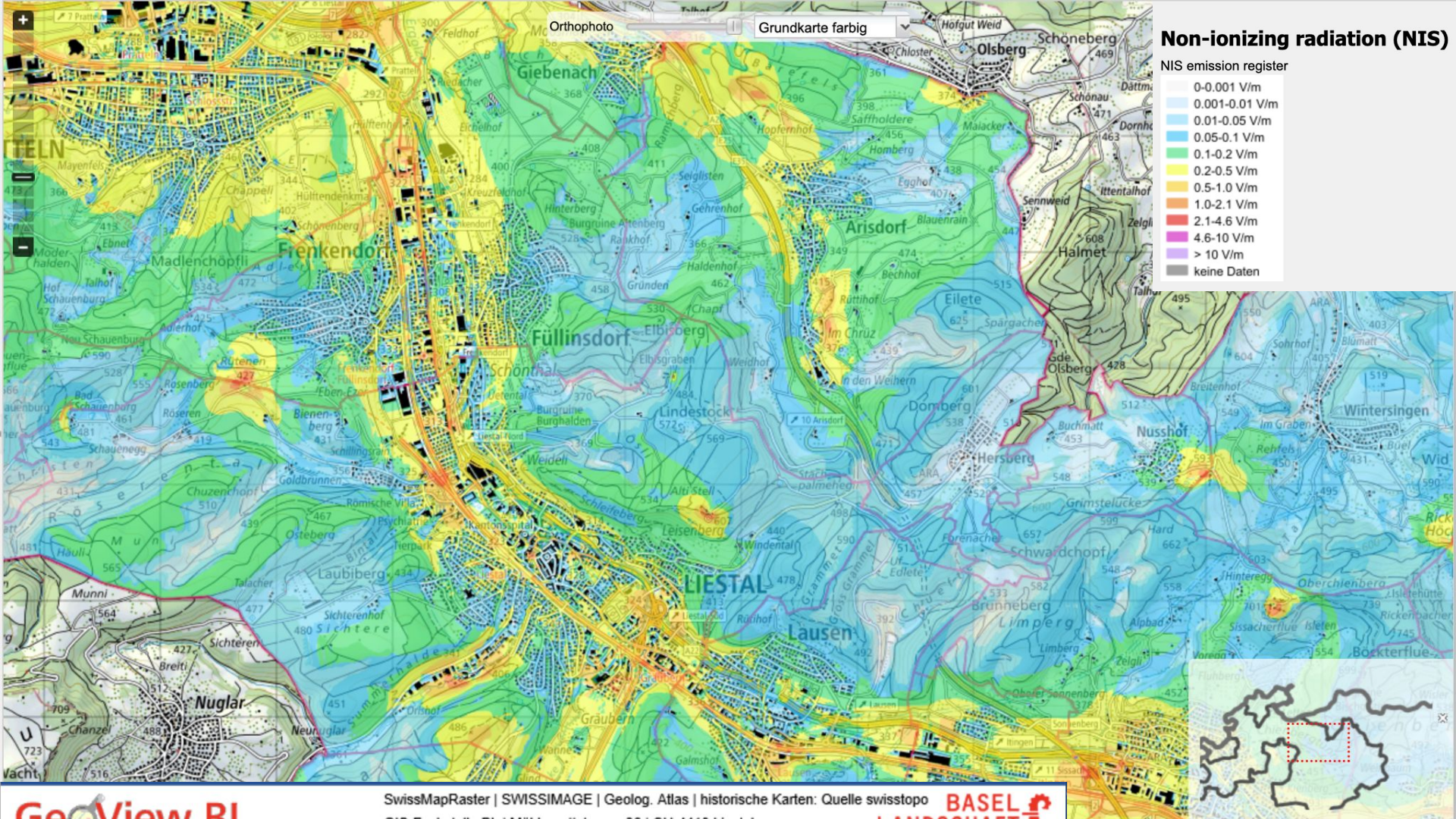




United States
Environmental Protection
Agency

Office of Radiation Programs
Office of Air and Radiation
Washington, D.C. 20460

EPA 520/1-85-014
July 1986



**The Radiofrequency
Radiation Environment:
Environmental Exposure
Levels and RF Radiation
Emitting Sources**

1986: EPAs Last Measurement Report on EMF Levels in USA

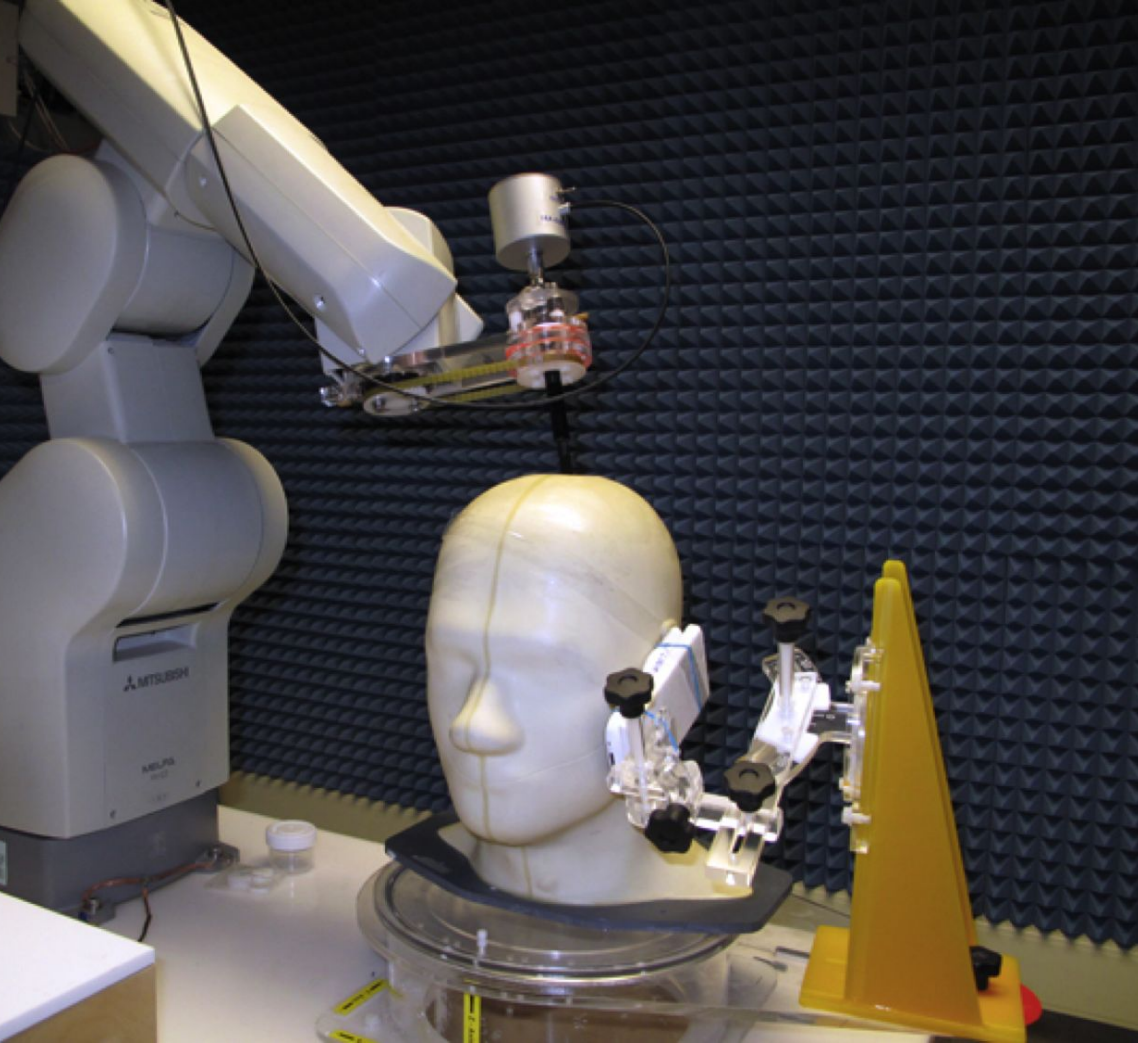


Transparent Oversight and Enforcement is Essential

- Auditing
- Scheduled post deployment compliance reporting.

Wildlife and the natural environment must be considered, especially in the era of 5G where exclusion zones are widening (Virto et al., 2024).





Photos From Pixel 4 Test Submitted to FCC

Body SAR is measured with a 10 mm distance



FCC SAR TEST REPORT

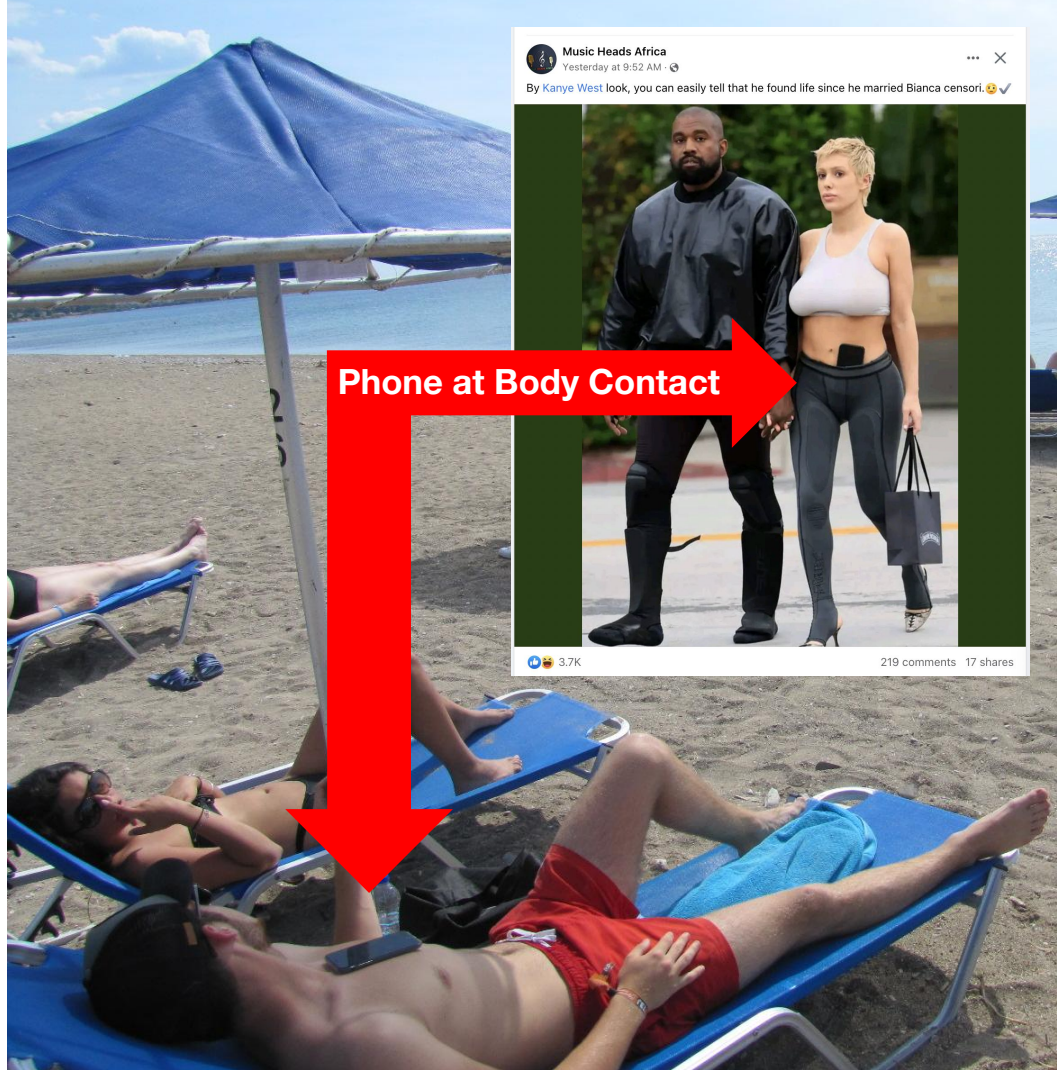


Left Side, Test Separation 10 mm

“The highest SAR values for the Pixel 4 are 1.20 W/kg when used near your ear or 1.34 W/kg **at a distance of 1.0 cm (0.4 in) from your body.**”

-Pixel 4 Safety & regulatory manual

<https://fccid.io/A4RG025J/Test-Setup-Photos/Test-Setup-SAR-4675321>



Phone at Body Contact



Accountability and enforcement for cell phones

French Agency ANFR post market surveillance program: SAR tests for hundreds of phones

- 2016: **89% phones tested at 0 mm exceeded EU limit** (2W/kg)
- Gandhi (2019) analyzed ANFR data and concluded exceedances would be 3 to 11 times FCC limit.
- **EU changed test distance** from 25 mm to 5mm (RED Directive)
- PhoneGate Association lists over **48 phones software updated or pulled from the market due to excessive SAR levels measured by ANFR.**
- 2019: French Ministers called for 0 mm phone testing, France filed to EU (2020,2023)
- **European Committee for Electrotechnical Standardization** proposal to perform SAR at 0 mm distance to the body for body-worn test conditions (Douglas et al, 2023).

Chicago Tribune

“We tested popular cell phones for radiofrequency radiation. Now the FCC is investigating.” August 21, 2019

- Tribune tested several phone models for body SAR
 - 2 mm distance
 - manufacturers distance (5,10,15 mm)
- Several models exceeded FCC limits at 2 mm *and at* 5,10 or 15 mm.

December 10, 2019

FCC Report released FCC lab tests of phones with separation distances of 5 to 15 mm.

“All sample cell phones tested by the FCC laboratory...produced maximum 1-g average SAR values less than the 1.6 W/kg limit specified in the FCC rules.”



FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-362-3000
Facsimile: 301-362-3290

December 10, 2019

Results of Tests on Cell Phone RF Exposure Compliance

Grantees:

- a) Apple Inc.
- b) BLU Products, Inc.
- c) Motorola Mobility LLC
- d) Samsung Electronics Co Ltd

Model Numbers:

- 1) iPhone 7
- 2) iPhone X
- 3) iPhone XS
- 4) Vivo 5 Mini
- 5) Moto e5 Play
- 6) Moto g6 Play
- 7) Galaxy S9
- 8) Galaxy J3

Table 2: SAR Test Results

FCC ID	Manufacturer	Description	Wireless Tech Tested	Test Distance (mm)	Original SAR Report Measured SAR Value (W/kg)	Chicago Tribune Measured SAR Value (W/kg)	FCC Lab Maximum Measured SAR Value (W/kg)
BCG-E3091A	Apple	iPhone 7 Portable Handset	WCDMA	5	1.140	3.560	0.946
BCG-E3161A	Apple	iPhone X Portable Handset	WCDMA	5	1.090	2.19 ¹	0.799
BCG-E3218A	Apple	iPhone XS Portable Handset	GPRS	5	0.047	N/A ²	1.350
A3LSMG960U	Samsung	Galaxy S9 Portable Handset	CDMA	15	0.795	0.625	0.538
A3LSMJ337A	Samsung	Galaxy J3 Portable Handset	WCDMA	10	1.040	1.380	1.230
IHDT56XC4	Motorola	Moto e5 Play Portable Handset	WCDMA	5	1.120	4.700	1.020
IHDTF6XB1	Motorola	Moto g6 Play Portable Handset	WCDMA	5	0.944	0.247	1.250
YHLBLUVIV05MN	BLU	Vivo 5 Mini Portable Handset	GPRS	10	1.246	0.295	0.668

The FCC had also tested phones at 2 mm.

FCC: SARs exceeded 1.6 W/kg in 10 of 17 SAR tests at 2mm.

“We observed that at a 2 mm separation distance, the FCC RF exposure limits were exceeded...”

-FCC 9/29/2023 letter to Scarato RE FOIA Control 2023-000281 and 2023-000325



A	B	C	D	E		G
CONFIDENTIAL *FCC INTERNAL ONLY*						
*NOTE: THE FOLLOWING RESULTS ARE FROM SAR TESTS AT A SEPARATION DISTANCE NOT IN ACCORDANCE WITH FCC GUIDANCE						
FCC ID	Manufacturer	Description	Sample Type	SAR Configuration	FCC Lab Measured SAR Value (W/kg)	Serial Number
BCG-E3091A	Apple	iPhone 7 Portable Handset	Provided by Manufacturer	WCDMA Band 4, RMC, 12.2 kbps, Ch 1513, Body, Bottom, 2 mm	1.440	C6K6HD69HG7N
BCG-E3161A	Apple	iPhone X Portable Handset	Provided by Manufacturer	WCDMA Band 2, RMC, 12.2 kbps, Ch 9262, Body, Bottom, 2 mm	1.350	C39VF007JH2Q
				GPRS 1900, GMSK, 2 Tx Slots, Ch 512, Body, Bottom, 2 mm	0.727	
BCG-E3218A	Apple	iPhone XS Portable Handset	Purchased by FCC	GPRS 1900, GMSK, 2 Tx Slots, Ch 661, Body, Back, 2 mm	2.340	GONZ50M7KPF8
				GPRS 1900, GMSK, 2 Tx Slots, Ch 661, Body, Bottom, 2 mm	1.990	
A3LSMG960U	Samsung	Galaxy S9 Portable Handset	Provided by Manufacturer	CDMA BC1, RC3, TDSO 32, Ch 600, Body, Back, 2 mm, Connect ther	4.520	R38K6095MYL
				CDMA BC1, RC3, TDSO 32, Ch 600, Body, Back, 2 mm, Position ther	4.380	
A3LSMG960U	Samsung	Galaxy S9 Portable Handset	Purchased by FCC	CDMA BC1, RC3, TDSO 32, Ch 600, Body, Back, 2 mm, Connect ther	No Data Yet	R3M706TT9A
				CDMA BC1, RC3, TDSO 32, Ch 600, Body, Back, 2 mm, Position ther	No Data Yet	
A3LSMJ337A	Samsung	Galaxy J3 Portable Handset	Provided by Manufacturer	WCDMA Band 4, RMC, 12.2 kbps, Ch 1312, Body, Back, 2 mm, Con	5.200	RF8KA1J3X6E
				WCDMA Band 4, RMC, 12.2 kbps, Ch 1312, Body, Back, 2 mm, Posi	5.140	
IHDT56XC4	Motorola	Moto e5 play Portable Handset	Provided by Manufacturer	WCDMA Band 2, RMC, 12.2 kbps, Ch 9262, Body, Back, 2 mm, Con	1.390	359524090350295
				WCDMA Band 2, RMC, 12.2 kbps, Ch 9262, Body, Back, 2 mm, Posi	1.360	
IHDT56XB1	Motorola	Moto g6 Play Portable Handset	Provided by Manufacturer	WCDMA Band 5, RMC, 12.2 kbps, Ch 4132, Body, Front, 2 mm, Cor	1.980	351864090034178
				WCDMA Band 5, RMC, 12.2 kbps, Ch 4132, Body, Front, 2 mm, Pos	1.980	
IHDT56XB1	Motorola	Moto g6 Play Portable Handset	Purchased by FCC	WCDMA Band 5, RMC, 12.2 kbps, Ch 4132, Body, Front, 2 mm, Cor	1.080	3518643090300620
				WCDMA Band 5, RMC, 12.2 kbps, Ch 4132, Body, Front, 2 mm, Pos	1.090	

Chicago Tribune

FCC says tests find cell phones comply with federal limits on radiofrequency radiation.

By Joe Mahr

December 20, 2019

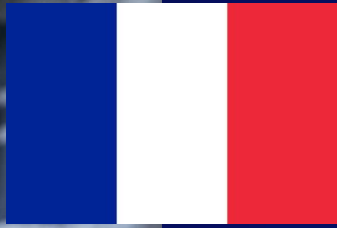
“The FCC said this week that its own testing testing found all eight models it evaluated were in compliance.”

“the FCC's recent study did not test phones at 2 mm distance”

The FCC did not mention its 2 mm tests in 3 court cases.

1. **EHT et al., v. the FCC:** Petitioners alleged the FCC ignored record evidence.
2. **Cohen et al., v. Apple, Inc:** Consumers (class action) alleging Apple had not warned them about excessive RF.
3. **CTIA v. City of Berkeley:** Wireless industry sued Berkeley to halt implementation of its *cell phone right to know* ordinance that informed consumers (point of sale) that phones in a pants or shirt pocket or bra could result in RF exposure exceeding federal guidelines.





France

Consumer Information for RF Emitting Devices

Order by Ministers of Health and Economy
(2019)

- Reduce exposure: speakerphone
- Children and adolescents should limit call time

"Keep radio equipment **away from the stomachs of pregnant women & adolescents.**"

American Academy
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN®

“If you plan to watch a movie on your device, download it first, then switch to airplane mode while you watch in order to avoid unnecessary radiation exposure.”

- American Academy of Pediatrics



“It is wise to reduce exposure...”

-Connecticut
Department of Public Health



Athens Medical Association



Cyprus National Committee
on Environment and Children's Health



Vienna Medical Association



Swiss Physicians Association of
Doctors for Environmental
Protection



Cyprus Medical Association

Policy Measures Aimed at Mitigating Health Risk To Children



Russia: Cell tower, base stations no longer allowed near schools. National schedule for the relocation of base stations off school



Lithuania: Cell antennas prohibited on kindergartens and hospitals



Greece: Cell antennas prohibited on school grounds. Restrictive limit 300 meter radius around kindergartens, schools, hospitals and elder homes.



Bangladesh: No cell towers on homes, schools, colleges, playing fields.



Israel: Cell tower setback 100m from schools.



Chile: Prohibits cell towers in “sensitive areas”



Queensland, Australia: No new towers on school property, required distance of at least 200 meters and emissions no greater than 1% of ARPANSA



India: Mumbai, Zilla Parishad & Karnataka: Cell towers prohibited near schools, colleges, orphanages and old age homes.



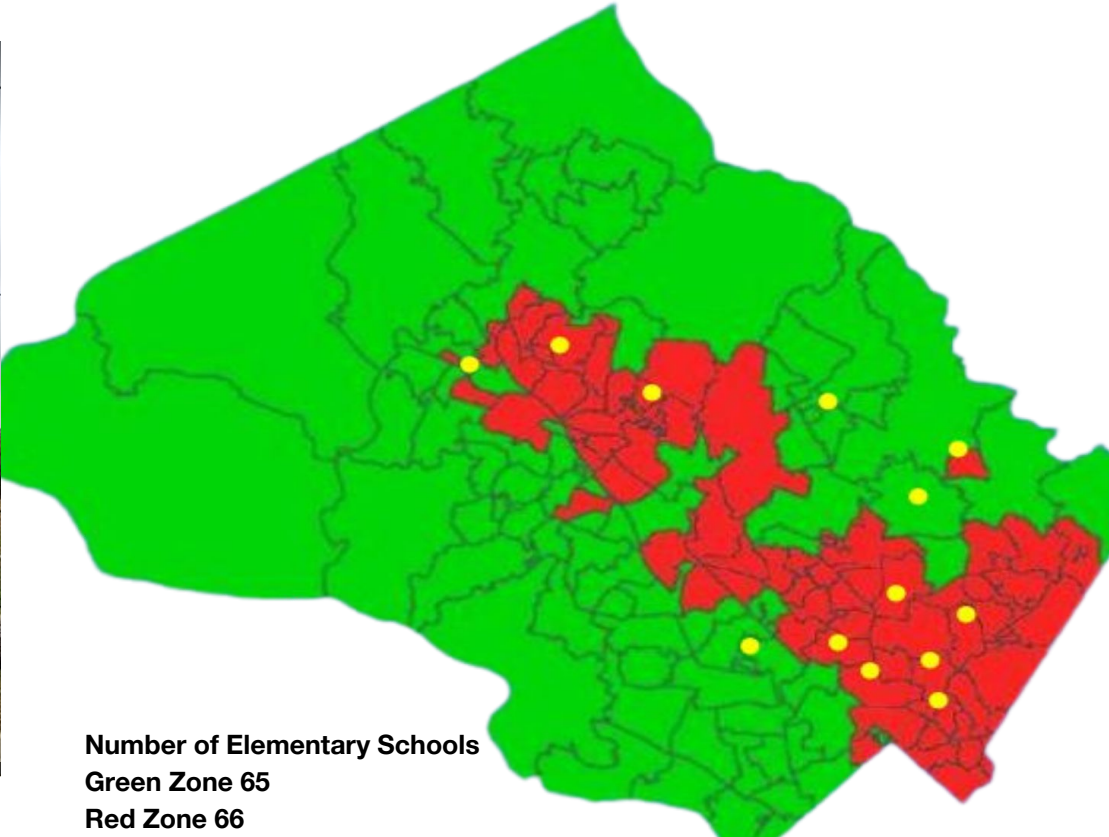
Towers and antennas deployed on schools nationwide despite some local governments restrictions and setbacks.

- Shelburne, Massachusetts: 3,000 feet for schools and 1,500 feet for homes.
- Williamson County Tennessee: 1,500 foot setback for schools.
- Copake, New York: 1,500 feet from homes, schools, churches and public buildings.
- Sallisaw, Oklahoma: 1,500 feet from homes or structures.
- Stockbridge, Massachusetts: 1,000 feet for schools, playgrounds and athletic fields. 600 feet for residential.
- Walnut City, California: 1,500 feet setbacks for schools, parks and residential zones.
- Calabasas, California: 1,000 feet for homes and schools.
- Davis, California: 500 feet of residential zones and schools.
- Bar Harbor, Maine: 1500 feet setback for schools.
- Bedford, New Hampshire: 750 feet from nearest residentially-zoned property.
- San Diego County: 300 feet for small cell wireless for schools, childcare centers, hospitals, religious facilities, fire and police stations.
- Fairfax, California: 300 ft. from schools and parks.

Cell Towers Disproportionately Placed on Schools With Higher Free Lunch and Higher Minority Population (Red Zone)



Wheaton High School, Montgomery County Maryland



Number of Elementary Schools
Green Zone 65
Red Zone 66
Image from Parents Coalition of Montgomery County

Limiting liability with positioning to minimize negative health effects of cellular phone towers

J.M. Pearce ^{a b c}  

^a Department of Electronics and Nanoengineering, School of Electrical Engineering, Aalto University, Espoo, Finland

^b Department of Electrical & Computer Engineering, Michigan Technological University, USA

^c Department of Materials Science & Engineering, Michigan Technological University, USA

Highlights

- Cellular phone networks demand widespread human exposure to radio-frequency radiation (RFR).
- Cellular phone base stations density & power output increasing global human RFR exposure.
- Already enough medical-scientific evidence to warrant long-term liability concerns.
- To protect cell phone tower firms, companies should seek to minimize human RFR exposure.

Companies can mitigate their risk by competing on safety.

Alphabet, Inc. (Google) Shareholder Motion

June 7th: Alphabet Shareholder Meeting Vote on **Proposal #5 “Regarding a Report on Electromagnetic Radiation and Wireless Technologies Risks.”**

Requiring an annual report on the risks associated with wireless electromagnetic radiation emitted by Google’s smartphones and wireless devices.

EHT filed a comprehensive exempt solicitation to Google's response that regulatory limits are adequate protective.

Santa Clara California Medical Association

Recommendations for Best Practices for Technology in Schools (2023)

- Create a “Safe Tech in Schools Program” to educate on reducing wireless radiation for students and staff.
- Create cell phone-free policies for the classroom.
- Prefer hard-wired ethernet devices instead of Wi-Fi
- Professional RF measurements.
- Avoid installation of smart meters.
- Consider a policy to restrict installation of cell towers on or near school property.

The US Needs A Transparent Regulatory Framework for Wireless With Policy Measures to Mitigate Risks

1. Development of **science based limits** for humans and non-humans
2. **Full environmental reviews** prior to the licensing and national buildout of major new technologies like 5G, 6G and beyond
3. **A research program with premarket and post market safety testing**
4. **Health and environmental surveillance** for long term impacts
5. Robust **publicly accessible oversight and compliance program** with regular audits.
6. Nationwide **EMF monitoring and mapping**- including forests, parks and ecologically sensitive areas.
7. **A federal registry** for all wireless facilities (4G, 5G and “small” cells)
8. **Worker protections and interagency collaboration**
9. Implementation of **measures to reduce exposure and manage risk.**

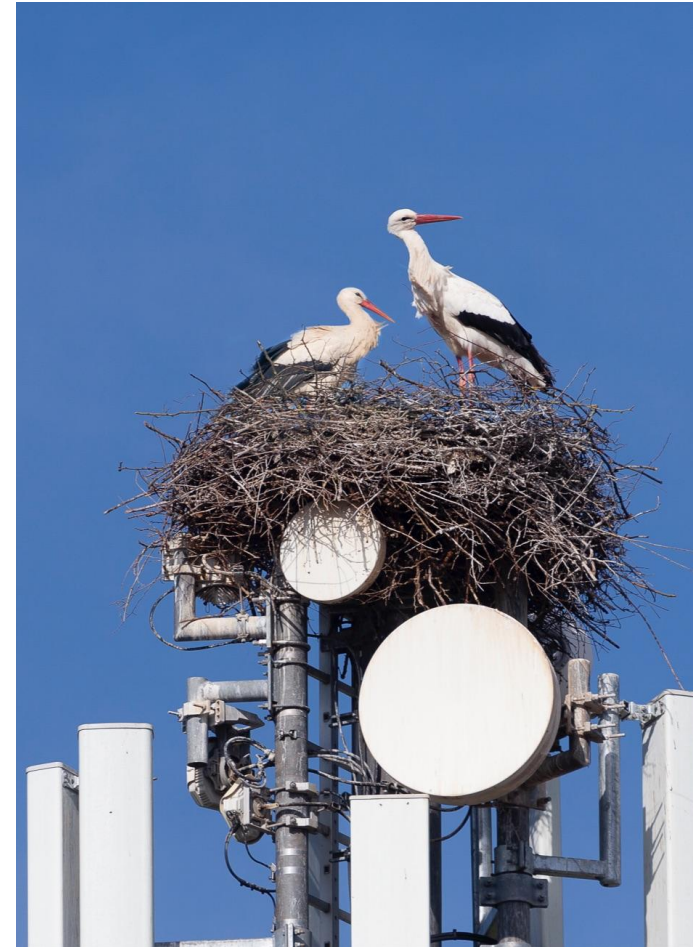
Until adequate limits and regulations for wildlife are developed, measures to mitigate/reduce RF in ecologically sensitive areas, conservation areas, wildlife protected areas, bird habitat, turtle breeding areas, bee colonies should be urgently implemented.

Jérémy S. P. Froidevaux, Laura Recuero Virto, Marek Czerwiński, Arno Thielens, and Kirsty J. Park [Addressing Wildlife Exposure to Radiofrequency Electromagnetic Fields: Time for Action](#) Environmental Science & Technology Letters, 2024, 11, 1, 3–4

Thill A, Cammaerts MC, Balmori A. [Biological effects of electromagnetic fields on insects: a systematic review and meta-analysis](#). Rev Environ Health. 2023 Nov 23

Levitt, B. B., Lai, H. C., & Manville, A. M. (2021). [Effects of non-ionizing electromagnetic fields on flora and fauna, Part 3. Exposure standards, public policy, laws, and future directions](#). Reviews on Environmental Health.

[Sivani, S. and D. Sudarsanam. \(2012\): "Impacts of radio-frequency electromagnetic field \(RF-EMF\) from cell phone towers and wireless devices on biosystem and ecosystem-a review."](#) Biology and Medicine 4, no. 4 202-216.



Ensuring a healthy future for children, wildlife and the environment should be at the center of the decision making process.

ehtrust.org
healthytechhome.org
wildlifeandwireless.org

Theodora.Scarato@ehtrust.org



**HEALTHY
TECH** at **HOME**
PROJECT



**ENVIRONMENTAL
HEALTH TRUST**