Recommendations to the NTIA Modernizing United States Spectrum Policy and Establishing a National Spectrum Strategy

Theodora Scarato MSW

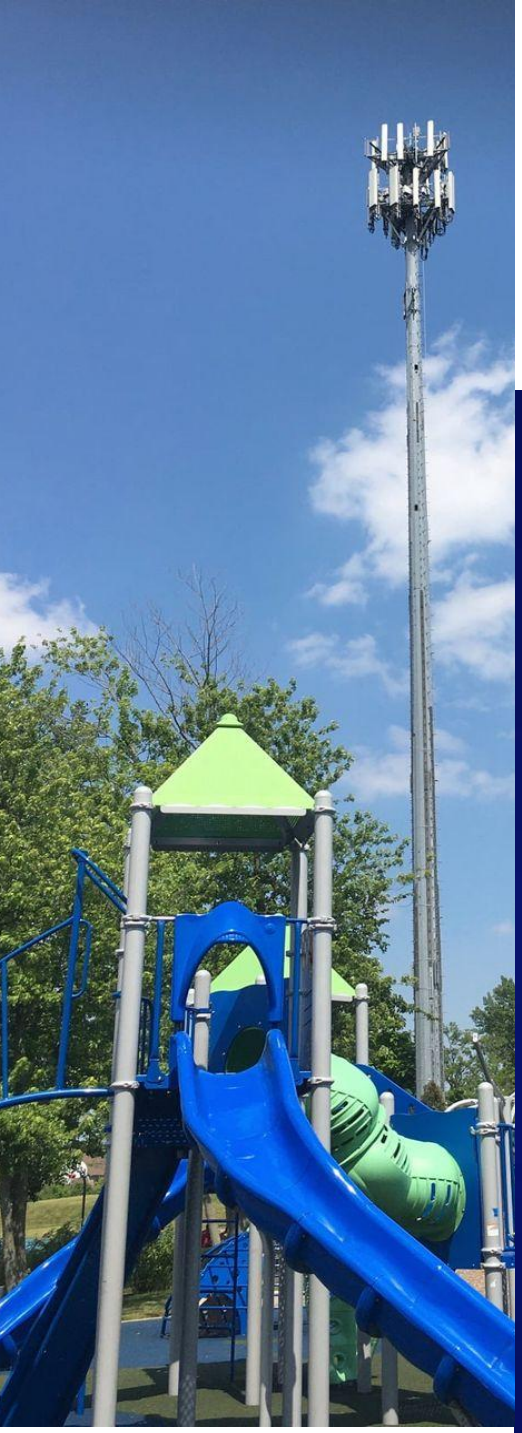
Executive Director Environmental Health Trust

And

Rola Masri

Director of Government Outreach Environmental Health Trust

On December 12, 2023, Theodora Scarato, Executive Director, and Rola Masri, Director of Government Outreach, of the Environmental Health Trust met with Scott Harris, John Alden, Scott Patrick, Paul Ransom and Jonathan Stefanick of the NTIA Office of Spectrum Management.



US FCC Standards for Cell Towers Unchanged Since 1996

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1996 Limits for Heating

FCC limits not designed to address:

- biological effects.
- long term exposures.
- Modern technology and real world exposures of cumulative sources (numerous frequencies and modulations from numerous sources).
- children's vulnerability due to more sensitive brains and developing systems.

2019: We launched a lawsuit against the FCC for is decision not to update FCC limits

FCC Human Exposure Limits

"At the present time there is no federally-mandated radio frequency (RF) exposure standard." FCC

- FCC limits are guidelines adopted in 1996 but not safety standards developed by federal agencies.
- FCC limits are for short term acute exposures, not long term low levels exposures.
- The EPA was defunded in 1996 just as it was poised to release recommended safety limits.

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United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Argued January 25, 2021 Decided August 13, 2021

No. 20-1025

ENVIRONMENTAL HEALTH TRUST, ET AL.,
PETITIONERS

v.

FEDERAL COMMUNICATIONS COMMISSION AND UNITED STATES OF AMERICA,
RESPONDENTS

Environmental Health Trust et al. v. the FCC

2021: United States Court of Appeals for the D.C. Circuit: **FCC did not provide evidence of examining the full record.**

The Court mandated the FCC explain how FCC limits address:

- long-term exposure
- children's vulnerability
- Impacts to the developing brain and reproductive system
- environmental effects
- technological developments since 1996

No response so far.

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Regulatory Gaps

- No Federal Registry
- No Measuring and Monitoring
- No Oversight and Enforcement Program
- No Standardized Compliance Reports
- No Ongoing Research Review
- No Hazard Evaluation or Risk Assessment of FCC Limits.
- No Health and Environmental Surveillance

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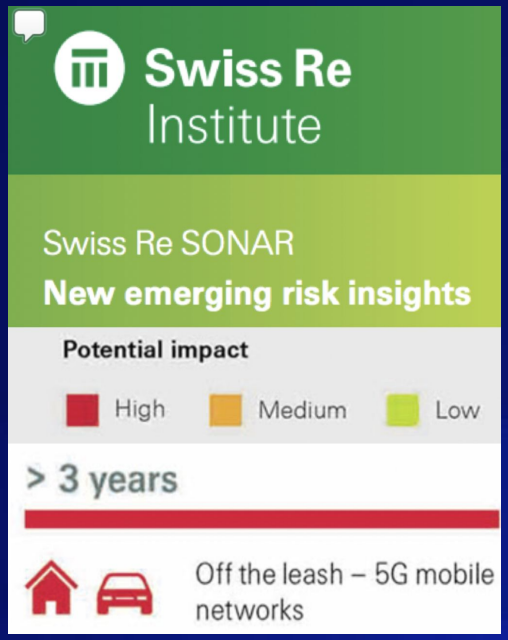
Wireless Radiation Regulatory Gaps

There has been no review, no risk assessment, or hazard evaluation of all of the relevant up to date evidence on bioeffects by any U.S. regulatory agency or agencies.



Swiss Re Report

5G Technology described 5G as "off the leash" a “high impact” emerging risk.

- Concerns re “potential negative health effects from electromagnetic fields are likely to increase.”
- Hackers can exploit 5G to steal more data faster.
- Privacy, security and espionage

“As the biological effects of EMF in general and 5G in particular are still being debated, potential claims for health impairments may come with a long latency.”

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Insurance Companies Rank RF Risk as "High" Industry Standard to Exclude Coverage

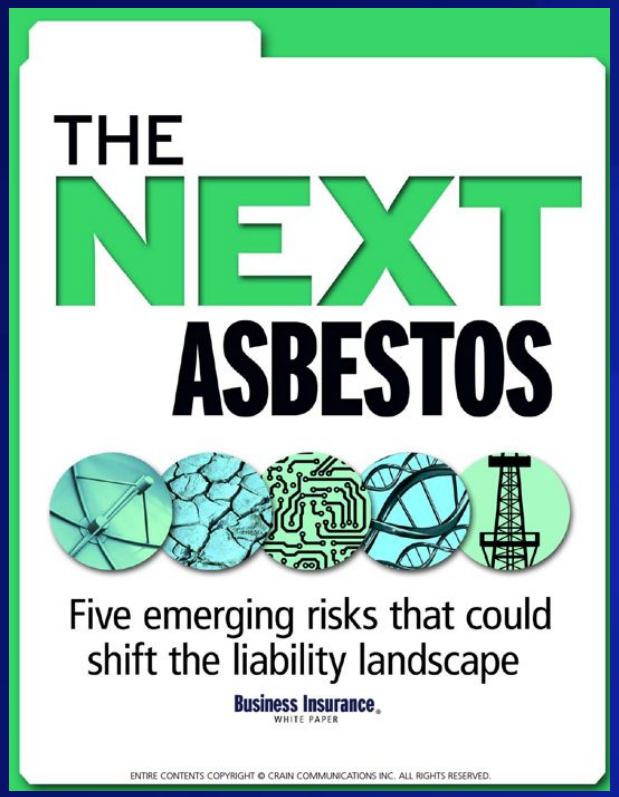

Image: 2011 *Business Insurance White Paper*

"The danger with EMF is that, like asbestos, the exposure insurers face is underestimated and could grow exponentially and be with us for many years."

-Lloyds of London 2010 Report

- **No insurance coverage** for cell phone companies for EMF damages since 1997.
- **Insurance companies exclude damage from EMFs** as an industry standard in general policies.

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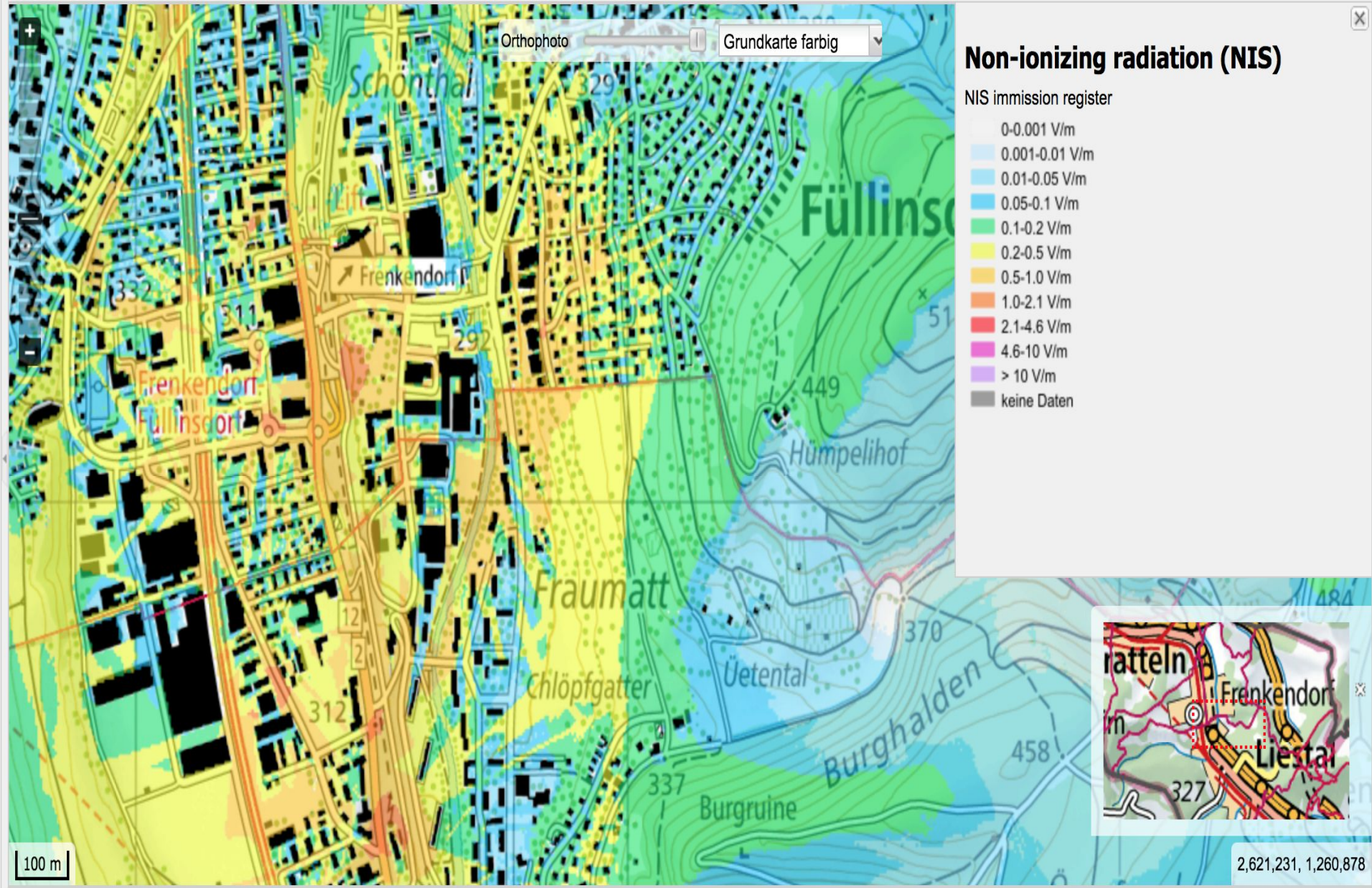
Switzerland 2023

SwissMapRaster | SWISSIMAGE | Geolog. Atlas | historische Karten: Quelle swisstopo
GIS-Fachstelle BL | Mühlemattstrasse 36 | CH-4410 Liestal

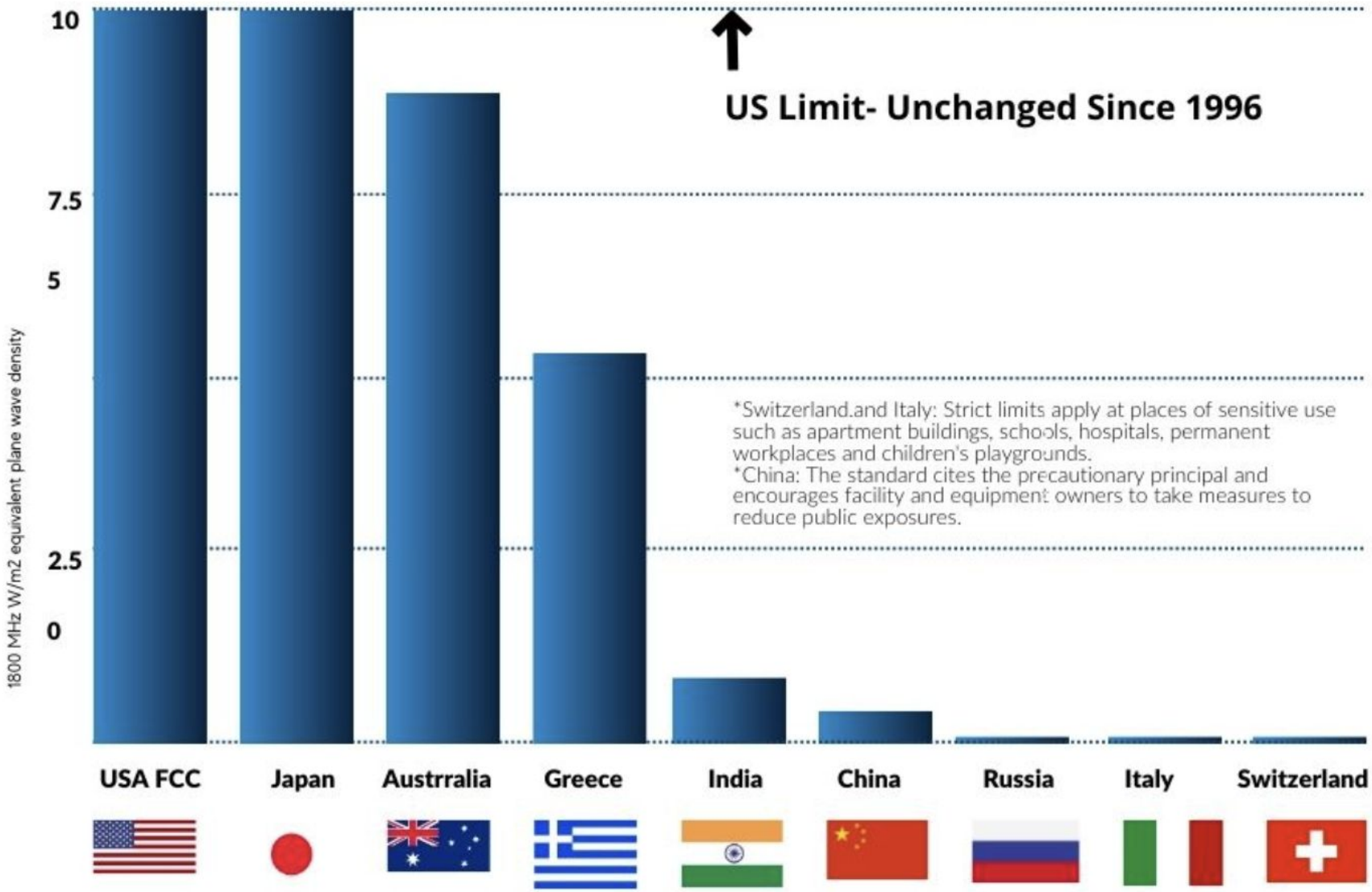
BASEL LANDSCHAFT



Environmental RF Exposure Limits For Cell Towers and Wireless

Applied to Homes and Schools

Limit for 1800 MHz W/m2 equivalent plane wave density



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FDA U.S. FOOD & DRUG ADMINISTRATION

"The FDA does not regulate cell towers or cell tower radiation. Therefore, the FDA has no studies or information on cell towers to provide in response to your questions."

-Ellen Flannery, Director of the FDA Office of Policy Center for Devices and Radiological Health January 11, 2022

View from third floor of home in Pennsylvania with "small" cell going up

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United States Environmental Protection Agency

Health Effects Research Laboratory Research Triangle Park NC 27711

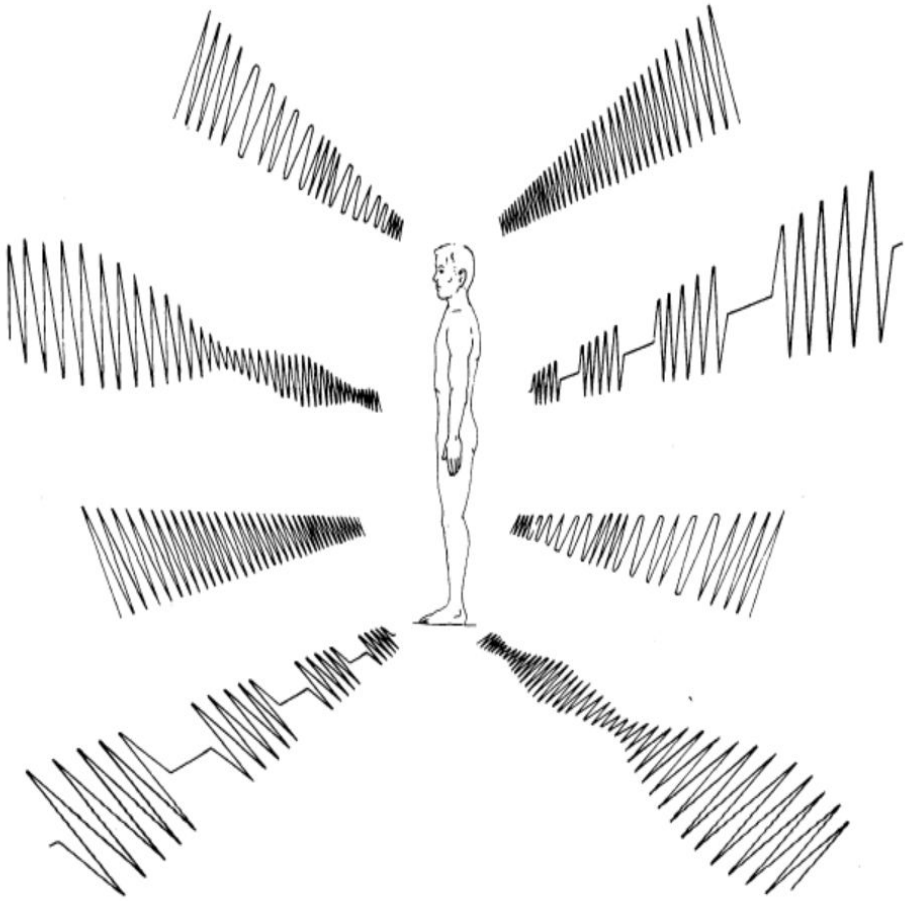
September 1984 Final Report

Research and Development

EPA

Biological Effects of Radiofrequency Radiation

600883026F



"EPA's last review was in the 1984 document Biological Effects of Radiofrequency Radiation. The EPA does not currently have a funded mandate for radiofrequency matters."

-Lee Ann B. Veal
Director, EPA Radiation Protection Division
Office of Radiation and Indoor Air
to Scarato July 8, 2020 and 2023

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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Cell Tower and Base Station Antennas Increasing Environmental Levels

- A 2018 multi-country study (Sagar et al. 2018) found RF measurements in Los Angeles, California now **70 times higher than levels measured in City in the late '70s,** as part of a twelve-city study (Tell and Mantiply 1982, Hankin 1986).

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The NTIA must ensure wildlife and habitat are protected.

- FCC regulations were <u>not designed</u> to protect wildlife.
- Airborne species and trees are highly exposed near wireless facilities.
- Data is not being gathered on wireless impacts to wildlife.
- Spectrum planning must include addressing wildlife and habitat impacts.

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DE GRUYTER Rev Environ Health 2021; aop

Review Article

B. Blake Levitt*, Henry C. Lai and Albert M. Manville II

Effects of non-ionizing electromagnetic fields on flora and fauna, part 1. Rising ambient EMF levels in the environment

https://doi.org/10.1515/reveh-2021-0026
Received February 19, 2021; accepted March 20, 2021;
published online May 27, 2021

Abstract: Ambient levels of electromagnetic fields (EMF) have risen sharply in the last 80 years, creating a novel energetic exposure that previously did not exist. Most recent decades have seen exponential increases in nearly all environments, including rural/remote areas and lower atmospheric regions. Because of unique physiologies, some species of flora and fauna are sensitive to exogenous EMF in ways that may surpass human reactivity. There is limited, but comprehensive, baseline data in the U.S. from the 1980s against which to compare significant new surveys from different countries. This now provides broader and more precise data on potential transient and chronic exposures to wildlife and habitats. Biological effects have been seen broadly across all taxa and frequencies at vanishingly low intensities comparable to today's ambient exposures. Broad wildlife effects have been seen on orientation and migration, food finding, reproduction, mating, nest and den building, territorial maintenance and defense, and longevity and survivorship. Cyto- and geno-toxic effects have been observed. The above issues are explored in three consecutive parts: Part 1 questions today's ambient EMF capabilities to adversely affect wildlife, with more urgency regarding 5G technologies. Part 2 explores natural and man-made fields, animal magnetoreception mechanisms, and pertinent studies to all wildlife kingdoms. Part 3 examines current exposure standards, applicable laws, and future directions. It is time to recognize ambient EMF as a novel form of pollution and develop rules at regulatory agencies that designate air as 'habitat' so EMF can be regulated like other pollutants. Wildlife loss is often unseen and undocumented until tipping points are reached. Long-term chronic low-level EMF exposure standards, which do not now exist, should be set accordingly for wildlife, and environmental laws should be strictly enforced.

Keywords: 2G – 4GLTE; 5G; cell phone towers/masts/base stations/small cells; "Internet of Things" (IoT); magneto-reception; millimeter waves (MMW); nonionizing electro-magnetic fields (EMF); radiofrequency radiation (RFR); satellites; wildlife.

PART 1: DEFINING THE PROBLEM: TECHNOLOGY AND RISING EMF LEVELS

Introduction: environmental disconnect

Since the advent of electrification in the late 1800s and wireless communications in the 1930s, ambient levels of radiation from devices, broadcast facilities, land-based telecom infrastructure, satellites, and military applications have gradually risen across a range of frequencies in the nonionizing bands of the electromagnetic spectrum. There has been broad discussion in the media and elsewhere about nonionizing electromagnetic fields (EMF) effects to humans, especially since the International Agency for Research on Cancer (IARC) at the World Health

Three part review (Levitt et al 2021) of over 1200 studies on EMF impacts to flora and fauna published in *Reviews on Environmental Health*

- Biological effects seen broadly across all taxa and frequencies studied with impacts *"at vanishingly low intensities comparable to today's ambient exposures."*

- Impacts to orientation, migration, reproduction, nest building, den building and survivorship.

Levitt et al. 2022

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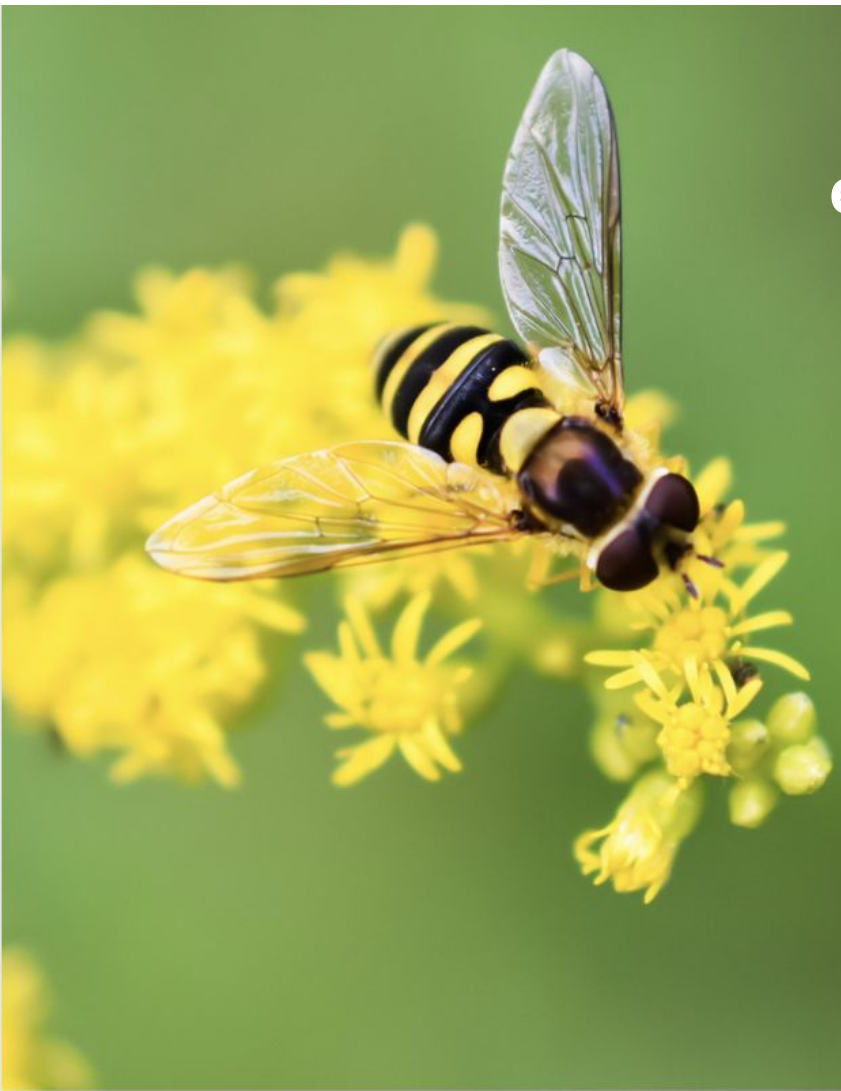
2023 Systematic Review on Insects and EMF

Reviews on Environmental Health

By Alain Thill Marie-Claire Cammaerts and Alfonso Balmori.

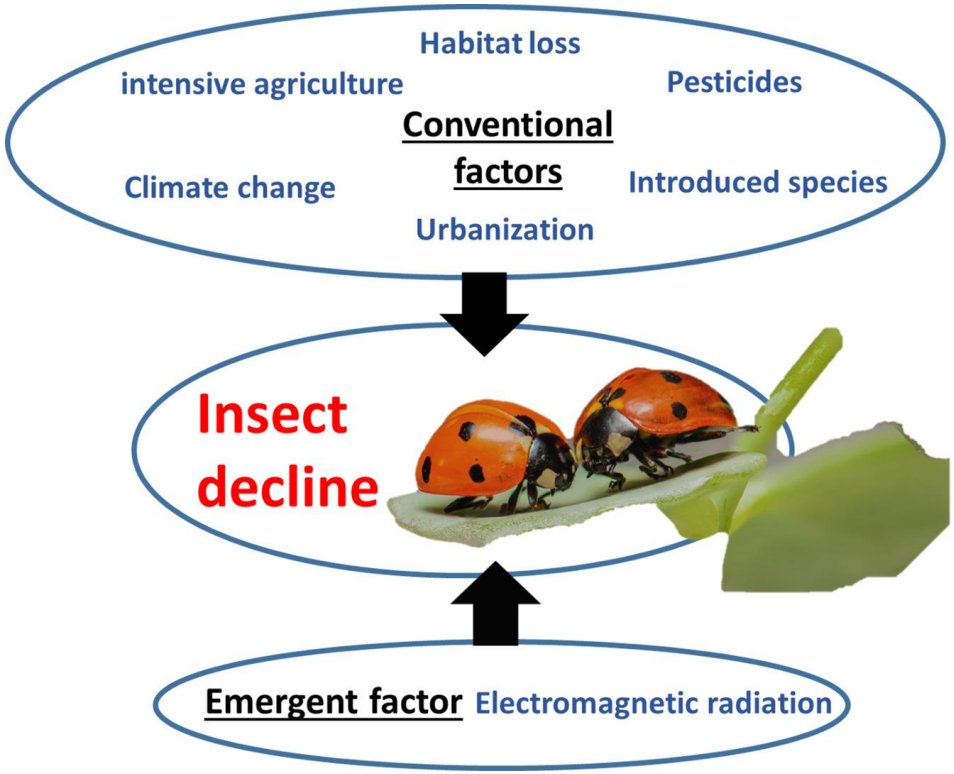


"vast majority of studies found effects, generally harmful ones"

The majority of studies found impacts:

- Reproductive capacity
  Development
- Metabolism
- Behavior
- Orientation
- Memory
- Oxidative stress
- DNA damage

“Electromagnetic radiation as an emerging driver factor for the decline of insects”



Alfonso Balmori reviewed research that has been conducted on the link between exposure to power-frequency non ionizing EMF and wireless radiation and the decline of insect species in a paper entitled “Electromagnetic radiation as an emerging driver factor for the decline of insects.”

Documented impacts to insects include:

- loss of queen cells
- changes to weight gain of hive
- poor survival in winter
- changes to propolisation
- changes to flight, foraging and feeding
- changes to short-term memory
- causes worker piping signals which can mean disturbance or preparation for swarming
- reduced egg-laying speed of queen
- no honey or pollen in a colony by the end of exposure
- lower weight of honeycomb
- increased mortality.

Balmori A. Electromagnetic radiation as an emerging driver factor for the decline of insects. Sci Total Environ. 2021

https://www.sciencedirect.com/science/article/abs/pii/S0048969720384461?via%3Dihub

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A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF)

Cucurachi et al, 2013

- **RF-EMF had a significant effect on birds, insects, other vertebrates, other organisms and plants in 70% of the studies.**
- **Development and reproduction of birds & insects were most strongly affected endpoints.**

Cucurachi, S., Tamis, W. L. M., Vijver, M. G., Peijnenburg, W. J. G. M., Bolte, J. F. B., & de Snoo, G. R. (2013). A review of the ecological effects of radiofrequency electromagnetic fields (RF-EMF). *Environment International*, *51*, 116–140.

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Insect exposure at and above 6 GHz could lead to an increase in absorbed power between 3–370%.

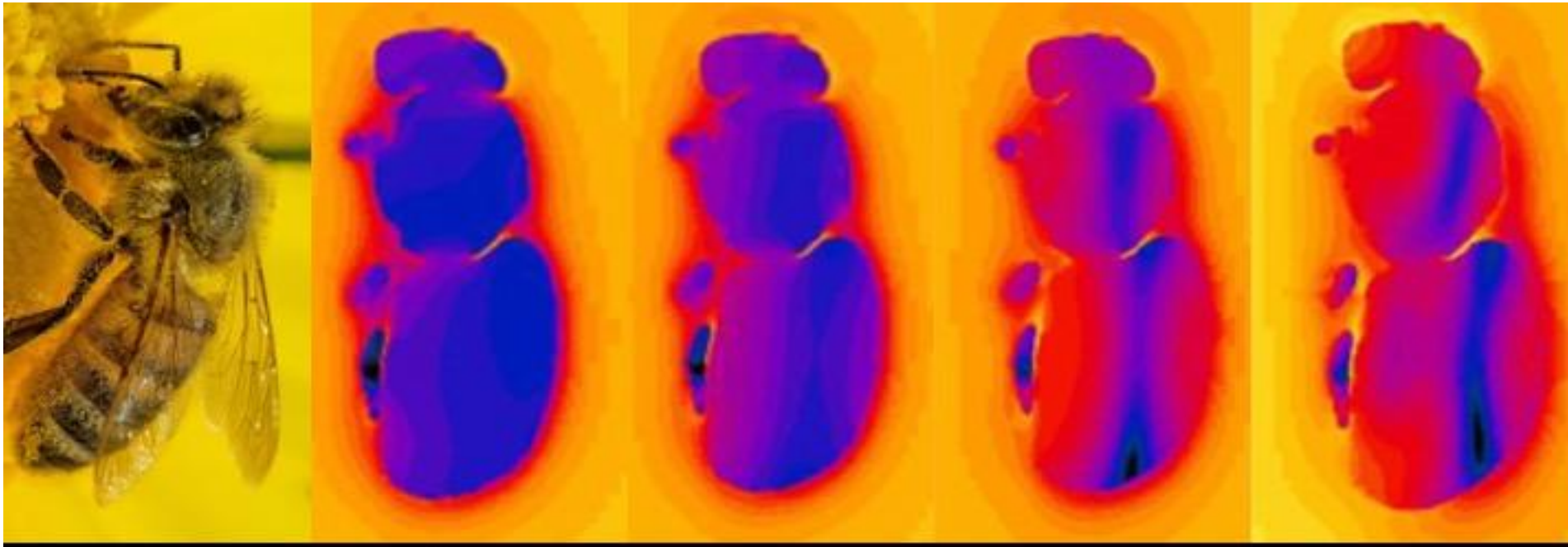

Image: "Exposure of Insects to Radio-Frequency Electromagnetic Fields From 2 to 120 GHz" by Thielens et al.

Honeybee Exposure to Wireless: Lighter Color Equals Higher Absorbed Power

"this could lead to changes in insect behavior, physiology, and morphology over time…"

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Norway maple tree, August 2012
Badly damaged tree crown on the side facing an RF transmitter

Radiofrequency Radiation Injures Trees

- A 2016 field study of dozens of trees followed over 9 years.
- RF measured on sides of trees.

"Statistical analysis demonstrated that electromagnetic radiation from mobile phone masts is harmful for trees."

Waldmann-Selsam, C., et al. "Radiofrequency radiation injures trees around mobile phone base stations." in Science of the Total Environment (2016)

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[a] Consejería de Medio Ambiente, Junta de Castilla y León, C/Rigoberto Cortejoso, 14 47071 Valladolid, Spain

Norway Maple Tree July 2015 Radiofrequency Radiation Measurements

2,100 µW/m2 on side facing mast.

290 µW/m2 on side opposite mast

Radiofrequency radiation injures trees around mobile phone base stations, Science of The Total Environment, by Cornelia Waldmann-Selsam, Alfonso Balmori-de la Puente, Helmut Breunig, Alfonso Balmori

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Damage to Norway Maple Tree 2013 to 2016

May 2013 | June 2014 | June 2015 | July 2016

Breunig, Helmut

"Tree Damage Caused By Mobile Phone Base Stations An Observation Guide." (2017).

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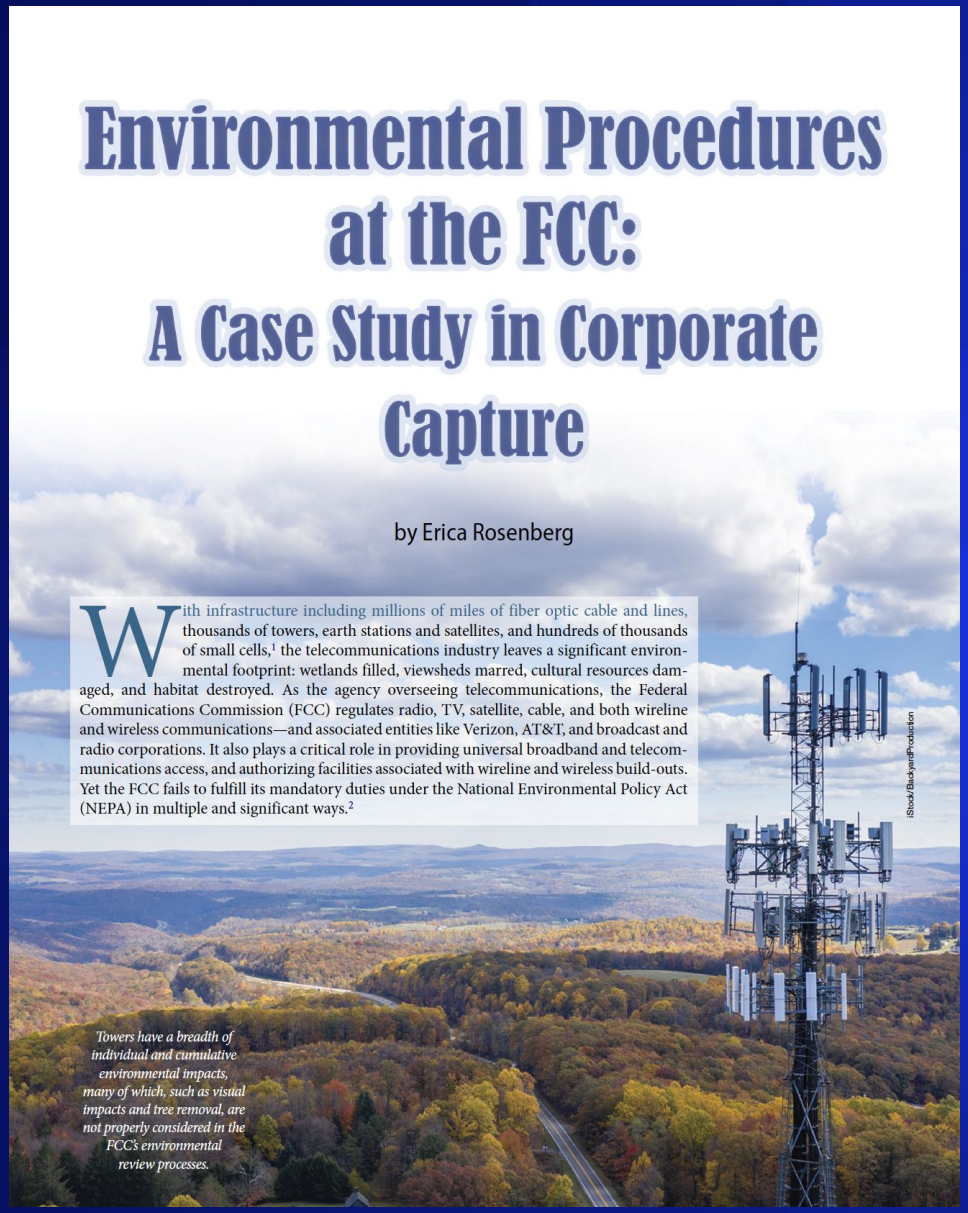

Environmental Procedures at the FCC: A Case Study in Corporate Capture

by Erica Rosenberg

With infrastructure including millions of miles of fiber optic cable and lines, thousands of towers, earth stations and satellites, and hundreds of thousands of small cells,[1] the telecommunications industry leaves a significant environmental footprint: wetlands filled, viewsheds marred, cultural resources damaged, and habitat destroyed. As the agency overseeing telecommunications, the Federal Communications Commission (FCC) regulates radio, TV, satellite, cable, and both wireline and wireless communications—and associated entities like Verizon, AT&T, and broadcast and radio corporations. It also plays a critical role in providing universal broadband and telecommunications access, and authorizing facilities associated with wireline and wireless build-outs. Yet the FCC fails to fulfill its mandatory duties under the National Environmental Policy Act (NEPA) in multiple and significant ways.[2]

iStock/BackyardProduction

Towers have a breadth of individual and cumulative environmental impacts, many of which, such as visual impacts and tree removal, are not properly considered in the FCC's environmental review processes.

How the FCC Fails to Follow Environmental Laws and Fails the Public

"The result of the FCC's lack of accountability is cumulative and incalculable environmental damage: views of protected landscapes and historic sites ruined, wetlands filled, endangered species habitat cleared, sacred sites desecrated, burial mounds and archaeological sites disturbed, and fragile underwater environments degraded."

Attorney Erica Rosenberg
Former Assistant Chief, Competition and Infrastructure Policy Division at the Federal Communications Commission
Wireless Telecommunications Bureau
Harvard University, BA and Boston College Law School, JD.

Erica Rosenberg (2022) Environmental Procedures at the FCC: A Case Study in Corporate Capture, Environment: Science and Policy for Sustainable Development

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Recommendations:
The FCC must respond to the DC Circuit by engaging relevant agencies in hazard evaluation and risk assessment for humans and environment.

A spectrum strategy must address the critical regulatory gaps and must consider RF impacts holistically and programmatically:

- Biological effects at low intensities- interference with living organisms.
- Long term exposures
- Increased ambient RF levels
- Combinations of frequencies
- The increased sensitivities of flora and fauna to particular frequencies
- The impact of various exposure parameters beyond power density such as modulation, pulsation and signal variability

Federal agencies with health, environmental and occupational expertise need to be engaged in EMF bioeffect activities.

All new technologies (modulations, frequencies, and propagation patterns) need to be tested for long term impacts to wildlife and trees/plants before deployment.

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A National Spectrum Strategy must include recommendations for a regulatory roadmap for wildlife and environmental protection.

All new technologies (modulations, frequencies, and propagation patterns) need to be properly tested for long term impacts to wildlife and trees/plants before deployment.

Full transparency is needed at every stage of the process.

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Additional Recommendations for Wildlife Impacts

1. RF compliance test procedures updated to consider flora and fauna. Current “nearest walking surface” measurements are inadequate to capture wildlife exposures.
2. Premarket and post market safety testing and environmental surveillance for long term impacts.
3. A robust oversight and compliance program
4. A nationwide RF monitoring system including forests, parks and ecologically sensitive areas in addition to rural and urban areas in order to monitor EMF levels and track wildlife changes.
5. A federal registry for all wireless facilities – broadcast, cell tower base stations (3G, 4G, 5G), and small cell network antennas.
6. Conduct full environmental reviews prior to the licensing and national buildout of major new technologies like 5G, 6G and beyond.
7. Installations of cell towers and wireless networks near ecologically sensitive areas, conservation areas, wildlife protected areas, important bird habitat, turtle breeding areas, bee colonies, zoos, etc. should be robustly studied for environmental impacts before permitting.

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International Agency for Research on Cancer

World Health Organization

PRESS RELEASE N° 208

31 May 2011

IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102)☆

Anthony B. Miller[a,*], L. Lloyd Morgan[b], Iris Udasin[c], Devra Lee Davis[d,e]

[a] Dalla Lana School of Public Health, University of Toronto, Canada
[b] Environmental Health Trust, Berkeley, CA, United States
[c] Rutgers University School of Public Health, United States
[d] Environmental Health Trust, Teton Village, WY, United States
[e] Hebrew University of Jerusalem, Israel

ARTICLE INFO

Keywords:
Brain cancer
Vestibular schwannoma
Salivary gland tumor
Electric hypersensitivity
Glioma
Meningioma
Radio frequency fields
Cell phones
Mobile phones

ABSTRACT

Epidemiology studies (case-control, cohort, time trend and case studies) published since the International Agency for Research on Cancer (IARC) 2011 categorization of radiofrequency radiation (RFR) from mobile phones and other wireless devices as a possible human carcinogen (Group 2B) are reviewed and summarized. Glioma is an important human cancer found to be associated with RFR in 9 case-control studies conducted in Sweden and France, as well as in some other countries. Increasing glioma incidence trends have been reported in the UK and other countries. Non-malignant endpoints linked include acoustic neuroma (vestibular Schwannoma) and meningioma. Because they allow more detailed consideration of exposure, case-control studies can be superior to cohort studies or other methods in evaluating potential risks for brain cancer. When considered with recent animal experimental evidence, the recent epidemiological studies strengthen and support the conclusion that RFR should be categorized as carcinogenic to humans (IARC Group 1). Opportunistic epidemiological studies are proposed that can be carried out through cross-sectional analyses of high, medium, and low mobile

Environmental Pollution 242 (2018) 643–658

Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective☆

Dominique Belpomme [a, b, 1], Lennart Hardell [a, c, 1, 2], Igor Belyaev [a, d, e, 1], Ernesto Burgio [a, f], David O. Carpenter [a, g, h, *, 1]

[a] European Cancer Environment Research Institute, Brussels, Belgium
[b] Paris V University Hospital, Paris, France
[c] Department of Oncology, Orebro University Hospital, Faculty of Medicine, Orebro, Sweden
[d] Department of Radiobiology, Cancer Research Institute, Biomedical Research Center, Slovak Academy of Science, Bratislava, Slovak Republic
[e] Laboratory of Radiobiology, Institute of General Physics, Russian Academy of Science, Moscow, Russian Federation
[f] Instituto Scientifico Biomedico Euro Mediterraneo, Mesagne, Italy
[g] Institute for Health and the Environment, University at Albany, Albany, NY, USA
[h] Child Health Research Centre, The University of Queensland, Faculty of Medicine, Brisbane, Australia

ARTICLE INFO

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ABSTRACT

Exposure to low frequency and radiofrequency electromagnetic fields at low intensities poses a significant health hazard that has not been adequately addressed by national and international organizations such as the World Health Organization. There is strong evidence that excessive exposure to mobile phone-frequencies over long periods of time increases the risk of brain cancer both in humans and animals. The mechanism(s) responsible include induction of reactive oxygen species, gene expression alteration and DNA damage through both epigenetic and genetic processes. *In vivo* and *in vitro* studies demonstrate adverse effects on male and female reproduction, almost certainly due to generation of reactive oxygen species. There is increasing evidence the exposures can result in neurobehavioral decrements and that some individuals develop a syndrome of "electro-hypersensitivity" or "microwave illness", which is one of several syndromes commonly categorized as "idiopathic environmental intolerance". While the symptoms are non-specific, new biochemical indicators and imaging techniques allow diagnosis that excludes the symptoms as being only psychosomatic. Unfortunately standards set by most national and international bodies are not protective of human health. This is a particular concern in children, given the rapid expansion of use of wireless technologies, the greater susceptibility of the developing nervous system, the hyperconductivity of their brain tissue, the greater penetration of radiofrequency radiation relative to head size and their potential for a longer lifetime exposure.

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Cell Phone Radio Frequency Radiation Studies

What did the studies find?

The NTP studies found that high exposure to RFR (900 MHz) used by cell phones was associated with:

- **Clear evidence of tumors in the hearts of male rats.** The tumors were malignant schwannomas.
- **Some evidence of tumors in the brains of male rats.** The tumors were malignant gliomas.
- **Some evidence of tumors in the adrenal glands of male rats.** The tumors were
- benign, malignant, or complex combined pheochromocytoma.

NTP scientists found that RFR exposure was associated with an increase in DNA damage. Specifically, they found RFR exposure was linked with significant increases in DNA damage in:

- the frontal cortex of the brain in male mice,
- the blood cells of female mice, and
- the hippocampus of male rats.

European Parliament

Health impact of 5G

2021 Conclusions on Commonly Used RF Frequencies (450 to 6000 MHz)

1) Cancer
EMF are probably carcinogenic for humans, in particular related to gliomas and acoustic neuromas;

2) Reproductive Developmental Effects
These frequencies clearly affect male fertility and possibly female fertility too. They may have possible adverse effects on the development of embryos, foetuses and newborns

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Evidence for a health risk by RF on humans living around mobile phone base stations: From radiofrequency sickness to cancer

A. Balmori [1]

C/ Rigoberto Cortejoso, 14 47014, Valladolid, Spain

ARTICLE INFO

Keywords:
Base station
Cell tower
Health
Mast
RF radiation
Microwave syndrome
Radar
Radio antennas

ABSTRACT

The objective of this work was to perform a complete review of the existing scientific literature to update the knowledge on the effects of base station antennas on humans. Studies performed in real urban conditions, with mobile phone base stations situated close to apartments, were selected. Overall results of this review show three types of effects by base station antennas on the health of people: radiofrequency sickness (RS), cancer (C) and changes in biochemical parameters (CBP). Considering all the studies reviewed globally (n = 38), 73.6% (28/38) showed effects: 73.9% (17/23) for radiofrequency sickness, 76.9% (10/13) for cancer and 75.0% (6/8) for changes in biochemical parameters. Furthermore, studies that did not meet the strict conditions to be included in this review provided important supplementary evidence. The existence of similar effects from studies by different sources (but with RF of similar characteristics), such as radar, radio and television antennas, wireless smart meters and laboratory studies, reinforce the conclusions of this review. Of special importance are the studies performed on animals or trees near base station antennas that cannot be aware of their proximity and to which psychosomatic effects can never be attributed.

73.6% showed effects by base station antennas on the health of people:

- 73.9% radiofrequency sickness
- 76.9% cancer
- 75.0% changes in biochemical parameters

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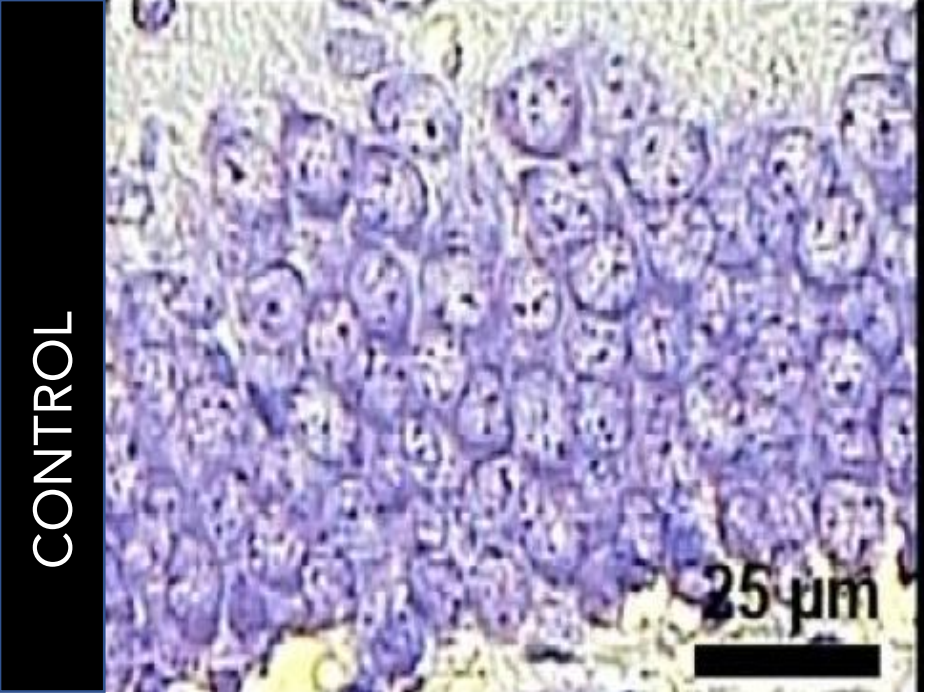
2022 Measurement Study Found RF Hotspots

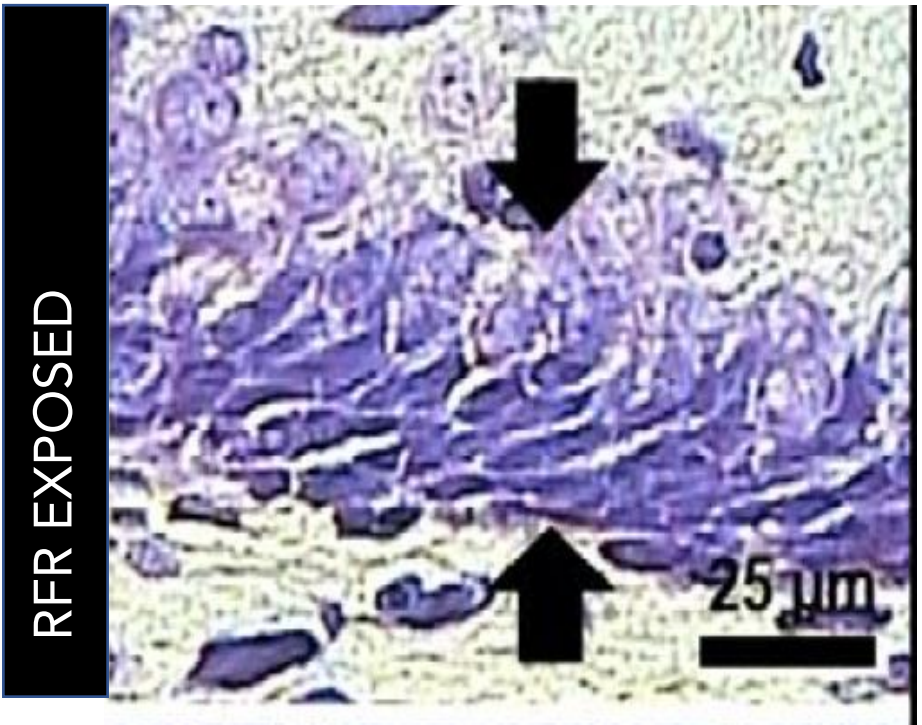
Where antennas were mounted on utility poles

Figure 7. Gervais Street: Cell phone base station antenna placed close to street level and causing high exposure to pedestrians and nearby café visitors (exposure scenario illustration). The antenna appears camouflaged and seemingly part of a utility pole. The measurer only discovered the antenna due to the high radiofrequency levels in the vicinity.

Measurements of radiofrequency electromagnetic fields, including 5G, in the city of Columbia, South Carolina, USA

TARMO KOPPEL[1,3] and LENNART HARDEL WORLD ACADEMY OF SCIENCES JOURNAL 4: 23, 2022





Wireless Radiation Impacts the Brain

Research Finds Memory Damage, Behavior Problems, Hyperactivity

- Decreased and damaged brain cells in animals exposed as adults and prenatally
- (Suleyman et al, 2016, Sonmez et a 2010, Bas et al.2009, 2009)
- Impacts to blood brain barrier
  (Nittby 2010, Sirav and Seyhan 2011,
- Altered brain activity increase in glucose activity- NIH
  (Volkow et al. 2011).
- Decreased memory in teens
  (Foerster et al. 2018).
- Decreased memory and hyperactivity after prenatal exposure- Yale
  (Aldad et al., 2011).
- Behavioral problems after pre/post natal -University of California School of Public Health
  (Divan et al., 2008, 2012).
- Hyperactivity/inattention problems in child after prenatal exposure
  (Birks et al., 2017)

Fewer hippocampal granular cells in the dentate gyrus (DG) of newborn rats following prenatal 900 MHz EMF exposure Odaci E, Bas O, and Kaplan S. (2008)

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T-Mobile™

Ecolog Institute Report (2000) commissioned by T-Mobile

* Recommended an exposure limit **1000 times lower than the FCC's** current power density limit.

Office of Environmental Health and Safety
333 South Beaudry Avenue, 21th Floor

Los Angeles California Public School District

FACT SHEET

No. 2013-01 RADIOFREQUENCY EXPOSURE FEBRUARY 2013 (Reviewed March 2019)

RF-EMF Limit 10,000 Less than the FCC limits & Ban on Cell Towers

"Since 2007, District staff has utilized a precautionary threshold level that addresses these non-thermal exposures. **Our threshold is 0.1 µW/cm2 or 10,000 times lower than the FCC standard. It is believed that a more conservative level is necessary to protect children, who represent a potentially vulnerable and sensitive population.**"

"There are three Board of Education resolutions …associated with cellular towers near schools whereby a prohibition exists regarding siting towers on school campuses."

INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS

Since 2004, the International Association of Firefighters has officially opposed cell towers on their stations

"until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is proven that such sitings are not hazardous to the health of our members."

Insurance Companies Rank RF Risk as "High" Industry Standard to Exclude Coverage

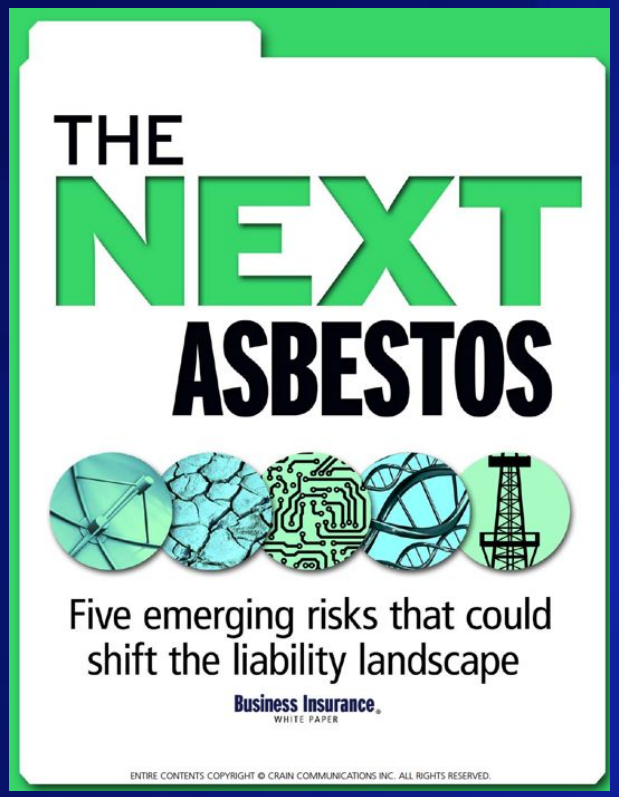


Image: 2011 *Business Insurance White Paper*

"The danger with EMF is that, like asbestos, the exposure insurers face is underestimated and could grow exponentially and be with us for many years."

-Lloyds of London 2010 Report

- Swiss Re Report 2019 5G rated as a **"high off the leash"** emerging risk
- Swiss Re Reports *2013, 2014* ranks the "unforeseen consequences of EMF" to the insurance industry as "High"
- **No insurance coverage** for cell phone companies for EMF damages since 1997.
- **Insurance companies exclude damage from EMFs** as an industry standard in general policies.

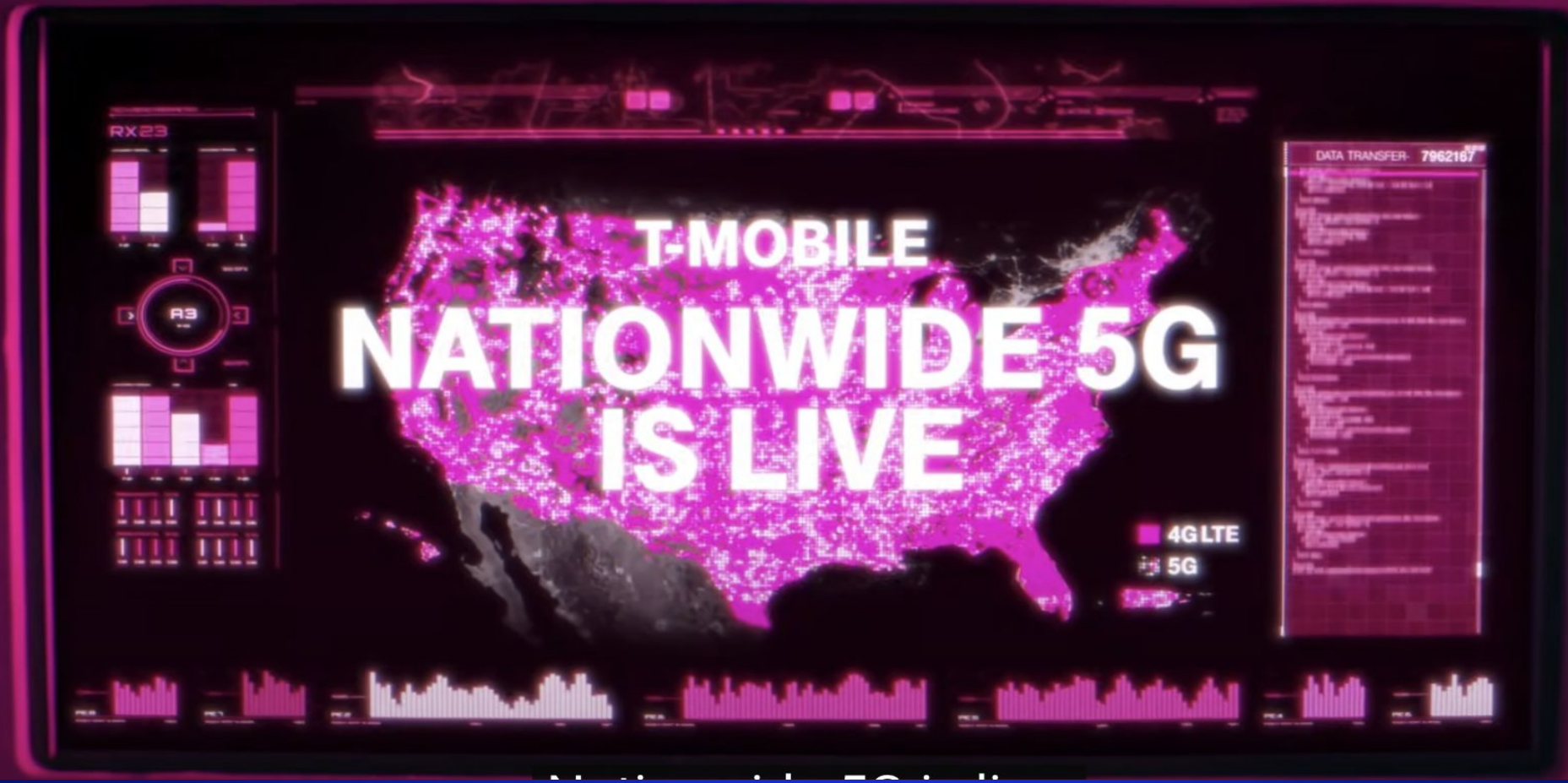
ENVIRONMENTAL HEALTH TRUST

Wireless Companies Warn Shareholders of Risk But Not Consumers Nor Neighbors

"If **radio frequency emissions from wireless handsets or equipment** on our communications infrastructure are **demonstrated to cause negative health effects**, potential future claims could adversely affect our operations, costs or revenues….**We currently do not maintain any significant insurance** with respect to these matters."

-Crown Castle 10-K

ENVIRONMENTAL HEALTH TRUST



T-Mobile

In addition, **the FCC has from time to time gathered data regarding wireless device emissions, and its assessment of the risks associated with using wireless devices may evolve based on its findings.** Any of these allegations or changes in risk assessments could result in customers purchasing fewer devices and wireless services, could result in significant legal and regulatory liability, and could have a material adverse effect on our business, reputation, financial condition, cash flows and operating results."
(T- Mobile 10-K Report page 21)

ENVIRONMENTAL HEALTH TRUST

Verizon and T-Mobile Mobile Protection Insurance Defines Non-ionizing Radiation as "Pollution"

LIBERTY INSURANCE UNDERWRITERS INC., or one of its insurance company affiliates.

WIRELESS COMMUNICATIONS EQUIPMENT COVERAGE INSURANCE POLICY

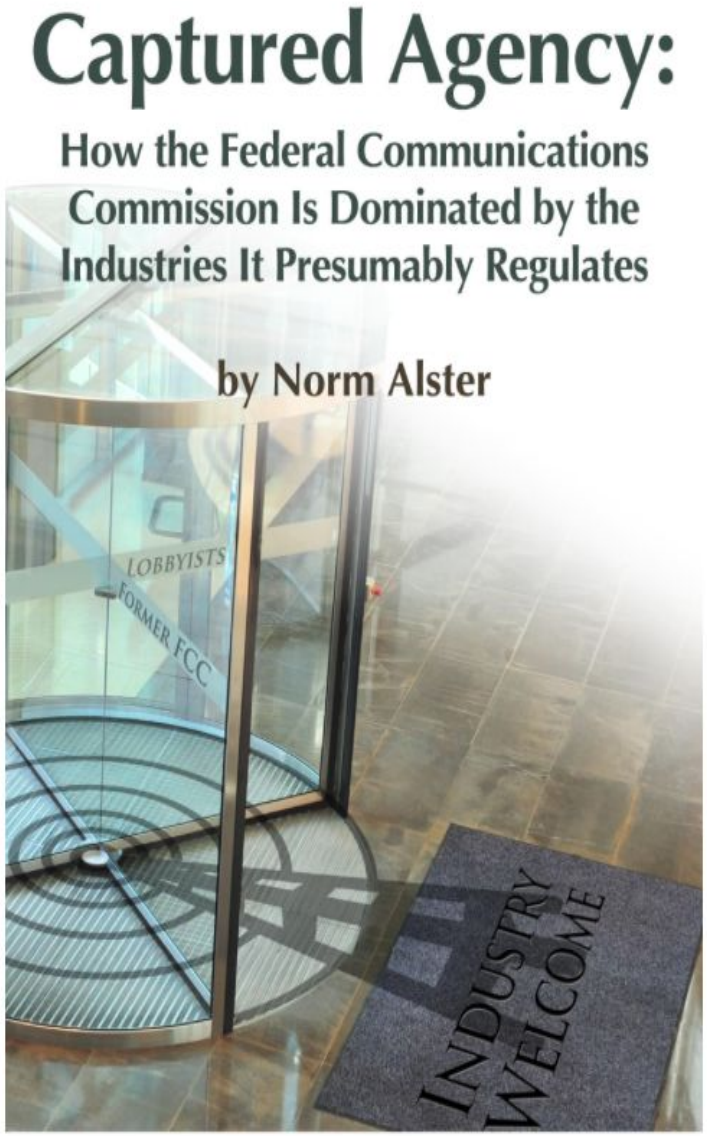
B. EXCLUSIONS

This insurance does not apply to loss or damage identified in any of the following or directly or indirectly caused by or resulting from any of the following:

16. Pollution

The discharge, dispersal, seepage, migration or escape of pollutants. Pollutants means any solid, liquid, gaseous, or thermal irritant or contaminant including smoke, vapor, soot, fumes, acid, alkalis, chemicals, artificially produced electric fields, magnetic field, electromagnetic field, sound waves, microwaves, and all artificially produced ionizing or non-ionizing radiation and/or waste. Waste includes materials to be recycled, reconditioned or reclaimed.

ENVIRONMENTAL HEALTH TRUST



www.ethics.harvard.edu

HARVARD UNIVERSITY
Edmond J. Safra
Center for Ethics

Harvard Report "Captured Agency"

- Compares the wireless industry to the tobacco industry
- US Congress receives millions from industry.
- Wireless companies using same playbook as Big Tobacco.
- The US FCC is a "captured agency" with a revolving door between industry and government.

USA Government Regulatory Gaps

No **compliance and enforcement** program for **cell towers** or **5G/4G** "small" cells.

ENVIRONMENTAL HEALTH TRUST

View of “Small” Cell Being Installed
Window of Pittsburgh Home

No FCC Oversight or Review of RF Reports

- No **standardization for RF compliance report formats**
- No **follow up** on recommendations

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USA Regulatory Gaps

No **federal registry** of all wireless facility sites.

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USA Regulatory Gaps

No **measuring** **monitoring** or **mapping** for environmental RF levels.

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No U.S. federal agency is studying the **health and environmental effects of cell tower** and **4G/5G "small" cell** antennas.

Government Accountability Office 2012, 2020

ENVIRONMENTAL HEALTH TRUST