ENVIRONMENTAL HEALTH TRUST

October 21, 2026

Department of Health and Human Services
200 Independence Avenue, S.W.
Washington, DC 20201

Re: Request for Information on Electromagnetic Fields (EMFs), Radiofrequency (RF) Radiation, and Wireless Radiation Exposure (HHS-OASH-2026-0397)

COMMENTS OF ENVIRONMENTAL HEALTH TRUST

I. Introduction

This filing provides comments from Environmental Health Trust (EHT) in the above-referenced proceeding.[1] EHT is a 501(c)(3) non-profit corporation focused on scientific and legal research, as well as policy advice and support, regarding environmental health. EHT is also dedicated to educating the public about emerging dangers to human health and the environment, particularly as it relates to radiofrequency (RF) emissions from wireless infrastructure and devices.

II. Summary

EHT welcomes the Department's invitation to submit scientific studies and other related technical information.

[1] *Request for Information on Electromagnetic Fields (EMFs), Radiofrequency (RF) Radiation, and Wireless Radiation Exposure*, 91 Fed. Reg. 59,792 (Sept. 21, 2026), https://www.govinfo.gov/content/pkg/FR-2026-09-21/pdf/2026-19252.pdf (hereafter "*RFI*").

EHT strongly urges HHS and both the Commission and FDA to, under the weight of the scientific evidence, find that the current RF exposure limits are insufficient to protect public health and the environment. They should instruct the FCC that those RF limits must be lowered to reflect the science previously disregarded by both the Commission and FDA to reflect the work accomplished by other countries. It has never been sufficient to rely almost solely on industry-funded and industry-influenced studies. The entire record in this proceeding requires careful, detailed, and transparent study. The real-time wireless radiation emissions and exposures from networks and devices is a matter of national interest and wireless radiation measurements must be made available. The Surgeon General has reported a sharp rise in screen addiction which necessarily increases wireless radiation exposure to wireless device users. A national Radiation Weather Exposure (REW) system, similar in format to the National Weather Service's Air Quality Index (AQI) is needed, in order for citizens, scientists, regulators, operators and others to be able to clearly and transparently see the wireless radiation levels to which they are being exposed. Standards for measuring wireless radiation emissions and exposures to which humans, flora and fauna are subjected are urgently needed as a matter of national concern, and increased radiation exposure due to screen addiction needs further assessment and study.

Consistent with the Department's request for information on "the current state of the scientific evidence on RF/EMF exposures and health outcomes,"[2] EHT does not limit its submission to any single category of study, exposure source, or health endpoint. The RFI expressly invites evidence of adverse effects at levels below current federal exposure limits (Question 12), evidence of environmental effects (Question 14), and any additional scientific

[2] *Id.*

evidence the Department should consider (Question 18).[3] EHT therefore presents the scientific and technical record as fully as possible, identifying for each source whether it is peer-reviewed research, a government report, a spectrum management or precision-measurement practice or standard, or another type of evidence, as the RFI requests.

A comprehensive record is especially important here because the existing federal exposure limits were adopted and retained by the Federal Communications Commission (FCC or "Commission"), which has repeatedly declined to engage with much of the science presented to it on this issue. The U.S. Court of Appeals for the D.C. Circuit confirmed that failure in *Environmental Health Trust v. FCC*, 9 F.4th 893 (D.C. Cir. 2021),[4] holding that the Commission had not adequately explained its conclusion that its limits protect against non-cancer harms. Notably, the Court also cited the Food and Drug Administration (FDA) which is an HHS operating division. The *Shuren Letter* is an FDA product which is greatly flawed and must be replaced with a product that reflects gold standard science.[5]

The Department should not treat any perceived FCC or court limits as a substitute for its own independent review of the evidence. EHT introduced a comprehensive scientific analysis and inventory on August 6, 2025, when it petitioned the FCC to comply with the D.C. Circuit's mandate in *Environmental Health Trust v. FCC*, and that entire record is now submitted to the record in this proceeding.[6] Through this submission, EHT intends to update the scientific record

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[3] *Id.*
[4] *Env't Health Trust v. FCC,* 9 F.4th 893 (D.C. Cir. 2021).
[5] *See Id.* at 904 (citing Jeffrey Shuren's April 24, 2019 letter to Julius Knapp, Chief of the FCC's Office of Engineering and Technology).
[6] Petition of Environmental Health Trust 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, ET Docket Nos. 13-84 & 19-226 (FCC filed Aug. 6, 2025), https://www.fcc.gov/ecfs/search/search-filings/filing/10806965028484 (hereafter "*EHT v. FCC* Petition"). Also included as Appendix A.

first introduced when it petitioned the Federal Communications Commission to comply with the D.C. Circuit's mandate in *Environmental Health Trust v. FCC*[7] in August 2025.[8]

Given that this topic is (i) the subject of ongoing litigation,[9] and (ii) that most countries who seriously examined evidence of wireless radiation harms to humans, flora and fauna have dramatically reduced the allowable Radiofrequency (RF) exposure limits, and (iii) that the United States possesses world-leading technologies for radio-spectrum radiation analysis, mitigation, dosimetry, propagation, and risk assessment, the Department should give full weight to the substantial body of evidence that current federal RF exposure limits do not adequately protect human health or the environment. To strengthen the scientific record before the Department, EHT reiterates many of the arguments made in its August 2025 petition bolstered by additional scientific studies, as well as update the wealth of scientific studies contained in the petition's Appendices. Furthermore, despite the *RFI*'s silence on the environmental effects of RF, these comments will include studies on it. In *Environmental Health Trust v. FCC,* the D.C. Circuit remanded the Commission's decision to retain its RF exposure limits in part because the Commission had failed to address record evidence of RF effects on the environment, including on wildlife and trees. The Department should therefore consider the environmental evidence in its own right, rather than rely on an FCC framework that a federal court has found did not adequately account for it. The Department is encouraged to dialogue with the U.S. Environmental Protection Agency (EPA) and the environmental and health agencies of other countries. The Department is encouraged to stimulate and fund ample and transparent research in

[7] *Env't Health Trust v. FCC,* 9 F.4th.
[8] *EHT v. FCC* Petition.
[9] *Env't Health Trust v. FCC,* 9 F.4th. *See also* Petitioners' Reply in Support of Mandamus, *In re Child.'s Health Def.*, No. 26-1121 (D.C. Cir. Oct. 9, 2026), https://ehtrust.org/wp-content/uploads/In-re-CHD-et-al.-Petitioners-Reply-in-Support-of-Mandamus.pdf.

the fields of EMF Exposure, Human RF Exposure (to children and adults and to the vulnerable) and also EMF and RF exposure to flora and fauna. Any other forms of wireless radiation should also be studied in this context.

EHT acknowledges the following categories outlined in the Department's Request for Information:

a. Public Experiences and Reported Potential Adverse Health Effects

b. Exposure Standards and Risk Assessment

c. Measuring Human Exposure and Public Health Surveillance

d. Existing Evidence

e. Federal Research Priorities

f. Additional Information

What follows is a detailed exposition that addresses each of these categories.

III. Detailed Comments

A. *Environmental Health Trust (EHT) v. FCC*: The Scientific Record is Still Largely Unexamined, and the Court Wants FDA Input.

The federal court mandate requires the Commission, and by extension the Food and Drug Administration (FDA) to go back to the scientific record[10] that was in place in the FCC docket at

[10] *Env't Health Trust v. FCC,* 9 F.4th at 903 ("Under this highly deferential standard of review, we find the Commission's order arbitrary and capricious in its failure to respond to record evidence that exposure to RF radiation at levels below the Commission's current limits may cause cancer. … That failure undermines the Commission's conclusions regarding the adequacy of its testing procedures, particularly as they relate to children, and its conclusions regarding the implications of long-term exposure to RF radiation, exposure to RF pulsation or modulation, and the implications of technological developments that have occurred since 1996, all of which depend on the premise that exposure to RF radiation at levels below its current limits causes no negative health effects.") On the FDA, the Court notes that the FCC states "the FDA's conclusion that, in light of the information, exposure to RF

the time of the 2019 FCC Order.[11] Some of the many key studies and reports from the 2019 docket that still require proper scientific review by the FCC and FDA include and are not limited to:

i. J.A. 3068 (BioInitiative Working Grp., *BioInitiative Report* (Cindy Sage & David O. Carpenter eds., 2012)).
ii. Igor Yakymenko et al., *Oxidative Mechanisms of Biological Activity of Low-Intensity Radiofrequency Radiation*, 35 Electromagnetic Biology & Med. 186 (2016), https://doi.org/10.3109/15368378.2015.1043557.
iii. Henrietta Nittby et al., *Increased Blood-Brain Barrier Permeability in Mammalian Brain 7 Days After Exposure to the Radiation from a GSM-900 Mobile Phone*, 16 Pathophysiology 103 (2009), https://doi.org/10.1016/j.pathophys.2009.01.001.
iv. Henry Lai, *A Summary of Recent Literature on Neurobiological Effects of Radiation*, in *Mobile Communications and Public Health* 187-222 (M. Markov ed., 2018).
v. Milena Foerster et al., *A Prospective Cohort Study of Adolescents' Memory Performance and Individual Brain Dose of Microwave Radiation from Wireless Communication*, 126 Env't Health Perspectives 077007 (2018), https://doi.org/10.1289/EHP2427.
vi. Nat'l Toxicology Program, U.S. Dep't of Health & Hum. Servs., NTP TR 595, *Toxicology and Carcinogenesis Studies in Hsd:Sprague Dawley SD Rats Exposed to Whole-Body Radio Frequency Radiation at a Frequency (900 MHz) and Modulations (GSM and CDMA) Used by Cell Phones* (2018), https://ntp.niehs.nih.gov/publications/reports/tr/tr595.
vii. Ju Hwan Kim et al., *Long-Term Exposure to 835 MHz RF-EMF Induces Hyperactivity, Autophagy and Demyelination in the Cortical Neurons of Mice*, 7 Sci. Reps. 41129 (2017), https://doi.org/10.1038/srep41129.
viii. Ronald L. Melnick, *Commentary on the Utility of the National Toxicology Program Study on Cell Phone Radiofrequency Radiation Data for Assessing Human Health Risks Despite Unfounded Criticisms Aimed at Minimizing the Findings of Adverse Health Effects*, 168 Env't Rsch. 1 (2019), https://doi.org/10.1016/j.envres.2018.09.010.
ix. L. Falcioni et al., *Report of Final Results Regarding Brain and Heart Tumors in Sprague-Dawley Rats Exposed from Prenatal Life Until Natural Death to Mobile Phone Radiofrequency Field Representative of a 1.8 GHz GSM Base Station Environmental Emission*, 165 Env't Rsch. 496 (2018), https://doi.org/10.1016/j.envres.2018.01.037.

radiation at levels below the Commission's current limits does not cause harmful health effects. But they offer 'no articulation of the factual . . . bases' for the FDA's conclusion." *Id.* at 905 (citation omitted).

[11] *Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies*, Resolution of Notice of Inquiry, ET Docket 13-84, FCC 19-126 (2019).

x. He Gao et al., *Personal Radio Use and Cancer Risks Among 48,518 British Police Officers and Staff from the Airwave Health Monitoring Study*, 120 Brit. J. Cancer 375 (2019), https://doi.org/10.1038/s41416-018-0365-6.

Moreover, a detailed report that was submitted to the Department of Health and Human Services (HHS) under separate cover by EHT's Founder, Dr. Devra Davis, must be reviewed,[12] as must the detailed scientific record as submitted in EHT's *FCC Petition* on August 6, 2025.[13] A large number of additional studies from that record are highlighted throughout these comments and Appendices. Per the Court's order, they must be considered.

The Commission must also examine and develop spectrum management standards for assessing emissions and exposures that impact humans, flora, and fauna. Risk assessment and health impacts from radiofrequency exposure studies ultimately cannot be uniformly coherent without such standards.

B. The Complete Scientific Record Must Be Reviewed and the HHS and FDA Must Look to More Advanced Wireless Radiation Limits in Other Countries, Especially Due to the Ongoing Harms.

The technology now exists to measure radiofrequency emissions in real-time throughout the country and compare readings against exposure limits of peer countries—highlighting the insufficiency of the U.S. exposure standards compared to other countries. As noted in a 2026

[12] Devra Davis, *Response to HHS Request for Information*, Docket No. HHS-OASH-2026-0397 (Oct. 21, 2026). Also included as Appendix B. Dr. Davis has submitted, and may continue to submit, additional scientific data into the HHS record.
[13] *EHT v. FCC* Petition.

National Spectrum Management Association (NSMA) presentation,[14] the proposed National Radiation Exposure Weather (REW) system operates much like the Air Quality Index (AQI)[15] (see Figure 1) and uses calibrated, professional-grade radio spectrum analyzers to measure wireless radiation exposure levels. By a recent simulated monitoring of 15,007 locations nationwide, which is intended to illustrate the capabilities of a future national wireless radiation monitoring network, about 90.4% are compliant with the Commission's extremely old Human Radiofrequency (RF) exposure standard, yet when gauged against the Swiss standard, only about 0.01% of those same 15,007 sites meet Swiss protection limits.[16] Deploying a real time 24/7/365 REW system nationwide will enable citizens, scientists, property owners, network operators, and regulators to have an unprecedentedly clear understanding of the radiation exposure environment. With such a clear picture now technically available, the urgency for the U.S. to make such measurements widely available is obvious. It is also obvious that it is past time to revise the U.S. Human RF exposure standards to be in line with peer countries. See Figures 3-6 below for examples of how the REW system operates in practice.

[14] Joseph M. Sandri, Jr., *National RF Emission Map & Monitoring Networks: Real Time, Prior Measured & Predictive*, 18-19 (May 13, 2026), https://www.nsma.org/wp-content/uploads/National-RF-Emission-Map-and-Monitoring-Networks-Real-Time-Prior-Measured-and-Predictive-Joseph-Sandri.pdf.

[15] AirNow is the main public Air Quality Index (AQI) source. It is a partnership of the Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration NOAA, National Weather Service (NWS), National Park Service, National Aeronautics and Space Administration (NASA), Center for Disease Control and Prevention (CDC), U.S. Forest Service and state, tribal and local air agencies. *See*: www.airnow.gov.

[16] According to data provided to EHT by Waterford Consultants. For background on the study, *see* Appendix C.

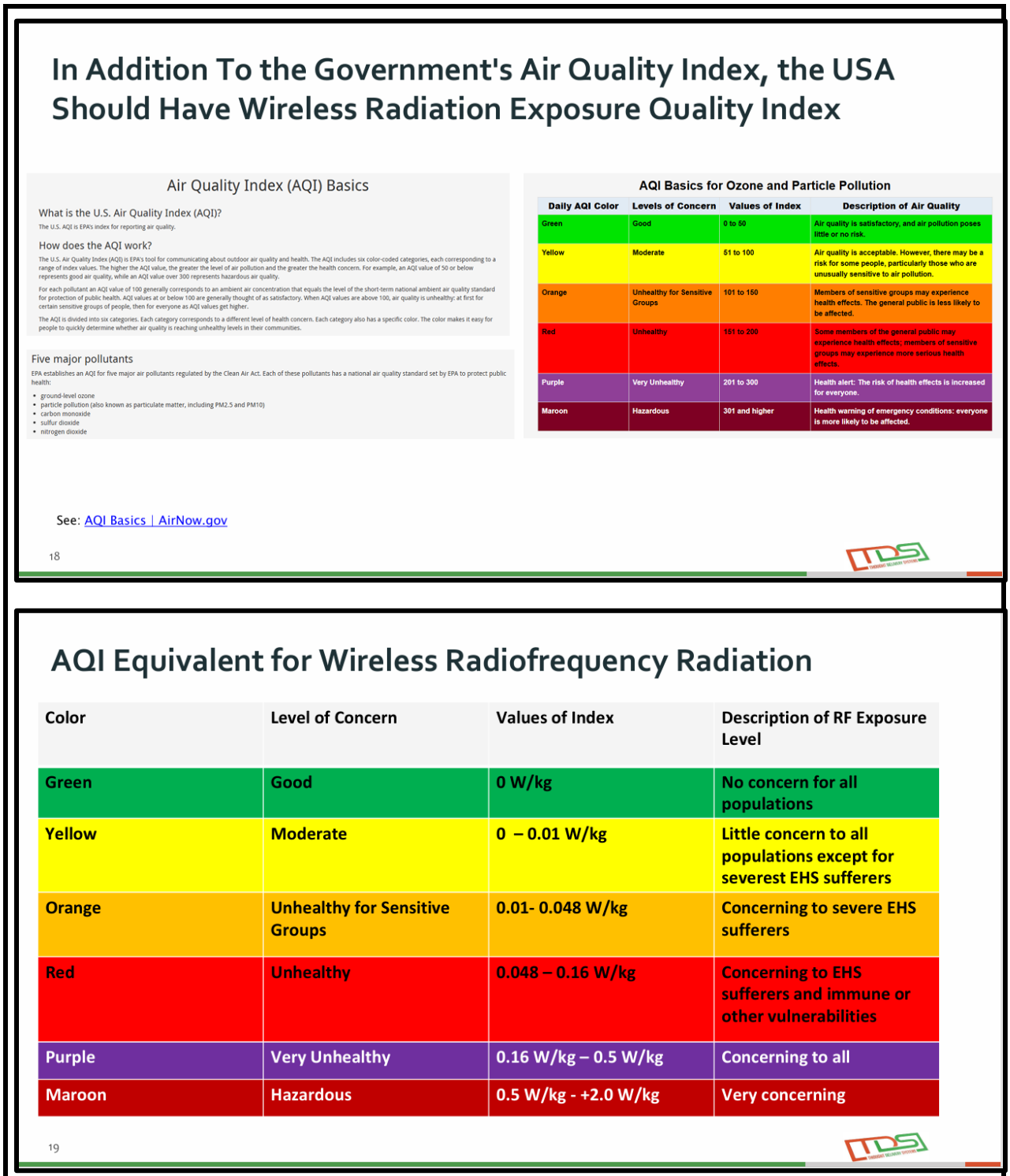


Figure 1. Air Quality Index and proposed equivalent for radiofrequency radiation.[17]

[17] Sandri, *supra* note 14 at 18-19.

The United States excels at real-time monitoring of weather, air quality, water quality, and ionizing radiation, and its expert agencies are well-accustomed to providing transparently accessible resources to researchers and the public.

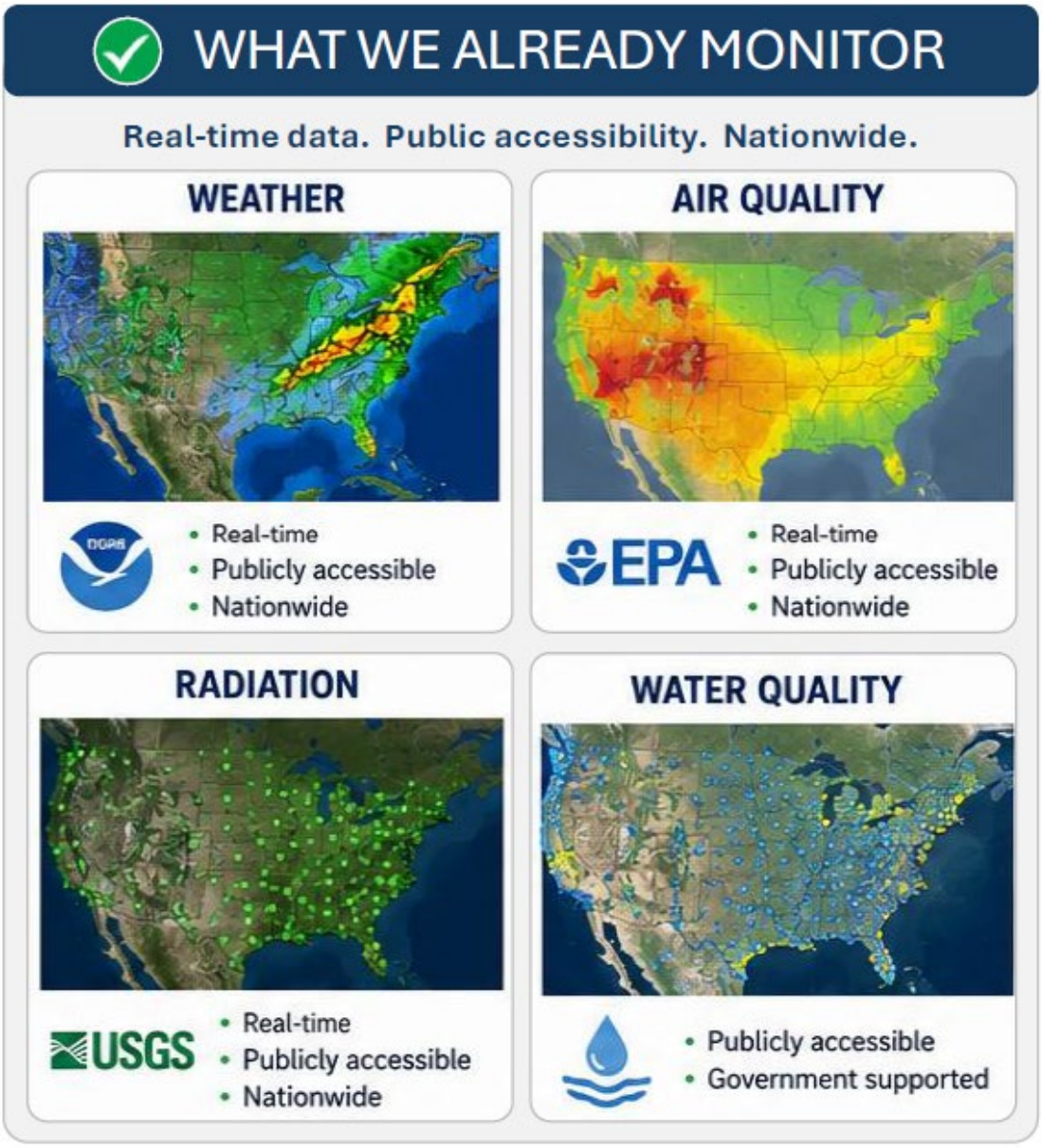


Figure 2. The United States already monitors weather, air quality, radiation, and water quality in real time.[18]

[18] Source: Waterford Consultants.

There is no good reason why the United States' children, property owners, and the public at large, along with flora and fauna, should be exposed to exponentially higher wireless radiation levels than those of other countries.

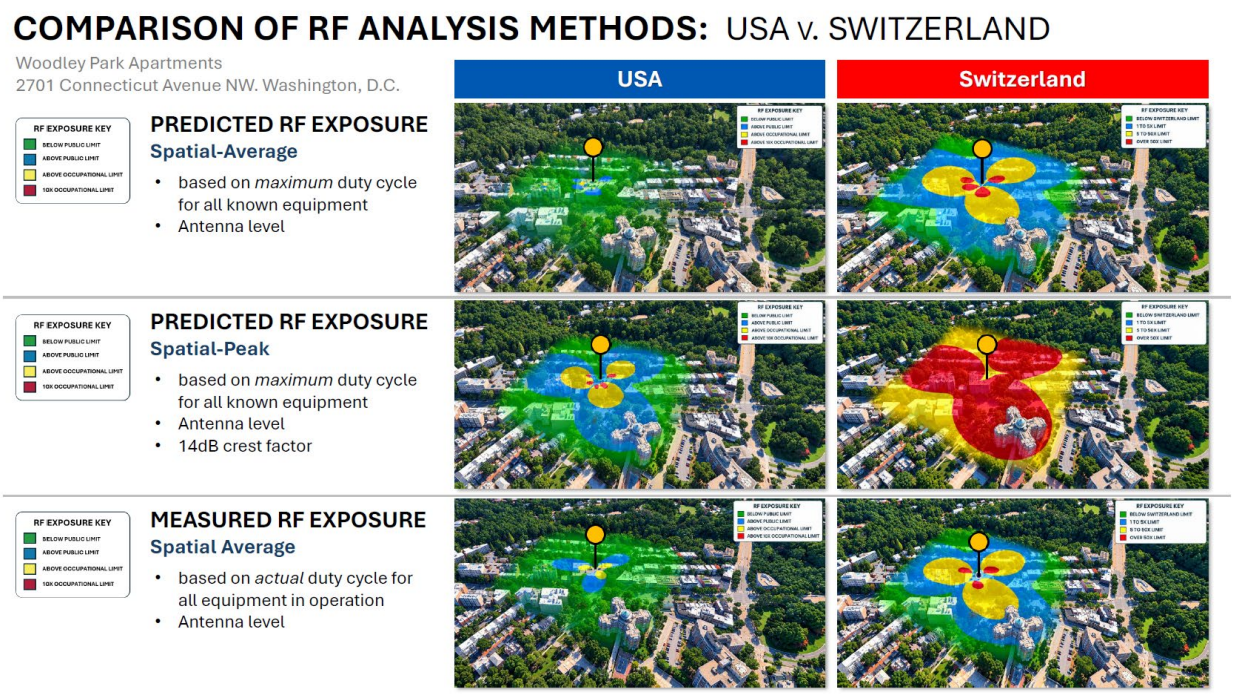


Figure 3. Radiation plume of a tower located at the Woodley Park Apartments in Washington, D.C. Green areas represent areas below the U.S. and Swiss limits respectively, while increasingly warmer colors represent stages of exceedance of the country's general population exposure limits. Sources: Cardinal Communications,[19] Waterford Consultants.

[19] Americans for Responsible Technology et al., Citizen Petition for Imminent Hazard Ruling Concerning the Safety of Human Exposure to Non-Ionizing Radiofrequency Radiation, at pages 236–242, *RF Exposure Analysis: 2701 Connecticut Avenue, NW, Washington, DC. Cardinal Communications, a Division of Thought Delivery Systems, Inc. for THE BALANCE GROUP,* Docket No. FDA-2021-P-1347, (filed Dec. 21, 2021), https://www.americansforresponsibletech.org/_files/ugd/2cea04_db07f220b02245a88cc4e9e5561dad15.pdf.

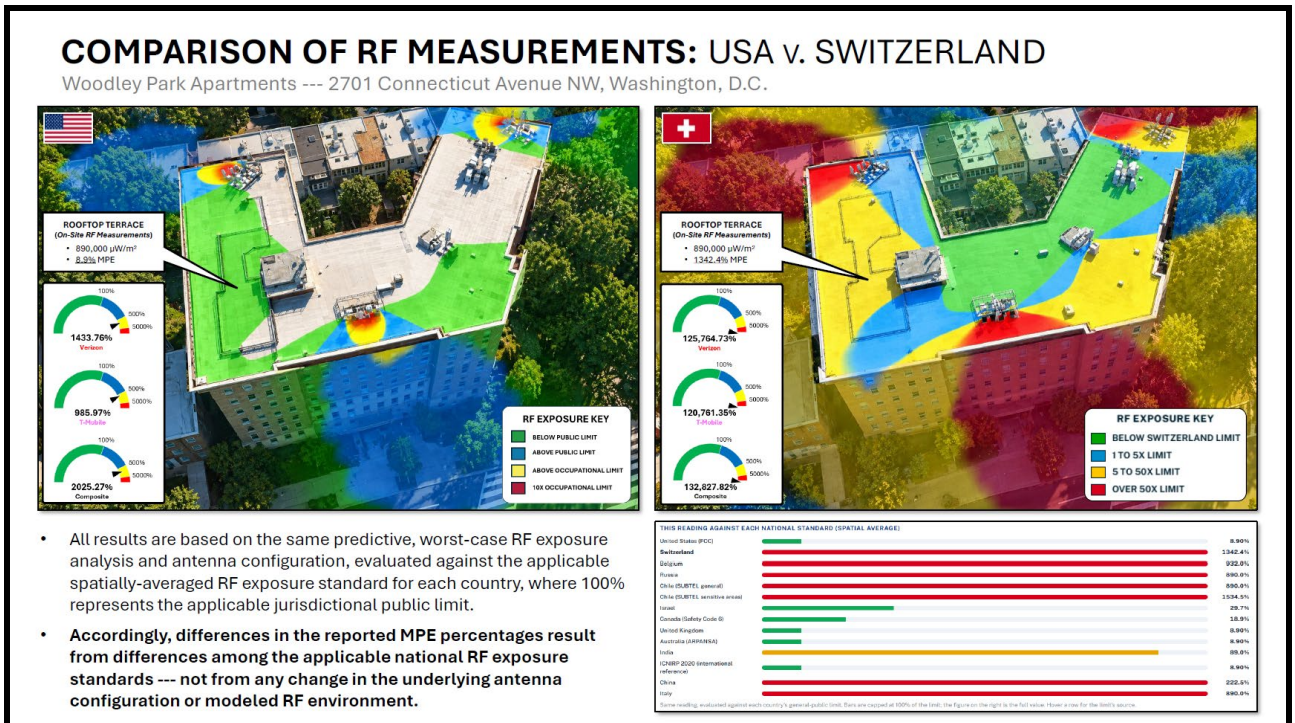


Figure 4. Readings taken by Cardinal Communications[20] and interpreted by Waterford's RF Infrastructure Sentry (RFIS) unit, colored to show which areas are compliant and noncompliant under both the U.S. and Swiss exposure limit. The accompanying bar chart compares the spatial average at the site against the exposure limits of several different countries. Source: Waterford Consultants.

Green shows wireless radiation exposure levels below the U.S. public exposure limit, blue shows levels above the U.S. public exposure limit., yellow shows levels above the U.S. occupational exposure limit., and red shows levels ten times higher than the U.S. occupational exposure limit.

For Switzerland, green is below the exposure limit, blue is 1-5 times the limit, yellow is 5-50 times the limit, and red is over 50 times the limit.

[20] *Id.*

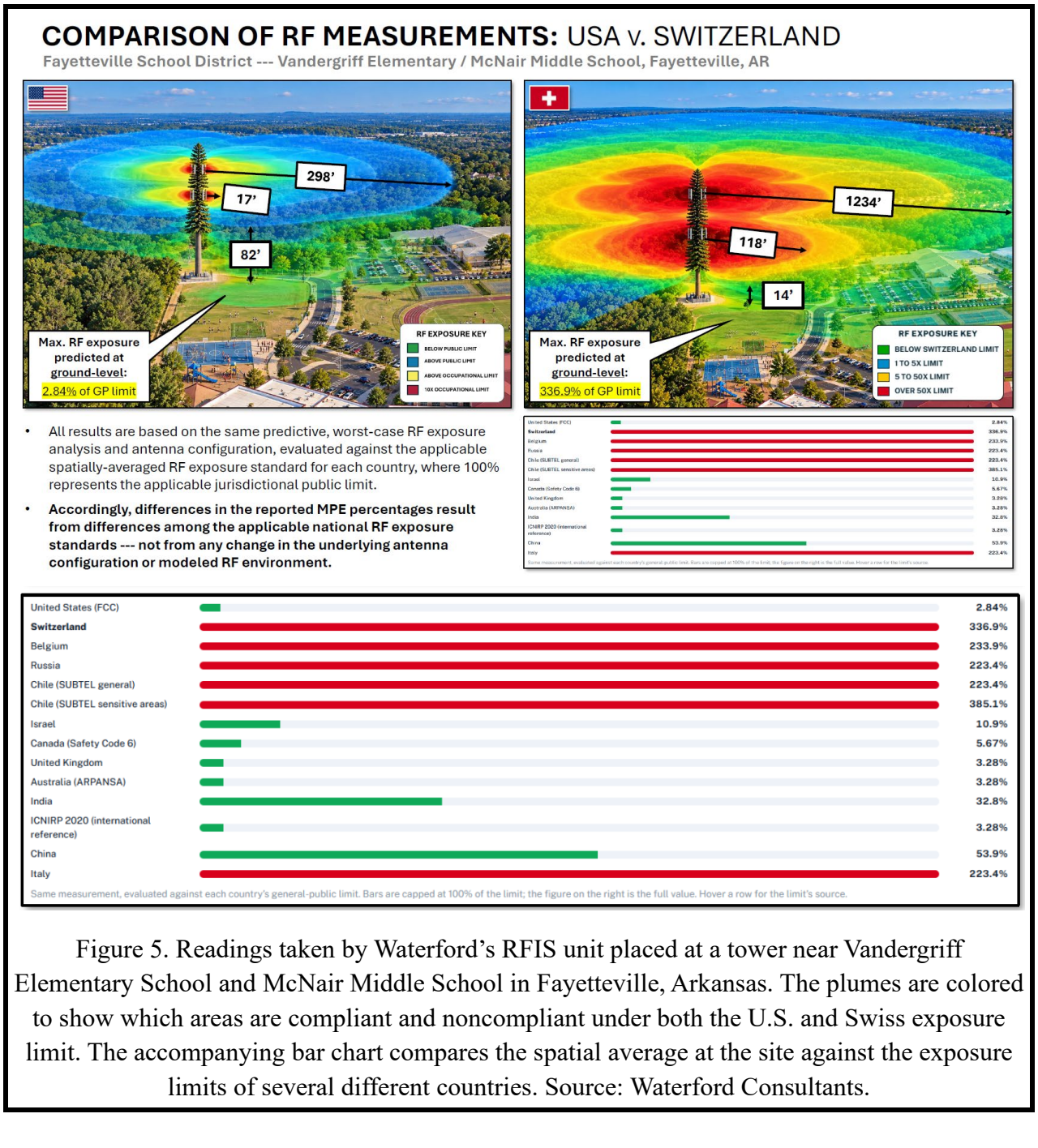


Figure 5. Readings taken by Waterford's RFIS unit placed at a tower near Vandergriff Elementary School and McNair Middle School in Fayetteville, Arkansas. The plumes are colored to show which areas are compliant and noncompliant under both the U.S. and Swiss exposure limit. The accompanying bar chart compares the spatial average at the site against the exposure limits of several different countries. Source: Waterford Consultants.

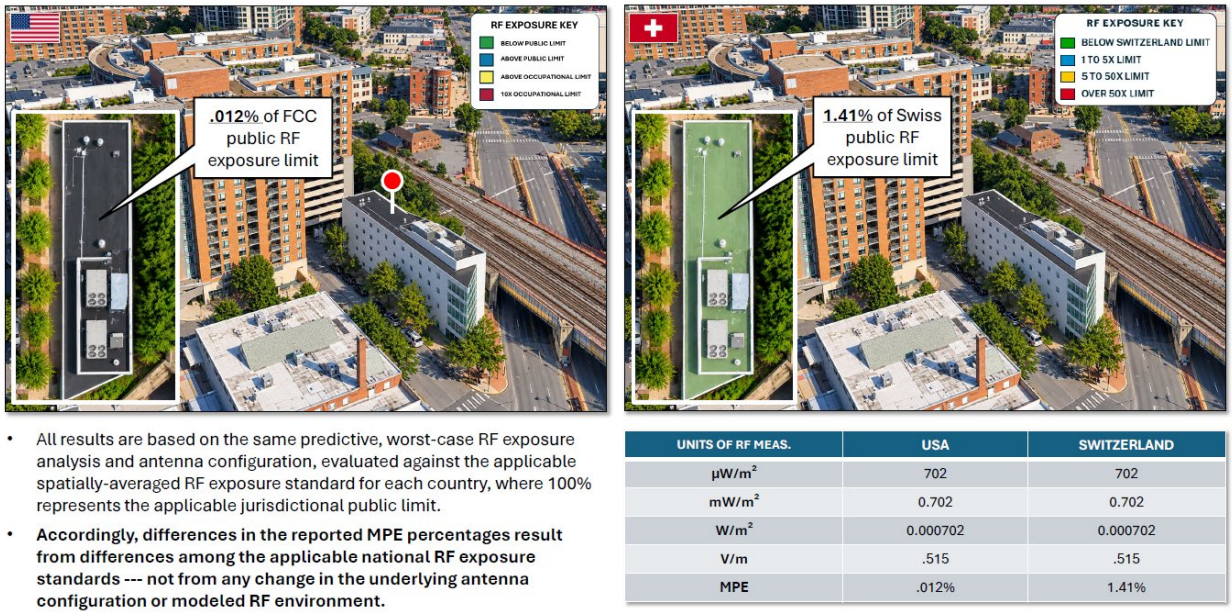


Figure 6. Comparison of the RFIS readings atop the Silver Spring Innovation Center in Silver Spring, Maryland against the U.S. and Swiss exposure standards. Source: Waterford Consultants.

C. Inadequacy of the FCC's RF Radiation Testing Procedures and Exposure Metrics Must Be Remedied; Radio-Frequency Measurement Standards Are Critically Needed for Assessing RF Impacts to Humans, Flora and Fauna.

The current environment for precisely measuring radiofrequency emissions—and the related exposures subjected to humans, flora and fauna –lacks standardization. That is a critical component that must be developed.

Standardization must occur if this proceeding and similar proceedings are to have a successful long-term coherence and impact.

A useful forum for developing standards for preventing harmful interference into networks and devices is the National Spectrum Management Association (NSMA; www.NSMA.org)

EHT supports the following three statements regarding recommended standards for measuring and evaluating radio-frequency exposures:

1. Recognize the longitudinal measurement gap as a priority research infrastructure issue. Conditions that were never measured cannot be recovered later by modeling, and the value of such a record increases with its length, which is why deferring its creation has a cost.
2. Encourage development of a vendor neutral national specification for continuous RF environmental monitoring, through an accredited standards developer or an industry association operating its own consensus process. It should address measurement methods, frequency coverage, temporal resolution, calibration, stated uncertainty, detector characteristics, absolute measurement units with regulatory comparisons carried as derived values, data provenance, completeness and gaps, retention, interoperable access and dataset protection. ITU-T K.83 is a useful starting point rather than a finished answer.
3. Evaluate a coordinated, independently administered monitoring framework able to support federal research, independent analysis and appropriate public disclosure. It should preserve the distinction between environmental measurement and individual

exposure, protect sensitive infrastructure information, and keep the resulting data accessible independently of any particular manufacturer or software platform.[21]

D. It is Impossible to Properly Understand the Health Effects Until the Wide Variety of Propagation and Modulation Techniques are Organized and Studied for Potential Harms.

As noted in *A Comparative Study of Waveforms Across Mobile Cellular Generations: From 0G to 6G and Beyond*[22] there is an extremely varied amount of waveforms and modulation techniques being utilized in the wireless communications industry. The vast differences in those techniques is well known when it comes to assessing and preventing harmful interference into wireless networks and devices. Yet the biological and thermal impacts from these sometimes dramatically different technologies remains understudied or not studied at all. In other words, interference into biologics (i.e., humans, flora and fauna) gets very little attention, but harmful interference into wireless networks and devices is extremely well-studied and policed. That wide gap in knowledge about harmful interference into biologics must be addressed through impact studies well-prior to reaching conclusions as to their safety regarding impacts to humans, flora and fauna. (See Figures 7-10). Wireless radiation damage to humans, children, flora, and fauna must take into account, for example, Orthogonal Frequency Division Multiple Access (OFDMA) versus Frequency Division Multiple Access (FDMA), as the impacts may vary wildly. The same is true for many other differences inherent in 3G to 4G to 5G to 6G and beyond. Simply put,

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[21] *See* Waterford Consultants, Comment on Request for Information on Electromagnetic Fields (EMFs), Radiofrequency (RF) Radiation, and Wireless Radiation Exposure, Docket No. HHS-OASH-2026-0397 (Oct. 14, 2026), https://www.regulations.gov/comment/HHS-OASH-2026-0397-3643.

[22] Farah Arabian & Morteza Shoushtari, *A Comparative Study of Waveforms Across Mobile Cellular Generations: From 0G to 6G and Beyond*, 6 Telecom 67 (2025), https://doi.org/10.3390/telecom6030067.

there is a great lack of federal funding for robust, peer-reviewed studies that assess wave form differences and their varying potential impacts on biologics from both short term and chronic exposures.

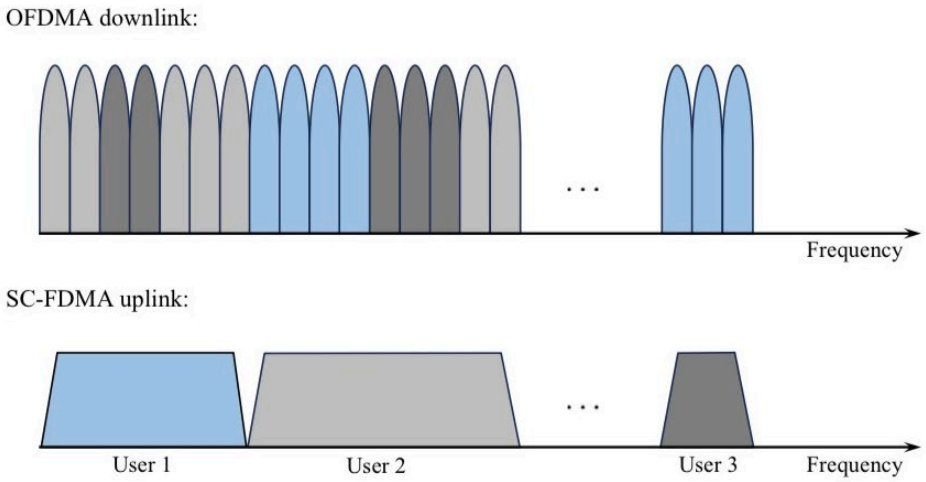


Figure 7: SC-FDMA vs. OFDMA (single carrier vs. multi-carrier frequency division multiple access) as illustrated in *A Comparative Study of Waveforms Across Mobile Cellular Generations: From 0G to 6G and Beyond*.

Modulation Scheme	BER	Throughput (kbps)	SE (bps/Hz)	Latency (ms)	Generation
Direct FSK	3×10^{-3}	9.6	Low (0.1 to 0.2)	High	1G
FM	N/A (Analog)	10	Low (0.2 to 0.3)	Medium: 30–50	1G
Fast FSK	Low ($\sim 4 \times 10^{-6}$)	9.6 to 14.4	Low (0.3 to 0.5)	Low: 10–30	1G
GMSK	Moderate ($\sim 4 \times 10^{-3}$)	9.6 (GSM), Up to 171 (GPRS)	Low (0.5)	Low (10–30)	2G to 2.75G
QPSK	Low ($\sim 4 \times 10^{-6}$)	Up to 384 (GPRS)	Medium (2)	Medium: 30–50	2G to 2.75G 3G and 4G
OQPSK	Low ($\sim 4 \times 10^{-6}$)	Up to 384 (GPRS)	Medium (2)	Medium: 30–50	2G to 2.75G
$\pi/4$ DQPSK	Moderate ($\sim 10^{-4}$)	Up to 384 (GPRS)	Medium (2)	Medium: 30–50	2G to 2.75G
8PSK	Moderate ($\sim 10^{-3}$)	Up to 1200 (EDGE)	High (3)	High: 100–200	2G to 2.75G 3G to 3.75G
BPSK	Low ($\sim 10^{-6}$)	9.6 to 384	Low (0.5 to 1)	Low: 10–20	2G to 2.75G 3G to 3.75G
16QAM	Moderate ($\sim 10^{-3}$)	Up to 1200	Medium (2 to 3)	Medium to high: 50–100	2G to 2.75G 3G to 3.75G
64QAM	High ($\sim 2 \times 10^{-2}$)	1500 to 3000 (LTE)	High (4 to 6)	Medium: 30–50	3G and 4G
OFDM with 256QAM	High ($\sim 10^{-1}$)	Up to 400,000	High (6 to 8)	Low: 10–30	4G And 4.5G 5G
DFT-s-OFDM with 64QAM	High ($\sim 10^{-2}$)	Up to 150,000	High (6 to 8)	Low: 10–30	4G And 4.5G 5G

Figure 8: *A Comparative Study of Waveforms Across Mobile Cellular Generations: From 0G to 6G and Beyond:* Performance metrics of the modulation techniques used in mobile communication systems. Values represent typical performance under standardized moderate SNR conditions. BER values are based on uncoded transmission at 10 dB Eb/N0.

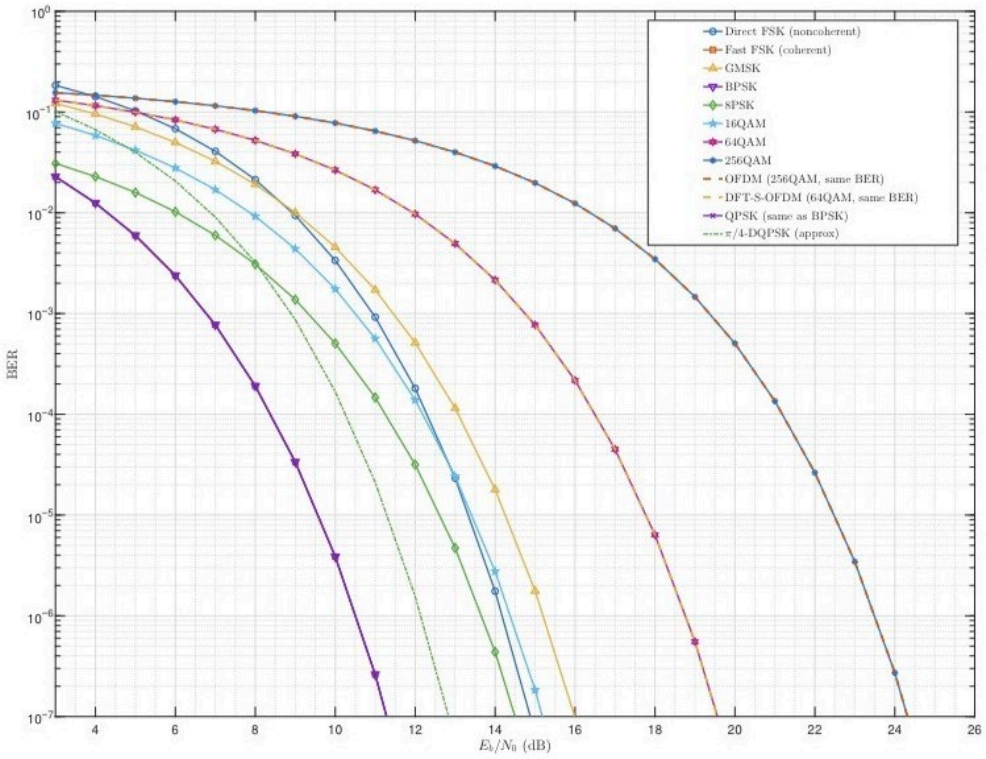


Figure 9: The BER performance of digital modulation schemes in AWGN as illustrated in *A Comparative Study of Waveforms Across Mobile Cellular Generations: From 0G to 6G and Beyond*

Table A2. Comparison of single-carrier and multi-carrier waveform characteristics. ✓ = yes; ✗ = no; ≈ /✓ = nearly yes; optional = depends on implementation.

KPI/Characteristic \ Waveform	Constant Envelope	SC-TDE	SC-FDE	SC-FDM	CP-OFDM	CP-OFDM -WOLA	F-OFDM	UFMC	FBMC	GFDM
Used CP	✗	✗	✓	✓	✓	✓	✓	optional	optional	✓
Lower OOB leakage compare to CP-OFDM	✓	✗	≈ /✓	✓	—	✓	✓	✓	✓	✓
Lower PAPR compare to CP-OFDM	✓	✓	✓	✓	—	✓	✗	✓	✗	✓
Good for short burst transmission	✓	✗	✓	✓	✗	✗	✓	✓	✗	✓
Based on pulse shaping (subcarrier-based filtering)	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
Based on Subband filtering	✗	✗	✗	✗	✗	✗	✓	✓	✗	✗
Complex structure	✗	✓	✗	✗	✗	✗	✓	✓	✓	✓
Allows asynchronous multiple access	✓	✗	✓	✗	✗	✓	✓	✓	✓	✓
Offset-QAM	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓
MIMO friendly	✗	✗	✗	✓	✓	✓	✓	✓	✗	✗
Support dynamic bandwidth allocation	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓
Top three:										
Highest SE	✗	✗	✗	✗	✗	✓	✗	✗	✓	✓
Lowest out-of-band emission	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓
Lowest implementation complexity	✓	✗	✓	✓	✗	✗	✗	✗	✗	✗
Lowest power consumption	✓	✗	✓	✓	✗	✗	✗	✗	✗	✗
Supports spectral coexistence with	✗	✗	✗	✗	UFMC FBMC	✗	CP-OFDM UFMC	FBMC	UFMC	✗

Figure 10: Comparison of single-carrier and multi-carrier waveform characteristics. ✓ = yes; ✗ = no; ≈ /✓ = nearly yes; optional = depends on implementation as illustrated in *A Comparative Study of Waveforms Across Mobile Cellular Generations: From 0G to 6G and Beyond*.

A reasoned and detailed analysis of the thermal and biological impacts from this wide variety of wave forms and modulations—especially when devices and networks using the varying techniques are lightly and heavily loaded with data—has yet to be published. The impacts to humans (children and adults), flora and fauna of 3G versus 4G versus 5G versus the coming 6G has yet to be comprehensively reviewed and funded by the U.S. government. This is a poverty when it comes to understanding Human and Environmental RF and EMF exposures.

E. Screen Addiction: The Department Must Investigate the Impacts of RF Radiation on Children.

On May 20, 2026, the U.S. Surgeon General issued a report on the dangers of screen addiction among the young, and highlighted that screen use increases with age—with children aged 13-18 averaging over 8 hours of screen use per day.[23] Screen addiction ties directly into RF exposure risk: *the more time young people spend on wireless devices, the greater their risk for RF exposure-related health effects insofar as they are spending more time in proximity to a source of RF emissions*, as EHT noted in its statement following the release of the Surgeon General's report.[24] FCC and FDA guidelines, for example, clearly cite that mobile phone users should not keep their devices in constant contact with their skin.[25]

[23] Off. of the Surgeon Gen., U.S. Dep't of Health & Hum. Servs., *U.S. Surgeon General's Advisory: Surgeon General's Warning on the Harms of Screen Use* 12 fig. 1 (2026), https://www.hhs.gov/sites/default/files/us-surgeon-generals-advisory-warning-on-the-harms-of-screen-use.pdf.
[24] *U.S. Surgeon General Releases Warning on Screen Use Harms and Offers Guidance on How to Protect Children*, Env't Health Tr. (May 22, 2026), https://ehtrust.org/u-s-surgeon-general-releases-warning-on-screen-use-harms-and-offers-guidance-on-how-to-protect-children/.
[25] *See, e.g., EHT v. FCC Petition* at 19-20.

F. ICNIRP and Its Fatal Flaws

The FCC must be instructed by HHS or the FDA to not continue to rely—as the FCC did in its *Public Notice*[26]—on the discredited ICNIRP studies. The industry-influenced and discredited ICNIRP work fails to address the core science and it is fatally reliant on *excessively short radiation exposure times*, which thoroughly discredits its conclusions. Peak network exposure levels fluctuate throughout the day, and chronic-exposure studies, and equipment-interference measurements are all necessarily handled with different methods and time scales than the improperly short durations relied upon by the discredited ICNIRP Model. For example:

1. **Identifying which minutes reflect peak wireless radiation levels can take hours, days, weeks or months.** Mobile-network RF-EMF levels are not constant; they rise and fall with human activity and network traffic. Tree leaf density in summer months impacts wireless propagation compared to winter months where trees are often leafless. Multi-country long-term monitoring (including a recent European sensor network study spanning ~17 months) shows clear, reproducible diurnal patterns: daytime levels are substantially higher than nighttime levels (nighttime reductions of ~12–48% depending on band), with daily minima often near 04:00 and higher values during active hours. Similar daily cycles (higher from roughly morning through evening, lower overnight) appear in many base-station studies.

In practice, peak or realistic-maximum levels are targeted by:

[26] *FCC Seeks Comment on RF Exposure Issues Subject to D.C. Circuit Remand in Environmental Health Trust v. FCC*, Public Notice, ET Docket No. 13-84, DA 26-997 (Sept. 17, 2026), https://docs.fcc.gov/public/attachments/DA-26-997A1.pdf.

- Measuring during known high-traffic windows (typically mid-morning to late afternoon/early evening on working days).
- Using continuous or long-duration monitoring stations that capture actual maxima.
- Applying extrapolation factors derived from long-term data so a short measurement can be related to a 24-hour or peak-period average.
- For compliance, often assuming worst-case loading (or measuring traffic-independent reference/pilot signals and scaling to maximum power).

Exact individual minutes are not fixed in advance because traffic fluctuates, but the overall daytime-vs-nighttime pattern is consistent enough that measurements timed to peak human activity periods reliably capture elevated levels. Short measurements (minutes) taken in those windows can overestimate the 24-hour average, which is useful for conservative assessment.

2. **Studying chronic exposure (weeks, months, years) when compliance measurements last only minutes.** The few-minute (or up to 30-minute) averaging times in guidelines such as the discredited ICNIRP standards, are tied to the thermal time constants of tissue for the established, mainly heating-related effects that the limits protect against. They are not intended nor competent to act as a complete substitute for long-term exposure assessment for biological harms long-term thermal damage.

3. **Chronic or cumulative impacts are required to be studied separately:**

- Epidemiology: Long-term population studies use proxies (distance to base stations, self-reported or billing-record mobile-phone use, residential address history) or, better, personal exposimeters worn by participants for days to weeks. Spot measurements of environmental levels help characterize places but do not by themselves quantify an individual's multi-year dose.
- Personal dosimetry / microenvironmental monitoring: Body-worn or portable devices log exposure over hours/days while people move through real environments.
- Controlled experiments: Laboratory animal studies apply defined RF exposures for hours per day over months or years; cell studies examine shorter but repeated exposures.
- Long-term fixed sensors or repeated spot campaigns capture temporal trends and variability beyond a single short measurement.

Compliance measurements therefore answer, "Is the field strength, averaged over the biologically relevant thermal time scale, below the protective limit?" They do not by themselves prove or disprove long-term non-thermal effects (which, under the current scientific consensus of bodies such as the incomplete and discredited ICNIRP, have not been established at levels below the guidelines). Those questions require the longer-term study designs above. Typical measured environmental levels remain far below the limits.

4. Duration for measurements of interference into network devices and equipment:

When the goal is to determine whether RF energy from one network or device is interfering with another (EMC, coexistence, spectrum occupancy, or performance degradation), the relevant timescales differ from health-compliance averaging:

- Spectrum analysis / signal identification: Seconds to a few minutes per band or span with a spectrum analyzer or real-time analyzer (FFT-based instruments can capture wide spans quickly and detect intermittent signals).
- Standard EMC emissions or immunity testing (e.g., IEC/EN 61000-4-3 radiated immunity, CISPR-style scans): Often tens of minutes to several hours once setup, multiple antenna polarizations, turntable positions, frequency steps, and dwell times are included. A full radiated-immunity sweep over a wide range can take on the order of a few hours.
- Link-performance or throughput-impact tests (Wi-Fi, cellular coexistence, etc.): Minutes to hours while traffic is generated and metrics (packet error, throughput, latency) are recorded under controlled interferers.
- Interference hunting or intermittent issues: Hours to days of monitoring or repeated surveys, because problems may appear only under specific traffic, time-of-day, or environmental conditions.

There is no single fixed “minutes-only” requirement analogous to the thermal averaging times in human-exposure guidelines; the duration is set by the need to capture the relevant signals, modulation characteristics, and performance effects under realistic or worst-case loading. Real-time analyzers and time-domain methods have reduced many of these measurement times substantially compared with older stepped-frequency approaches.

In summary, peak environmental levels are located by exploiting known daily traffic patterns (or continuous monitoring); chronic health questions are addressed with longer-term epidemiological, dosimetric, and experimental designs rather than single short compliance readings; and device/network interference assessments use whatever observation window (seconds to hours) is needed to characterize the interfering signals and their functional impact.[27]

IV. Conclusion

EHT strongly urges HHS and its FDA to, under the weight of the scientific evidence, find that the current RF exposure limits are insufficient to protect public health and the environment. They should instruct the FCC that those RF limits must be lowered to reflect the science previously disregarded by both the Commission and FDA and to reflect the work accomplished by other countries. It has never been sufficient to rely almost solely on industry-funded and industry-influenced studies. The entire record in this proceeding requires careful, detailed, and transparent study. The real-time wireless radiation emissions and exposures from networks and devices is a matter of national interest and wireless radiation measurements must be made available. The Surgeon General has reported a sharp rise in screen addiction which necessarily increases wireless radiation exposure to wireless device users. A national Radiation Weather Exposure (REW) system, similar in format to the National Weather Service's Air Quality Index (AQI) is needed, in order for citizens, scientists, regulators, operators and others to be able to

[27] *Mobile Network Exposure Rises and Falls With Human Activity*, EMFSA (July 19, 2026), https://www.emfsa.co.za/research-and-studies/mobile-network-exposure-human-activity/.
See also Chhavi Raj Bhatt et al., *Instruments to Measure Environmental and Personal Radiofrequency-Electromagnetic Field Exposures: An Update*, 45 Physical & Eng'g Scis. in Med. 687 (2022), https://doi.org/10.1007/s13246-022-01146-y. *Finally, see* James Pawson, *Quick Reference—Immunity Test Steps and Test Time*, Unit 3 Compliance (Jan. 17, 2021), https://www.unit3compliance.co.uk/quick-reference-immunity-test-steps-and-test-time/.

clearly and transparently see the wireless radiation levels to which they are being exposed. Standards for measuring wireless radiation emissions and exposures to which humans, flora and fauna are subjected are urgently needed as a matter of national concern, and increased radiation exposure due to screen addiction needs further assessment and study.

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Respectfully submitted,



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Appendices

Appendix A: Petition of Environmental Health Trust 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, ET Docket Nos. 13-84 & 19-226 (FCC filed Aug. 6, 2025). https://www.fcc.gov/ecfs/search/search-filings/filing/10806965028484

Appendix B: Devra Davis, *Response to HHS Request for Information*, Docket No. HHS-OASH-2026-0397 (Oct. 21, 2026). Dr. Devra Davis is founder and acting President of Environmental Health Trust.

Appendix C: Radiation Exposure Weather (REW) System