Request for Information on Electromagnetic Fields (EMFs), Radiofrequency (RF) Radiation, and Wireless Radiation Exposure

Comments directed to:
HHS, docket HHS-OASH-2026-0397 and:
FCC, docket ET Docket No. 13-84
cc: Environmental Health Trust, Silver Spring, MD

Submitted by Frog Safe, Inc.
a NFP/NGO established in 1998 to work on frog health problems in Queensland, Australia

Dear staff at HHS and FCC:

Thank you for accepting comments and feedback on the subject of EMF/RF – a technology that has been rolled out without sufficient or sometimes ANY prior investigation of its consequences to human health and biodiversity. In particular, EMF/RF is a major driver of the global 'insect apocalypse' and that will have affects up the line including to our food supply.

Sections in this submission:

Personal and organisational experiences with EMF:
Environmental damage should not and cannot be ignored
Deformities of Queensland frogs
Non-ionising radiation is NOT safe
Scientific papers, predominantly those studying environmental impacts:
Who is running the show? The government or the telcos?
Appendix 1: photos of deformed frogs

Attached papers:

Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G

Effects of non-ionizing electromagnetic fields on flora and fauna, Part 3. Exposure standards, public policy, laws, and future directions

Health and environmental effects to wildlife from radio telemetry and tracking devices—state of the science and best management practices

Personal and organisational experiences with EMF:

While our organisation is concerned about the loss of species which will also create cascading effects up the food chain, we have also experienced health effects to my person, my companion animals, the animals our organisation rescues, and the local biodiversity from EMF applications. There are two specific sources of these effects in our setting: the nearest mobile (you call them cell phones) tower and the smoke alarms in the house which are now required by law to connected to each other by EMF/RF.

1) Both myself and my companion animals have experienced nervous system issues from EMF in my bedroom. My animals were stressed and agitated from the 432Hz that the smoke alarms broadcast and I suffered ongoing insomnia which is dangerous over time. Once the smoke alarm was removed from my room, my animals settled down and stopped twitching and I was able to sleep. Removing the smoke alarm is in violation of the local laws but I and my animals cannot cope with it operating in my room. And that is only transmitting 432Hz. What is coming in the windows from the nearest mobile tower has broader impacts.

2) Our organisation receives amphibians to recover from injuries and diseases and these have also experienced nervous system issues and the inability to heal. Since the shutdown of 3G in Australia in October 2025, the nearest tower to our facility (834 meters) is now running 4G, 4GX, and 5G each for three different companies. The increase in EMF output has meant that we can no longer keep our rescue animals in the front part of their care room. When I was using the second shelving unit closer to the windows, the animals were stressed and were not getting better until I moved them all to the other end of the room away from the windows. Our capacity to handle large numbers of animals has been severely compromised by the fact that we can only use the back wall of the care room for our enclosures.

3) We need to breed insects to feed our rescue animals and these are even more sensitive to the EMF than our frogs are. I have been forced to buy an EMF meter to be able to pinpoint exactly where in a room I can safely place animal/insect enclosures. I have had to cover some walls and insect tanks with aluminum foil to block the radiation. While I can do that for the bug breeding tanks, I can't do that for the frog tanks as they need the natural light coming through the windows (which is also how the EMF is getting in).

4) We encourage volunteers and visitors to our facility to shut off their mobiles when they enter this house. I had a visitor who set their phone to 5G and refused to shut it off. Every time I had to walk past her desk, it placed me between the tower and her phone so I would have been walking 'through' a 5G signal. The next day, I had a migraine headache which was the first time I had one of those in well over ten years.

5) Our organisation moved to this facility in urban Innisfail in May 2023. The closest mobile tower is 834 metres away – refer to point 2 above. There were flowering shrubs in front of the house (facing the direction of the tower) and there were a couple dozen honey bees in those flowers every single day. I also had seven bee boxes setup for the use of the solitary bee species here. These were buzzing every day with several species of visiting bees. In October 2025, the Australian government allowed the shutdown of 3G. Immediately after, the same tower started broadcasting 4G, 4GX and 5G for three separate companies, massively increasing its output which led to the issues in points 2 and 3 above. Since then, I rarely see more than a couple bees of either type visiting my flowers and bee homes. Of note: I do not use any chemicals and neither does the neighbour. I have also 'opted out' of the local council coming by and spraying herbicide on the street. So the disappearance of the bees is not connected to chemicals.

6) I had reason to visit the regional Queensland town of Townsville in the spring and stayed at an inner city motel. I visited a lovely large formal botanic garden a few blocks away where a very large rose garden was included. There were a couple hundred bushes with a dozen roses in bloom on each. There were no insects anywhere in the developed area (other than a couple butterflies) and even in the botanic garden – not one bee to be seen in the entire rose garden; no mosquitos, no ants, no sandflies, no houseflies. Nothing. The same day, I drove out to the Townsville suburb Pallarenda nearby where there were some historic buildings and some walking tracks. I was being bitten by assorted bugs, ants getting in my sandals, and bees at the flowers. The site was a few kilometers away from the nearest mobile tower but there were several towers in central Townsville. The highest frequency any of them were running (at that time) was 2.9 Ghz but they were close together so their coverage areas overlapped. Chemical use could not be the cause of the disparity in insects since both areas would have been subject to herbicides and termiticides and, indeed, the Queen's Gardens would have been conservative in their use of chemicals so as to not damage the exhibits or the birds living in their aviary in the park.

7) I was looking at real estate in the coastal suburb of Wonga Beach about two hours drive north of the regional town Cairns in Queensland. Most of the suburb is clustered around two adjoining mobile towers loaded with a variety of broadcast frequencies including 4G, 4GX and 5G from multiple operators plus 4G and 5G wireless broadband (called the NBN here). It was the time of year when the cicada insects emerge from the soil and occupy trees. They congregate in large numbers and their noise can be deafening. As I drove extensively though the suburb streets (because I got lost trying to find the property), I saw no insects, nor did I hear any. The property I was looking at was on the edge of the suburb just over 3 kilometres from the nearest tower. As soon as I turned into that street, the cicadas were deafening, bugs everywhere, butterflies, native stingless bees all around the house, frogs calling in the yard, skinks in the garage – it was a wonderful reminder that there are still living things to share our backyards with – so long as you stay away from the mobile towers!

Is this form of radiation an acceptable price to pay just to make a phone call or retrieve information? Humans have no right to cause other species to go extinct. If people choose to use a technology for something as simple as talking to each other and that technology is damaging the natural world, then it either has to be modified to stop the harm or dropped entirely as a tool. I'd also like to point out here that while I need to be contactable for rescue cases whenever I leave the house, I am able to provide this service without using a so-called 'smart' phone. I have a little 'dumb' phone and it doesn't have internet access. At home, I use a landline. I have a wired desktop computer for internet/email and I have disabled the wireless option on the modem so that if the NBN goes down, then it's down. I have to be contactable always and I can still do this while controlling the severity of the radiation – others can do this too if they apply themselves.

Environmental damage should not and cannot be ignored

Our organisation's leading concern is what this technology is doing to the environment. And that concern is not just for the terrestrial based signals but those coming from satellites which are running at FAR higher frequencies to compensate for latency delays. Starlink operates at 42.5 Ghz all around the planet and their satellites only function for eight years before they are de-platformed to burn up in the atmosphere. They are now responsible for a buildup of aluminum particles in the upper atmosphere. (Aluminum causes dementia/Alzheimer's.) According to Tony Phillips' Spaceweather monitoring site (https://www.spaceweather.com/), Starlink has already 'dumped' 1,921 satellites with another 11,154 waiting their turns. And that is just Starlink – American

authorities are approving other companies to send up anything from dozens to thousands of satellites each for communications purposes. Then add in more from overseas countries like China.

article: https://spectrum.ieee.org/space-debris-atmosphere-burn-up

article: https://cires.colorado.edu/news/within-15-years-plummeting-satellites-could-release-enough-aluminum-alter-winds-temp

paper: https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2024GL109280
Potential Ozone Depletion From Satellite Demise During Atmospheric Reentry in the Era of Mega-Constellations

paper: https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2024JD042442
Investigating the Potential Atmospheric Accumulation and Radiative Impact of the Coming Increase in Satellite Reentry Frequency

article: https://www.science.org/content/article/burned-satellites-are-polluting-atmosphere

This is simply not acceptable for many reasons, one of which is planetary level pollution. The orbit is already grossly overcrowded – what happens when the collisions start? Additionally, what happens when geomagnetic storms 'shove' satellites out of orbit? Starlink has already lost at least 40 satellites due to geomagnetic activity. The weakening in the planet's protective magnetic shield has been documented and expected to get worse so it is inevitable that more satellites will be knocked out of orbit.

paper: https://link.springer.com/article/10.1186/s40623-024-02124-2
How geomagnetic storms affect the loss of Starlink satellites in February 2022?

The short lifespans of satellites and the fact that much of that technology is broadcasting to the ocean is just a massive waste of money that could be used for so many other benefits to humanity!

Deformities of Queensland frogs

One of the 'big mysteries' our organisation documented was the widespread problem of entire clutches of frogs and the introduced cane toad being malformed starting in 2003. We assumed that this was a chemical problem at first but note the extract from this paper (attached):

from page 293 of: The incidence of electromagnetic pollution on the amphibian decline: Is this an important piece of the puzzle?
paper: https://www.tandfonline.com/doi/full/10.1080/02772240600687200

"In a laboratory study, eggs and embryos of Rana sylvatica and Ambystoma maculatum were exposed to magnetic fields at several development stages. A brief treatment of the early embryo produced several types of abnormalities: microcephalia, scoliosis, edema, and retarded growth [48]. Several of the treated tadpoles developed severe leg malformations and extra legs…."

We documented most of these same malformations in 2003 which is when 3G was first introduced in Australia. These malformations were over a large geographic area and were severe, causing the mortality of every single member of a clutch. While chemicals remain a possibility, we were

shocked to find information from overseas that implicated EMF in the process. Since 3G was just entering the market at the same time, this was just too coincidental. See the photos in Appendix 1 for some examples of the malformations we documented.

Non-ionising radiation is NOT safe

I did several submissions to the Australian government opposing the shutdown of 3G. Some of the content is useful for this exercise.

Excerpt one:

"ToR: (d) the impact on elderly and health-compromised Australians who use medical alert devices on the 3G network;

"Most mobile phones have warnings in tiny little print in their user guides to warn about not wearing the phone on your body (pockets, stuck in bras, etc.) and even not to use the phone up against your head! But how is a person supposed to wear a medic alert device without having it next to their body? I'm sure many are worn like a necklace, dangling ever-present near the heart.

"While wearing a device near your heart that uses 3G is probably not the healthiest thing to do, it is far less dangerous than wearing a device that broadcasts 4G or God-forbid - 5G! Such devices are a genuine health hazard and very likely to be the cause of adverse and possibly even fatal incidents. If 3G is shut off, elderly and health compromised will be forced to wear devices that ironically can aggravate their health problems.

"Being in close proximity to 5G can cause migraines and nose bleeds in people and this has been observed repeatedly.

article: https://www.globalresearch.ca/glastonbury-festival-goers-walking-emf-minefield/5681851

article: https://cairnsnews.org/2023/12/02/mareeba-residents-suffering-nose-bleeds-and-headaches-blame-5g-network/

"I have attached a published paper on the impacts of radio-tracking devices on wildlife which shows they have definite deleterious impacts on the animals that wear them. What will happen to a person with a cardiovascular condition or a pacemaker being forced to use a 4g device close to their body? Even my little 4g "dumb" phone has a warning in the user guide not to use the phone near pacemakers or other medical equipment. Forcing a health compromised person to wear a high frequency device that could harm their health is assault and would be a violation under the [Australian] Criminal Code."

Excerpt two with additions:

"ToR: (j) any other related matters.

"We are just starting to notice the impacts of 4G on the decline of insects. It may well be involved in the decline of frogs with malformations and cancers being regularly seen in Qld at least.

link: https://www.frogsafe.org.au/index.php/health-problems/cancer-and-other-neoplasias

Wildlife authorities are also pointing out the escalating problem of paralysis syndrome in both lorikeets and flying-foxes in the same areas as 5g is being widely turned on. Coincidentally, this is the same geographic region where the national frog-die off in the winters of 2021/22 was the worst. However, research in Australia will be incomplete if EMF continues to be ignored as a potential disruptor. Because of the seasonality aspects, there could be a trigger which is causing a functional breakdown only because the animal is already affected by the constant EMF. It is another piece to the puzzle and the picture will not be complete without it.

link: https://wildlifehealthaustralia.com.au/Portals/0/ResourceCentre/FactSheets/Avian/Lorikeet_Paralysis_Syndrome.pdf

link: https://wildlifehealthaustralia.com.au/Incidents/Incident-Information/Incident-Flying-fox-paralysis-syndrome-south-east-Qld-northern-NSW-ongoing

link: https://aussieanimals.com/conservation/wildlife-rescue/paralysis-syndrome-bats-lorikeets/

link: https://www.sydney.edu.au/science/schools/sydney-school-of-veterinary-science/research/lorikeet-paralysis-syndrome-project.html

“Basically, any frequency 2.4 Ghz (4G, nbn, wifi) or higher is equivalent to a microwave oven running with its door wide open 24 hours day. This excerpt below is from Wikipedia talking about the impacts to humans of a microwave oven which runs at 2.45 Ghz. Note that a microwave oven is considered to be **non-ionising radiation** - the same as mobile towers - which agencies insist is not harmful. If so, then **why does this allegedly safe non-ionising radiation cause burns** as described below?

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"There are, however, a few cases where people have been exposed to direct microwave radiation, either from appliance malfunction or deliberate action.[89][90] This exposure generally results in physical burns to the body, as human tissue, particularly the outer fat and muscle layers, has a similar composition to some foods that are typically cooked in microwave ovens and so experiences similar dielectric heating effects when exposed to microwave electromagnetic radiation.

89: Frost, Joe L. (30 September 2001). Children and Injuries. Lawyers & Judges Publishing. p. 593. ISBN . Retrieved 29 January 2011.

90: Geddesm, Leslie Alexander; Roeder, Rebecca A. (2006). Handbook of electrical hazards and accidents. Lawyers & Judges Publishing. pp. 369ff. ISBN .

from: https://en.wikipedia.org/wiki/Microwave_oven

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“It has already been proven that the frequencies of 4G kill bees and cause cancer in humans (as well as other environmental damage that remains undiscussed) and EMF has been classified as a "possible (2B) carcinogen" by the IARC. The higher frequencies of 5G which cause health issues such as migraines will fall clearly into the definition of 'assault' in the Criminal Code and should be subject to a **moratorium**. **5G has never been properly and independently tested for human health or environmental impacts and until it is, 3G cannot be removed from service.”**

Scientific papers, predominantly those studying environmental impacts:

Some of these will be attached while others are just url's that you can check yourself. These papers are all publicly available so if I can access them, you (with particular reference to the FCC) can access them. If you had monitoring programs in place to make adjustments according to new information, then you would have already had read them yourself and used this information to change your guidelines. But instead, you have kept extremely old standards in place which have no bearing on the frequencies being used today. Does such a process meet the definition of a 'cover-up'???

link and attached: https://link.springer.com/article/10.1186/s12940-022-00900-9
Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G
from the abstract: *"the assumptions underlying the FCC's and ICNIRP's exposure limits are invalid and continue to present a public health harm"*

paper: https://link.springer.com/article/10.1186/s12940-025-01220-4
The WHO-commissioned systematic reviews on health effects of radiofrequency radiation provide no assurance of safety
Wow – the title says it all!

paper: https://www.frontiersin.org/journals/psychiatry/articles/10.3389/fpsyt.2026.1755918/full
Impact of extremely low frequency electromagnetic fields exposure on sleep quality and mental health in a Tunisian power plant: a cross-sectional study
I would agree with this paper as I have terrible insomnia when there is an EMF-emitting device in my room.

paper: https://ehsciences.org/powerlines-emf-elf-magnetic-fields-health/
The Health Effects of EMF, ELF and Magnetic Fields from Power Lines and Electricity
several studies are listed in this article

paper: https://www.avaate.org/?Evidence-for-a-health-risk-by-RF-on-humans-living-around-mobile-phone-base
Evidence for a health risk by RF on humans living around mobile phone base stations: From radiofrequency sickness to cancer

paper: https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2022.986315/full
Wireless technology is an environmental stressor requiring new understanding and approaches in health care

article: https://www.westonaprice.org/health-topics/does-short-term-exposure-to-cell-phone-radiation-affect-the-blood/#gsc.tab=0
Does Short-term Exposure to Cell Phone Radiation Affect the Blood?
Extract: *"The Russians have conducted many studies on the nonthermal effects, which they consider more significant than thermal effects, and as a result, they adopted a more stringent guideline that is sixty to one hundred times lower than U.S. guidelines."* The Russians apparently care more for their people and environment than the American government does!

paper: https://www.science.org/doi/10.1126/sciadv.adh1455
Electromagnetic fields disrupt the pollination service by honeybees

paper: https://www.sciencedirect.com/science/article/abs/pii/S001393510194263X
Evidence of Oxidative Stress in American Kestrels Exposed to Electromagnetic Fields

paper: https://www.sciencedirect.com/science/article/abs/pii/S0928468009000030?via%3Dihub
Electromagnetic pollution from phone masts. Effects on wildlife

paper: https://pubmed.ncbi.nlm.nih.gov/34047144/
Effects of non-ionizing electromagnetic fields on flora and fauna, part 1. Rising ambient EMF levels in the environment

paper: https://www.degruyter.com/document/doi/10.1515/reveh-2021-0050/html
Effects of non-ionizing electromagnetic fields on flora and fauna, Part 2 impacts: how species interact with natural and man-made EMF

paper: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0285522
Exposure to a 900 MHz electromagnetic field induces a response of the honey bee organism on the level of enzyme activity and the expression of stress-related genes

paper:
https://www.researchgate.net/publication/393336802_Effect_of_Electromagnetic_Radiation_on_Honey_Bees
Effect of Electromagnetic Radiation on Honey Bees

article: https://emfradar.com/articles/study-spotlight-emf-wildlife-flora-fauna-ecosystem
Study: What's Happening to Birds, Bees, and Trees Near…

paper: https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30221-3/fulltext
Planetary electromagnetic pollution: it is time to assess its impact

article: https://www.rfsafe.com/articles/cell-phone-radiation/wildlife-under-siege-rf-radiations-overlooked-environmental-toll.html
this page features a list of published studies on the impacts of EMF on wildlife

paper: https://www.nature.com/articles/s41598-020-60793-x
Anthropogenic electromagnetic fields (EMF) influence the behaviour of bottom-dwelling marine species

paper: https://www.tandfonline.com/doi/full/10.1080/15368378.2021.1881866
Genetic effects of non-ionizing electromagnetic fields

paper: https://pubmed.ncbi.nlm.nih.gov/30025338/
Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective
from the 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."* and: *"...standards set by most national and international bodies are not protective of human health. This is a particular concern in children…"*

paper: https://www.sciencedirect.com/science/article/abs/pii/S0006291X15003988
Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans

paper: https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2019.00223/full
Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices

link: https://ehtrust.org/26684-2/
Statement by Wildlife Biologist Alfonso Balmori, BSc on the FDA Review of Cell Phone Radiation
this page also has links to scientific papers detailing the impacts on wildlife

paper: https://pubmed.ncbi.nlm.nih.gov/25747364/
Anthropogenic radiofrequency electromagnetic fields as an emerging threat to wildlife orientation
other published papers are listed towards the bottom of this page

paper: https://pubmed.ncbi.nlm.nih.gov/27552133/
Radiofrequency radiation injures trees around mobile phone base stations

paper: https://pubmed.ncbi.nlm.nih.gov/24805233/
Anthropogenic electromagnetic noise disrupts magnetic compass orientation in a migratory bird

paper: https://pubmed.ncbi.nlm.nih.gov/25089692/
Electrosmog and species conservation

paper: https://www.sciencedirect.com/science/article/abs/pii/S0048969720384461
Electromagnetic radiation as an emerging driver factor for the decline of insects

link and attached: https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2022.1000840/full
Low-level EMF effects on wildlife and plants: What research tells us about an ecosystem approach

link and attached: https://www.researchgate.net/publication/354867978_Effects_of_non-ionizing_electromagnetic_fields_on_flora_and_fauna_Part_3_Exposure_standards_public_policy_laws_and_future_directions
Effects of non-ionizing electromagnetic fields on flora and fauna, Part 3. Exposure standards, public policy, laws, and future directions

link and attached: https://www.frontiersin.org/journals/veterinary-science/articles/10.3389/fvets.2024.1283709/full
Health and environmental effects to wildlife from radio telemetry and tracking devices—state of the science and best management practices
The notion that we would use a technology on small animals that would NOT be appropriate to use on a much larger human being and further, that such use is not even regulated is reckless. This excerpt from from this paper is demonstrative:
“There are no exposure standards for nonhuman species for ELF-EMF/RFR (5) and post-radio-tagging attachment surveillance for health effects is all but nonexistent. Due to the fact that radio-tagging technology is directly placed on/in wildlife, often communicating at various times and sequences with distant receivers, these can be strong near-field chronic exposures certainly not recommended for humans. One can reasonably assume safety issues would apply for nonhuman species as well but this is an unregulated area where low-level transmitters are given the benefit of the doubt over potential biological reactions.”

paper:
https://www.researchgate.net/publication/44685415_Mobile_Phone_Mast_Effects_on_Common_Frog_Rana_temporaria_Tadpoles_The_City_Turned_into_a_Laboratory
Mobile Phone Mast Effects on Common Frog (Rana temporaria) Tadpoles: The City Turned into a Laboratory

Who is running the show? The government or the telcos?

Why do we have regulatory agencies? Consumer affairs departments? Are they protecting the people and the ecosystems that support people or just 'rubber stamping' ways for corporations to siphon more money from individuals? (This isn't just a US problem – the Australian government is the same.)

My understanding is that the last independent safety tests done on EMF were back in the 80's and 90's when 2G was the highest level frequency used. This is appalling that far more powerful frequencies have been allowed to saturate the country and have never been properly tested. And why is that? Money. Very big money has been invested in this technology and if it kills off biodiversity or makes people ill and 'dumbs them down', the telecommunications companies (telcos) don't care. It's all about the money. If humanity and the ecosystems that support all of us are to survive, that has to stop.

Thank your for reading our submission. If you would like to discuss any part of it, please contact us via email.

Sincerely,
Deborah Pergolotti
Founding President
Frog Safe, Inc.
Innisfail, Queensland
Australia
email: deborah@frogsafe.org.au

see next page for Appendix 1: photos of malformations in local frogs

Appendix 1:

Malformations of Queensland anurans (frogs and the introduced cane toad) starting abruptly in 2003: widespread scoliosis; heavy mortality without regular calcium administration; polyploidy; missing eyes; wrong pigmentation; malformed legs; missing lungs; and stunted growth where the front of the body was normal proportions but the back half of the body was stunted. These were not random individuals but rather every individual in the clutch of eggs.

















