RF SAFE

Letter to W. Scott McCollough Regarding CHD et al. Initial Comments and Proposed Non-Thermal EMF Science Supplement

From	John Coates, Founder of RF Safe
Date	April 20, 2026
Re	Feedback on Children's Health Defense et al., Initial Comments in WT Docket No. 25-276, "Build America: Eliminating Barriers to Wireless Deployments" - RF/EMF science-and-authority section, pp. 21-36, and updated non-thermal EMF supplement

W. Scott McCollough, Esq.
Children's Health Defense

Dear Mr. McCollough:

Thank you for asking me to review the RF/EMF science-and-authority section of the Children's Health Defense et al. Initial Comments filed with the FCC in WT Docket No. 25-276, "Build America: Eliminating Barriers to Wireless Deployments." I understand that these are official Initial Comments already submitted to the FCC on December 31, 2025. My purpose here is therefore not to redline, but to offer constructive feedback on the filed section you asked me to review - particularly pages 21-36 - and to provide supplemental language that could be used in an ex parte filing, reply/supplemental record material, a related HHS/FDA request, or future proceedings.

The attached updated PDF supplement is intended to strengthen the same core position already advanced by CHD: the FCC should not expand federal preemption, accelerate deemed approvals, or further narrow local review while the agency's RF exposure framework remains under an unresolved D.C. Circuit remand and while HHS/FDA has not addressed the latest non-thermal, nonlinear, pulsed, modulated, aggregate, and tissue-specific EMF science under Public Law 90-602.

Core positioning of the supplement

The supplement does not ask the FCC to accept every contested non-thermal claim as established disease causation. It asks FCC and HHS to answer specific, now-testable mechanistic questions before relying on current thermal-centered RF compliance rules as a basis for broader federal preemption.

1. What the filed CHD comments already do well

The filed section correctly recognizes that the FCC's RF exposure rules are not mere background engineering standards. They are the practical predicate for federal preemption of local RF-based objections. If the exposure framework is outdated, incomplete, or inadequately explained, then further preemption of local review rests on an unstable legal and scientific foundation.

The section also correctly centers the D.C. Circuit remand in Environmental Health Trust v. FCC. That remains the cleanest administrative-law vulnerability: the Commission has not yet supplied the reasoned explanation required for long-term exposure, children, ubiquity of wireless devices, RF pulsation/modulation, Wi-Fi, 5G, testing procedures, and environmental effects.

The filed comments are also right to emphasize aggregate exposure. Real-world exposure is multi-source, multi-band, pulsed, modulated, and continuous over time. Current compliance methods tend to isolate fixed infrastructure, mobile/portable devices, and individual facilities even though biological exposure is cumulative in space and time.

Finally, the filed comments appropriately preserve the local-government issue. Even apart from RF health science, local review remains essential for structural safety, fire safety, emergency access, fall zones, aesthetics, historic preservation, setbacks, property impacts, sensitive-site siting, and public-safety conditions.

2. Principal vulnerabilities in the filed science wording

The recommendations below are offered in the spirit of strengthening the record and reducing avoidable targets for FCC, industry commenters, or a reviewing court.

A. Maxwell's equations are being asked to do too much

The filed section correctly explains that EM fields are physical, that fields superpose, and that modulation and pulsation can affect instantaneous exposure. The vulnerable step is moving from Maxwellian physics to statements that external fields necessarily produce adverse biological consequences at any intensity, or that Maxwell's equations alone establish no-threshold toxicological risk.

A stronger formulation is that Maxwell's equations make aggregate exposure, peak-to-average characteristics, modulation, pulsing, and spatial geometry relevant to exposure assessment. The adverse-effect question should then be anchored in biological evidence: S4/VGIC gating, calcium-rhythm fidelity, CYB5B, mitochondrial redox signaling, animal findings, and toxicological risk assessment.

B. Interaction, biological effect, adverse effect, and legal injury should remain distinct

Regulatory science distinguishes exposure, internal dose, biological interaction, measurable biological effect, adverse health endpoint, dose-response, and protective limit. The filed section sometimes compresses those steps. That creates a predictable response: the FCC can say interaction is not the same as harm. The supplement tightens this by arguing that new mechanisms create a duty to investigate and explain, not that every interaction is already proven adverse.

C. The "any frequency / any intensity" framing is easy to attack

The idea that the spectrum can be biologically active in multiple ways is important, but the safer language is not that every frequency and every intensity is necessarily harmful. The safer language is that biological coupling varies by frequency, modulation, polarization, intensity, tissue geometry, exposure duration, and biological target, and that the FCC must evaluate whether current single-source, time-averaged metrics remain adequate under modern multi-source exposure conditions.

D. The 0.1 uW/m2 / EHS / LOAEL discussion is vulnerable

The filed section usefully shows the large gap between ICNIRP/FCC limits and precautionary clinical or building-biology recommendations. The vulnerability is treating 0.1 uW/m2 as a toxicological LOAEL for EHS-sensitive persons. Bau-Biologie, AMA, EUROPAEM, and IGNIR values can support precautionary exposure-minimization arguments, but they should not be presented as consensus regulatory NOAEL/LOAEL thresholds unless the record is built to support that use. The supplement therefore avoids making EHS the main anchor and instead centers animal evidence, mechanistic pathways, and risk-assessment methods.

E. The Fourier/sidelobe discussion should be constrained by actual engineering conditions

The modulation/pulsation discussion is important, but idealized sinc-function sidelobes from a mathematical box pulse should not be treated as automatically dispositive for every real-world transmitter. Real transmitters use filters, pulse shaping, spectral masks, bandwidth limits, and duty-cycle controls. The stronger regulatory request is for actual waveform characterization: carrier frequency, modulation envelope, pulse repetition, duty cycle, occupied bandwidth, sidebands, peak-to-average ratio, rise/fall time, traffic loading, beamforming maxima, and aggregate exposure under realistic conditions.

F. The medical-device examples should be refined

Tumor Treating Fields and RF microneedling show that electromagnetic fields can have biological or medical effects under controlled conditions, but RF microneedling is primarily a heating example and TTFields operates in a distinct therapeutic context. They should not be used as direct proof that ambient wireless infrastructure causes harm. They are better used to show that field-tissue coupling is real, dose/geometry dependent, and biologically meaningful under the right conditions.

The updated supplement adds a stronger precedent: FDA's TheraBionic P1 HDE record. TheraBionic is directly relevant because it is an amplitude-modulated RF EMF device, described by FDA as non-thermal, operating at low delivered fields, and contraindicated in patients receiving calcium channel blockers. That is a much cleaner regulatory bridge to the S4/VGIC and calcium-signaling arguments.

G. The property and consent language should be legally durable

The filed section raises serious due-process, property, and remedy concerns. But phrases such as "license to maim" or "domestic licenses to kill" invite the agency or industry to portray the section as polemical. A more durable formulation is that FCC licenses should not be construed to create immunity from otherwise available personal-injury, property, nuisance, or due-process remedies, nor to create uncompensated property servitudes absent clear congressional authorization.

Similarly, the RF easement/property theory should be framed as constitutional avoidance rather than settled doctrine. The stronger version is that if the FCC interprets its rules to extinguish meaningful local process or private remedies for continuous unwanted exposure that materially interferes with property use, that interpretation raises serious Takings Clause, due-process, and constitutional-avoidance concerns.

H. Competing reviews should be used with conflict and viewpoint disclosure

If FCC or opposing commenters rely on Karipidis et al. or similar WHO-commissioned human epidemiology reviews to minimize non-thermal concerns, the record should disclose institutional and viewpoint conflicts. Key authors have ICNIRP roles or prior ICNIRP service. That does not prove misconduct, and I would not argue it that way. But it is material because ICNIRP's guideline paradigm is part of the thermal-centered framework under review. The correct response is disclosure, methodological transparency, and independent weighing of animal, mechanistic, toxicological, and molecular evidence.

3. How the attached updated PDF supplement strengthens the record

The PDF provides a supplemental section titled "Non-Thermal, Nonlinear, and Tissue-Specific EMF Mechanisms." It is designed to make the scientific argument harder to dismiss by moving from broad physical assertions to specific, falsifiable biological mechanisms and concrete agency duties.

- It centers the strongest administrative-law point: recent science does not require FCC to concede disease causation, but it does require FCC and HHS to evaluate specific non-thermal mechanisms before treating current RF compliance as a complete answer to health and environmental objections.
- It adds the S4 voltage-sensor/VGIC pathway as a mathematically specified nanoscale mechanism. This reframes the issue from generalized field interaction to ion-channel timing and calcium signaling.

- It adds the 2026 Cell CYB5B paper as a major new molecular target. CYB5B is framed carefully - not as proof that Wi-Fi or cellular exposure causes disease, but as a newly identified EMF-responsive mitochondrial membrane-associated mediator that makes the research question falsifiable.
- It adds FDA's TheraBionic P1 as a real-world regulatory precedent for non-thermal, amplitude-modulated RF effects involving calcium-channel biology.
- It defines "low-fidelity biology" narrowly as loss of temporal fidelity in endogenous calcium and redox signaling, not as a claim of direct disease causation.
- It introduces tissue-specific "density gating" as a hypothesis for HHS to test: susceptibility may be higher in tissues with dense excitable membranes, voltage-gated channels, mitochondria, CYB5B/redox machinery, and calcium-handling systems.
- It incorporates Ramazzini genetic profiling, WHO-commissioned animal evidence, and Melnick/Moskowitz/ICBE-EMF risk assessment as evidence that FCC must address animal, mechanistic, and toxicological lines together.
- It anchors the federal duty in Public Law 90-602 and the Electronic Product Radiation Control provisions, making the science operational for HHS/FDA rather than leaving it as an abstract scientific disagreement.

4. Why TheraBionic P1 should now be included

The TheraBionic P1 material is important enough to include in the letter and in the supplement because it is probably the cleanest FDA-recognized precedent for the proposition that non-thermal, amplitude-modulated RF EMF can be medically and regulatorily meaningful through calcium-channel biology.

FDA identifies TheraBionic P1 as an "Amplitude-Modulated Radiofrequency Electromagnetic Fields" device under HDE H220001, approved on September 26, 2023, for adults with advanced hepatocellular carcinoma who have failed first- and second-line therapy. FDA's public device page describes a handheld RF EMF generator with an antenna placed in the mouth and states that the generator emits EMF at specific amplitude-modulated frequencies that may stop cancer cells from dividing.

FDA's Summary of Safety and Probable Benefit states that the detailed RF source operates at 27.12 MHz, with the carrier amplitude-modulated at an 85 percent modulation depth, and that treatment uses low-level RF EMF derived from modulation frequencies ranging from 0.01 Hz to 150 kHz. The Summary also states that intrabuccal delivery results in systemic absorption of AM RF EMF, that delivered EMF is estimated to be 100 to 1,000 times lower than that delivered by cellular phones, and that it does not result in thermal heating in the brain or other specific organs.

Most importantly for the FCC/HHS issue, FDA's Summary states that TheraBionic P1 should not be prescribed for patients receiving calcium channel blockers or agents blocking L-type or T-type voltage-gated calcium channels unless treatment is modified to exclude those blockers. FDA's public device page likewise states that the device should not be used in people who receive calcium channel blockers.

This should be framed with the proper HDE caveat. HDE approval is based on safety and probable benefit, not the full PMA effectiveness standard. Therefore, I would not say FDA has conclusively proved the mechanism or that TheraBionic proves ordinary wireless exposure causes disease. The stronger and more defensible point is this:

> **Recommended TheraBionic positioning**
>
> FDA has authorized marketing of a non-thermal, amplitude-modulated RF EMF device whose stated operation, labeling, contraindications, and cited nonclinical evidence make calcium-channel biology clinically and regulatorily material. FCC and HHS therefore cannot categorically dismiss non-thermal calcium-channel effects as physically impossible, biologically irrelevant, or outside the scope of RF exposure policy.

This is especially useful because it bridges the filed comments' existing medical-device discussion with the supplement's S4/VGIC, CYB5B, mitochondrial redox, and calcium-rhythm framework. It gives the agencies a concrete comparator protocol: if the FDA can evaluate a low-level, amplitude-modulated RF

medical device through calcium-channel biology, HHS/FDA can also evaluate whether related pathways are relevant to consumer wireless and infrastructure exposure.

5. Suggested table of vulnerabilities and proposed cures

Filed-section vulnerability	Why it matters	Proposed cure or follow-up
Maxwell/no-threshold language	Easy for FCC to dismiss as physics-to-toxicology overreach.	Use Maxwell for superposition, aggregate exposure, peaks, and waveform disclosure; use S4/VGIC, CYB5B, TheraBionic, animal, and risk-assessment evidence for mechanism.
EHS/LOAEL anchor	Precautionary clinical values are not consensus toxicology thresholds.	Use EHS as accommodation/research issue; anchor the main science in animal evidence, S4/CYB5B, calcium signaling, redox, and toxicological methods.
Idealized sidelobe claims	Real transmitters are filtered and constrained by spectral masks.	Demand actual waveform characterization and post-construction measurement rather than relying solely on idealized pulse math.
Medical-device examples	TTFields and RF microneedling are useful but imperfect analogues.	Add TheraBionic P1 as a more directly relevant FDA HDE precedent for non-thermal AM RF calcium-channel biology.
Property/consent rhetoric	Can be portrayed as extreme even where the legal concern is serious.	Frame as preservation of remedies, clear-statement limits on preemption, due process, Takings Clause concerns, and constitutional avoidance.
Competing human epidemiology	FCC may cite ICNIRP-linked reviews as neutral closure.	Require conflict/viewpoint disclosure and transparent weighing against independent animal, mechanistic, molecular, and toxicological evidence.

6. Additional recommendations beyond the attached PDF

The updated PDF is designed to strengthen the non-thermal science section. The following additional items would further strengthen future FCC, HHS/FDA, or congressional communications:

- Add an exposure-metrics appendix defining W/m2, uW/m2, uW/cm2, V/m, A/m, SAR, absorbed power density, RMS, peak, duty cycle, crest factor, 6-minute averaging, 30-minute averaging, chronic exposure, near-field/far-field distinctions, and aggregate exposure ratios.
- Require aggregate RF exposure certification for towers, small cells, co-locations, modifications, and rooftops, including all relevant sources and frequency bands at public, residential, worker-access, school, hospital, and other sensitive receptor locations.
- Require 3D predicted and post-construction measured RF maps at ground level, upper-floor elevations, balconies, windows, rooftops, schoolyards, and maintenance-worker areas.
- Address combined device-plus-infrastructure exposure, especially personal-device uplink exposure plus infrastructure downlink exposure.
- Add sensitive-site triggers for schools, childcare centers, hospitals, elder-care facilities, dense residential zones, rooftop worker access, wildlife/pollinator habitat, and areas with multiple existing RF sources.
- Document lower-limit examples such as Italy and Switzerland with exact legal limits, frequency ranges, averaging rules, exceptions, enforcement practice, and network-performance evidence.
- Convert scientific concerns into specific regulatory asks: no expanded preemption until remand compliance; HHS/FDA review under Public Law 90-602; aggregate certification; post-construction measurement; sensitive-site review; public-facing RF database; and conflict-disclosed evidence review.

7. Suggested positioning for CHD, RF Safe, or related follow-up

Because the Initial Comments have already been filed, I would position the attached material as supplemental record support and as a basis for an ex parte submission, HHS/FDA petition/request, congressional communication, or future FCC filing. The strongest language is not that the record conclusively proves wireless radiation causes a particular disease. The strongest language is:

> **Suggested positioning language**
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> The record now identifies specific, testable molecular and tissue-level mechanisms - S4 voltage-sensor perturbation, CYB5B-mediated calcium oscillation, FDA-recognized non-thermal AM RF calcium-channel precedent in TheraBionic P1, mitochondrial redox disruption, and tissue-specific density gating - that make continued thermal-only reliance arbitrary unless FCC and HHS provide a reasoned response.

That formulation puts the burden where it belongs. It does not require CHD to win every contested scientific proposition in the comments themselves. It requires the agencies to answer newly specific mechanistic questions before expanding federal preemption based on exposure rules that remain tied primarily to heat and short-term averaging.

8. Closing

I respectfully submit the attached PDF as supplemental language (draft) and as a potential basis for further FCC, HHS/FDA, or congressional follow-up. I defer entirely to your judgment on how best to adapt the legal framing. My goal is to preserve the strongest parts of the filed CHD comments while reducing avoidable vulnerabilities and placing the newest non-thermal science into a form that is harder for the FCC to ignore.

The key strategic shift is to force the agencies to answer concrete questions rather than giving them an opportunity to attack overbroad language. The D.C. Circuit already required a reasoned explanation. The latest science now gives HHS and FCC specific places to look: S4/VGIC gating, CYB5B, calcium rhythm, mitochondrial redox, density gating, and FDA's own TheraBionic P1 record. In my view, failure to investigate those targets is precisely the type of public-health failure Public Law 90-602 was enacted to prevent.

Thank you for your work on this issue and for considering this proposed strengthening of the record.

Respectfully,

John Coates
Founder, RF Safe

Attachments / materials referenced

- PDF supplement: "Non-Thermal, Nonlinear, and Tissue-Specific EMF Mechanisms - Mechanistic plausibility, FDA-recognized calcium-channel precedent, newly falsifiable molecular targets, tissue-specific susceptibility, and the statutory duty to investigate under Public Law 90-602."
- Children's Health Defense et al., Initial Comments in WT Docket No. 25-276, "Build America: Eliminating Barriers to Wireless Deployments," filed December 31, 2025 - RF/EMF science-and-authority section reviewed at your request.
- Prior review notes identifying legal/scientific strengths, vulnerabilities, and recommended refinements for the CHD RF/EMF section.

Selected references supporting the proposed supplement

1. Environmental Health Trust v. FCC, 9 F.4th 893 (D.C. Cir. 2021).

2. Panagopoulos DJ, Yakymenko I, De Iuliis GN, Chrousos GP. "A comprehensive mechanism of biological and health effects of anthropogenic extremely low frequency and wireless communication electromagnetic fields." Frontiers in Public Health. 2025;13:1585441. doi:10.3389/fpubh.2025.1585441.
3. Kim J, Hwang Y, Kim S, et al. "Electromagnetic field-inducible in vivo gene switch for remote spatiotemporal control of gene expression." Cell. 2026. doi:10.1016/j.cell.2026.03.029.
4. U.S. Food and Drug Administration. "TheraBionic P1 - H220001." FDA Recently Approved Devices. Approval date September 26, 2023; content current as of June 4, 2024.
5. U.S. Food and Drug Administration. "HDE H220001: TheraBionic P1 - Summary of Safety and Probable Benefit." September 26, 2023.
6. Jimenez H, Wang M, Zimmerman JW, et al. "Tumour-specific amplitude-modulated radiofrequency electromagnetic fields induce differentiation of hepatocellular carcinoma via targeting Cav3.2 T-type voltage-gated calcium channels and Ca2+ influx." EBioMedicine. 2019;44:209-224. doi:10.1016/j.ebiom.2019.05.034.
7. Costa FP, de Oliveira AC, Meirelles R, et al. "Treatment of advanced hepatocellular carcinoma with very low levels of amplitude-modulated electromagnetic fields." British Journal of Cancer. 2011;105:640-648. doi:10.1038/bjc.2011.292.
8. Brooks AM, Vornoli A, Kovi RC, et al. "Genetic profiling of rat gliomas and cardiac schwannomas from life-time radiofrequency radiation exposure study using a targeted next-generation sequencing gene panel." PLOS ONE. 2024;19(1):e0296699. doi:10.1371/journal.pone.0296699.
9. Mevissen M, Ducray A, Ward JM, et al. "Effects of radiofrequency electromagnetic field exposure on cancer in laboratory animal studies, a systematic review." Environment International. 2025;199:109482. doi:10.1016/j.envint.2025.109482.
10. Melnick RL, Moskowitz JM, ICBE-EMF. "Exposure limits to radiofrequency EMF do not account for cancer risk or reproductive toxicity assessed from data in experimental animals." Environmental Health. 2026. doi:10.1186/s12940-026-01288-6.
11. Karipidis K, Baaken D, Loney T, et al. "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." Environment International. 2024;191:108983. doi:10.1016/j.envint.2024.108983.
12. FDA, Summary of Electronic Product Radiation Control provisions of the Federal Food, Drug, and Cosmetic Act; 21 U.S.C. secs. 360ii and 360kk.
13. ICNIRP public profiles for Karipidis, Baaken, and Roosli, documenting ICNIRP roles relevant to conflict or viewpoint-disclosure analysis.