

RF Power Density Measurements of Various Wireless Sources

The large numerical readings on the following pages are instantaneous readings of power density measurements of RF radiation in the frequency range 100MHz to 8 GHz.

Peak levels are usually higher than the large numerical readings on the screen. The readings should only be used as an indication of the order of magnitude of the RF power density levels

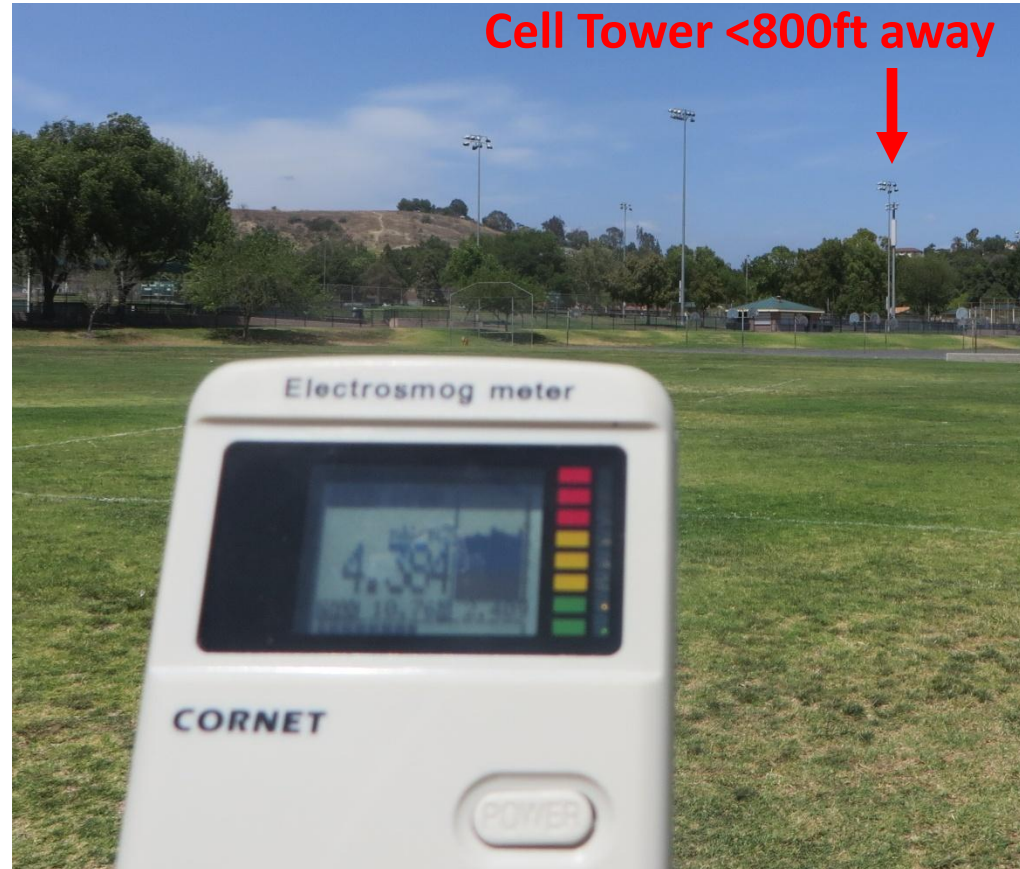
RF Radiation from Cell Towers Next to Schools

School "W", upstairs Bldg B

2.409mW/m² = 0.2409uW/cm²

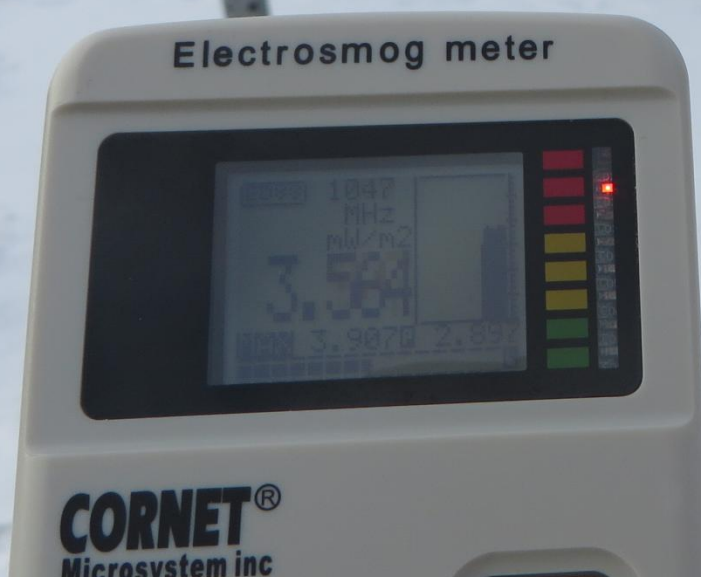
School "S", next to field

4.384mW/m² = 0.4384uW/cm²



RF Radiation from Cell Towers Next to Schools

Cell Tower 1000 ft From School



3.564 mW/m² = 0.3564 uW/cm²

RF Radiation at School w/ No Cell Towers

$$0.0034\text{mW/m}^2 = 0.00034\text{uW/cm}^2$$



The ambient environment of a School Without Cell Towers Closeby is ~ 1000 X lower in RF Radiation levels than a School With a Cell tower Closeby
($3.564/0.0034 = \sim 1000$)

RF Radiation Outside



Backyard

$0.0036\text{mW/m}^2 = 0.00036\mu\text{W/cm}^2$

Even at this low RFR level, there are 5 bars

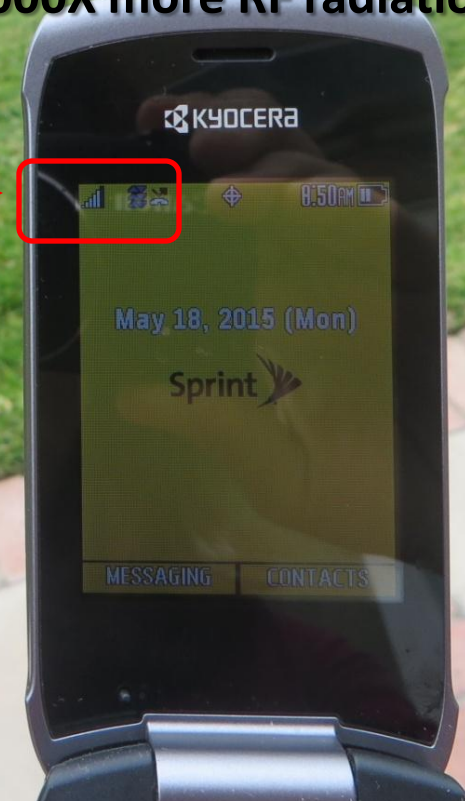
Even @ Sprint Cell Tower 1 mile away!

Range of a tower is 3-5 mi.

So why site them next to schools, subjecting

Children to 1000X more RF radiation?

5 out of 6 bars →



High RF Radiation Levels Inside Plane



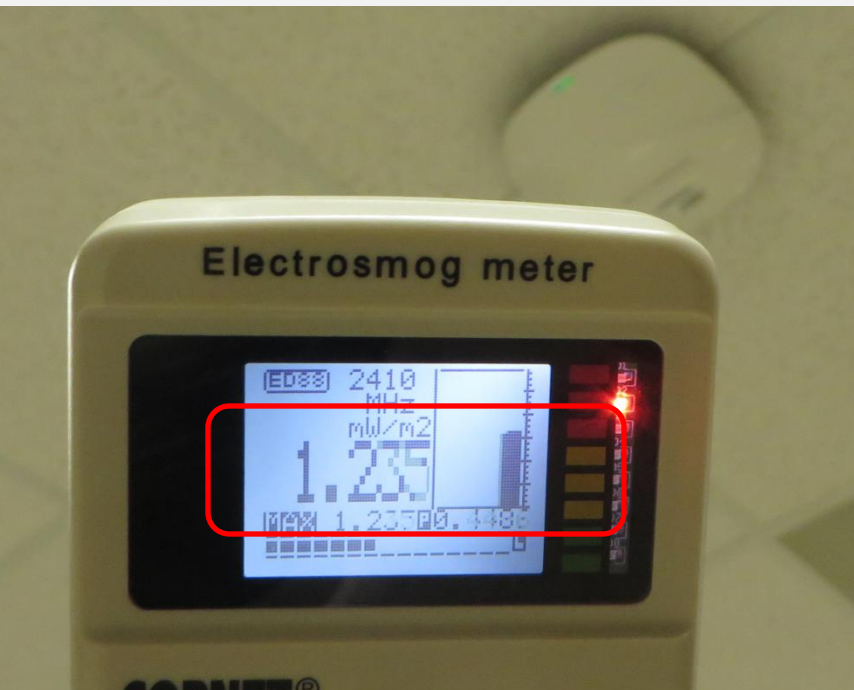
$$6.79 \text{ mW/m}^2 = 0.679 \text{ uW/cm}^2$$

$$0.4285 \text{ mW/m}^2 = 0.04285 \text{ uW/cm}^2$$

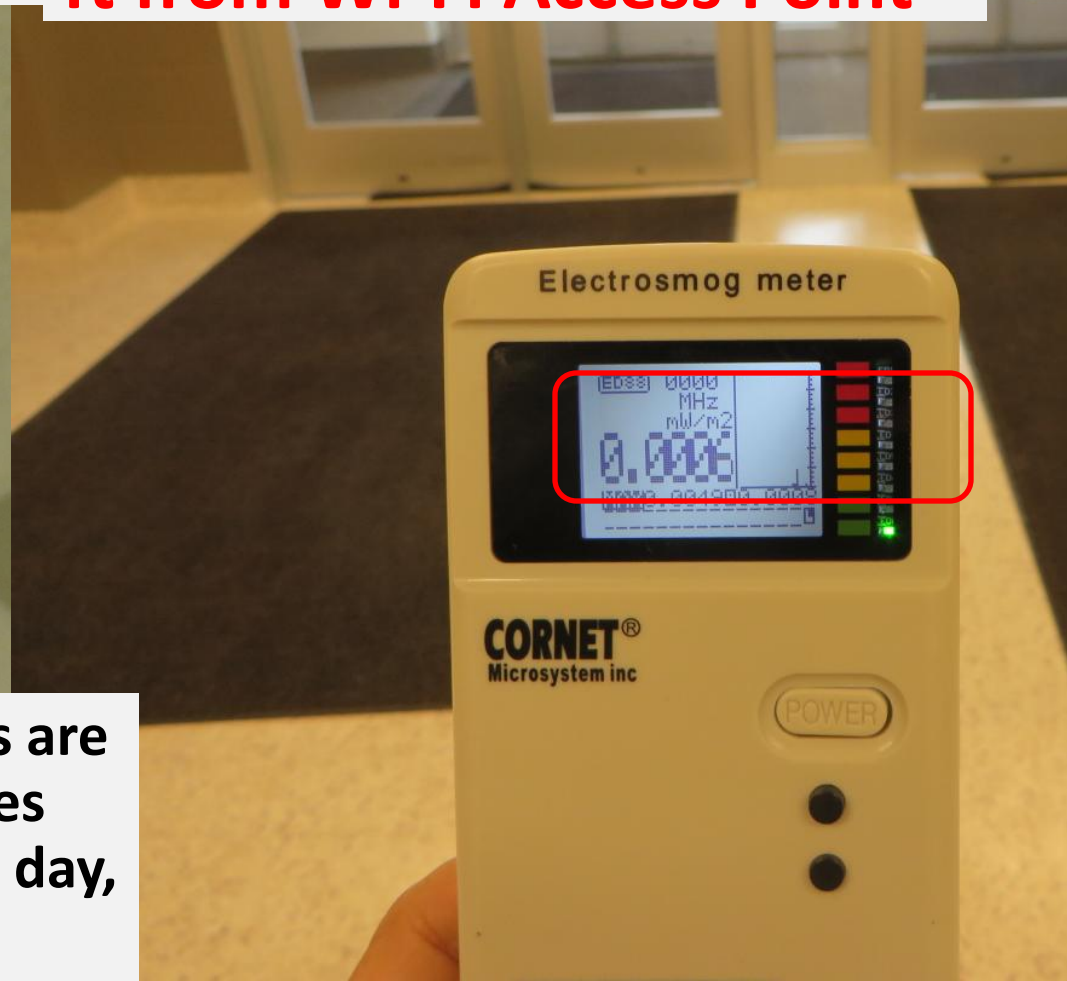
Sun Country Airlines Does Not Provide inflight Wi-Fi.
The RF radiation is from cell phones, ipads, laptops used by surrounding passengers.
These radiation levels are comparable to what is emitted from a cell tower or in a school classroom when cell phones, ipads, laptops are using Wi-Fi in the room.

Distance - A Huge Factor in Radiation Exposure At School

**Radiation Highest Under
Wi-Fi Access Point**



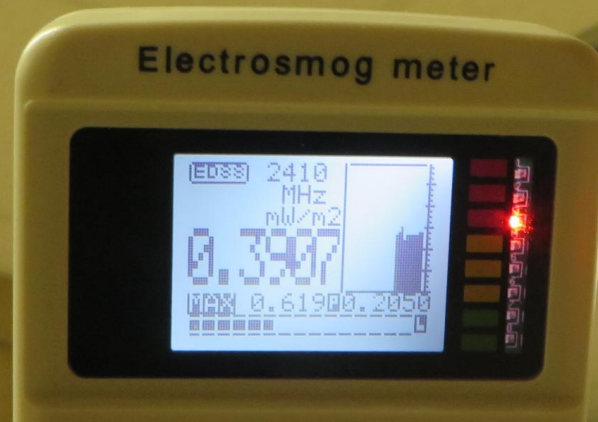
**Radiation over 1000X
lower in hallway at least 30
ft from Wi-Fi Access Point**



**This is Saturday, when no devices are
connected to Wi-Fi. When devices
are connected to Wi-Fi on school day,
it is even higher**

School Wi-Fi Access Point

0.3907 mW/m² = 0.03907 μW/cm²



This was a Saturday, not a school day, and no one was using this Wi-Fi router.

This is the RF radiation level that a person's head would be exposed to if he were standing under a Wi-Fi router even if no one was using Wi-Fi.

If this was an actual school day with students connected to the Wi-Fi router, RF radiation levels would be much higher.

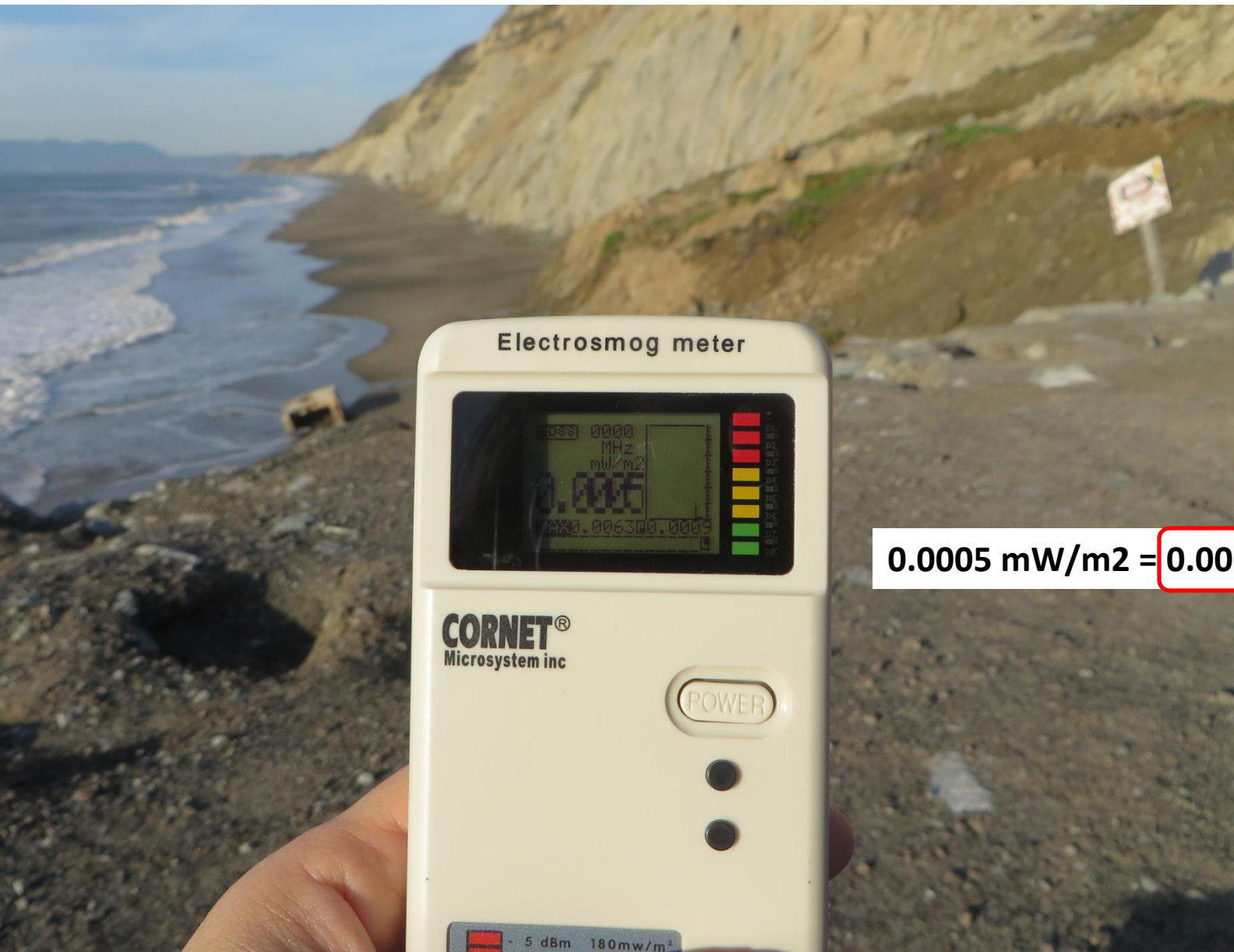
In a School Gym with Wi-Fi, Cell Phones



$$0.2831 \text{ mW/m}^2 = 0.02831 \text{ uW/cm}^2$$

**This school gym has a Wi-Fi access point.
There were about 30 adults and 20 students in the gym for a basketball game
(Most carried cell phones. Some were using cell phones during the game)**

Low Wireless Radiation Levels at Beach



$$0.0005 \text{ mW/m}^2 = 0.00005 \text{ uW/cm}^2$$

Wireless Radiation from DECT Cordless

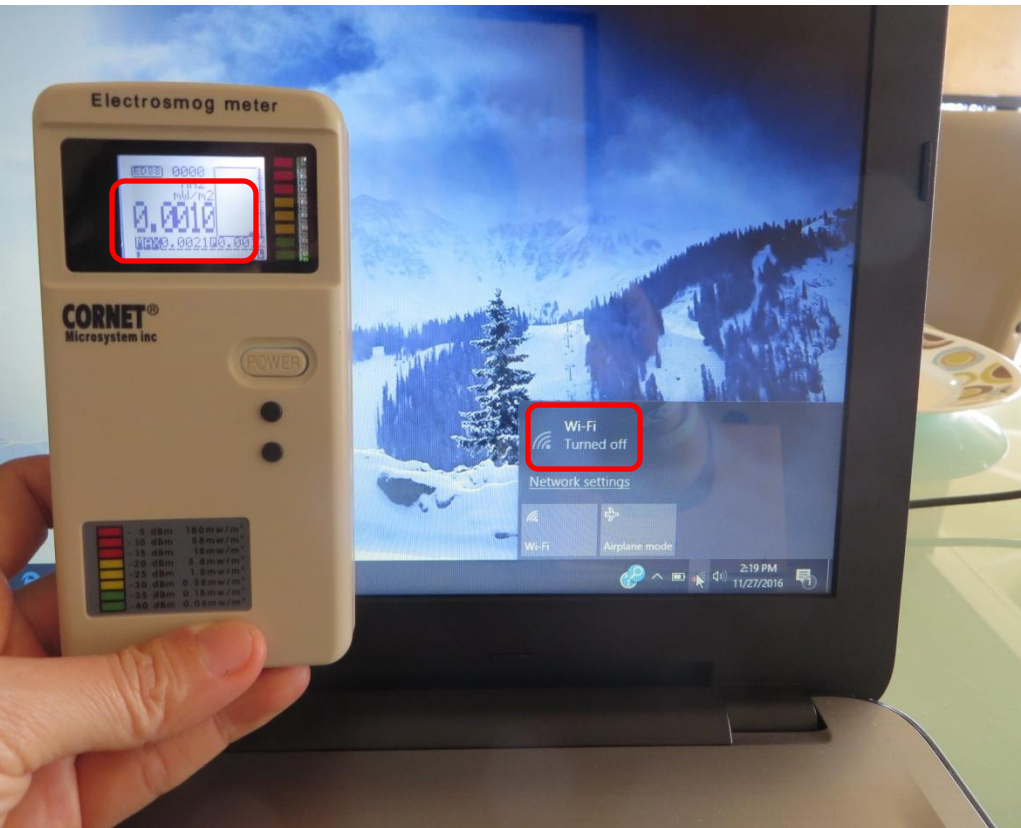
Wireless radiation emits constantly from a cordless phone, even when the phone is not in use ! (as you can see the handset is off)

$4.092 \text{ mW/m}^2 = 0.4092 \text{ uW/cm}^2$

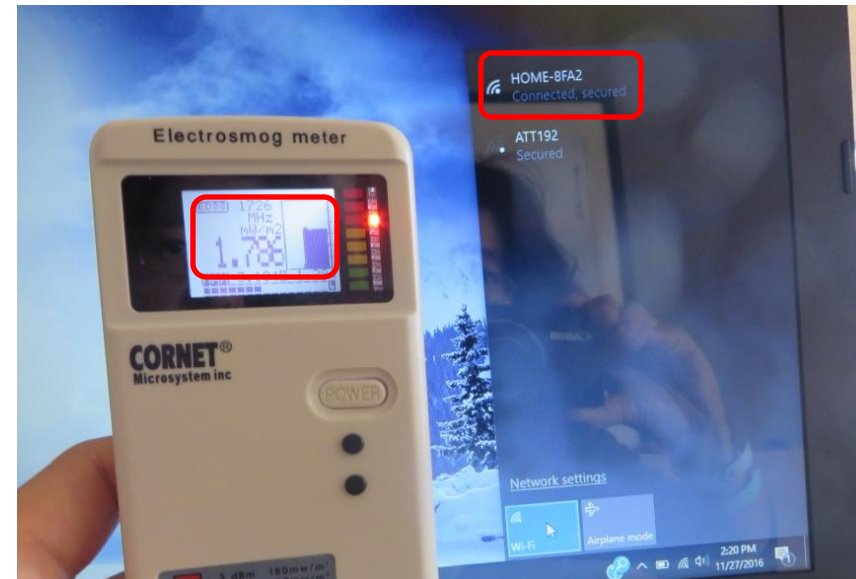


Laptop Radiation – Wi-fi On vs.Off

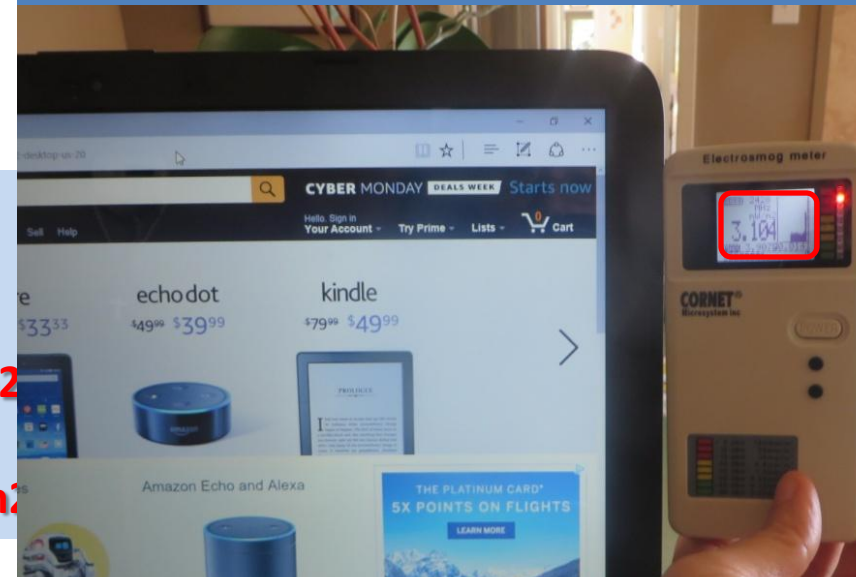
Wi-Fi Turned Off on laptop



Wi-Fi ON, no webpage open



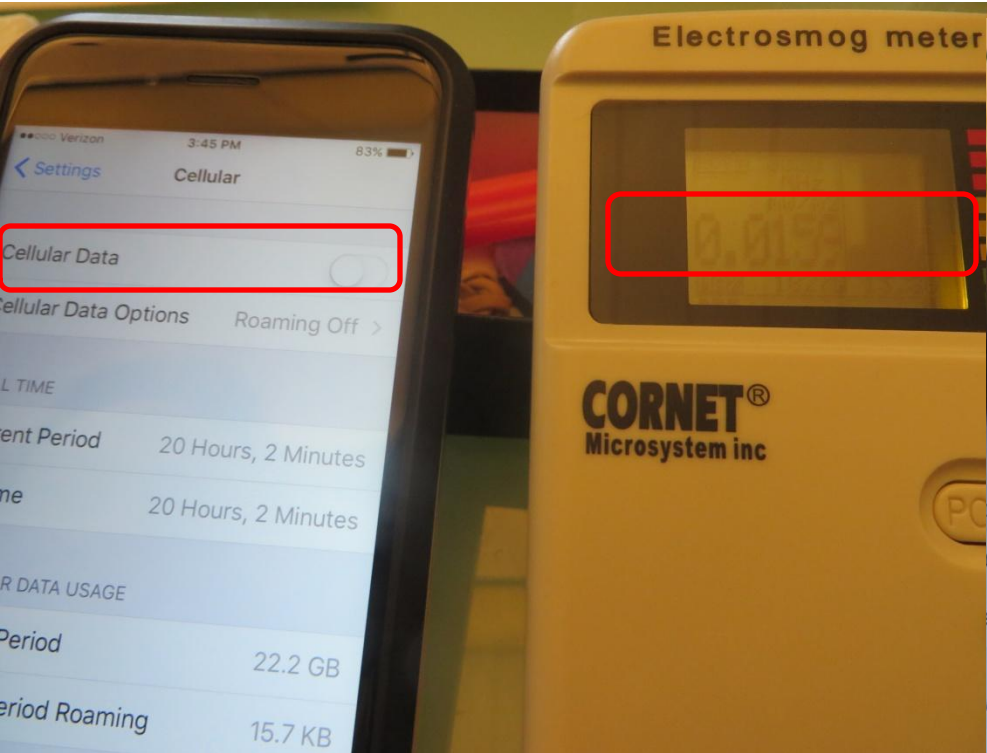
Wi-Fi On, webpage open on Amazon



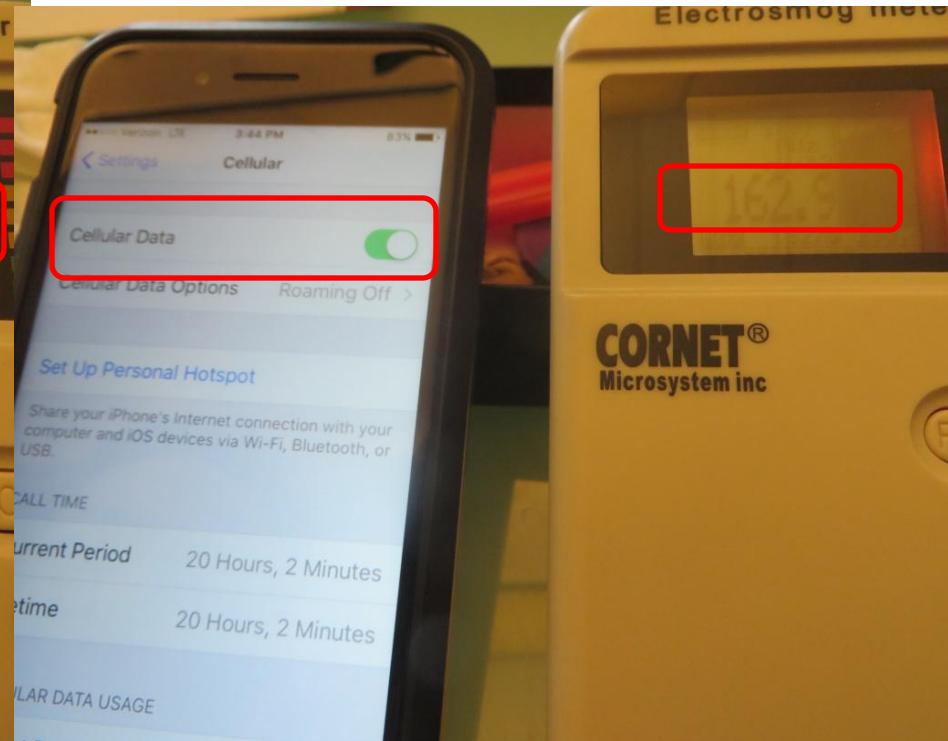
**When Wi-fi OFF, RF radiation is at lowest,
 $0.0010 \text{ mW/m}^2 = 0.0001 \mu\text{W/cm}^2$ (ambient level)**
**When Wi-fi ON, even though not using internet ,
RF 1000X+ higher at $1.786 \text{ mW/m}^2 = 0.1786 \mu\text{W/cm}^2$**
**When Wi-fi ON AND using internet,
RF 3000X+ higher at $3.104 \text{ mW/m}^2 = 0.3104 \mu\text{W/cm}^2$**

iphone Radiation – LTE On vs.Off

LTE Antenna off



LTE cellular data ON



When LTE antenna is OFF, RF radiation at $0.0159 \text{ mW/m}^2 = 0.00159 \mu\text{W/cm}^2$

When LTE is ON, RF radiation at 10,000X+ higher at $162.9 \text{ mw/m}^2 = 16.29 \mu\text{W/cm}^2$

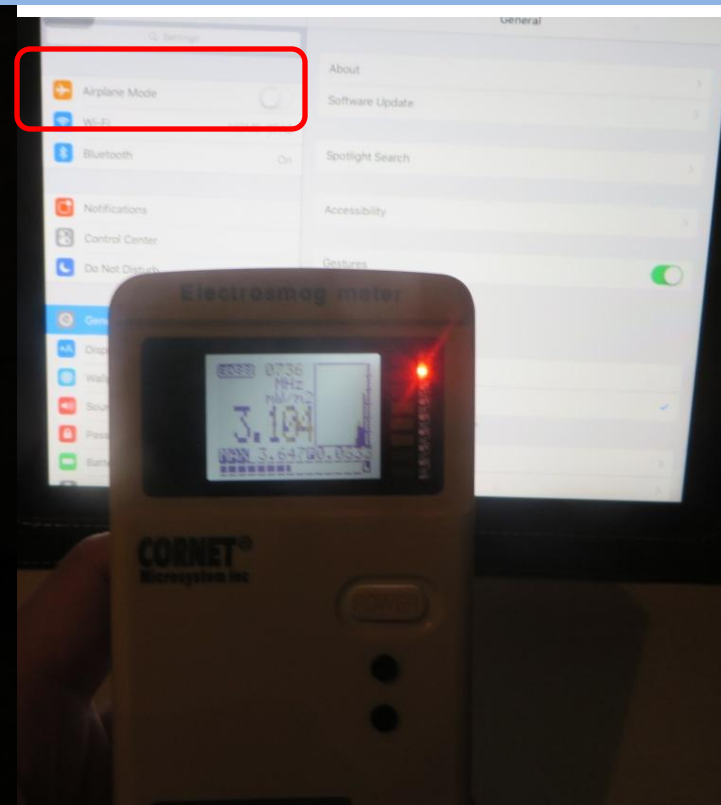
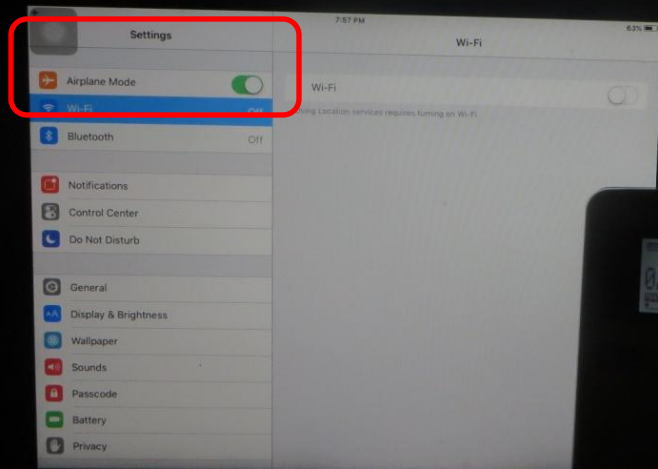
Carrying phone on your body , holding it to your head, holding it in your hand connected to LTE exposes you to high levels of RF radiation

Turn off LTE antenna when not using internet or airplane mode (shuts off all antennas)

ipad Radiation – Wi-fi On vs.Off

Airplane Mode off (Wi-Fi On)

Airplane Mode On (Wi-Fi Off)

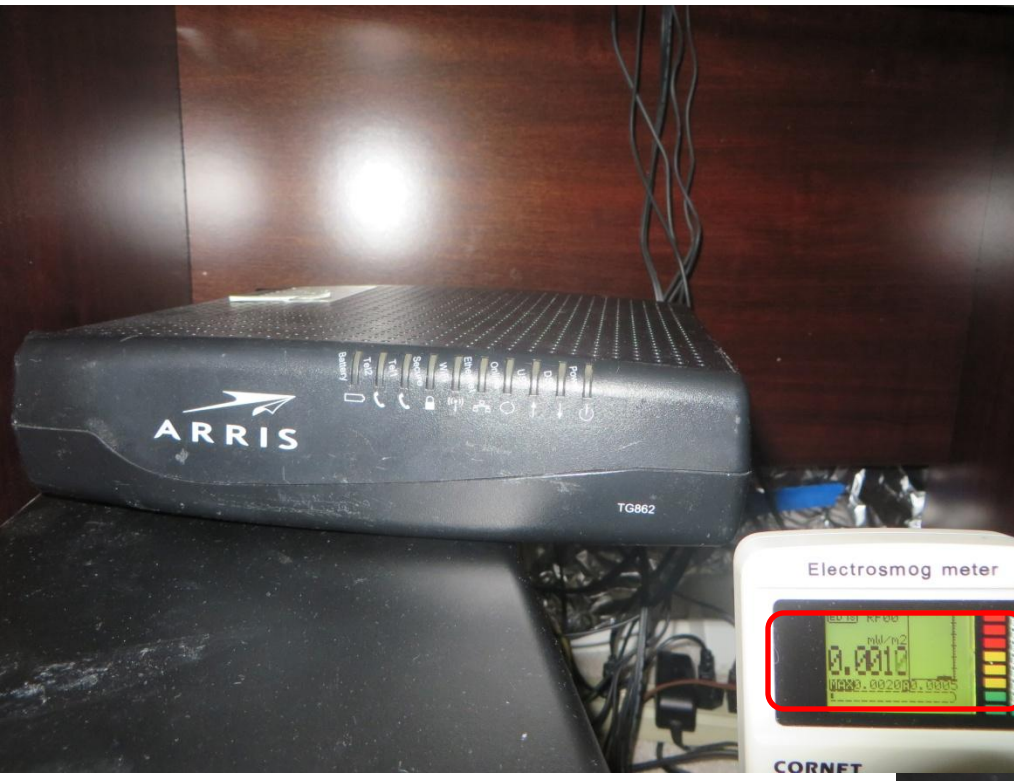


**When Airplane Mode ON (Wi-fi off), RF radiation is at ambient levels, 0.0015 mW/m2.
When Airplane Mode OFF (Wi-fi on), RF over 2000X higher at 3.104 mW/m2 = 0.3104uW/cm2.**

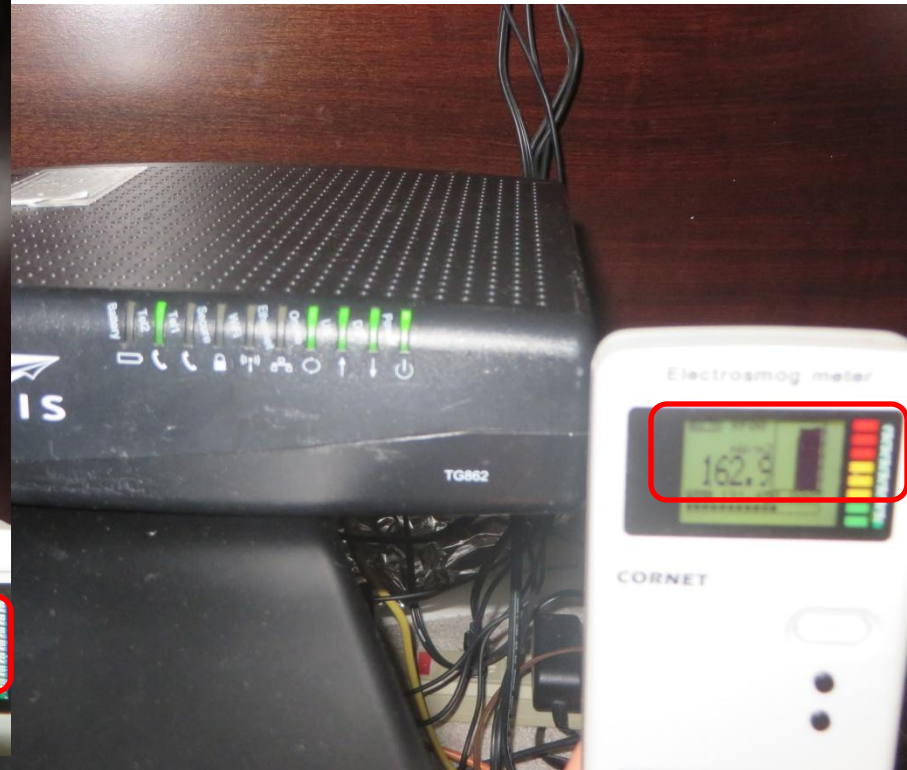
**To reduce your radiation exposure, don't hold ipad on your lap or in your hands .
Use it on a stand at a table.**

Home Wi-Fi Router

Wi-Fi OFF – 0.0015mW/m² (ambient level)



Wi-Fi ON – 162.9 mW/m²



**When wi-fi is off, RF radiation is at ambient levels for the room, 0.0010 mW/m².
When wi-fi is on, RF over 10,000X higher at 162.9 mW/m² = 16.29uW/cm².**

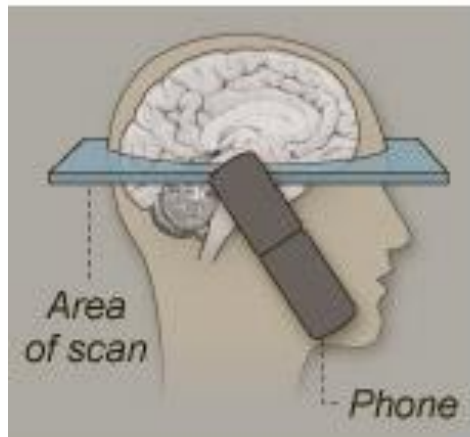
**Sitting close to a wi-fi router exposes your body to high levels of RF radiation.
Turn off wi-fi when not in use, and before going to bed at night.**

Cell Phone Radiation Affects Brain

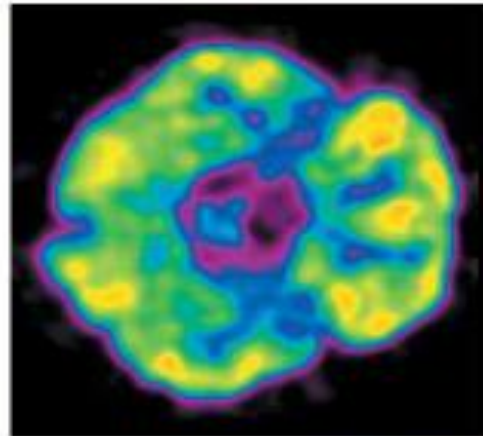
A 2011 U.S. study published in the Journal of the American Medical Association (JAMA) demonstrated that just 50 minutes of cell phone exposure increased brain glucose metabolism in the areas of the brain closest to the antenna. According Dr. Volkow, Director of the National Institute on Drug Abuse, part of the NIH, the study showed that the human brain is sensitive to cell phone radiation . <http://jama.jamanetwork.com/article.aspx?articleid=645813>

CELLPHONES AND THE BRAIN Researchers tested 47 people by placing a cellphone at each ear. Both phones were off in one test, and in the other test the right phone was on a muted call. After 50 minutes, brain scans showed increased consumption of glucose, or sugar, in areas of the brain near the activated phone.

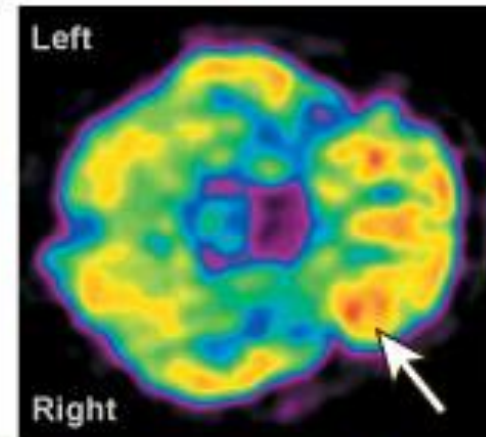
BRAIN SCAN



BOTH CELLPHONES OFF



RIGHT CELLPHONE ON



Rate of brain glucose metabolism LOW  HIGH

Source: JAMA

Note: images are from a single participant.

THE NEW YORK TIMES; IMAGES BY JAMA

What are the health effects at these RF levels?

**See the 2012 Bioinitiative Report ...
(Note: Table lists RF readings in $\mu\text{W}/\text{cm}^2$)**

2012 Bioinitiative Report

- Compendium by 29 int'l scientists/doctors - 21 PhD's, 10 MD's
- 3800 peer-reviewed, published studies on bioeffects from RF radiation
- EU Parliament used 2007 version to set limits

The screenshot shows a web browser window with the URL www.bioinitiative.org/table-of-contents/ highlighted by a red rectangle. The page features a blue sidebar with navigation links: "Editors' Notes", "What's New?", "BioInitiative Report", "Table of Contents", "Preface", "Conclusions", "Research Summaries", "RF Color Charts", "Participants", "Media", and "Contact". The main content area displays a "DOWNLOAD THE REPORT" button and a list of 24 sections, each preceded by a plus sign. The sections are: SECTION I: PREFACE, SECTION II: TABLE OF CONTENTS, SECTION 1: SUMMARY FOR THE PUBLIC AND CONCLUSIONS, SECTION 2: STATEMENT OF THE PROBLEM, SECTION 3: THE EXISTING PUBLIC EXPOSURE STANDARDS, SECTION 4: EVIDENCE FOR INADEQUACY OF THE STANDARDS, SECTION 5: EVIDENCE FOR EFFECTS ON GENE AND PROTEIN EXPRESSION, SECTION 6: EVIDENCE FOR GENOTOXIC EFFECTS - RFR AND ELF DNA DAMAGE, SECTION 7: EVIDENCE FOR STRESS RESPONSE (STRESS PROTEINS), SECTION 8: EVIDENCE FOR EFFECTS ON IMMUNE FUNCTION, SECTION 9: EVIDENCE FOR EFFECTS ON NEUROLOGY AND BEHAVIOR, SECTION 10: EFFECTS OF EMF FROM WIRELESS COMMUNICATION UPON THE BLOOD-BRAIN BARRIER, SECTION 11: EVIDENCE FOR BRAIN TUMORS AND ACOUSTIC NEUROMAS, SECTION 12: EVIDENCE FOR CHILDHOOD CANCERS (LEUKEMIA), SECTION 13: EVIDENCE FOR EFFECTS ON MELATONIN: ALZHEIMER'S DISEASE AND BREAST CANCER, SECTION 14: EVIDENCE FOR BREAST CANCER PROMOTION, SECTION 15: EVIDENCE FOR DISRUPTION BY THE MODULATING SIGNAL, SECTION 16: PLAUSIBLE GENETIC AND METABOLIC MECHANISMS FOR BIOEFFECTS OF VERY WEAK ELF MAGNETIC FIELDS ON LIVING TISSUE, SECTION 17: EVIDENCE BASED ON EMF MEDICAL THERAPEUTICS, SECTION 18: FERTILITY AND REPRODUCTION EFFECTS OF EMF, SECTION 19: FETAL AND NEONATAL EFFECTS OF EMF, SECTION 20: FINDINGS IN AUTISM CONSISTENT WITH EMF AND RFR, SECTION 21: MOBILE PHONE BASE STATIONS: WELL-BEING AND HEALTH, SECTION 22: PRECAUTION IN ACTION - GLOBAL PUBLIC HEALTH EXAMPLES SINCE BIOINITIATIVE 2007, SECTION 23: THE PRECAUTIONARY PRINCIPLE, and SECTION 24: KEY SCIENTIFIC EVIDENCE AND PUBLIC HEALTH POLICY RECOMMENDATIONS. The browser's taskbar at the bottom shows various application icons and the system clock indicating 2:34 PM on 4/12/2015.

www.bioinitiative.org/table-of-contents/

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BioInitiative Report

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4/12/2015

2012 Bioinitiative Report

(39,810) - x School News | x New Report Rec x Dr. Magda Hava x www.magdahav x Expert Studies | x safeschool.ca/u x apps.fcc.gov/ec x Google Maps x

www.bioinitiative.org/report/wp-content/uploads/pdfs/BioInitiativeReport-RF-Color-Charts.pdf

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

Power Density (Microwatts/centimeter ² - uW/cm ²)		Reference
As low as (10 ⁻¹³) or 100 femtowatts/cm ²	Super-low intensity RFR effects at MW resonant frequencies resulted in changes in genes; problems with chromatin conformation (DNA)	Belyaev, 1997
5 picowatts/cm ² (10 ⁻¹²)	Changed growth rates in yeast cells	Grundler, 1992
0.1 nanowatt/cm ² (10 ⁻¹⁰) or 100 picowatts/cm ²	Super-low intensity RFR effects at MW resonant frequencies resulted in changes in genes; problems with chromatin condensation (DNA) intensities comparable to base stations	Belyaev, 1997
0.00034 uW/cm ²	Chronic exposure to mobile phone pulsed RF significantly reduced sperm count,	Behari, 2006
0.0005 uW/cm ²	RFR decreased cell proliferation at 960 MHz GSM 217 Hz for 30-min exposure	Velizarov, 1999
0.0006 - 0.0128 uW/cm ²	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/cm ²	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/cm ²	In children and adolescents (8-17 yrs) short-term exposure caused conduct problems in school (behavioral problems)	Thomas, 2010
0.005 uW/cm ²	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/cm ²	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated)	Thomas, 2008
0.006 - 0.01 uW/cm ²	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/cm ²	RFR from cell towers caused fatigue, headaches, sleeping problems	Navarro, 2003

2012 Bioinitiative Report

Dr. Magda Havas, x www.magdahavas. x Expert Studies | An x safeschool.ca/uplo x apps.fcc.gov/ecfs/c x Google Maps x www.bioinitiative.c x M

initiative.org/report/wp-content/uploads/pdfs/BioInitiativeReport-RF-Color-Charts.pdf

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0.01 - 0.05 uW/cm ²	Adults (18-91 yrs) with short-term exposure to GSM cell phone radiation reported <u>headache, neurological problems, sleep and concentration problems.</u>	Hutter, 2006
0.005 - 0.04 uW/cm ²	Adults exposed to short-term cell phone radiation reported <u>headaches, concentration difficulties</u> (differences not significant, but elevated)	Thomas, 2008
0.015 - 0.21 uW/cm ²	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/cm ²	RFR linked to adverse neurological, cardio symptoms and cancer risk	Khurana, 2010
0.05 - 0.1 uW/cm ²	RFR related to <u>headache, concentration and sleeping problems, fatigue</u>	Kundi, 2009
0.07 - 0.1 uW/cm ²	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 <u>sperm head abnormalities</u> on the reproductive health of humans living in close proximity to GSM base stations were discussed."	Otitoloju, 2010
0.38 uW/cm ²	RFR affected calcium metabolism in heart cells	Schwartz, 1990
0.8 - 10 uW/cm ²	RFR caused emotional behavior changes, free-radical damage by super-weak MWs	Akoev, 2002
0.13 uW/cm ²	RFR from 3G cell towers <u>decreased cognition, well-being</u>	Zwamborn, 2003
0.16 uW/cm ²	Motor function, <u>memory and attention</u> of school children affected (Latvia)	Kolodynski, 1996
0.168 - 1.053 uW/cm ²	<u>Irreversible infertility</u> in mice after 5 generations of exposure to RFR from an 'antenna park'	Magras & Zenos, 1997
0.2 - 8 uW/cm ²	RFR caused <u>two-fold increase in leukemia</u> in children	Hocking, 1996
0.2 - 8 uW/cm ²	RFR <u>decreased survival in children with leukemia</u>	Hocking, 2000
0.21 - 1.28 uW/cm ²	Adolescents and adults exposed only 45 min to UMTS cell phone radiation reported increases In headaches.	Riddervold, 2008