

September 17, 2021

Honorable Joseph R. Biden, President
The White House
1600 Pennsylvania Avenue N.W.
Washington, DC 20500

Dear President Biden,

We write to you as scientists and public health experts deeply committed to protecting public health and the environment and as authors of more than two thousand publications to urge you to take immediate actions to reduce and restrict the rapid and continuing increase in our schools, workplaces, and communities of wireless microwave radiofrequency radiation (RFR). Instead of racing headfirst towards 5G, the U.S. should invest in a safe technology infrastructure, develop protective wireless radiation safety limits, and enact meaningful policy changes to limit our children's radiation exposures.

When it comes to wireless radiation, U.S. policies have not kept up with the science. On August 13, 2021, the United States Court of Appeals for the District of Columbia Circuit [ruled](#) that the decision by the Federal Communications Commission (FCC) in 2019 to retain its 1996 wireless radiation safety limits for human exposure to wireless radiation was “arbitrary and capricious.” Specifically, the court pointed out that the agency had ignored research showing damage to memory and reproduction and indications that children are more vulnerable to wireless radiation. In an extraordinary rebuke, the court [ordered](#) the FCC to “address the impacts of RF radiation on children, the health implications of long-term exposure to RF radiation, the ubiquity of wireless devices, and other technological developments that have occurred since the Commission last updated its guidelines.”

The bottom line from this landmark ruling is that the decision to re-affirm FCC's 1996 wireless exposure limits does not rest on sound science. Federal agencies have not reviewed the mounting scientific evidence. The court noted that the “silence” of federal health and safety agencies in the FCC record such as the National Cancer Institute, the Environmental Protection Agency, the Centers for Disease Control and Prevention, and the National Institute for Occupational Safety and Health does not mean these agencies agree with the FCC's 1996 limits. The court ruling highlights the fact that relevant US agencies have not reviewed research on: impacts to flora and fauna; long-term exposures from cell towers; children's unique vulnerability; and health effects such as damage to the brain and reproduction.

A strong federal action plan is required to ensure accountability.

Accordingly, to assist the government in devising such policies, we ask

1. That the National Academies of Science, Engineering, and Medicine (NASEM) be tasked with creating an independent interdisciplinary expert committee to include members from the private and public sectors that will provide a detailed report, within a year of its appointment, that will: identify and review relevant recommendations from other advanced nations regarding exposures in schools, homes and workplaces; identify local, state and federal policies that will reduce public and environmental exposures; evaluate current FCC procedures and approaches to compliance testing in light of the most recent science and in light of the new ways people use devices; evaluate the current body of research and identify major scientific data gaps and research priorities; and develop an inter-agency National Action Plan for monitoring, surveillance, and priority-setting to ensure safety for current and future wireless technologies;
2. A full environmental impact review is needed to evaluate 5G and the rapid proliferation of wireless antennas in the country for enhanced networks. [New research](#) establishes that numerous environmental impacts of RFR merit concerted regulatory action, yet the US does not have regulations that protect wildlife and the natural environment. In addition, experts are [documenting](#) the exponentially increasing energy demands of 5G networks, “smart” wireless devices, and new communication technologies which will contribute to climate change and impact public health and our planet.

The [scientific evidence](#) has substantially increased. A [recent analysis](#) published by the Environmental Working Group concluded that FCC limits should be 200 to 400 times lower than the whole-body exposure limit set by the FCC in 1996, if they employed current risk assessment guidelines. Unfortunately, school districts nationwide are deploying high-capacity Wi-Fi networks in school buildings, testing out 5G networks with students, and signing leases with companies to install cell towers on school property, relying on these outdated FCC limits. As the American Academy of Pediatrics and numerous other specialists have noted, children are [uniquely vulnerable](#) to wireless radiation.

We agree that “broadband internet is the new electricity” that enables Americans to do their jobs, to participate equally in school learning and health care, and to create a fairer playing field by

eliminating the digital divide. The United States must bridge the digital divide with a “future-proof” broadband infrastructure that is affordable, reliable, high-speed, and sustainable.

We urge that, wherever possible, the broadband system rely on safer, more secure and efficient, wired connections, especially for schools and other institutions where wired connections will save money and eliminate exposures to wireless radiation, found by the National Toxicology Program to result in clear evidence of cancer, DNA damage to multiple organs, and lower birth weight.

In economic terms, the American Jobs Plan notes that the United States “has some of the highest broadband prices among OECD countries.” Current proposals for wireless 5G are far more costly and wasteful than wired communications. Wired cables create a safer, more secure, faster, and longer-lasting connection. In sum, they are more cost-effective.

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

Yours sincerely,



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APPENDIX

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APPENDIX 1: BIOLOGICAL AND ECOLOGICAL IMPACTS OF WIRELESS AND NON-IONIZING RADIATION

A substantial body of [peer-reviewed science](#) documents multiple serious negative impacts on human health from wireless microwave radiation, including [increased brain](#), [breast](#) and [thyroid](#) cancer risk, [cellular stress](#), [genetic damage](#), harm to the [reproductive system](#), [learning](#) and [memory deficits](#), [behavioral problems](#), [neurological effects](#), [damage to brain development](#), [headaches](#), and various adverse [impacts to wellbeing](#).

Most notable among the science on RFR is the United States’ own years-long [National Toxicology Program](#) (NTP) study into the effects of cellphone radiation exposure. The \$30 million, interagency-supported study originally requested and commissioned by the Food and Drug Administration (FDA) exposed animals in their lifetimes to the same levels of cell phone radiation that humans get today. Using standard protocols for testing, with repeated reviews from relevant federal agencies, the NTP study showed conclusively that low-intensity, modulated radio signals of the form of GSM and CDMA cause cancer and heart damage in animals as well as DNA damage in multiple organs.

Non-ionizing radiation at lower frequencies also can cause biological harm to humans, studies show. As an example, Kaiser Permanente research on prenatal exposures to magnetic field non-ionizing electromagnetic field (EMF) radiation has found increased [miscarriage](#) as well as

higher incidences of [ADHD](#), [obesity](#), and [asthma](#). While several countries have strict limits on residential exposures, the United States has no regulatory limits whatsoever on allowable exposures to magnetic field non-ionizing EMF.

Recent reports from the [Swiss government's](#) EMF expert advisory group, the [National Research Foundation of Korea](#), and [Yale Medicine](#), confirm the view that *legal levels* of wireless radiation can damage the health of children, pregnant women, and the medically vulnerable.

Christopher Portier PhD, a longtime U.S. government scientist now retired, recently submitted a [comprehensive review](#) of the scientific research in a major cell phone/brain cancer lawsuit where he concludes that “the evidence on an association between cellular phone use and the risk of glioma in adults is quite strong.”

“In my opinion, RF exposure probably causes gliomas and neuromas and, given the human, animal and experimental evidence, I assert that, to a reasonable degree of scientific certainty, the probability that RF exposure causes gliomas and neuromas is high,” he wrote.

The [176-page expert report](#) with 443 references was prepared for the plaintiffs in a major product liability [lawsuit](#), Murray et al. v Motorola, Inc. et al., filed in the Superior Court for the District of Columbia against the telecommunications industry. Dr. Portier was the Director of the United States National Center for Environmental Health at the Centers for Disease Control and Prevention in Atlanta, and the Director of the Agency for Toxic Substances and Disease Registry. He is one of many US governments scientists and [advisors to the World Health Organization](#) highlighting the ever-growing body of scientific evidence showing harm.

THE ENVIRONMENTAL IMPERATIVE

The unfettered proliferation of new wireless networks including 5G and 4G antenna densification constitutes a major global contributor to greenhouse gases and hazardous e-waste. Rather than advance climate objectives, 5G instead constitutes an unmitigated disaster for our climate because of the vast surge in energy demand that will take place. Further, 5G deployment will increase environmental levels of RFR, which science documents to be harmful not only to human health, but also to wildlife and the environment.

5G requires hundreds of thousands of new so-called “small” cell towers and billions of new wireless devices, which will use massive amounts of energy in their production, operation, and disposal. 5G antennas are referred to as [“hungry, hungry hippos”](#) and [“a battery vampire.”](#)

[Numerous reports](#) have [documented](#) the exponentially increased use of energy by 5G and 4G densification and the Internet of Things. [Streaming](#) with [wireless](#) results in higher greenhouse gas emissions compared to safer, faster, and more secure corded/wired fiber-optic connections.

While there may be improvements in energy efficiency for new devices individually, these gains are completely lost in the increases in total demand that will take place with the proliferation of games, videos, other streaming services, and the continued generation of highly addictive apps.

Additionally, telecommunications firms contend that 5G network antennas must be sited about every 100 yards, and they have haphazardly started nationwide construction on hundreds of thousands of new “small cell” antennas near our homes and schools.

5G densification to accommodate this wireless infrastructure will inevitably require the removal of countless numbers of trees from urban and rural locales. Not only will this destroy valuable tree canopies, increase greenhouse gases, and damage root systems, but it will cause a dramatic increase in environmental levels of radiofrequency radiation (RFR) known to [damage trees](#).

Wireless technology can also impact [insects](#), [bees](#), [plants](#), [animals](#), and [bacteria](#), all of which are vital to the ecosystem, even in the densest urban environment.

U.S. FEDERAL POLICY ON 5G DISREGARDS HEALTH AND ENVIRONMENTAL IMPACTS

The implication of the NTP study, and a [parallel study](#) carried out by the Ramazzini Institute of Bologna, Italy, along with recent reviews on [oxidative stress](#), reproduction and [genetic effects](#), is that current Federal Communications Commission (FCC) human exposure limits for non-ionizing RFR originating from the wireless infrastructure allow for hazardous levels of exposure. In reality, the push for 5G constitutes an unethical experiment with all of us as unwitting subjects.

The FCC has [proposed new rules](#) for a large range of EMF frequencies (lower than are currently used for wireless networks) without adequate safety testing. As scientific comments in FCC [Docket 19-226](#) document, these lower frequencies cannot be considered safe.

It is not widely appreciated that the FCC already ushered in unprecedented and untested commercial expansion of 5G and 4G cellular technology without serious deliberation on the effects of this new technology on humans and the environment. Its lack of serious, systematic deliberation on the science is demonstrated by its unchecked rejection of the need to comply with

the National Environmental Policy Act (NEPA), the Administrative Procedures Act (APA), and the Americans With Disabilities Act (ADA).

Our historic legal appeal, [EHT et al. v. FCC](#), documents numerous violations of these federal laws and demonstrates how the FCC did not provide evidence of having undergone a “hard-look” or systematic assessment of the scientific evidence on the [FCC’s own record](#) when [deciding in 2019](#) to keep its outdated 1996 wireless radiation limits.

Under NEPA, all major federal regulations must undergo review for their potential impact on the environment. FCC limits are not designed to protect wildlife or the natural environment, yet the FCC refused to conduct an environmental assessment of the 5G network. Although the records were withheld, FOIA investigations by the Environmental Health Trust have found that the FCC [internally discussed](#) the issue of environmental review related to 5G, yet never moved forward to complete one. Studies attached in our appendix show the folly of this unscientific decision as a significant body of research indicates risk to flora and fauna requiring regulatory action.

Unlike other countries that provide robust resources to their people on how to decrease exposure, United States agencies downplay the issue of health effects and provide minimal information on how families can reduce exposures. The Centers for Disease Control (CDC) [hired an industry consultant](#) to draft numerous website pages on the health effects of non-ionizing radiation. The [EPA](#) scrubbed their website of content on potential health risks of wireless radiation and now simply references and parrots the FCC.

Further, the FCC and FDA now state that they rely on a self-appointed, self-monitored, private club termed the International Commission of Non-ionizing Radiation Protection (ICNIRP). This small group of around one dozen scientists is closely allied with industry and does not represent the larger expert scientific community. It repeatedly puts forward [unfounded criticisms](#) of U.S. government research yet remains unchecked by oversight or independent external review. [Numerous investigations](#), [published research](#), and a [2020 report](#) released by European Members of Parliament details the ways in which ICNIRP has serious conflicts of interests and remains under the influence of the telecommunications industry. Yet both the FCC and the FDA substantiate their rejection of the US NTP \$30 million animal study with ICNIRP’s criticism despite the fact that several retired [scientists](#) of the National Institutes of Health have documented that ICNIRP’s criticisms are erroneous.

As a result of the FCC's omissions, the 5G rollout and 4G densification must be halted until environmental evaluations are completed and federally developed safety limits that protect public health and the environment are created.

APPENDIX 2: POLICY RECOMMENDATIONS

Immediate steps are needed to reduce public exposure. As scientists dedicated to public health, we ask that broadband infrastructure projects prioritize a wired telecommunication infrastructure, and that the climate, public health, and environmental impacts of future networks be integrated into any assessment of policy options and proposed regulations promulgated by your administration.

We have developed a list of recommendations that include robust review, research and development of safety limits. However, the most important recommendations are the policy recommendations for immediate reductions of environmental exposures to non ionizing radiation. The research indicating risk is substantial enough to require immediate policy changes. We recommend the following:

- 1. Appointment of an interdisciplinary committee at the National Academies of Science, Engineering, and Medicine (NASEM) to review the science underlying 5G and other wireless networks, to identify major data gaps and uncertainties in underlying science and technology, develop major interdisciplinary training and research programs for medical and engineering professionals, and set near-term and long-term priorities for research on health and safety.** This review must systematically consider the full lifetime costs and benefits of current and future telecom technologies including the evaluation of immediate and long-term climate impacts. The National Academy of Sciences (NAS) Report, 2020, "[An Assessment of Illness in U.S. Government Employees and Their Families at Overseas Embassies](#)" commissioned by the U.S. State Department cites "directed, pulsed radiofrequency energy" as "the most plausible mechanism" to explain the mystery illness suffered by U.S. Embassy personnel. In 2008, an interdisciplinary [NAS Workshop](#) also advised on critical research issues that were effectively ignored.
- 2. As part of infrastructure proposals, the Administration should prioritize wired networks *up to and inside* of buildings and evaluate economic opportunities to**

ensure their environmental sustainability and capacity to bridge the digital divide.

In anticipating thousands of miles of new transmission lines to be laid to renew the electrical grid, we stress that much-needed expanded access to broadband need not and should not depend on wireless networks but instead on economical wired fiber-optic cable that goes to and through the premises.

3. **An immediate halt to the 5G rollout and associated 4G densification.** Consistent with the [actions of France](#) and other governments, and advice from [more than 400](#) experts, we call for a full halt to the more than 1 million new 5G network antennas and associated cell towers — some slated for neighborhoods and areas of pristine wilderness [in our National Parks](#) — and the concomitant destruction of hundreds of thousands of trees and wildlife habitats.
4. **A full environmental review of the impact of 5G network deployment along with associated 4G proliferation.** The U.S. must first do a comprehensive assessment on the environmental and climate impacts of the hundreds of thousands of new 5G/4G wireless facilities which includes impacts to tree canopy, wildlife habitat, and how millimeter waves will impact insects and pollinators and more.
5. **Examination of federal interagency coordination regarding scientific research on non-ionizing electromagnetic radiation impacts to human and environmental health.** The review must engage all relevant U.S. health, science, and environmental agencies (such as the Environmental Protection Agency (EPA), National Cancer Institute (NCI), Occupational Safety and Health Administration (OSHA), the National Institutes of Health (NIH) and National Toxicology Program (NTP), the U.S. Department of Interior, the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, and other agencies that regularly rely on wireless radiation to complete their essential missions, to evaluate relevant scientific evidence of immediate and long-term biological impacts as well as the rapidly expanding impacts on climate, wildlife, and our natural world.
6. **A Congressional hearing with scientific experts and federal agencies to ensure our elected officials are fully informed about the science, policy and needs moving forward in order to develop public health protective policy.**
7. **The development of science-based safety limits for human and wildlife exposures to RFR and non-ionizing EMF.** In consultation with other relevant agencies, the EPA should develop long-term and short-term safety limits based on scientific research. The United States must also develop exposure limits on magnetic field EMF and other

frequencies in the non-ionizing range used in electricity distribution, wireless power transfer and other applications.

8. **Appointment of FCC commissioners who are committed to independence.** We call on you to end [the revolving door](#) through which FCC commissioners come from and return to the telecom industry. The FCC is termed a “Captured Agency” in a Safra Center for Ethics, Harvard Law School report from 2012.
9. **Support a multimedia national public awareness education campaign so that people know why and how to reduce exposure to wireless and other non-ionizing electromagnetic radiation, best steps to be taken in schools and workplaces to improve cybersecurity and safer access to digital technology.** We also ask that your administration develop and validate a nationwide educational campaign for parents, teachers, and the public so they understand why and how to reduce daily exposures to wireless radiofrequency and other non-ionizing radiation from laptops, cell phones, and the numerous digital devices in our lives today. This includes an update to the public information posted on the websites of the CDC, EPA, National Cancer Institute, and FCC to include straightforward, unambiguous recommendations to reduce exposure to non-ionizing radiation as well as refer to the full results of the National Toxicology Program study and other independent research on wireless and non-ionizing radiation.
10. **Promotion of policies that reduce wireless exposures in schools.** Strategies are urgently needed to eliminate sources of radiofrequency radiation in the indoor environment, especially in schools and public buildings. Wi-Fi infrastructure should be replaced with wired networks in the classroom where children spent most of their waking hours.
11. **Labor policy that addresses growing occupational exposures.** An investigation by the National Department of Labor and Occupational Safety and Health Administration into current and projected occupational exposures and practical measures to reduce occupational exposures is urgently needed addressing the range of workplace exposure, from hospitals, to schools, to delivery drivers, to electricians working on rooftops, to cell tower climbers.
12. **The launch of a task force convened by the Surgeon General on how to minimize health effects of technology on children.** The harmful physical, social, and emotional effects of screens are well-documented, yet our children’s use of screens continues to increase.

INTERNATIONAL ACTIONS ON WIRELESS INFRASTRUCTURE

While the U.S. should be leading efforts to create and validate safer technology, especially for our schools and workforce, we have fallen far behind other countries in this regard. Several high-tech nations have surpassed the United States in recognizing not only environmental but also human impacts from wireless radiation exposure. France, Israel, Korea, French Polynesia, and Switzerland, among others, have policies and educational programs to reduce public exposure to wireless and non-ionizing radiation. Numerous countries have far more stringent cell tower radiation exposure limits compared to the United States.

Deeply concerned about growing evidence linking brain cancer to cell phone use, the Korean National Cancer Institute has issued clear recommendations to reduce cell phone radiation to children. Other nations issue notices at points of sale, ban or restrict the use of Wi-Fi and cell phones in schools, and ban the advertising and sale of cell phones to young children.

APPENDIX 3: Reports and White Papers: 5G, Energy Consumption, and Climate

Reports and White Papers

Data Center Forum White Paper, (2020) [Environmentally Sustainable 5G Deployment
https://www.datacenter-forum.com/datacenter-forum/5g-will-prompt-energy-consumption-to-grow-by-staggering-160-in-10-years](https://www.datacenter-forum.com/datacenter-forum/5g-will-prompt-energy-consumption-to-grow-by-staggering-160-in-10-years)

German Environment Agency and German Federal Environment Ministry (2020) ["Fibre optic video transmission is nearly 50 times more efficient than UMTS"
https://www.umweltbundesamt.de/en/press/pressinformation/video-streaming-data-transmission-technology](https://www.umweltbundesamt.de/en/press/pressinformation/video-streaming-data-transmission-technology)

High Council for the Climate Report (2020) ["Controlling the carbon impact of 5G"
https://www.hautconseilclimat.fr/publications/maitriser-limpact-carbone-de-la-5g/](https://www.hautconseilclimat.fr/publications/maitriser-limpact-carbone-de-la-5g/)

Huawei (2020) [5G Power: Creating a green grid that slashes costs, emissions & energy use,
https://www.huawei.com/us/publications/communicate/89/5g-power-green-grid-slashes-costs-emissions-energy-use](https://www.huawei.com/us/publications/communicate/89/5g-power-green-grid-slashes-costs-emissions-energy-use)

Mills, Mark P., National Mining Association / American Coalition for Clean Coal Electricity (2013), [“The Cloud Begins with Coal – Big Data, Big Networks, Big Infrastructure, and Big Power. An overview of the electricity used by the global digital ecosystem.”](https://www.tech-pundit.com/wp-content/uploads/2013/07/Cloud_Begins_With_Coal.pdf)
https://www.tech-pundit.com/wp-content/uploads/2013/07/Cloud_Begins_With_Coal.pdf

National Resources Defense Council, 2014 [“Data Center Efficiency Assessment”](https://www.nrdc.org/sites/default/files/data-center-efficiency-assessment-IP.pdf)
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Shehabi et al., Berkeley Laboratory (2016) [“United States Data Center Energy Usage Report”](https://eta.lbl.gov/publications/united-states-data-center-energy-PDF) [https://eta.lbl.gov/publications/united-states-data-center-energy PDF](https://eta.lbl.gov/publications/united-states-data-center-energy-PDF)

The Center for Energy Efficient Telecommunications (2013) [“The Power of Wireless Cloud: An analysis of the energy consumption of wireless cloud”](https://www.cesc.kth.se/polopoly_fs/1.647732.1600689929!/ceet_white_paper_wireless_cloud_v2%20(1).pdf),
[https://www.cesc.kth.se/polopoly_fs/1.647732.1600689929!/ceet_white_paper_wireless_cloud_v2%20\(1\).pdf](https://www.cesc.kth.se/polopoly_fs/1.647732.1600689929!/ceet_white_paper_wireless_cloud_v2%20(1).pdf)

The Shift Project (2019) [“LEAN ICT: TOWARDS DIGITAL SOBRIETY”: OUR NEW REPORT ON THE ENVIRONMENTAL IMPACT OF ICT”](https://theshiftproject.org/en/article/lean-ict-our-new-report/), [PDF Summary](https://theshiftproject.org/en/article/lean-ict-our-new-report/)
<https://theshiftproject.org/en/article/lean-ict-our-new-report/>

Vertiv 5G (2019) [Telco Industry Hopes and Fears FROM ENERGY COSTS TO EDGE COMPUTING TRANSFORMATION](https://www.vertiv.com/globalassets/documents/white-papers/451-research-paper/10648_advisory_bw_vertiv_266274_0.pdf)
https://www.vertiv.com/globalassets/documents/white-papers/451-research-paper/10648_advisory_bw_vertiv_266274_0.pdf

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Baliga, Jayant, Ayre, Robert, Hinton, Kerry, Tucker, Rodney S. [“Energy Consumption in Wired and Wireless Access Networks”](https://doi.org/10.1109/MCOM.2011.5783987) in IEEE Communications Magazine, vol. 49, no. 6, pp. 70-77, June 2011, doi: 10.1109/MCOM.2011.5783987.

Belkhir, Lotfi and Elmeligi, Ahmed. [Assessing ICT global emissions footprint: Trends to 2040 & recommendations](#), Journal of Cleaner Production, Volume 177, 2018, Pages 448-463, ISSN 0959-6526, <https://doi.org/10.1016/j.jclepro.2017.12.239>.

Corcoran, Peter and Andrae, Anders. (2013). [Emerging Trends in Electricity Consumption for Consumer ICT](#), Global Forecasting of ICT footprints, https://aran.library.nuigalway.ie/bitstream/handle/10379/3563/CA_MainArticle14_all-v02.pdf?sequence=4

Li, C., Zhang, J., and Letaief, K. B. [Energy Efficiency Analysis of Small Cell Networks](#)," 2013 IEEE International Conference on Communications (ICC), 2013, pp. 4404-4408, doi: 10.1109/ICC.2013.6655259.

Morley, Janine, Widdicks, Kelly, Hazas, Mike. "[Digitalisation, energy and data demand: The impact of Internet traffic on overall and peak electricity consumption](#)" Energy Research & Social Science, Volume 38, 2018, Pages 128-137, ISSN 2214-6296, <https://doi.org/10.1016/j.erss.2018.01.018>.

Shehabi, Arman, Walker, Ben , Masanet Eric. (2014) "[The energy and greenhouse-gas implications of internet video streaming in the United States](#)" Environmental Research Letters <https://doi.org/10.1088/1748-9326/9/5/054007>

Sikdar, B. "[A study of the environmental impact of wired and wireless local area network access](#)," in IEEE Transactions on Consumer Electronics, vol. 59, no. 1, pp. 85-92, February 2013, doi: 10.1109/TCE.2013.6490245.

Xiaohu Ge, Jing Yang, Gharavi, Hamid. [Energy Efficiency Challenges of 5G Small Cell Networks](#). IEEE Commun Mag. 2017 May;55(5):184-191. doi: 10.1109/MCOM.2017.1600788. Epub 2017 May 12. PMID: 28757670; PMCID: PMC5528873.

APPENDIX 4: Scientific Citations on Wireless, Non-ionizing Radiation, Health and Environment

Adams, Jessica A., Tamara S. Galloway, Debapriya Mondal, Sandro C. Esteves and Fiona Mathews. "Effect of mobile telephones on sperm quality: A systematic review and

meta-analysis.” *Environment International* 70 (September 2014): 106-112.

<https://doi.org/10.1016/j.envint.2014.04.015>.

Aldad, Tamir S., Geliang Gan, Xiao-Bing Gao, and Hugh S. Taylor. “Fetal Radiofrequency Radiation Exposure From 800-1900 Mhz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice.” *Scientific Reports* 2, no. 312 (2012).

[10.1038/srep00312](https://doi.org/10.1038/srep00312).

Asl, Jafar Fatahi, Bagher Larijani, Mehrnoosh Zakerkish, Fakher Rahim, Kiarash Shirbandi, and Rasoul Akbari. “The possible global hazard of cell phone radiation on thyroid cells and hormones: a systematic review of evidence.” *Environmental Science and Pollution Research* 26, no. 18 (June 2019): 18017-18031.

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APPENDIX 5: Letters from the EPA and other federal agencies confirming lack of adequate human health and environmental review

1. [2020 Letter from EPA to EHT Confirming Lack of Environmental Review](#)
2. Correspondence between NCI and FDA with New Hampshire Commission

On January 8, 2021 the EPA wrote Theodora Scarato Executive Director of Environmental Health Trust that the EPA had no funded mandate to research the issue of EMFs and confirmed that they have not reviewed this research since 1984.

2020 EPA Email to Environmental Health Trust: “No Funded RFR Mandate”

----- Forwarded message -----

From: **Veal, Lee**<Veal.Lee@epa.gov>

Date: Wed, Jul 8, 2020 at 11:32 AM

Subject: RE: Letter with specific Questions Related to the FDA review and to the EPA, CDC, NIOSH and FDA Jurisdiction on EMFs

To: Theodora Scarato <Theodora.Scarato@ehtrust.org>

Dear Director Scarato;

Thank you for sending us your questions and references regarding radiofrequency (RF) radiation. Up through the mid-1990s, EPA did study non-ionizing radiation. The Telecommunications Act of 1996 directs the Federal Communications Commission (FCC) to establish rules regarding RF exposure, while the U.S. Food and Drug Administration (FDA) sets standards for electronic devices that emit non-ionizing or ionizing radiation. EPA does not have a funded mandate for radiofrequency matters, nor do we have a dedicated subject matter expert in radiofrequency exposure. The EPA defers to other agencies possessing a defined role regarding RF. Although your questions are outside our current area of responsibilities, we have provided a response to each one as you requested.

1. *What is your response to these scientists' statements regarding the FDA report and the call to retract it?*

EPA Response: The EPA does not have a funded mandate for radiofrequency matters, has not conducted a review of the FDA report you cited or the scientists' statements, and therefore has no response to it.

2. *To the FDA- What consultants were hired for the FDA review and report on cell phone radiation?*

EPA Response: This is not an EPA matter. Please refer this question to the FDA.

3. *What U.S. agency has reviewed the research on cell phone radiation and brain damage? I ask this because the FDA only has looked at selected studies on cancer. If your agency has not, please simply state you have not.*

EPA Response: EPA's last review was in the 1984 document [Biological Effects of Radiofrequency Radiation \(EPA 600/8-83-026F\)](#). The EPA does not currently have a funded mandate for radiofrequency matters.

4. *What U.S. agency has reviewed the research on damage to memory by cell phone radiation? If so, when and send a link to the review.*

EPA Response: EPA's last review was in the 1984 document [Biological Effects of Radiofrequency Radiation \(EPA 600/8-83-026F\)](#). The EPA does not currently have a funded mandate for radiofrequency matters.

5. *What U.S. agency has reviewed the research on damage to trees from cell phone radiation? If so, when was it issued and send a link to the review. [Note this study showing damage from long term exposure to cell antennas.](#)*

EPA Response: The EPA does not have a funded mandate for radiofrequency matters, and we are not aware of any EPA reviews that have been conducted on this topic. We do not know if any other U.S. agencies have reviewed it.

6. *What U.S. agency has reviewed the research on impacts to birds and bees? If so, when and send a link to the review. I will note the latest research showing [possible impacts to bees](#) from higher frequencies to be used in 5G.*

EPA Response: The EPA does not have a funded mandate for radiofrequency matters, and we are not aware of any EPA reviews that have been conducted on this topic. We do not know if any other US agencies have reviewed it.

Correspondence between NCI and FDA with New Hampshire Commission

- [Correspondence from NCI and FDA to New Hampshire Commission](#)
- See also [Final Report on New Hampshire Commission to Study the Environmental and Health Effects of Evolving 5G Technology on 5G Sent to New Hampshire Governor and Legislature PDF](#)

APPENDIX 6: A Short US Timeline on Wireless Radiation Regulations

A Short US Timeline on Wireless Radiation Regulations

After WWII: US begins robust interagency research: TriService Conference Reports [1957](#), [1958](#), [1959](#); [1967 Air Force Report](#), [1971 Naval Report](#), [1978 Report Office of Science & Technology](#), [1978 Conference](#), [1979 Dept of Commerce Report](#), [1980 Dept of Energy Report](#), [1994 Air Force Report](#).

1979: United States Congressional Hearing (Transcript [1](#), [2](#), [3](#))

1980's to 1996: EPA measured levels in US and was [tasked to develop](#) wireless radiation safety limits. [1984 EPA Report on Biological Effects](#), [1986 Report on Environmental Exposure Levels](#)

1995: EPA meets with FCC & [presents](#) EPA's plan to develop RF safety limits

1996: EPA [defunded](#) from researching EMFs. EPA closed project measuring EMF levels in US.

1996: FCC adopts [RF wireless radiation rules and safety limits](#) from ([ANSI/IEEE C95.1-1992](#) and [NCRP's 1986 Report](#) based primarily on thermal effects- thus US does not have federally developed limits.

1999: [FDA requests](#) the National Toxicology Program to study cell phone radiation because of the lack of safety data on health effects from long term chronic exposure.

2008: [National Research Council Report "The Identification of Research Needs Relating to Potential Biological or Adverse Health Effects of Wireless Communications Devices"](#)

2008: [US House Subcommittee Hearing: Health Effects of Cell Phone Use](#)

2009: [US Senate Subcommittee Hearings on Health Effects of Cell Phone Radiation](#)

2012: [Government Accountability Office Report](#) recommends cell phone test procedures be reassessed to ensure they reflect real world use and are based on latest science.

2013: FCC opens [official inquiry 13-84](#) asking if RF limits/regulations need to be updated.

2013 to 2019: Thousands of pages of [scientific evidence](#) submitted to FCC in Docket 13-84.

2018: National Toxicology Program releases [Final Reports](#) on large scale animal studies of chronic exposure to cell phone radiation and concludes “clear evidence” of cancer and genotoxicity. FDA [rejects](#) the findings. EHT and expert scientists [write the FDA](#) regarding their biased review and have not received a response.

2019: FCC decides in [19-126](#) not to update 1996 RF limits.

2020: EHT [filed case](#) against the FCC arguing its 2019 decision was not based on adequate review of the [FCC 13-84 record](#).

2021: The U.S Court of Appeals for DC Circuit [rules](#) on EHT et al., v. FCC in favor of environmental health groups.

Notable US Agency letters

1996: [EPA Letter that US Limits are only protective for thermal impacts](#)

1999: [Scientists from US federal agencies-radiofrequency interagency workgroup \(RFIWG\)-write IEEE Work Group Chair on critical issues about RF exposure limits](#)

2002: [EPA Letter stating FCC’s 1996 RF limits do not protect against all effects](#)

2003: [Scientists from US federal agencies \(RFIAWG\) again write IEEE on additional issues about IEEE’s RF exposure limits](#). Both 1999 and 2003 letters remain unanswered.

2014: [U.S. Department of the Interior Letter to the National Telecommunications and Information Administration stating FCC Guidelines are outdated](#).

APPENDIX 7: Letters to the FDA on their Literature Review and 2020 Website Update on “Cell Phone Safety.”

- [Letter calling for a retraction signed by several scientists \(see below\)](#).
- [Ronald Melnick PhD’s letter to the FDA on the National Toxicology Program study](#)
- [Prof. Tom Butler of the University College in Cork, Ireland’s letter to the FDA](#)
- [Igor Belyaev, PhD, Dr. Sc. Head, Department of Radiobiology of the Cancer Research Institute, Biomedical Research Center of the Slovak Academy of Science letter to the FDA](#)
- [Alfonso Balmori, BSc statement to the FDA](#)
- [Albert Manville PhD, retired Senior Wildlife Biologist, Division of Migratory Bird Management, U.S. Fish & Wildlife Service, Wash. DC HQ Office \(17 years\); Senior Lecturer, Johns Hopkins University](#)

The Honorable Alex Azar
Secretary of Health and Human Services
U.S. Department of Health & Human Services
200 Independence Avenue, S.W.
Washington, D.C. 20201

The Honorable Stephen Hahn MD
Commissioner of Food and Drugs Administration

Jeffrey Shuren, M.D., J.D.
Director, Center for Devices and Radiological Health

Food and Drug Administration
10903 New Hampshire Avenue
Silver Spring, MD 20857

Sent electronically to ombuds@oc.fda.gov, DICE@fda.hhs.gov, jeff.shuren@fda.hhs.gov,
Stephen.Hahn@fda.hhs.gov, Secretary@HHS.gov,

Re: Call for Retraction of Flawed FDA Literature Review on Cell Phones

Dear Honorable Commissioner Hahn, Honorable Secretary of Health and Human Services Alex Azar and Dr. Shuren, Director of the FDA Center for Devices and Radiological Health;

As experts in the field of bioelectromagnetics, we are writing to urge you to retract a recent flawed report entitled “[Review of Published Literature between 2008 and 2018 of Relevance to Radiofrequency Radiation and Cancer](#)”. Further, we ask you to remove and replace recent revisions to FDA websites that invoke this recent report as grounds for asserting that cellphone radiation has no known health effects, contrary to official reviews in other high-technology nations.

As many of us have detailed in letters sent to your offices, this report does not merit publication or posting on FDA’s website as it represents a highly limited review of the literature, contains “numerous scientific errors” omitting important studies for review and including studies that have been rejected for their flawed methods, and fails to acknowledge official actions by governments in [France](#), [South Korea](#), [Belgium](#), [Cyprus](#), [European Parliament](#) and recommendations by the [American Academy of Pediatrics](#) and [California Department of Public Health](#) that have issued specific advice about why and how to reduce exposures to cellphones and other wireless radiation sources. By dismissing scientific evidence of adverse effects and downplaying the need for individuals to take precautionary measures when using cell phones, the FDA review does not comport with the Agency’s mission of protecting and promoting public health.

Contrary to what the report and FDA website assert, there is no “scientific consensus” that cell phone radiation and 5G are safe as evidenced by the [official statements](#) of hundreds of scientists and medical organizations.

The FDA in collaboration with US health and environmental agencies should convene an interdisciplinary panel of independent experts to provide a systematic review of relevant literature on cell phones and wireless radiation and health to guide the agency in its policy recommendations. Further, any such review

should also consider the growing evidence of environmental effects along with public health impacts of exposures as well as relevant policy developments.

Signed,

Ronald Melnick PhD, former National Institutes of Health Scientist

Lennart Hardell MD, PhD, Professor Department of Oncology, Faculty of Medicine and Health, Örebro University, SE-701 82 Örebro, Sweden (retired). The Environment and Cancer Research Foundation Örebro, Sweden

Samuel Miham MD, former Head of the Chronic Disease Epidemiology Section, Washington State Department of Health

David Carpenter MD, Director of the Institute for Health and Environment at University of Albany's School of Public Health, former director of the Wadsworth Laboratory of the New York State Department of Health.

Henry Lai, PhD, Professor Emeritus, University of Washington, Seattle, WA

Alfonso Balmori, BSc Biologist. Spain

Beatrice Golomb, MD PhD, Professor of Medicine, University of California, San Diego

Devra Davis, PhD, MPH President of Environmental Health Trust and Fellow American College of Epidemiology, former founding Executive Director, Board on Environmental Studies and Toxicology, National Academies of Sciences, Engineering and Medicine

Hillel Baldwin, MD, Fellow American Association of Neurological Surgeons

Dr. Anthony Miller, Professor Emeritus of University of Toronto and World Health Organization Senior Advisor to Environmental Health Trust

Prof. Tom Butler, University College, Cork, Ireland

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Magda Havas, Ph.D., Associate Professor, Trent University

Prof. Suleyman Dasdag, Department of Biophysics, Medical School of Istanbul Medeniyet University, Istanbul, Turkey

Don Maisch, PhD, Australia

Martin L. Pall, PhD, Professor Emeritus of Biochemistry and Basic Medical Sciences, Washington State University

Peter Hensinger M.A.

Hugo Schooneveld, PhD, Former senior researcher, Wageningen University, the Netherlands.

Dr. Monika Krout, Germany

Professor Elihu D. Richter MD, MPH at the Occupational and Environmental Medicine Department at the Hebrew University-Hadassah School of Public Health and Community Medicine

Marc Arazi MD of Phonegate Association, France

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