-in-5g?iframe=1>

Tom Wheeler noted that the structure of 5G networks to provide for additional capability “also introduce[s] new security vulnerabilities.” <https://www.brookings.edu/articles/the-digital-future-requires-making-5g-secure/>

¹⁸ 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>

¹⁹ In testimony to the House Energy and Commerce Committee, 3/ 2221, former FCC Chair and former CTIA CEO Tom Wheeler spoke disappointingly that despite approximately \$40 billion of government subsidies “over the last decade,” those subsidies “have failed to deliver the goal of universal access to high-speed broadband ... because it failed to insist on futureproof technology, ... and focused more on the companies being subsidized than the technology being used or the people who were supposed to be served.”

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

²⁰ A principle of the Telecom Act of 1996 is nondiscrimination among functionally equivalent services. Correlatively, treating as the same services that are not functionally equivalent is discriminatory against services with superior service characteristics – in this case, discriminatory against wired broadband. For example, see 47 USC §160, §224(e)(1), §253(c), §332(c)(7)(B)(i)(I).

²¹ <https://www.benton.org/blog/how-fixed-wireless-technologies-compare-fiber>

²² <https://ehtrust.org/science/reports-on-power-consumption-and-increasing-energy-use-of-wireless-systems-and-digital-ecosystem/>

²³ House Energy & Commerce Committee, 1/29/20 testimony

<https://docs.house.gov/meetings/IF/IF16/20200129/110416/HHRG-116-IF16-Wstate-SieferA-20200129.pdf>

“House Energy & Commerce Committee, 9/21/23 witness, “Fiber is the most scalable, reliable, long-term, future proof strategy we have.”

https://www.youtube.com/watch?v=ptQJ_wbtHYc&t=6029s

Biological Hazards of Wireless Radiation – Executive Summary

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

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

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

- **Industry Funded Research** – The wireless industry has funded studies that show adverse biological impacts. A 1990s \$28.5 million study found that RF radiation produces biological effects that are potentially hazardous to humans in ways that have nothing to do with heated tissue. A 2000 study for a major telecom carrier found RF radiation has links to cancer, neurological disorders and cognitive impairment. Insurance companies will not insure for personal injury from RF radiation, reflecting their concerns about the possible magnitude of their liability, e.g., that 5G is a high, “off the leash” risk.
- **Reports from Federal Agencies** – A 2018 \$30 million US National Toxicology Program (NTP) study found “clear evidence of cancer” in lab rats from wireless radiation. In 2019, the FCC admitted that RF radiation can have non-thermal impacts on humans, but it has conducted no studies to determine what those impacts might be or what changes should be made to its RF radiation emission limits. In 2021, the DC Circuit Court of Appeals ruled in *Environmental Health Trust, et al v. FCC* that the FCC's lack of action was arbitrary and capricious for failing to review its emission standards in light of new science and current technology and that it should consider non-cancer health impacts of wireless radiation. So far, the FCC has failed to comply with the Court order. As early as 1971, the US Naval Medical Research Academy concluded from 2300 studies that RF radiation, including millimeter (e.g. 5G), are linked to cardiac, neurological and other disorders.
- **Independent Studies** – Several major independent studies have concluded biological effects from RF radiation, including by the World Health Organization in 2025 (finding increased risk of cancer, along with its initial Class 2B carcinogen classification in 2011), the Ramazzini Institute in 2018 (clear evidence of cancer in lab rats, corroborating the NTP's results) and the New Hampshire Commission in 2020 (all forms of wireless radiation are harmful). The American Academy of Pediatrics warns that children are disproportionately affected by cell phone radiation. Studies concluded increased risk for ADHD, delayed motor skills, diabetes and demyelination of fetuses' brain neurons.
- **Chronic Diseases and Clusters near Cell Towers** – Illnesses near cell towers, e.g., nausea, rashes, stroke, atrial fibrillation and a variety of cancers, have been documented near Duluth, MN (51 strokes), Pittsfield, MA (17 residents fell ill and many evacuated, one resident who remained died), Ripon, CA (4 children and 4 teachers developed cancer; one child died) and Eagle, ID (atrial fibrillations from 5G cell towers).

BIOLOGICAL HAZARDS OF WIRELESS RADIATION -- SOME HIGHLIGHTS

July 1, 2025

"The evidence presented to the Board includes well over one thousand peer-reviewed scientific and medical studies which consistently find that pulsed and modulated RFR has bio-effects and can lead to short- and long-term adverse health effects in humans, either directly or by aggravating other existing medical conditions. Credible, independent peer-reviewed scientific and medical studies show profoundly deleterious effects on human health, including but not limited to: neurological and dermatological effects; increased risk of cancer and brain tumors; DNA damage; oxidative stress; immune dysfunction; cognitive processing effects; altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and damage to the blood-brain barrier."¹

~ 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.**² That means the radiation does not need to heat human tissue. (Note that the FCC limits only account for thermal, not non-thermal, adverse effects.)
 - a) The research was peer-reviewed with scientific oversight by both an independent Peer Review Board at the Harvard School of Public Health and a U.S. Government Interagency Working Group, chaired by the FDA, and including EPA, OSHA, NIOSH, CDC, FCC, and NIH.³
 - b) Abruptly after these findings, the EPA was defunded from doing any further research on the biological effects of wireless radiation.⁴
2. **Industry Commissioned Study Finds Biological Effects.** A study in 2000 commissioned by a major telecom carrier found links to cancer, leukemia, neurological disorders and cognitive impairment, with special caution for children and an acknowledgement of those already disabled from the radiation.⁵

¹ <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.

² 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.

³ Ibid.

⁴ Overpowered, What Science Tells Us About the Dangers of Cell Phones and Other WiFi-Age Devices, Martin Blank, PhD, 2014 at 110-112.

⁵ T-Mobil Deutsche Telekom commissioned study by the Ecolog-Institute, April 2000, "Mobile Telecommunications and Health Review of the Current Scientific Research in View of Precautionary Health Protection," <https://ehtrust.org/wp-content/uploads/ecolog2000.pdf>.

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.⁶
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.⁷
5. **RF Radiation is a Pollutant.** The telecom industry characterizes RF radiation as a pollutant in their device protection plans and disclaim insurance liability.⁸
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.⁹
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."¹⁰
8. **"Why Tech Leaders Don't Let Their Kids Use Tech."**¹¹ 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

⁶ 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/0rfwys743dgeqpifwu3ua/Manufacturer-own-patents-to-cut-radiation-RCR-Wireless-News.pdf?rlkey=e5hm46nyp9an6ugu4y005ldm3&st=xr7ocreh&dl=0>.

⁷ 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>.

⁸ 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>.

⁹ <https://ehtrust.org/key-issues/electromagnetic-field-insurance-policy-exclusions/>.

¹⁰ <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/>.

¹¹ "Why Tech Leaders Don't Let Their Kids Use Tech," <https://kidzu.co/health-wellbeing/why-tech-leaders-dont-let-their-kids-use-tech/>.

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.”¹²

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).¹³ NTP found malignant heart schwannomas and malignant brain gliomas.¹⁴ NTP is one of the most prestigious toxicology institutions in the world. In 1999, the FDA had nominated the NTP to conduct a \$30 million study of RF radiation “with a high priority,” to conduct animal studies, stating that it was “not scientifically possible to guarantee that non-thermal levels of microwave radiation . . . will not cause long-term adverse health effects.”¹⁵
 - 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.”¹⁶ “Overall, the NTP findings demonstrate the potential for RFR **to cause cancer in humans.**”¹⁷ [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.¹⁸ The FCC averages exposure levels over 30 minutes,¹⁹ which completely obscures the

¹² Ibid.

¹³ See letter of Dr. Birnbaum, former NIH and NTP Director, and hyperlinked amicus brief <https://www.dropbox.com/scl/fi/nc7l00p8zxk8tj0l2a1yr/Dr.-Linda-Birnbaum-cell-tower-letter.pdf?rlkey=vq1i363i74umg9ybydrrhmn5d&st=q9l49h88&dl=0> ; see also, <https://ehtrust.org/former-niehs-director-dr-linda-birnbaum-interviewed-about-cell-phone-radiation/>.

¹⁴ <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>.

¹⁵ 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.

¹⁶ 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.

¹⁷ Ibid. 11.

¹⁸ 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).

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

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.²⁰

- 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.²¹ The FCC has not yet complied.
- c) **FCC's Maximum Permissible Exposure Limit (MPEL)** are the limits of RF radiation for human exposure. MPEL allows for a very high human exposure limit of ten million microwatts per square meter.²² The FCC has acknowledged a "worst-case" scenario of transmitters "operating simultaneously and continuously" at the MPEL with an individual "in the main transmitting beam and within a few feet of the antenna for several minutes or longer."²³ While the FCC dismisses this scenario as "extremely remote," it is allowing 4G and 5G cell

²⁰ 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 μ s 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>.

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."

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

²² 47 CFR 1.1310(e)(1)(ii) shows 1 mW/cm², which is equivalent to 10 million uM/m²,

<https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-1/subpart-I/section-1.1310>.

²³ FCC's *Guidelines for Cellular Antenna Site Calculations*, <https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites#:~:text=In%201996%20the%20FCC%20adopted,lower%2Dpowered%20cell%20site%20transmitters>.

towers to be installed²⁴ just feet from a home, business or school where individuals and children are in the main transmitting beam for many hours a day.

- d) The FCC's MPEL is based on IEEE (Institute of Electrical and Electronic Engineers) guidelines²⁵ which "have not been changed since 1991 and do not consider children."²⁶ Testing was performed on "a model head with dimensions based [on] the 90th percentile of U.S. military recruits in the year 1989. The corresponding body of the head would be a six foot, two inches, 220 lb. male."²⁷ A Specific Absorption Rate (SAR) – rate of absorption of electromagnetic radiation -- is then calculated based on thermal effects (heating tissue) of that model head.²⁸ However, biological effects from RF radiation are also non-thermal, documented by the studies cited herein, yet neglected in FCC testing.
- e) The FCC failed to disclose that in 2019 when it tested cell phones next to the body (which is the way that the public typically uses cell phones), the cell phones exceeded the limits of RF radiation for human exposure.²⁹

3. **A U.S. Naval Medical Academy Research** report from 1971 by Dr. Zory Glaser³⁰ linked 23 chronic diseases to RF radiation based on over 2300 studies.³¹ A Feb 2025 report correlates Dr. Glaser's findings from 1971 of biological effects of RF radiation and millimeter wave (5G) technology to reported cases of chronic disease.³² 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.³³ In 1976, Dr. Glaser updated the total bibliography to 3700 reports relating to the biological effects of RF radiation.³⁴

²⁴ *In re Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Inv.*, 33 F.C.C.R. 9088, 9104-05 (2018).

²⁵ FCC guidelines are set forth at 47 CFR 1.1310, see note at (d)(4); see also, <https://www.fcc.gov/consumers/guides/human-exposure-radio-frequency-fields-guidelines-cellular-and-pcs-sites#:~:text=In%201996%20the%20FCC%20adopted,lower%2Dpowered%20cell%20site%20transmitters>.

²⁶ *The Effects of RF-EMF on the Child Brain*, Aaron Skaist, Vol 12, No. 2, 2019, at 2, The Science Journal of the Lander College of Arts and Sciences, <https://touroscholar.touro.edu/cgi/viewcontent.cgi?article=1218&context=sjlcas>.

²⁷ *Ibid* at 3.

²⁸ *Ibid*.

²⁹ <https://ehtrust.org/press-release-concealed-fcc-cell-phone-radiation-tests-show-human-exposure-limits-were-exceeded/>.

³⁰ About Dr. Zory Glaser, <https://zoryglaser.com/>.

³¹ https://www.magdahavas.com/wp-content/uploads/2010/06/Navy_Radiowave_Brief.pdf.

³² 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.

³³ *Ibid* at 3.

³⁴ <https://ehtrust.org/wp-content/uploads/Naval-MRI-Glaser-Report-1976.pdf>.

4. **A U.S. Air Force report** from 1994³⁵ states that “[i]t is known that electromagnetic radiation [EMR] has a biological effect on human tissue” covering a wide range including adverse cardiovascular, neurological and behavioral effects including the risk of cancer. Since 1956, the Dept. of Defense directed the Armed Forces (Army, Navy, Air Force) to study EMR. The report found that EMR can interact with human tissue’s bioelectrical function and Eastern Europe and the then Soviet Union found that human tissue may be more sensitive to EMR’s non-thermal effects.
5. **Central Intelligence Agency (CIA).** In 2012, the CIA declassified and approved for release a 1977 Russian study on the “Biological Effects of Millimeter Radiowaves” which found that while millimeter waves only penetrate the skin, they trigger a cascade of adverse biological effects within the body.³⁶
 - a) The study coins the term “**radiowave disease**” to describe these effects.³⁷ Adverse effects on the skin included demyelination of sections of nerve fibers (damage or destruction to the insulation around nerve fibers which disrupts normal nerve impulse transmission), fragmented neural conductors, and deformation of sensory receptors, leading to neurological disorders.
 - b) The people observed working with millimeter radio wave generators had disturbances in their blood and immuno-biology.³⁸
 - 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.”³⁹
 - d) The degree of adverse effects **increased with more exposure**;⁴⁰ the lab animals had been exposed for 15 minutes a day for 60 days. It reported that when exposure ceases, disorders from low millimeter radio waves are reversible.⁴¹ However, if adverse effects depend on duration of exposure, then Americans exposed continuously 24/7, 365 days a year, would suffer adverse biological effects, but without reprieve and without the ability to recover.
6. **Chronology of Federal Agencies** expressing since at least the 1990s that the FCC’s wireless limits address only thermal (heating of human tissue), not non-thermal exposure, of RF radiation,⁴² despite the fact that non-thermal exposure produces biological effects and disease, as documented herein.

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

1. **The World Health Organization’s (WHO) International EMF Project Review of April 2025** of animal studies found reliable evidence that RF radiation increases the risk of cancer.⁴³ This reinforces the 2018 findings of cancer from the National Toxicology Program and the Ramazzini Institute. The WHO’s results may lead scientists to call for the IARC to augment its carcinogenicity classification from “possible” Class 2B in humans set in 2011 to “probable” or “known” carcinogenicity in humans in

³⁵ *Radiofrequency / Microwave Radiation Biological Effects and Safety Standards, a Review (1994)*, Scott Bolen, Rome Laboratory, Griffiss Air Force Base, at 1, <https://youandemf.com/wp-content/uploads/2025/01/EMR-US-Military-Report.pdf>.

³⁶ <https://mdsafetech.org/wp-content/uploads/2019/02/biological-effects-of-millimeter-wavelengths.-zalyubovskaya-declassif-by-cia-1977-biol-eff-mm-waves.pdf>.

³⁷ Ibid at 57.

³⁸ Ibid at 60.

³⁹ Ibid at 59.

⁴⁰ Ibid at 59.

⁴¹ Ibid at 58.

⁴² <https://ehtrust.org/timeline-of-development-of-safety-limits-for-wireless-radiation-in-us/>.

⁴³ <https://www.sciencedirect.com/science/article/pii/S0160412025002338>.

2025.⁴⁴ The objective of the new review was to systematically evaluate the effects of RF EMF exposure on cancer.

- a) The WHO's IARC classified EMF as a **Class 2B possible human carcinogen** in 2011⁴⁵ (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."⁴⁶
- b) "[R]esults from animal experiments that the IARC was lacking were later provided by the U.S. National Toxicology Program (NTP) report of two types of cancers in laboratory rats that were exposed, lifelong, to 2G and 3G cell phone RF radiation frequencies below 6 GHz . . . did not exceed 1°C,"⁴⁷ i.e., did not heat tissue.
- c) Since the WHO 2011 IARC cancer finding by independent scientists, other factions within the WHO have sought to produce industry-aligned pronouncements. For example, its website states a lack of causality of harm from wireless radiation.⁴⁸ 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).⁴⁹ 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.**"⁵⁰ The WHO's April 2025 review reinforces that conclusion.
 - i. The WHO recently commissioned a study by Karpidis, et al, which concluded in 2024 no hazards from wireless radiation,⁵¹ however, the study has been found to be severely flawed

⁴⁴ See, e.g., <https://icbe-emf.org/who-funded-study-reports-high-certainty-of-the-evidence-linking-cell-phone-radiation-to-cancer-in-animals/>.

⁴⁵ https://www.iarc.who.int/wp-content/uploads/2018/07/pr208_E.pdf.

⁴⁶ 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}.

⁴⁷ 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}.

⁴⁸ <https://www.who.int/news-room/questions-and-answers/item/radiation-5g-mobile-networks-and-health>.

⁴⁹ 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>

⁵⁰ 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.

⁵¹ K. Karipidis, D. Baaken, T. Loney, M. Blettner, C. Brzozek, M. Elwood, C. Narh, N. Orsini, M. Röösli, 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.

with no scientifically valid assessment,⁵² and its conclusion contradicted scientific evidence and was drawn from data showing hazards.⁵³ Researchers have called for a retraction of the study.⁵⁴

ii. Another WHO study in 2024 on RF-induced oxidative stress identified 11,599 studies on oxidative stress within the 800-2450 MHz range, but discarded more than 99% of those studies.⁵⁵ Researchers have called for a retraction of that study, as well.⁵⁶

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.⁵⁷

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]⁵⁸ and genotoxicity [associated with increased DNA

⁵² 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>)

⁵³ “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%20Health%20Organizations%20EMF%20Projects%20Systemic%20Review%20s%20on%20the%20Association%20Between%20RF%20Exposure%20and%20Health%20Effects%20Encounter%20Challenges%20Health%20Matters.pdf?rlkey=o77i19den485rdo2k4ktdzhgj&st=842p0rbv&dl=0>.

⁵⁴ 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>.

⁵⁵ 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>.

⁵⁶ Ibid.

⁵⁷ <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}.

⁵⁸ 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.

damage]⁵⁹. Therefore, the IARC Category should be upgraded from Group 2B to Group 1, a human carcinogen⁶⁰.”⁶¹ [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.”⁶²
 - 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 . . . ”⁶³
4. **Panagopoulos, et al, Review on human-made EMF’s ion forced-oscillation and voltage-gated ion channel dysfunction, oxidative stress and DNA damage (2021).** “[E]xtremely low frequency (ELF) band, and the microwave/radio frequency (RF) band which is always combined with ELF, may lead to DNA damage [which is] connected with cell death, infertility and other pathologies, including cancer.”⁶⁴
5. **New Hampshire Commission** studied the biological effects of wireless radiation and issued a report Nov. 2020⁶⁵ with former commissioner Dr. Kent Chamberlain explaining a “key finding being that exposure to wireless communication radiation is harmful to the health of humans and the environment. Those findings apply to all forms of wireless radiation, which include all generations of cellphone radiation.” (see Appendix A, Dr. Chamberlin’s letter explaining their findings).
6. **Thousands of scientific and medical studies** show neurological disorders; increased risk of cancer⁶⁶ 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.⁶⁷

⁵⁹ 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.

⁶⁰ 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.

⁶¹ 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.

⁶² EnvironHealth 21, 92 (2022). <https://doi.org/10.1186/s12940-022-00900-9>.

⁶³ Ibid.

⁶⁴ <https://pmc.ncbi.nlm.nih.gov/articles/PMC8562392/> Dr. Dimitris J. Panagopoulos is an EMF-biophysicist at the Chοremeion Research Laboratory, Medical School, University of Athens, Greece, <https://www.researchgate.net/profile/Dimitris-Panagopoulos-3>.

⁶⁵ <http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>.

⁶⁶ *Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen (Review)*, Journal of Oncology, <https://www.spandidos-publications.com/10.3892/ijo.2015.2908>.

⁶⁷ 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,

7. **Eight case studies** since Jan 2023 in Sweden show adverse health impacts from exposure to 5G towers. Previously healthy individuals developed typical “microwave syndrome” symptoms shortly after the towers were installed: headaches, abnormal fatigue, heart arrhythmia, burning skin, trouble concentrating.⁶⁸ The significance of these reports is that non-ionizing radiation⁶⁹ from 5G — well below levels allowed by authorities — can cause health problems in individuals who had no prior history of electromagnetic sensitivity.⁷⁰ Dr. Lennart Hardell, lead author of the reports and world-renowned scientist on cancer risks from radiation, affirms these reports as “groundbreaking” because they serve as the “first warning of a health hazard.”⁷¹
8. **One-third of Americans suffer from symptoms from RF radiation**, based on a 2019 Bevington study which analyzed the prevalence of symptoms from RF radiation within any given population.⁷² Based on a population of 332.4 million people in the U.S.,⁷³ 120 million have symptoms, 2% of which (7 million) have severe symptoms or can't work.
9. **The Bioinitiative Report's** review of 1800 studies found biological effects of RF radiation which can occur within minutes of exposure,⁷⁴ and recommends no more than 0.1 microwatts per centimeter squared for human exposure⁷⁵ (compared to the FCC's MPEL of 580 microwatts per centimeter squared). Chronic or prolonged exposure to cell towers can result in biological effects; RF radiation exposures “prevent the body from healing damaged DNA, produce immune system imbalances,

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/>.

⁶⁸ <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-mE3XeBxqaXPQdFxslf9Q23bMCer9vgUBHnCvJXBrgBv-w7YdRUDwF0>; see also, “The microwave syndrome or electrohypersensitivity: historical background,” <https://pubmed.ncbi.nlm.nih.gov/26556835/>.

⁶⁹ <https://childrenshealthdefense.org/emr/emf-key-terms-descriptions/>.

⁷⁰ <https://childrenshealthdefense.org/emr/emf-wireless-health-impacts/>.

⁷¹ <https://www.stralskyddsstiftelsen.se/two-studies-show-that-5g-caused-the-microwave-syndrome-in-healthy-persons/>.

⁷² “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>.

⁷³ <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>.

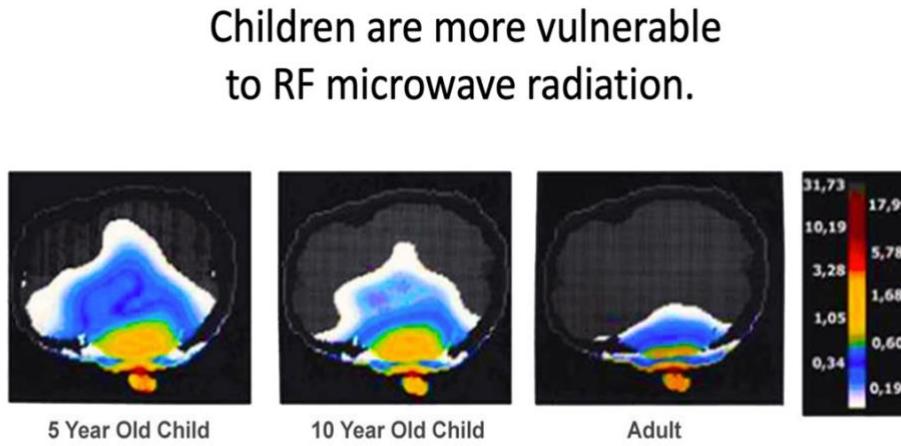
⁷⁴ *Key Scientific Evidence and Public Health Policy Recommendations*, Supplement 2012, at 4, David O. Carpenter, MD, Director, Institute for Health and the Environment University at Albany, Cindy Sage, MA, Sage Associates, https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2012_Key_Scientific_Studies.pdf.<https://bioinitiative.org/>; see also, BioInitiative 2012 Conclusions, <https://bioinitiative.org/conclusions/>.

⁷⁵ *Key Scientific Evidence and Public Health Policy Recommendations* 2007, at 22-23, https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2007_Key_Scientific_Studies.pdf.

metabolic disruption . . . lower resistance to disease . . . pervasive impairment of metabolic and reproductive functions.”⁷⁶

10. Children absorb more RF radiation and are at greater risk than adults.⁷⁷

a) **From cell phones:**⁷⁸



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

b) **American Academy of Pediatrics:** children are disproportionately affected by cell phone radiation due to their lower bone density and amount of fluid in the brain allowing for absorption of greater quantities of RF radiation than in adults.⁷⁹

c) **Greater risk for fetuses:** risk of “degeneration of the protective myelin sheath that surrounds brain neurons.”⁸⁰

⁷⁶ *Key Scientific Evidence and Public Health Policy Recommendations*, Supplement 2012, at 4, [https://bioinitiative.org/](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2012_Key_Scientific_Studies.pdf); see also, BioInitiative 2012 Conclusions, <https://bioinitiative.org/conclusions/>.

⁷⁷ 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/>.

⁷⁸ 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/>.

⁷⁹ *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/](https://bioinitiative.org/wp-content/uploads/pdfs/sec24_2012_Key_Scientific_Studies.pdf).

⁸⁰ *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>.

- d) **School-age children:** risk of “[d]igital dementia.”⁸¹
- e) **Childhood leukemia,** increased risk.⁸²
- f) **Potential dangers of cell towers near schools.**⁸³
 - 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.⁸⁴
 - 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.⁸⁵
 - 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.⁸⁶

11. Neurobehavioral Symptoms Near Cell Towers. The following chart shows a worsening of symptoms when closer to a cell tower but a lessening of symptoms when farther away from a cell tower.⁸⁷

⁸¹ *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>.

⁸² *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.

⁸³ Dr. Magda Havas: WiFi in Schools is Safe. True or False? <https://www.youtube.com/watch?v=6v75sKAUFdc>.

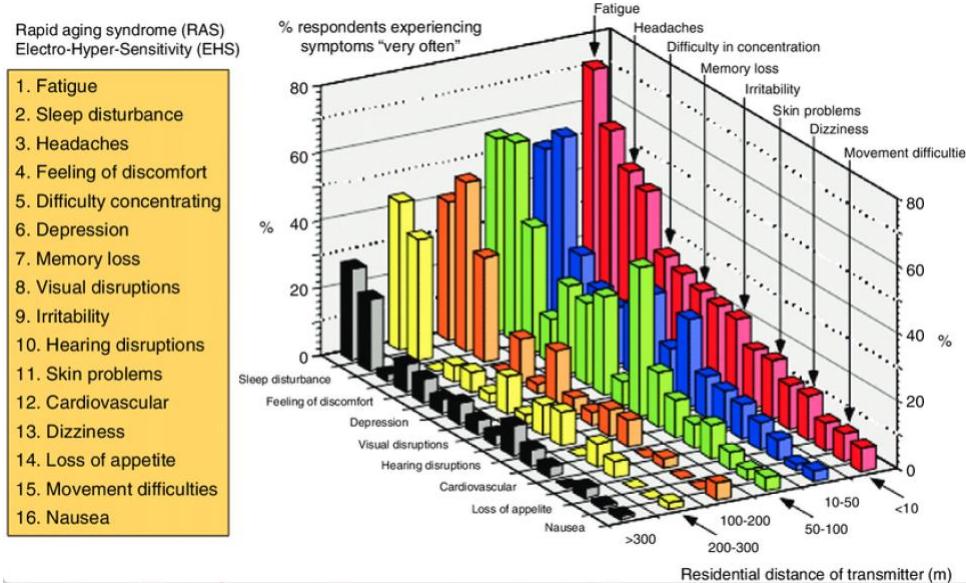
⁸⁴ *Association of Exposure to Radio-Frequency Electromagnetic Field Radiation (RF-EMFR) Generated by Mobile Phone Base Stations (MPBS)with Glycated Hemoglobin (HbA1c) and Risk of Type 2 Diabetes Mellitus*, Sultan Ayoub Meo et al, International Journal of Environmental Research and Public Health, 2015; 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.

⁸⁵ 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/>.

⁸⁶ Child With Heart Problems From Wireless: 5G Health Risks California SB 649 Hearing,

https://www.youtube.com/watch?v=OgNLR9fQOX4&list=PLT6DbkXhTGoDakSqp1i_7milpwGx4xMFq.

⁸⁷ *Cell Tower Health Effects*, Physicians for Safe Technology, <https://mdsafetech.org/cell-tower-health-effects/>.



Symptoms experienced by people near cellular phone base stations; RF radiation affects the blood, heart and autonomic nervous system.⁸⁸ Source: Santini, et al (France): Pathol Biol. 2002;50:S369-73; Dr. Magda Havas, PhD.

12. RF Radiation Effects. A group of toxicology researchers from multiple universities concluded that overall, high frequency RF radiation even below the FCC limits “can result in: carcinogenicity (brain tumors/glioma, breast cancer, acoustic neuromas, leukemia, parotid gland tumors), genotoxicity (DNA damage, DNA repair inhibition, chromatin structure), mutagenicity, teratogenicity, neurodegenerative diseases (Alzheimer’s Disease, Amyotrophic Lateral Sclerosis), neurobehavioral problems, autism, reproductive problems, pregnancy outcomes, excessive reactive oxygen species/oxidative stress, inflammation, apoptosis, blood-brain barrier disruption, pineal gland/melatonin production, sleep disturbance, headache, irritability, fatigue, concentration difficulties, depression, dizziness, tinnitus, burning and flushed skin, digestive disturbance, tremor, cardiac irregularities, adverse impacts on the neural, circulatory, immune, endocrine, and skeletal systems” and “from this perspective, **RF is a highly pervasive cause of disease.**”⁸⁹

13. 5G’s Biological Effects. Contrary to claims that 5G’s higher frequencies (millimeter waves) simply “bounce” off the skin, researchers have documented that the coiled portion of the skin’s sweat duct can be regarded as a helical antenna in the sub-THz band and the skin, our largest organ, can intensely absorb the higher 5G frequencies.⁹⁰ 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.”⁹¹ The free

⁸⁸ Dr. Magda Havas, https://www.researchgate.net/figure/Symptoms-experienced-by-people-near-cellular-phone-base-stations-based-on-the-work-of_fig2_258313941.

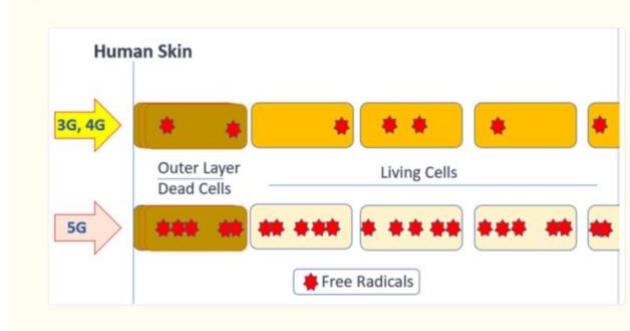
⁸⁹ Ronald N. Kostoff, Paul Heroux, Michael Aschner, Aristides Tsatsakis, “Adverse health effects of 5G mobile networking technology under real-life conditions,” Toxicology Letters, Vol 323, 2020, pp. 35-40, ISSN 0378-4274, <https://doi.org/10.1016/j.toxlet.2020.01.020>.

⁹⁰ 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>.

⁹¹ 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,

radicals accumulating on the skin from 5G (see figure below) cause oxidative stress which can lead to DNA strand breaks, cancer and atherosclerosis.⁹²

Figure 1.



14. **Clumping of blood cells.** A Feb 2025 study found that when an otherwise healthy person is in close proximity to a cell phone red blood cells clumped together (rouleaux formation), which leads to blood abnormality, less oxygen transport, and potentially blockages, stroke and heart problems.⁹³
15. **“The 5G Appeal”** to the United Nations to halt the proliferation of 5G, warning of potential biological effects, was signed by 252 scientists and professionals from 43 countries, 40 scientists of which are from 15 U.S. states, including scientists and medical professionals from Columbia and Harvard.⁹⁴ Other scientists have joined in consensus statements.⁹⁵
16. **International Association of Fire Fighters** passed a resolution in 2004 that disapproved of cell towers on or near fire stations until safety can be proven.⁹⁶
17. **Increases in brain cancer** in the U.S. have been reported, with scientists attributing a high probability on RF radiation from cell phone use.⁹⁷

<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>.

⁹² 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.

⁹³ “Hypothesis: ultrasonography can document dynamic in vivo rouleaux formation due to mobile phone exposure,” Robert R. Brown, Barbara Biebrich, *Front. Cardiovasc. Med.* , 10 February 2025 Sec. Atherosclerosis and Vascular Medicine, Volume 12 - 2025 | <https://doi.org/10.3389/fcvm.2025.1499499>; see also, <https://ehtrust.org/cellphones-and-your-blood-what-you-need-to-know/>.

⁹⁴ <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/>.

⁹⁵ <https://phiremedical.org/wp-content/uploads/2020/11/2020-Non-Ionising-Radiation-Consensus-Statement.pdf>.

⁹⁶ <https://www.iaff.org/cell-tower-radiation/>.

⁹⁷ 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/>.

18. **Comprehensive overview** of the adverse biological effects on people and the environment is provided at https://ehtrust.org/wp-content/uploads/EHT-5G-Health-and-Environment-Open-Letter-3_2021-3.pdf.

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.⁹⁸
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.⁹⁹ One of those who remained has since died of cancer. The order cited residents having reported “headaches, ringing in the ears, dizziness, heart palpitations, nausea, and skin rashes,” and, e.g., a child who had “to sleep with a bucket next to her bed in case she needs to throw up.”¹⁰⁰ Because the telecom carrier threatened to sue, the Board of Health was compelled to rescind the order. The residents filed suit against the city but lost on federal preemption, i.e., no legal recourse for health claims.
 - b. **In Ripon, CA** when a cell tower was placed near an elementary school, 4 children (ages 6-11) got cancer (brain, liver, kidney) and 4 teachers got breast cancer.¹⁰¹ One of the children who contracted brain cancer (glioblastoma) when he was 10 years died in Aug 2024.¹⁰² After the 4th student was diagnosed with cancer, the tower was removed.¹⁰³ Since the tower was removed, it was reported that there were no more instances of cancer at the school.¹⁰⁴
 - 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.¹⁰⁵

⁹⁸ <https://childrenshealthdefense.org/defender/marcia-haller-cell-tower-rf-radiation-sickness/>.

⁹⁹ <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.

¹⁰⁰ <https://ehtrust.org/family-injured-by-cell-tower-radiation-in-pittsfield-massachusetts/>.

¹⁰¹ See beginning of video at https://www.youtube.com/watch?v=-9TMTexPb_0&t=128s .

¹⁰² 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>.

¹⁰³ <https://mdsafetech.org/2019/03/25/cell-tower-to-be-removed-after-4th-ripon-student-diagnosed-with-cancer/>.

¹⁰⁴ See beginning of video at https://www.youtube.com/watch?v=-9TMTexPb_0&t=128s .

¹⁰⁵ <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



College of Engineering and Physical Sciences
Department of Electrical and Computer Engineering

Kingsbury Hall
33 Academic Way
Durham, NH 03824-2619
V: 603.862.1357
F: 603.862.1832
TTY: 7.1.1 (Relay NH)

www.ceps.unh.edu/ece ece.dept@unh.edu

February 13, 2023

Queens Community Board No. 12
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