Submitted for Docket HHS-OASH-2026-0397 and FCC Proceeding 13-84

To the HHS (please note the same submission has been made to the FCC):

My children have experienced adverse health effects from chronic wireless (radiofrequency) radiation exposures, which has been documented by physician diagnosis. (I have omitted my name on this document because the instructions for submission said to not include any personal information, however, you can contact me through the email address I have provided to verify my identity or to request more information.)

The ubiquity of intense wireless radiation exposures in schools, workplaces and travel has limited their life opportunities, lifestyle and choice of career. After intense Wi-Fi was installed in their schools, I had to homeschool them out of necessity (which excluded me from my engineering career), and they could not return to public school until we found a high school that would accommodate them, which was extremely difficult. They could not attend school in our assigned school district, which precluded them from attending school with their friends from the neighborhood and Boy Scout troop. While my husband and I are both chemical engineers, and my children excelled at math and science, they could not pursue a career in engineering because they would not be able to work in an indoor office environment which would likely have intense Wi-Fi exposures, so their career choices have been limited to ones were they can work for themselves and control the levels of wireless radiation in their work environment. College was almost impossible and limited – we could find only one private college that was willing to accommodate them in the classrooms and in the dorms. Attending the large state public universities was not possible. Travel was limited and more expensive too – staying in large hotels was not possible, because they have strong Wi-Fi. When we traveled, we would stay in residential rentals like airbnb's so we could turn off Wi-Fi.

The symptoms they experienced from wireless radiation were painful and bleeding skin rashes, headaches, difficulty concentrating, digestive problems, insomnia, and endocrine problems. My son was only 9 years old at the time these problems began, and his life has not been the same since. I have submitted several studies (Belpomme & Irigaray 2020, Bevington 2019, Santini et al 2002) that have found the same adverse health effects that my children experienced from chronic wireless radiation exposures. DeLuca et al 2014 (attached) found that electromagnetic sensitivity was a medical condition - that people who have problems detoxifying environmental contaminants and producing glutathione have a much higher chance of developing electromagnetic sensitivity. This explains why some are more sensitive and have symptoms while others who have better repair and detoxification mechanisms seem unaffected.

Because high levels of RF radiation can be found everywhere – in schools, workplaces, parks with cell towers, workplaces, hospitals, hotels, cars, and travel – we spend a lot of time planning for wireless mitigation for travel, school and work; our residential locations are limited to those at a safe distance from cell phone towers; and our car options are limited to ones where the Wi-Fi and Bluetooth can be turned off (increasingly difficult to find). If it is not possible to mitigate to acceptable levels, we forgo it. For example, my children could not attend some school trips, and we cannot purchase Toyota vehicles 2020 or newer and Honda vehicles 2025 or newer, because the newer models do not have the ability to shut-off Wi-Fi and Bluetooth.

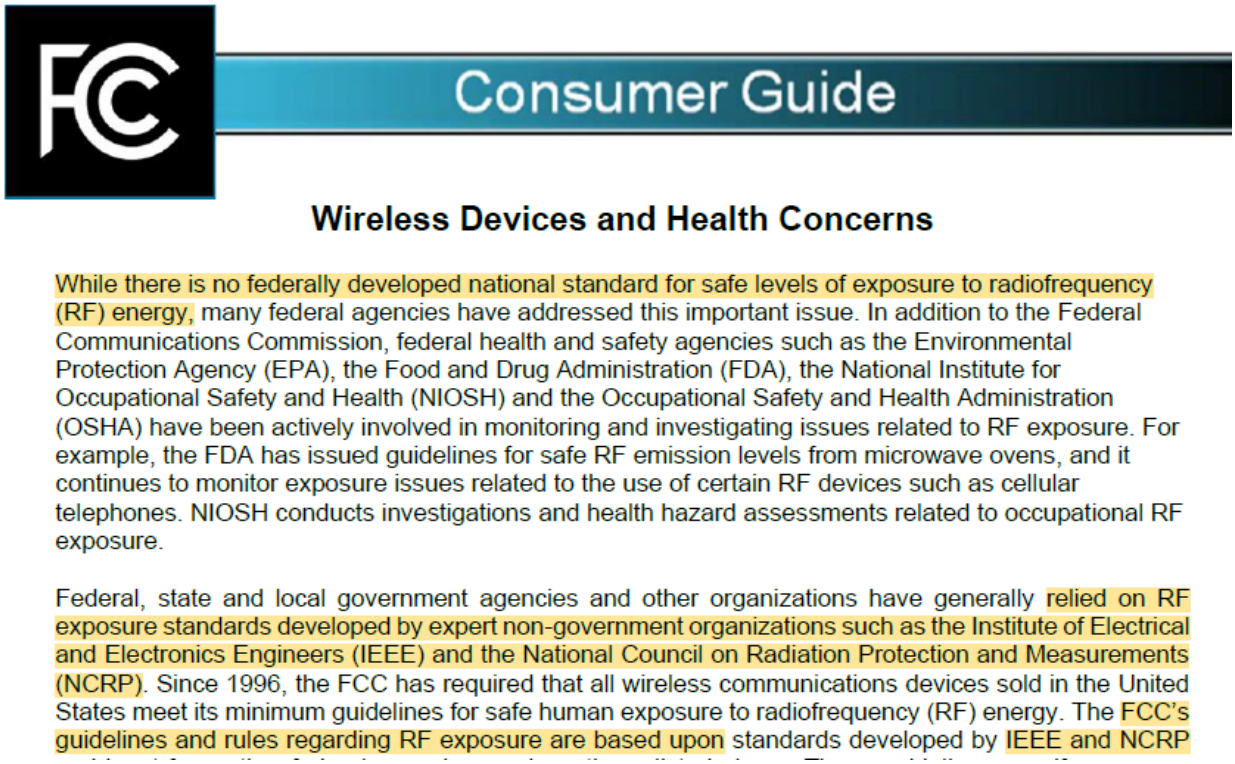
There are other families who have suffered more than we have. Some have not been able to attend school in–person at all, some avoid going outside their home and only do so when necessary, and some do not travel at all.

No Safety Standards for Chronic Exposure, Only Guidelines from Industry

1) ***"There is NO federally developed national standard for safe levels of exposure to radiofrequency (RF) energy", only "guidelines"*** **the FCC adopted from the telecom industry (IEEE, NCRP) per the FCC.** See excerpt from 2019 FCC Consumer Guide below (full document has been submitted). Note: this language was removed from Guides published after 2019, but the exposure guidelines are the same and have not changed, so this language, while deleted, is still applicable and accurately describes the FCC's exposure limits.

   The FCC guideline for maximum permissible exposure (MPE) of radiofrequency (RF) radiation was adopted in 1996, but the FCC has not done any re-evaluation or established actual safety standards since.

   Excerpt from 2019 FCC Consumer Guide:



Consumer Guide

Wireless Devices and Health Concerns

While there is no federally developed national standard for safe levels of exposure to radiofrequency (RF) energy, many federal agencies have addressed this important issue. In addition to the Federal Communications Commission, federal health and safety agencies such as the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) have been actively involved in monitoring and investigating issues related to RF exposure. For example, the FDA has issued guidelines for safe RF emission levels from microwave ovens, and it continues to monitor exposure issues related to the use of certain RF devices such as cellular telephones. NIOSH conducts investigations and health hazard assessments related to occupational RF exposure.

Federal, state and local government agencies and other organizations have generally relied on RF exposure standards developed by expert non-government organizations such as the Institute of Electrical and Electronics Engineers (IEEE) and the National Council on Radiation Protection and Measurements (NCRP). Since 1996, the FCC has required that all wireless communications devices sold in the United States meet its minimum guidelines for safe human exposure to radiofrequency (RF) energy. The FCC's guidelines and rules regarding RF exposure are based upon standards developed by IEEE and NCRP

2) **FCC guideline for MPE is NOT a safety standard established to protect against all harms coming from chronic exposures, but protects ONLY against acute short-term exposures that could cook your body tissues in 30 minutes or less**

Our government guideline for wireless radiation exposures, established in 1996, is NOT based on protecting people or animals against all harmful effects at chronic

exposures that everyone is exposed to daily, but based only on the maximum level that should not be exceeded in order to prevent tissue heating from short term exposures of 30 minutes or less. In setting this guideline in 1996, the FCC adopted the industry assumption from NCRP and IEEE that the only harm that could come from radiofrequency exposures is tissue heating, without any testing or proving that there are no health effects from chronic exposures below thermal levels.

The FCC MPE (Maximum Permissible Exposure) Limit for radiofrequency exposures (for frequencies 1.5 GHz and above, which is the range for Wi-Fi, 4G, and 5G) is **1000 uW/cm2 for 30 min**, which again is for short-term exposures (30 min or less) and not chronic exposure, as given here https://www.gpo.gov/fdsys/pkg/CFR-2002-title47-vol1/pdf/CFR-2002-title47-vol1-sec1-1310.pdf

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Therefore, there is no limit established for chronic exposures (greater than 30 minutes). In other words, if there is not enough microwave radiation coming from a device or cell tower to cause your tissues to warm up (i.e. cook you) in 30 minutes, then FCC guidelines considers it to be a "safe" level. This MPE limit was never intended to be a chronic exposure limit, but a short-term one to protect people from burns, established in 1996.

Thousands of Studies Showing Effects at Chronic Exposures Below FCC Thermal Limits of 1000 uW/cm2

However, there are thousands of **peer-reviewed studies showing health effects at non-thermal, chronic exposures below 1000 uW/cm2**, and a compendium of 3800 studies from around the world can be found in the 2012 Bioinitiative Report. The complete report, which is too large to attach, can be found here https://bioinitiative.org/

The 2012 Bioinitiative Report's Color Charts is a table of studies listing the RF exposure levels used in the study and the health effects observed, which can be found here https://bioinitiative.org/rf-color-charts/ (also attached), with excerpts below:

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure
(Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
As low as (10^{-13}) or 100 femtowatts/cm2	Super-low intensity RFR effects at MW reasonant frequencies resulted in changes in genes; problems with chromatin conformation (DNA)	Belyaev, 1997
5 picowatts/cm2 (10^{-12})	Changed growth rates in yeast cells	Grundler, 1992
0.1 nanowatt/cm2 (10^{-10}) or 100 picowatts/cm2	Super-low intensity RFR effects at MW reasonant frequencies resulted in changes in genes; problems with chromatin condensation (DNA) intensities comparable to base stations	Belyaev, 1997
0.00034 uW/cm2	Chronic exposure to mobile phone pulsed RF significantly reduced sperm count,	Behari, 2006
0.0005 uW/cm2	RFR decreased cell proliferation at 960 MHz GSM 217 Hz for 30-min exposure	Velizarov, 1999
0.0006 - 0.0128 uW/cm2	Fatigue, depressive tendency, sleeping disorders, concentration difficulties, cardio- vascular problems reported with exposure to GSM 900/1800 MHz cell phone signal at base station level exposures.	Oberfeld, 2004
0.003 - 0.02 uW/cm2	In children and adolescents (8-17 yrs) short-term exposure caused headache, irritation, concentration difficulties in school.	Heinrich, 2010
0.003 to 0.05 uW/cm2	In children and adolescents (8-17 yrs) short-term exposure caused conduct problems in school (behavioral problems)	Thomas, 2010
0.005 uW/cm2	In adults (30-60 yrs) chronic exposure caused sleep disturbances, (but not significantly increased across the entire population)	Mohler, 2010
0.005 - 0.04 uW/cm2	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated)	Thomas, 2008
0.006 - 0.01 uW/cm2	Chronic exposure to base station RF (whole-body) in humans showed increased stress hormones; dopamine levels substantially decreased; higher levels of adrenaline and nor-adrenaline; dose-response seen; produced chronic physiological stress in cells even after 1.5 years.	Buchner, 2012
0.01 - 0.11 uW/cm2	RFR from cell towers caused fatigue, headaches, sleeping problems	Navarro, 2003

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure
(Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
0.01 - 0.05 uW/cm2	Adults (18-91 yrs) with short-term exposure to GSM cell phone radiation reported headache, neurological problems, sleep and concentration problems.	Hutter, 2006
0.005 - 0.04 uW/cm2	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated)	Thomas, 2008
0.015 - 0.21 uW/cm2	Adults exposed to short-term GSM 900 radiation reported changes in mental state (e.g., calmness) but limitations of study on language descriptors prevented refined word choices (stupified, zoned-out)	Augner, 2009
0.05 - 0.1 uW/cm2	RFR linked to adverse neurological, cardio symptoms and cancer risk	Khurana, 2010
0.05 - 0.1 uW/cm2	RFR related to headache, concentration and sleeping problems, fatigue	Kundi, 2009
0.07 - 0.1 uW/cm2	Sperm head abnormalities in mice exposed for 6-months to base station level RF/MW. Sperm head abnormalities occurred in 39% to 46% exposed mice (only 2% in controls) abnormalities was also found to be dose dependent. The implications of the pin-head and banana-shaped sperm head. The occurrence of sperm head observed increase occurrence of sperm head abnormalities on the reproductive health of humans living in close proximity to GSM base stations were discussed."	Otitoloju, 2010
0.38 uW/cm2	RFR affected calcium metabolism in heart cells	Schwartz, 1990
0.8 - 10 uW/cm2	RFR caused emotional behavior changes, free-radical damage by super-weak MWs	Akoev, 2002
0.13 uW/cm2	RFR from 3G cell towers decreased cognition, well-being	Zwamborn, 2003
0.16 uW/cm2	Motor function, memory and attention of school children affected (Latvia)	Kolodynski, 1996
0.168 - 1.053 uW/cm2	Irreversible infertility in mice after 5 generations of exposure to RFR from an 'antenna park'	Magras & Zenos, 1997
0.2 - 8 uW/cm2	RFR caused a two-fold increase in leukemia in children	Hocking, 1996
0.2 - 8 uW/cm2	RFR decreased survival in children with leukemia	Hocking, 2000
0.21 - 1.28 uW/cm2	Adolescents and adults exposed only 45 min to UMTS cell phone radiation reported increases In headaches.	Riddervold, 2008

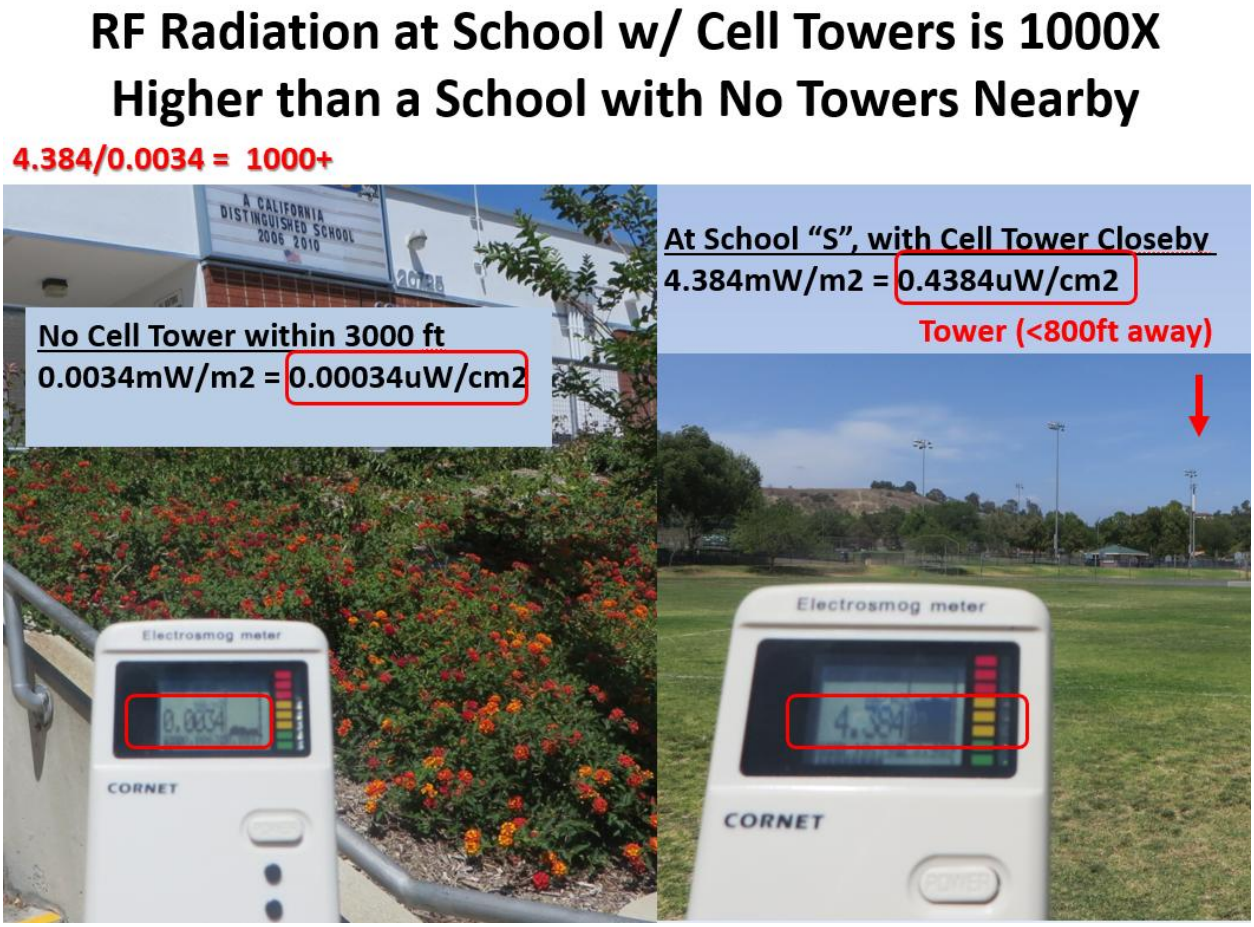
From the Bioinitiative Report's Color charts above, **health effects are seen even at chronic exposure levels below 0.1 uW/cm2, and they include neurological problems** (headaches, insomnia, feelings of nervousness) **and immune problems** (allergies, cancer). Each line of the chart is a separate study, with reference provided.

My children, when they are chronically exposed to RF levels above 0.001 uW/cm2, get headaches, sleeping problems, and concentration difficulties, and these symptoms have also been reported by the studies in the Bioinitiative Report's color charts for RF levels above 0.001 uW/cm2.

Dose Response in Health Effects from Chronic RF Exposure in My Family

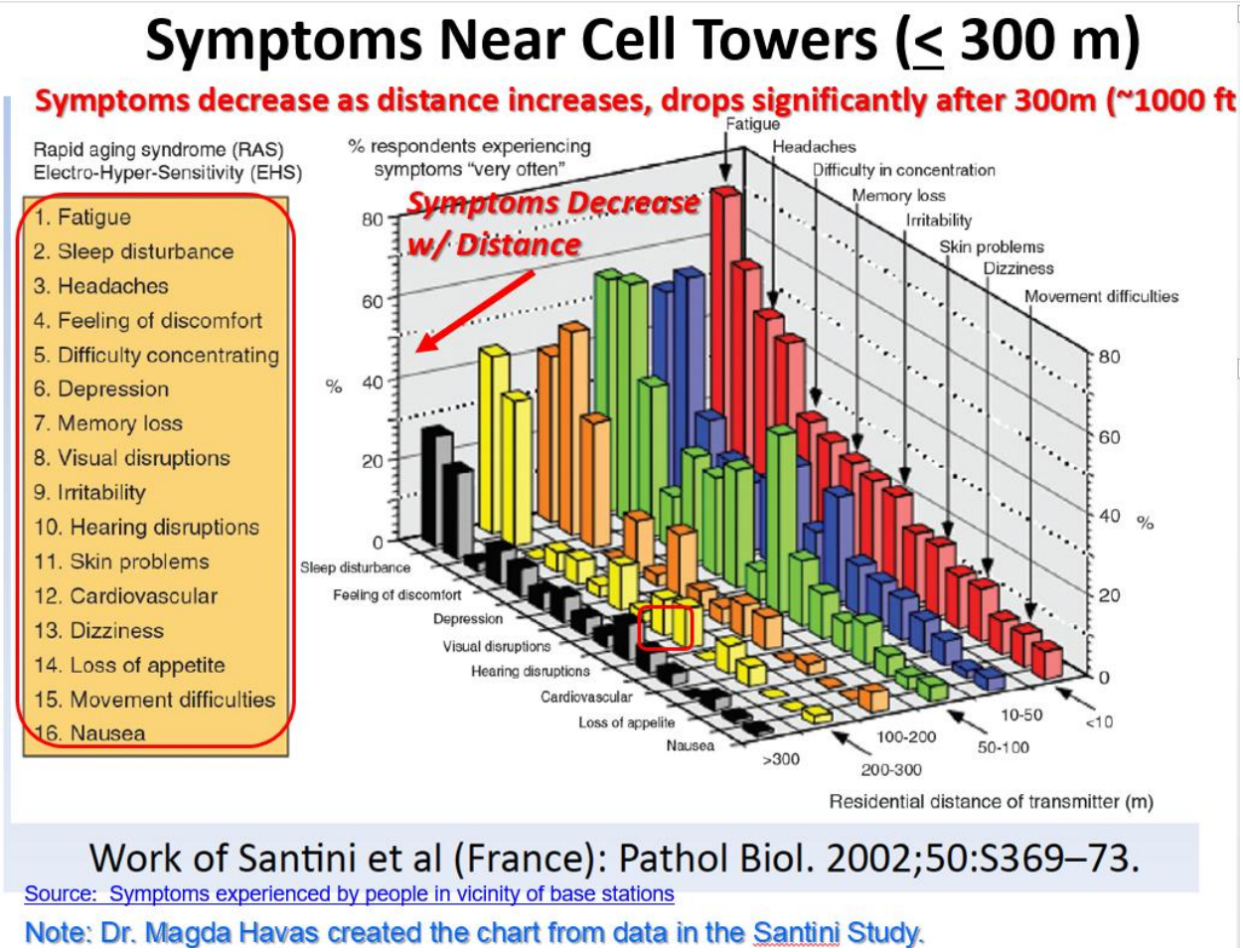
Areas within the immediate range of a cell tower (i.e. less than 1000ft) are about 1000 times higher than background levels of RF radiation. Ambient (background) levels of microwave radiation, i.e. at greater distances (2000 ft+) from a cell tower, is around 0.0003 uW/cm2 per my measurements – see below. However, within the immediate range of a cell tower (<1000 ft), it can be as high as 0.1-1.0 uW/cm2 – see below. While both these levels are lower than 1000uW/cm2, the levels within the immediate vicinity of a cell tower is around 1000 times higher than areas not next to a cell tower. So people living close to a cell tower or kids

attending school next to a cell tower are exposed to about 1000 times higher RF radiation than background levels for many hours every day for years, not just 30 minutes.



A study by Santini et al, published in French in 2002, shows dose response. (The English translation is attached, and the original study published in French can be found here [Enquête sur la santé de riverains de stations relais de téléphonie mobile :: II/ Incidences de l'âge des sujets, de la durée de leur exposition et de leur position par rapport aux antennes et autres sources électromagnétiques - ScienceDirect] People living within 300 meters of cell towers were surveyed for symptoms, and the study found that the highest frequency of symptoms were found in those living closest to the cell towers, and that symptom frequency decreased with increased distance from the towers. This shows dose response – that symptom levels increase as radiation levels increase. The top 5 symptoms were Fatigue, Sleep Disturbances, Headaches, Feeling of Discomfort, and Difficulty in concentration. Skin problems, dizziness, memory loss, and cardiovascular symptoms were among the other symptoms.

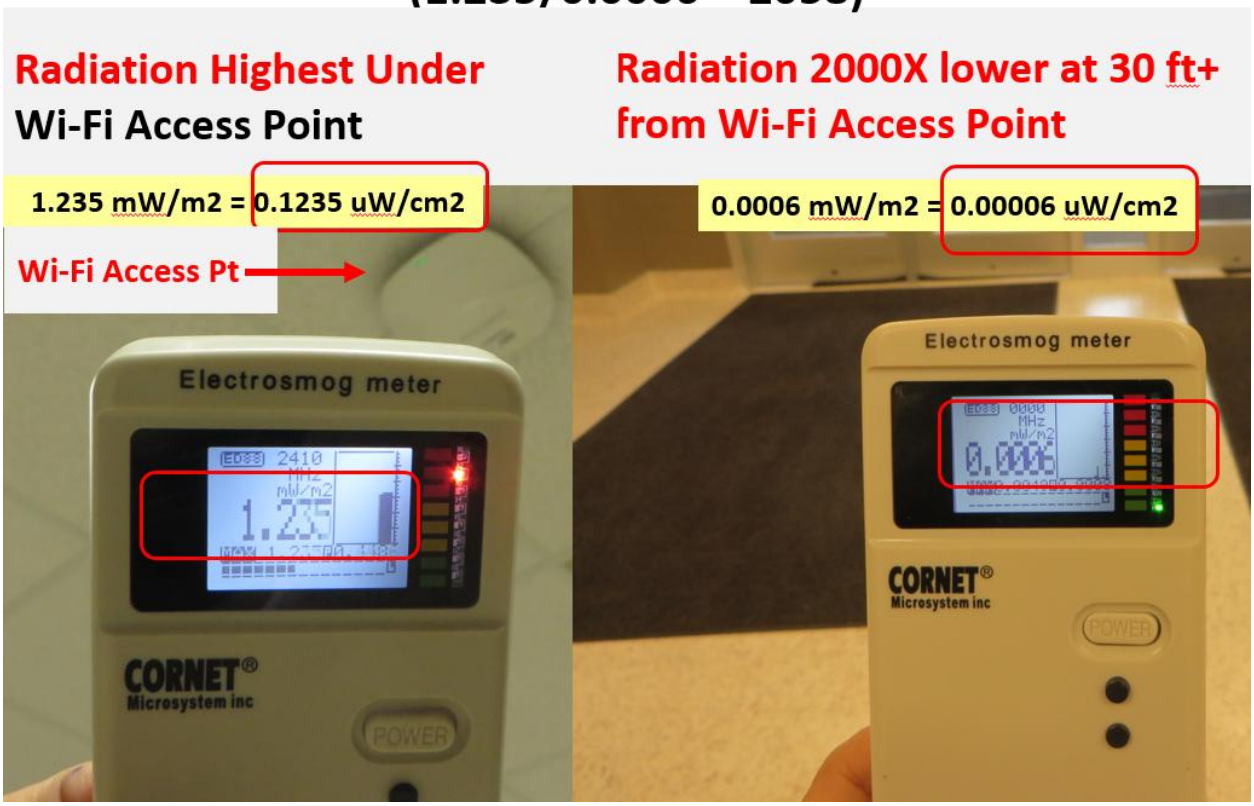
Dr. Magda Havas made a chart from the data in this study, which shows graphically that symptom frequency decreased as distance from the tower increased and radiation levels decreased, which demonstrates dose response.



Increased distance from a Wi-Fi access point also greatly reduces Wi-Fi exposure levels. In the picture below, the RF radiation levels were at 0.1235 uW/cm2 under the Wi-Fi access point, but at 30 feet from it, the radiation levels are over 2000 times lower at 0.00006 uW/cm2.

Wi-Fi Radiation at 30 Feet from Wi-Fi Access Point is 2000X lower Than Under Wi-Fi Access Point!

(1.235/0.0006 = 2058)



When my children sat near the Wi-Fi access points in their classrooms or attended school with a cell tower closeby, they experienced the adverse health effects mentioned previously. When they were not in school, they did not experience symptoms. Before they had accommodations, when they went to school, they would have symptoms afterwards – bad rashes, headaches, nosebleeds, concentration problems, and sleeping difficulties. On the weekends and school breaks when they did not go to school, there would be no symptoms. However, when my son would play basketball on the weekends near a cell phone tower, he would get the same symptoms that he only got when he went to school. On school days where he spent more time in classrooms where he sat farther from the Wi-Fi access points or spent more time in the gym (lower Wi-Fi radiation), his symptoms were less. It took a few months of this pattern repeating before realizing that high levels of wireless radiation from cell phone towers and/or Wi-Fi access points were triggering their symptoms. My children's integrative physician later diagnosed them with electromagnetic sensitivity and wrote a letter asking their schools to accommodate them.

After they received accommodations from their school, which consisted of transferring to another school without a cell tower nearby and sitting at least 30 ft from a Wi-Fi access point in their classrooms (or turning down its power), their symptoms decreased. The schools they attended would move their classes to a large one where they could be

far enough from an access point or they would move an access point or turn down its power levels in order for them to not have symptoms. We are grateful to these schools for making accommodations – if they did not do so, my children would not have been able to go to high school or college, which would have been a waste of their potential because they are smart A-students and have a lot to contribute to the world. When they attended school with a cell tower nearby or if they were in close proximity to a Wi-Fi access point for significant periods of time, they became ill with the symptoms mentioned previously. When they were exposed to higher levels of RF radiation, they would become sick, but when they were exposed to lower levels, their symptoms would be low or decreased. This is evidence of dose response seen in my children. My children could only attend school without becoming ill if the school does have a cell tower nearby and their seating needs to be far enough away from a Wi-Fi access point. Our choice of residence location is also limited, and it has to also be far enough away from a cell tower.

Cell Connectivity at Background < 1/1,000,000 of FCC 1000 uW/cm2!

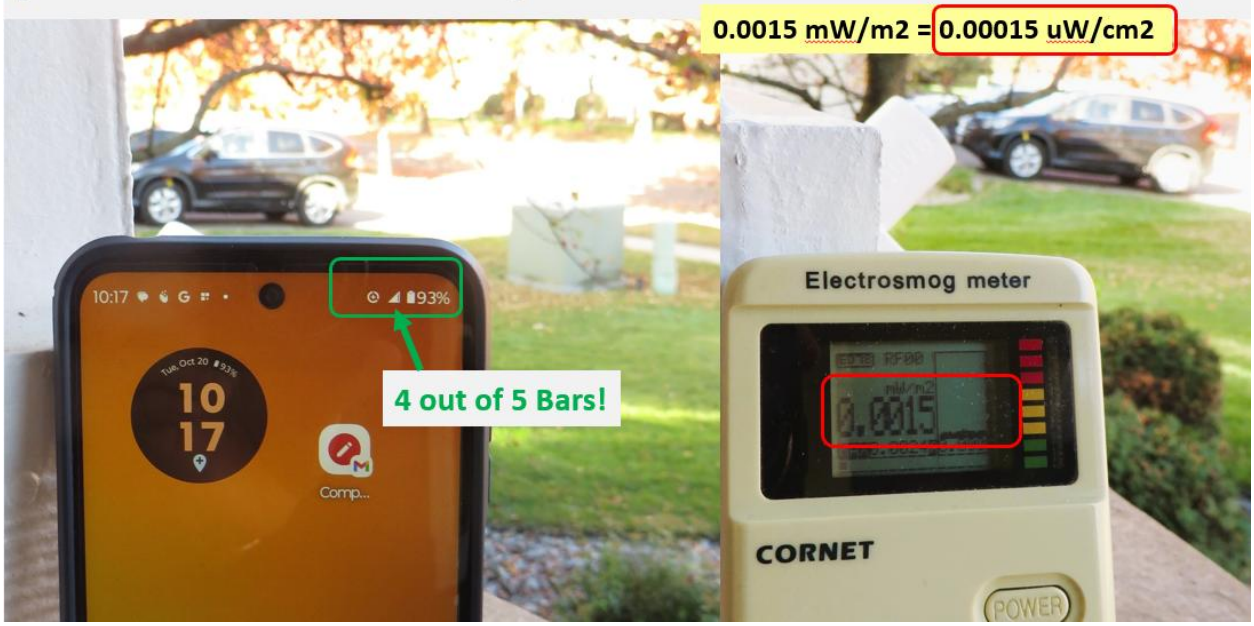
As previously mentioned, when my children are chronically exposed to RF levels above 0.001 uW/cm2, they get headaches, bad skin rashes, nosebleeds, sleeping problems, and concentration difficulties. ***Is this background RF level too low to support cell connectivity?*** The answer is “no”. Measurements indicate that even at background RF radiation levels below 0.001 uW/cm2 (e.g.at 0.00015 uW/cm2), there is enough cell tower signal present to provide 4 out of 5 bars reception for good cell phone connectivity – see below. .

Below, measurements taken outside show that a smart phone is receiving 4 out of 5 bars signal level (which is considered a good connection) when the RF signal levels are at 0.00015 uW/cm2, which is < 1/1,000,000 of the FCC MPE limit of 1000 uW/cm2!

Low Radiation 0.00015 uW/cm2 still provides Great Reception!
(4 out of 5 bars!)

Background RF level low at 0.00015 uW/cm2, Great reception 4/5 bars!
0.00015 uW/cm2 is less than 1/1,000,000 of FCC MPE @1000 uW/cm2

(Measurements taken October 17, 2026)



Chronic Exposure Limit for Safety < 1000 uW/cm2. Expert Recommendations

As an engineer, I was taught that RF radiation could only be harmful at thermal levels because that's what the FCC's guidelines indicated. I was unaware of the research showing harmful effects from chronic exposures below thermal levels. I had trusted, like most people, that we have government (FCC) standards adequate to protect us from harm at chronic exposures, and that the proper research had been done by our government in setting these standards before allowing these exposures to be forced on the public - those living, working, or schooling next to cell towers are exposed to over 1000 times higher than background RF levels, and those.sitting under a Wi-Fi access point are exposed to over 1000 times higher than RF background levels also because the FCC thermal guidelines permit this. However, most people are unware of all of this. It was not until after my children were harmed that I learned we did not have any government standards based on testing, but only guidelines adopted from industry. The lack of proper government regulation on this issue has caused irreparable damage to my children's education, their opportunities in life, career choices, ability to travel, and their health.

Wireless connectivity is important, and everyone, from babies to adults, is exposed daily to wireless radiation. We needed safe, chronic exposure standards 30 years ago in

1996. **We need them even more now as wireless technology has boomed since 1996**. The US District Court agreed by ordering the FCC to re-evaluate its limits in 2021

Cell towers have been installed next to homes and schools where people are exposed more than 30 minutes. Wi-Fi access points have been installed in classrooms and children sitting underneath them are exposed for more than 30 minutes per day, every day for years. What is the safe chronic exposure limit for them?

FCC should be working with independent scientists who understand the health effects from chronic exposures to non-thermal levels of wireless radiation to develop safe standards. Since 2012, these scientific experts have been recommending a chronic exposure limit between 0.0003 to 0.001 uW/cm2

The FCC and HHS should look to the 2012 Bioinitiative Report for guidance, as it discusses this topic and summarizes the recommendations made by many scientists knowledgable on the health effects from chronic RF exposure.

The **2012 Bioinitiative Report recommends a precautionary chronic exposure level of 0.0003 uW/cm2**, based on 0.003 uW/cm2 as the level of the lowest observed effect from RF radiation in cell tower studies, reduced by a factor of 10 as a safety precaution. Excerpt from Chapter 1. Summary for the Public (attached):

> A scientific benchmark of 0.003 uW/cm2 or three nanowatts per centimeter squared for 'lowest observed effect level' for RFR is based on mobile phone base station-level studies. Applying a ten-fold reduction to compensate for the lack of long-term exposure (to provide a safety buffer for chronic exposure, if needed) or for children as a sensitive subpopulation (if studies are on adults, not children) yields a 300 to 600 picowatts per square centimeter precautionary action level. This equates to a 0.3 nanowatts to 0.6 nanowatts per square centimeter as a reasonable, precautionary action level for chronic exposure to pulsed RFR. Even so, these levels may need to change in the future, as new and better studies are completed. This is what the authors said in 2007 (Carpenter and Sage, 2007, BioInitiative Report) and it remains true today in 2012.

Note that **a background level of 0.0003 uW/cm2 allows for strong cell phone reception– measurement pictures above showed that at 0.00015 uW/cm2, which is half the BIR's precautionary level, that reception was strong at 4 out of 5 bars** The goal in setting safe exposure limits should be: **Minimize chronic exposure levels to keep sensitive populations safe while still providing service**

Building Biology Healthy Home Standards 2012 says that a maximum of 0.001 uW/cm2 (= 10 uW/m2) **is of "small concern"** – page 42 (attached):

High Frequency Radiation
≤ 0.1 µW/m^2 Rated *No Concern*
0.11o 10 µW/m^2 Rated *Small Concern*
11 to 1000 µW/m^2 Rated *Strong Concern*
> 1000 µW/m^2 Rated *Extreme Concern*

Summary – Chronic Exposure Standard ~ 0.0003-0.001 uW/cm2 Justified

In the FCC's own words, ***"There is no federally developed national standard for safe levels of exposure to radiofrequency (RF) energy", only "guidelines"*** **that protect against thermal damage that the FCC adopted from the telecom industry (IEEE, NCRP)** in 1996. However, there are thousands of peer-reviewed studies showing health effects below thermal limits, as well as thousands of testimonials from independent scientists, doctors and credible people that have said they experience the same health effects as those found in these studies. And in 2021, a federal court ordered the FCC to review their guidelines. Federal safety standards for chronic RF exposure need to be done as soon as possible, and until that is done, it is appropriate and responsible to make the public aware that exposure guidelines are under review and put warning labels on all wireless products, and to halt further increases in wireless infrastructure for 5G and 6G to stop the increase in RF exposures to everyone.

FCC (nor FDA) has not proven that there are no harmful effects to humans (or animals) at chronic exposures below thermal levels of 1000 uW/cm2, the FCC's MPE limit, yet that is the current exposure guideline which was established in 1996 and has not been changed despite the boom in wireless infrastructure and technology in the past 30 years...

Since good cell phone reception exists at a background RF level of 0.00015 uW/cm2 that is far less than the FCC MPE of 1000 uW/cm2, and since scientific experts and building biology experts have recommended chronic exposure limits at 0.0003-0.001 uW/cm2, also far less than the MPE, **and since we have thousands of scientific studies showing adverse health effects from chronic exposures at far less than 1000 uW/cm2, the standard for safe chronic RF exposures should be LOWERED to a fraction of the current FCC MPE limit of 1000 uW/cm2, NOT increased.**