

THE TRUTH ABOUT EMF'S & 5G



What is SAR?
What is Cosmic Radiation?
Microwave Radiation
Sleeping Tips
Blue Light Dangers
Electromagnetic Radiation
EMF's & Children
& Much More



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Microwave Emissions from Mobile Phones Exceed Safety Limits



Microwave Emissions from Mobile Phones Exceed Safety Limits

In his scientific report from early 2019, Prof. Om. P. Gandhi shows that mobile phones fail the Specific Absorption Rate (SAR) safety limits both in Europe and the USA. He recommends that the regulators change current compliance testing methods.

As consumers, we generally think that all electronic products we use, including mobile phones, are safe to use. When it comes to mobile phones and other wireless technology, one of the safety tests that a product needs to pass before it's released to the market is a Specific Absorption Rate (SAR) test. The results of such test reveal whether the product is above or below a set safety limit.

Prof Gandhi reveals that the current safety standards and the way these tests are carried out are not providing us, the consumers, with true results. And because of that, we can't rely on them. We'll explain why.

What is SAR?

To make it as simple as possible, SAR is a value stated in W/kg that gives you an idea about how much of radiation you absorb whilst making a phone call (with a phone at your head), downloading files or being connected to wifi.

Who is Prof Gandhi?

Now you might be asking yourself: Who is this professor and why should I listen to what he has to say in his report?

[Prof. Om. P. Gandhi](#), is currently the Chair at the Department of Electrical and Computer Engineering at the University of Utah.

Below is a list of some of his professional achievements:

- author and co-author of over 200 journal articles on electromagnetic dosimetry, microwave tubes, and solid-state devices
- editor of Biological Effects and Medical Applications of Electromagnetic Energy (Prentice-Hall, 1990)
- co-editor of Electromagnetic Biointeraction (Plenum Press, 1989).
- president of the Bioelectromagnetics Society (1992-1993)
- recipient of the d'Arsonval Medal of the Bioelectromagnetics Society for pioneering contributions to the field of bioelectromagnetics in 1995
- co-chairman of IEEE SCC 28.IV Subcommittee on the RF Safety Standards (1988-1997)
- chairman of the IEEE Committee on Man and Radiation (COMAR) 1980-1982
- recipient of the Microwave Pioneer Award of the IEEE Microwave Theory and Techniques Society in 2001
- scientific advisor of the Environmental Health Trust
- recipient of the State of Utah Governor's Medal for Science and Technology in 2002

In other words, Prof Gandhi is an expert in his field.

Phones fail safety tests when held against the body

Prof. Gandhi gives an overview of both of his own findings and of the results of a very extensive cell phone SAR test data report prepared by the [French National Agency of Frequencies](#) (ANFR).

Both papers agree on the following:

Most cell phones' SAR is way above the safety limits when held against the body. They exceed those limits 1.6-3.7 times within the European standards and up to 11 times within the U.S. standards.

If you're wondering how this is even possible, read on.

What is wrong with current SAR testing methods?

1. Unrealistic distance between phone and body:

According to the professor, over the past 5-10 years, the manufacturers started to recommend we hold a phone between 5-25mm away from the body. Same is done with SAR testing.

But what would happen if we do the same testing at a 0mm distance from the body, the way we usually use a phone?

The vast majority of people usually carry a phone in their pocket or on their body or place it right to their ear when on a call (that is unless they use a loudspeaker or a set of headphones). When browsing, we usually carry a phone in one hand.

It has been already proven that the closer the phone to the body, the higher the SAR reading.

This is why Prof Gandhi believes that without adding distance as part of the set test conditions, the majority of wireless devices won't comply.

2. SAR Measurements at different distances

To illustrate his point, take a look at the below SARs in W/kg measured for representative phones (out of 450 tested). They were held against the flat phantom model of the body at manufacturer-suggested distances (D) and at distances of 5 and 0mm. (Table taken from Reference 1):

Make	MODEL	SAR at Mfr. Suggested Distance D	SAR (5mm)	SAR (0mm)	Percent increase in SAR for	
					From D to 0mm	From 5 to 0mm
POLAROID	PRO 881A	1.05 (15 mm)	3.63	7.42	13.90%	15.40%
HTC	ONE SV	0.366 (15 mm)	2.256	7.183	22.00%	26.10%
BLACKBERRY	Z 10	0.934 (15 mm)	3.18	6.8	14.20%	16.40%
MOTOROLA	MOTOLUXE	0.254 (25 mm)	2.96	5.86	13.40%	14.60%
ORANGE	NEVA 80 (ZTE BLADE V770)	1.39 (15 mm)	3.62	5.79	10.00%	9.90%
HUAWEI	P9 (EVA-L09)	1.32 (15 mm)	3.18	5.6	10.10%	12.00%
MOTOROLA	RAZR I	0.507 (25mm)	2.27	5.51	10.00%	19.30%
SONY	XPERIA S CITIZY LT26i	0.748 (15 mm)	2.253	5.45	14.20%	19.30%
APPLE	IPHONE 5	0.825 (10 mm)	1.453	5.321	20.50%	29.60%
SAMSUNG	GALAXY S 5 SM-G900 F	0.545 (15 mm)	1.55	3.55	13.30%	18.00%
ECHO	NOTE	1.35 (5 mm)	1.35	4.15	25.20%	25.20%
APPLE	IPHONE 5C	1.11 (5 mm)	1.11	3.11	22.90%	22.95%
SAMSUNG	GALAXY J7 (SM-J710FN)	1.29 (5 mm)	1.29	3.56	22.50%	22.50%

The results clearly show that at 0mm distance, none of the tested phones pass the current safety limit of 2 W/kg in Europe and 1.6 (W/kg) in the US.

3. Unrealistic head/body model:

Prof Gandhi confirms that the current test model is based on an Army Recruit test model with large head size. Based on this, it is only clear that such baseline isn't suited to reflect the variety of phone users. What about the SAR in children with a much thinner skull and developing the brain, or in women and men of smaller head sizes?

Recommendation: Change current test conditions

Prof. Gandhi strongly suggests that the industry regulators set up compliance testing under realistic conditions. He recommends that:

- test at 0mm distance to reflect realistic user experience
- Include a variety of phantom models to include children, women, and men of smaller head sizes.

What's in it for you?

Now that you have been educated on how things work behind the scenes of mobile phone safety testing, we sincerely hope that you will use your critical thinking and common sense and remember that:

- A lower SAR rating doesn't necessarily make a phone safer for daily use.
- Unless your head is the same size as of a 100g army recruit, you will always absorb a larger amount of radiation.
- Children absorb far more radiation than adults.

We don't ask that you suddenly stop using your phone and other wireless devices. But we do invite you to take care of your body well to build resilience and limit exposure where possible.

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Why should you turn off wifi at night?



Why should you turn off wifi at night?

How many of you find yourselves sleeping with the phone next to your head and with the wifi constantly on? Have you ever thought switching wifi off for the night could be part of the solution, leading to better health of your family?

Electromagnetic fields (EMFs), also called radio frequency, emitted from wireless devices can affect your health. With wifi being one of the main sources of EMFs in your home, switching it off at night could be a simple step to help you get a healthier sleep and to reduce your exposure by a third.

Let us explain why.

If you are new to the topic of radio frequencies, microwave radiation and EMFs, start with our article titled '[The Beginner's Guide to Electromagnetic Radiation](#)'.

Done it?

Then let's answer the main question and have a look at the [Bioinitiative](#) report on the effects of EMFs on health. Compiled by 29 independent scientists and health experts from around the world, this report is only one of many reliable resources available online that shows evidence of the effects and possible risks from wireless technologies and electromagnetic fields.

According to this report, bioeffects (effects on the human, animal or cell biology) are clearly established and take place at very low levels of exposure to electromagnetic fields and radiofrequency radiation, be it from a mobile or cordless phone use,

mobile phone masts, WI-FI, and wireless utility 'smart' meters that produce whole-body exposure.

Studies quoted in the report show that these exposures can not only cause DNA damage, but can also cause oxidative stress (think faster ageing and disease) and can be carcinogenic. There have also been studies showing the impact on sperm function, brain and the nervous system as well as behaviour in offspring.

So the more we are exposed to these fields and wireless radiation, the more the body needs to keep up to keep everything in check and combat this source of stress.

This is exactly why switching off your wifi during night time is one of the very simple things to do to help combat the issue of EMFs. It is not the only solution, but reducing the exposure time by 7 or 8 hours a day, where possible, is definitely worth it.

Tips to help you sleep better

In one of our previous articles titled 5 Top Tips to help you sleep like a baby (link to blog) we share an overview of why paying attention to your sleep is one of the keys to a healthy life. In the same article we also discuss top eight factors that can influence your sleep, including EMF exposure, the foods you eat, stress, exercise and light.

If you are curious or concerned about your children's sleeping habits, you might also want to read our article titled [How EMFs Affect Children's Health](#).

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1. <https://bioinitiative.org>
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5 Top Tips to help you sleep like a baby



5 Top Tips to Help You Sleep like a Baby

Have you ever tossed and turned in your bed, unable to quiet your mind until the early morning hours? Have you ever stayed up late staring at a computer screen for hours only to find it difficult to fall asleep right after?

If you said yes to any of the above, read on. We have compiled 5 top tips to help you sleep better, get enough rest and wake up more alert and ready for the day ahead of you.

Why is great quality sleep one of the secrets to a healthier life?

Sleep is one of the vital building blocks of life. During the ideally 7-9 hour long sleep (recommended for adults) your body rests and regenerates. Your organs, muscles and cells recover and repair. Your brain is able to process and get rid of metabolic waste buildup from the day and to create new connections and memories.

Lack of sleep and bad sleep quality has been linked to mood and attention problems, irritability, anxiety, premature ageing and even Alzheimer's disease.

memory issues

During sleep, your brain forms connections that help you process and remember new information. A lack of sleep can negatively impact both short- and long-term memory.

trouble with thinking and concentration

Your concentration, creativity, and problem-solving skills aren't up to par when you don't get enough rest.

mood changes

Sleep deprivation can make you moody, emotional, and quick-tempered. Chronic sleep deprivation can affect your mood and lead to anxiety or depression, which may escalate.

accidents

Being drowsy during the day can increase your risk for car accidents and injuries from other causes.

weakened immunity

Too little sleep weakens your immune system's defenses against viruses like those that cause the common cold and flu. You're more likely to get sick when you're exposed to these germs.

high blood pressure

If you sleep less than five hours a night, your risk for high blood pressure increases.

risk for diabetes

A lack of sleep affects your body's release of insulin, a blood sugar-lowering hormone. People who don't get enough sleep have higher blood sugar levels and an increased risk for type 2 diabetes.

weight gain

With sleep deprivation, the chemicals that signal to your brain that you are full are off balance. As a result, you're more likely to overindulge even when you've had enough to eat.

low sex drive

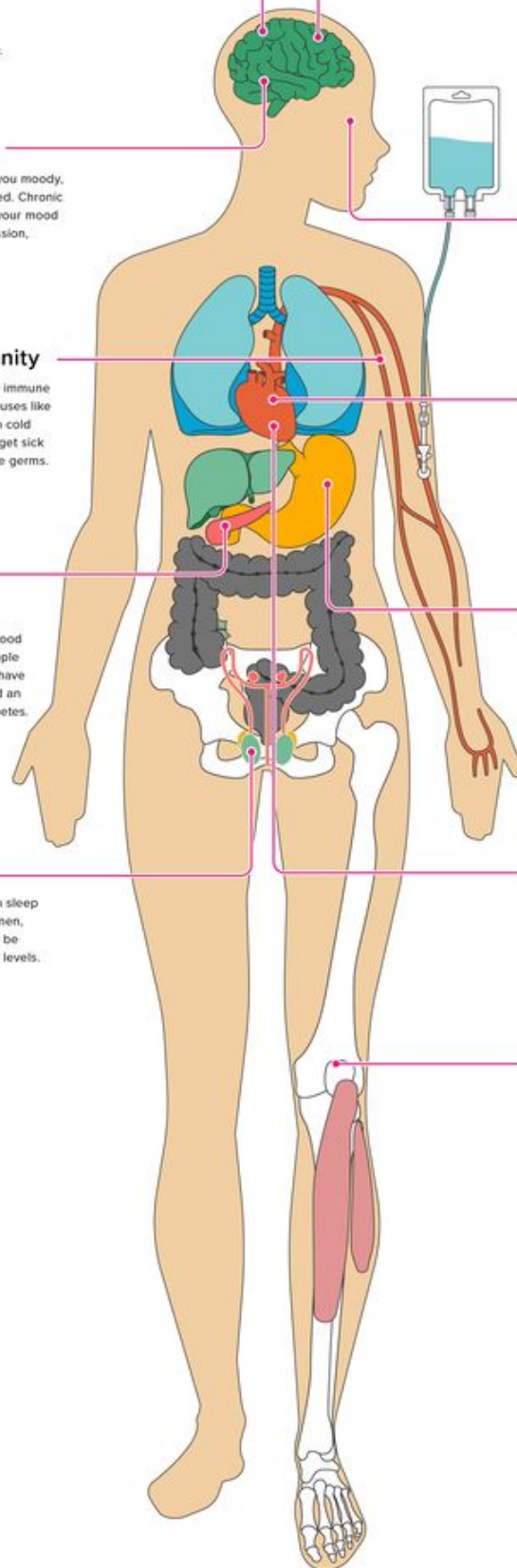
People who don't get enough sleep often have a lower libido. In men, this decreased sex drive may be due to a drop in testosterone levels.

risk of heart disease

Sleep deprivation may lead to increased blood pressure and higher levels of chemicals linked to inflammation, both of which play roles in heart disease.

poor balance

Lack of sleep can affect your balance and coordination, making you more prone to falls and other physical accidents.



What impacts your sleep?

Here's a list of top eight factors that might be influencing your sleep.

1. Electromagnetic frequencies (EMFs) from wireless devices and dirty electricity

Not sure what EMFs are? Learn about them in our article 'The Beginner's Guide to Electromagnetic Radiation'. ([link to blog post](#))

If you do know, were you aware that wireless radiation has been shown to damage sleep and affect the brain? According to the Environmental Health Trust, it might lead to higher toxic load on the body.

EMFs from wireless devices have also been found to delay the so-called non-REM deep sleep stage and shorten the time you spent there. The non-REM deep sleep is a state where your body repairs itself, builds tissues and strengthens the immune system, so it is crucial that your body gets it.

But that's not all. The so called 'dirty electricity' or low frequency electromagnetic fields emitted from the electrical circuits and sockets might play a role in affecting your heart rate.

Because at Qi-Technologies we are experts at helping you solve problems related to the effects of electromagnetic radiation from wireless devices, we have gone further with explaining how Wireless devices emitting electromagnetic radiation can affect your sleep ([link to name and article here – to come](#)).

2. Light

Light affects your brain directly through special light sensitive cells in our eyes, which tell decide whether it is daytime or night time.

Blue light, emitted by any devices with screens is prominent in daylight and it will keep you more alert at night. Too many hours in front of a screen can significantly influence your sleep cycle and further impact on your sleep.

Read more about how Blue Light affects your sleep. ([link to blog How does blue light affect your sleep?](#))

3. Shift Work and Travel

Light changes due to a shift in work schedule or travel across time zones strongly influences our internal clock and our ability to sleep at various times.

4. Stress, pain, anxiety and other medical conditions

If you are constantly under psychological, emotional or physical stress you might find it difficult to fall asleep. Pain can also cause interrupted or light sleep.

5. Medications, coffee, alcohol and other substances

Caffeine, alcohol, nicotine, antihistamines, as well as certain prescription medications including beta blockers, alpha blockers, and antidepressants, can affect your sleep quality.

6. The foods you eat

The food you eat (including drinks) will either aid to a healthy sleep or quite the opposite. Highly processed foods with high sugar / carbohydrate content will have an affect on how your body winds down for sleep. The sugar in your system is able to pull you out of a deep sleep, easily making you feel exhausted the next day.

7. Exercise

According to the US National Sleep Foundation, less time sitting is associated with better sleep and health and exercising at any time of the day seems to be good for sleep.

8. The environment you sleep in

The earlier mentioned light, noise, temperature and mattress/bed quality can all impact how you sleep. There is no prescribed temperature for sleeping, but slightly

cooler environment works usually better. Extreme temperatures in sleeping environments tend to disrupt sleep.

What can you do to get a better sleep?

Here are 5 simple steps to help you supercharge your sleep.

1. Limit EMF exposure where possible

- If possible, switch off the fuse in your bedroom to decrease the low frequency EMFs.
- Switch off wifi for the night. Find out why you need to switch off your wifi at night ([link to article](#))
- Remove your phone and any wireless devices from your and your kids' bedroom during the night.
- If you're concerned about your children's sleeping habits, you might like our article titled [How EMFs Affect Children's Health](#) ([link](#)).

2. Create a sleep friendly routine

- Your routine can include going to bed around the same time every night, waking up around the same time every morning.
- Unwind doing something relaxing, such as having a bath, gentle yoga, stretching or reading.
- Grab a book or paper-like e-reader without lit background.

3. Create a nourishing environment

- Keep your bedroom tidy and clutter free. When our brain is surrounded by disorder, it might find it more difficult to settle down.
- Use dim lights before switching off for the night.
- Open the window and let the air circulate.
- Sleep in a dark room and keep the light out during sleep.
- Avoid watching screens during night time

4. Reduce Stress and keep fit

Stress keeps your body in a fight or flight mode and doesn't allow it to fully restore.

- Find strategies that will help you become more resilient and cope more effectively with stress on a daily basis. This might include exercise, yoga, tai chi, meditation, mindfulness, developing more self-awareness or regular massage.

5. Avoid heavy meals and caffeine

- Ditch caffeine past noon and opt in for a light dinner, ideally three hours before bedtime.
- Skip sugary foods late at night to allow the body to rest.

Now all you have to do is sleep like a baby!

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How does blue light affect your sleep?



How does blue light affect your sleep?

Have you ever found yourself staring at a computer screen for hours, working, studying, browsing or watching a movie? You would stay up until very late, only to find yourself wide awake as soon as your head hits the pillow.

Although there are a few key things that can impact your sleep quality ([link to blog](#)), how much time you spend using your wireless devices is one of the major influencers of how well you will sleep.

And it is mainly because of blue light.

What is blue light?

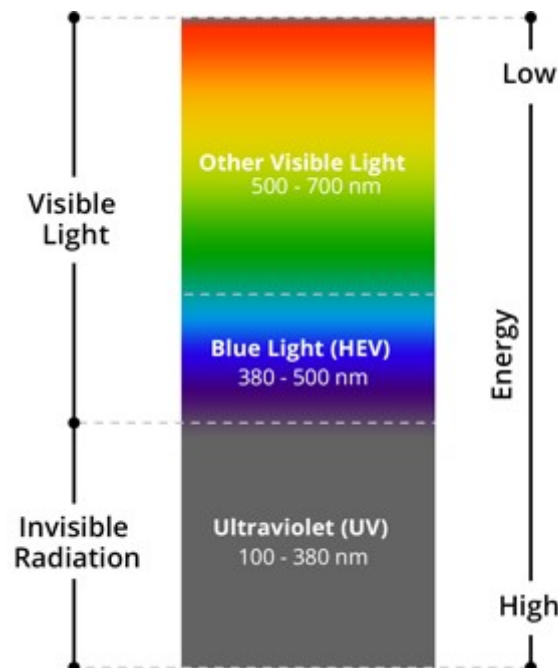
The sunlight we are normally exposed to is made of a few different light rays: red, orange, yellow, green, blue and many shades of each of these colors. (Read more about light in our [Beginner's guide to electromagnetic radiation – link to blog](#)).

It is fair to say that sunlight is the main natural source of blue light, helping us to stay awake and alert during the day.

On the other hand, Fluorescent and LED lighting, flat-screen TV screens, smartphone screens, tablets, computers are man-made devices also emitting blue light.

According to [Dr.Heiting, Doctor of Optometry \(O.D.\)](#), although the amount of blue light these devices emit is only a fraction of that emitted by the sun, it is the amount

of time we spend using them and how close to the screens we are that can have possible long-term effects on our health.



The body's biological clock: The Circadian Rhythm

Imagine your body has a biological clock running on a 24 hour cycle. This biological clock, called the circadian rhythm or the circadian clock, controls your sleep-wake cycle.

Your eyes help you recognise which part of the sleep-wake cycle it is currently in. They react to the exposure to light, including blue light, through light-sensitive cells.

During night time, the eyes signal to the brain that it is time to sleep and regenerate.

Darkness also causes the body to produce a hormone called 'melatonin'. This hormone, produced in the pineal gland of our brain, signals the body to prepare for sleep. Beside this, melatonin has antioxidant and anti-inflammatory properties and contributes to a healthy function of the body's immune and neurological systems.

How does blue light impact on your sleep?

Blue light keeps you more alert and awake and tricks the body into thinking it is still daytime. The body's clock is now shifted and out of sync, causing you to have trouble falling asleep, not having a deep enough sleep and waking up tired.

As a result, the body produces very little to no melatonin during night time.

A 2014 study done by researchers at the [Harvard Medical School in Boston](#) showed that reading a backlit device before bed makes worsens your sleep significantly more than reading a paper book under dim light.

The study reported that people who used an iPad at night:

- Produced 55% less melatonin;
- It took them an extra 10 minutes to fall asleep
- Had less so called REM (Rapid Eye Movement) sleep during the night, which is when we dream.

On waking up the next day, the iPad readers felt sleepier, and it took them longer to feel alert, compared to the book readers

Interestingly, the next night the iPad readers' circadian clocks got delayed by more than 90 minutes and their bodies started to feel tired an hour and a half later than normal.

What happens when you don't sleep?

Not giving your body the vital rest it needs can lead to all sorts of other problems.

Lack of sleep prevents your brain to clear itself out of toxins built up during the waking hours.

A recent [study](#) lead by researchers from the Washington University School of Medicine in St. Louis, MO, suggests that adults who do not get enough deep sleep may be on their way to developing Alzheimer's disease.

Poor sleep might cause memory issues, trouble with concentration or mood changes. It can also weaken your immune system, increase inflammation and the risk for type 2 diabetes.

Improve your sleep hygiene for better health

It is now clear how important sleep is and why you should reduce your exposure to blue light during night time. Here are 5 tips to get you there:

1. Use blue light blockers and filters on your devices. It will help you reduce exposure to artificial blue light during the day.
2. Stop any activity on your mobile devices and computers at least 2-3 hours before going to bed. Allow your body to start preparing for sleep.
3. Dim the lights during the evening. Switch off any LED lights and choose a softer, orange and yellow light to reduce blue light exposure.
4. Like reading? Opt in for a book or paper-like e-reader without backlit background.
5. Switch off wifi and remove your phone and any wireless devices from your bedroom during the night. Wireless devices emit electromagnetic radiation that can also affect your sleep

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The Beginner's Guide to Electromagnetic Radiation



The Beginner's Guide to Electromagnetic Radiation

What do a rainbow, a mobile phone and a head CT scan have in common?

One thing for sure. They all emit EMFs (Electromagnetic fields) or otherwise called Electromagnetic Radiation (EM radiation).

We often talk about EM radiation in connection with mobile phones and wireless technology but the fact is, EM radiation includes so much more than this.

In this article, we will explain some very basic concepts to help you understand where wireless technology fits in:

- What is EM radiation?
- What is the EM spectrum?
- What types of EM radiation are there?
- What is ionising and non-ionising radiation?
- What are the effects of EM radiation on health?

What Is Electromagnetic Radiation?

When you sit in a car to drive to your favourite cinema, it takes you there because its engine creates enough energy to make it move. When we talk about movement, we talk about 'kinetic energy'.

By nature, EM radiation is also a form of energy.

Let's take a look at how it all works.

Whilst you use your car to travel to where you want to be, EM radiation uses an 'electrically charged particle' as its vehicle.

And depending on its qualities, this particle might be able to travel through the air, through any matter, including the human body, concrete walls or even vacuum.

As the electrically charged particle travels, it disturbs the environment around it through 'electromagnetic waves'.

What is Electromagnetic Spectrum?

No all EM radiation is created equal. So what makes one type of EM radiation different from another?

They behave differently depending on the quality of the waves they create, which we call a 'wavelength' or 'frequency'.

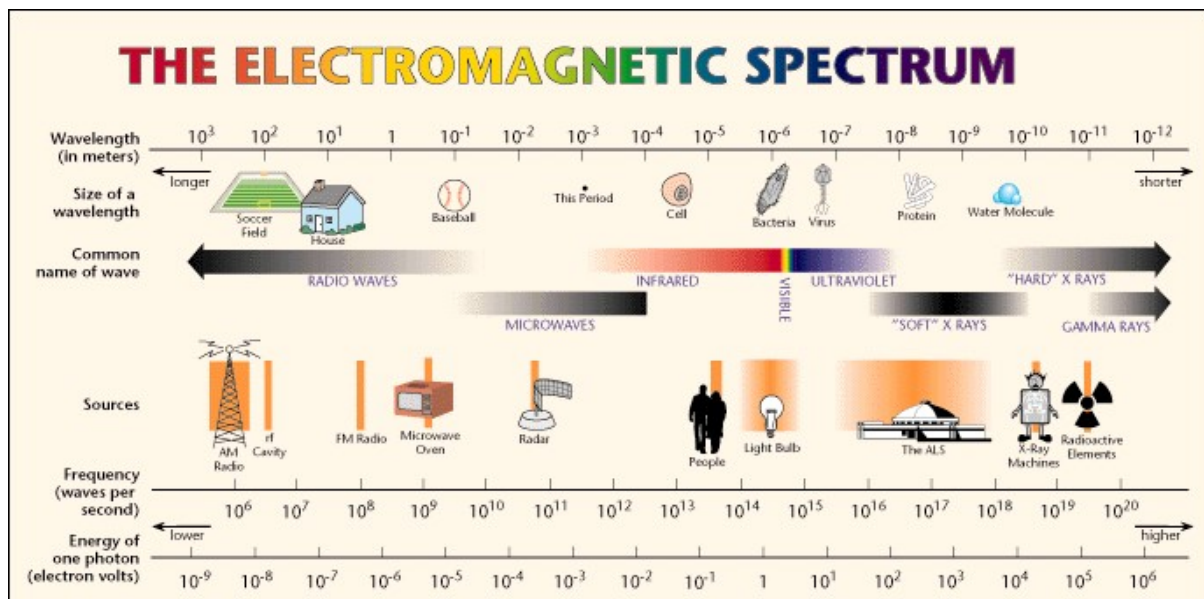
To illustrate this, imagine two boats travelling across the ocean. The first boat is three times bigger than the other one. Will the waves created by both boats in surrounding waters be exactly the same?

No, it won't. The size and frequency of the waves will depend on the size of the boat and the speed (the energy) it's using to move forward.

Same applies to wavelength and frequency.

The electromagnetic waves with higher energy and frequency are shorter, whereas waves with lower energy and frequencies are longer.

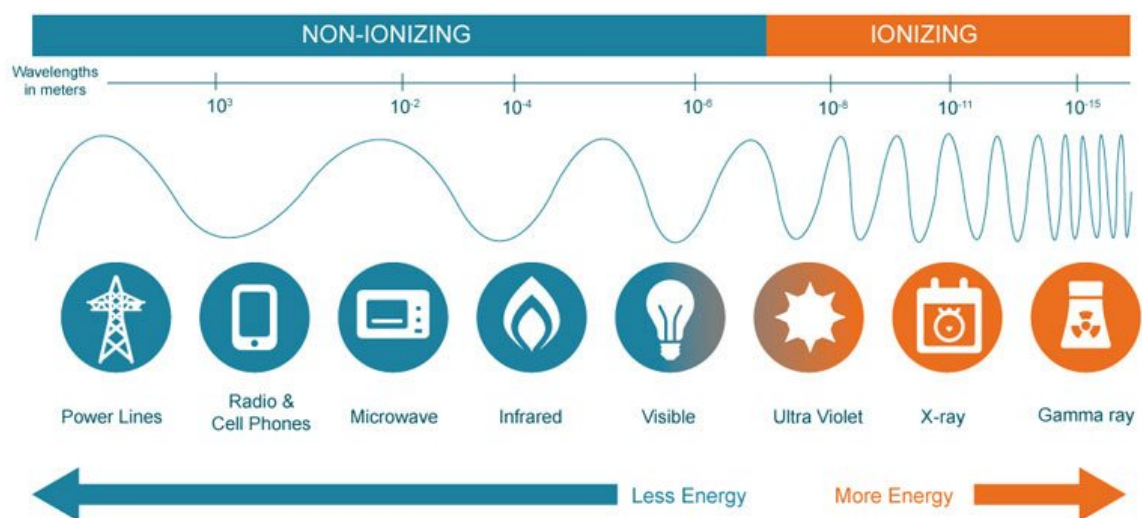
Based on those characteristics we can organise them in the Electromagnetic (EM) Spectrum.



Source: https://marine.rutgers.edu/cool/education/class/josh/em_spec.html

What EM Radiation types are there?

We can group certain frequency ranges into different types, from lowest to highest wavelengths and the amount of energy they carry:



Source: <https://www.mirion.com/learning-center/radiation-safety-basics/what-is-radiation>

1. Power Lines

Power lines have the lowest wavelengths.

2. Radio Waves

Radio waves are transmitted by radio broadcasts, TV broadcasts, radars, and even mobile phones.

Some examples of radio spectrum bands include extremely low frequency (ELF), ultra low frequency (ULF), low frequency (LF), medium frequency (MF), ultra high frequency (UHF), and extremely high frequency (EHF).

Bluetooth, wi-fi, cordless phones, GPS and 5G all use the ultra-high frequency ranges. 5G will also use the extremely high-frequency range.

3. Microwaves

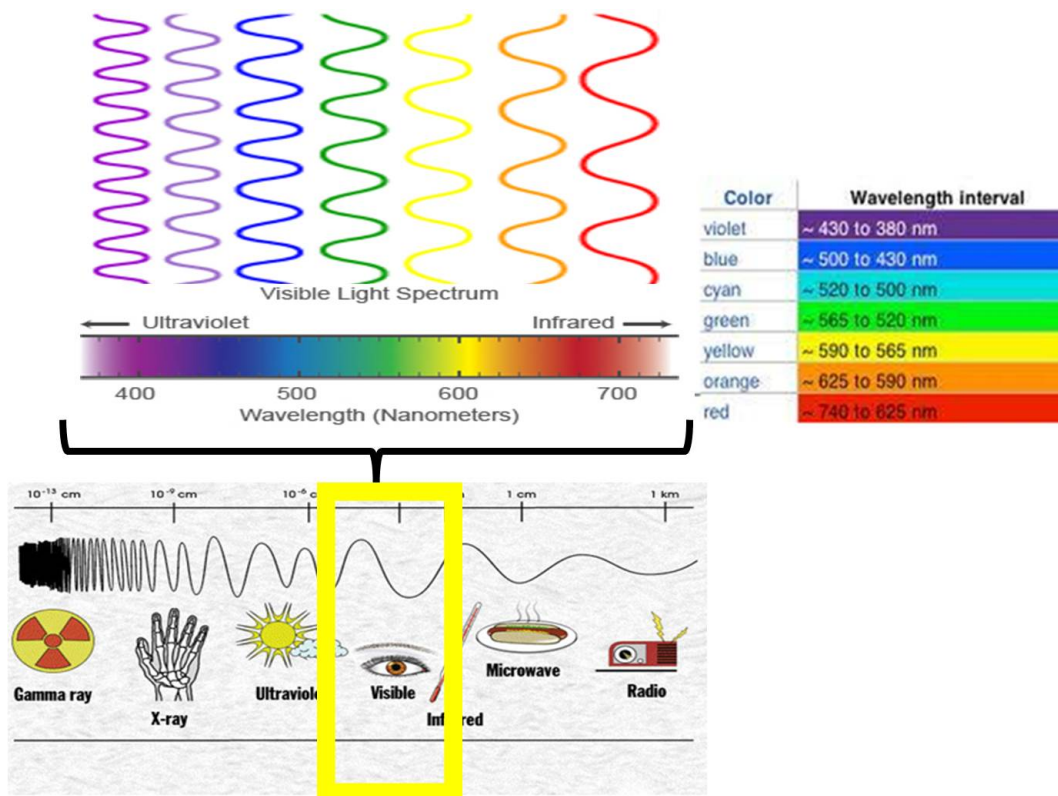
Microwaves can be used to broadcast information through space, as well as to warm food. Some of the 5G frequencies will be in the microwave range.

4. Infrared radiation

Infrared radiation can be released as heat or thermal energy. Infrared cameras, for instance, would use this radiation to detect heat.

5. Visible Light

Visible light is the only part of the electromagnetic spectrum that humans can see. The colours of the rainbow would fall into the visible spectrum of electromagnetic radiation, with each colour having its own wavelength.



6. UV Light

UV light is responsible for your tan or sunburn.

7. X-rays

Unlike light, x-rays have higher energy and can pass through most objects, including the body. They are commonly used in Medical x-rays, mammography, CT scans, fluoroscopy and in radiotherapy (cancer treatments).

8. Gamma rays

Gamma rays are generated by radioactive atoms and in nuclear explosions.

Ionising vs Non-Ionising Radiation

ER radiation can be also divided into two groups based on the severity of the radiation. Ionising radiation holds a great amount of energy to remove electrons and cause atoms to break down.

Higher frequency waves such as X-rays and gamma-rays have ionising radiation.

Lower frequency waves such as radio waves, do not have ionizing radiation and are grouped as non-ionising.

What are the effects of EM radiation on health?

Just because radiation is non-ionising doesn't mean that it doesn't affect our biology.

EM radiation emitted from mobile phones, wifi routers, and similar wireless devices have been to have biological effects on our cells, including increased inflammation and oxidative stress, fertility or cognitive function.

You can read the following articles related to this topic (link all articles):

'Are all EMFs harmful?'

How EMFs affect children's health?

5G: Is the health of your family at risk?

What is mobile phone Specific Absorption Rate (SAR): safety and health concerns

Emissions from mobile phones exceed safety limits

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Are all EMFs harmful?



Are all EMFs (Electromagnetic Fields) harmful?

Interested in keeping your family healthy? If so, the chances are you've come across the term 'EMFs' (Electromagnetic fields), specifically in connection with mobile phones, wifi routers, laptops or smart meters. Due to their unfavorable impact on our wellbeing, the reputation EMFs have earned is very much a negative one.

But are they all the same? Are they all harmful?

The answer is NO. They aren't.

Certain types of electromagnetic fields are naturally occurring and an integral part of life on Earth as we know it. And specific types of EMFs can be even used therapeutically, for example, to speed up the healing of broken bones.

In the following lines we will explain:

- What are Electromagnetic Fields?
- How do they occur in nature?
- What is the problem with human-made mobile phone EMFs?
- How to protect your family from harmful EMFs?

What are Electromagnetic Fields?

Essentially, we are all born into the sea of electromagnetic fields. Similar to gravitational forces that keep our feet on the ground, EMFs are one of the fundamental forces of nature.

They are basically a combination of electric and magnetic fields and they come in different 'shapes and sizes'.

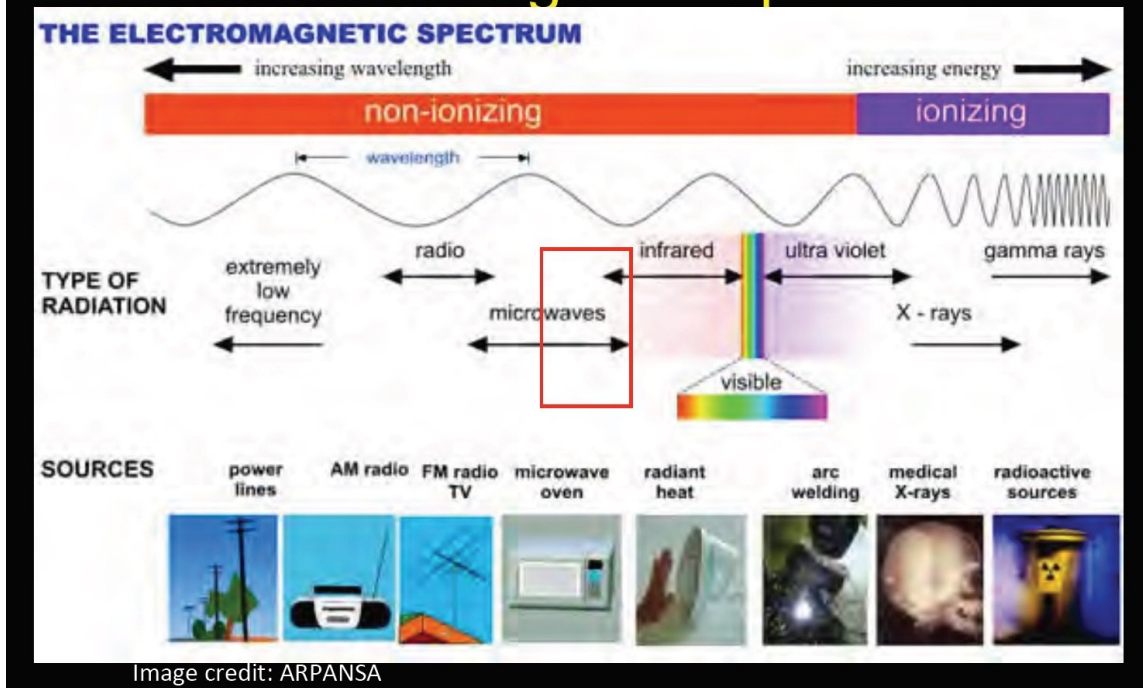
From the picture below you can see that they differ in their wavelength (how far in between each wave) and frequency (how quickly the wave changes). Based on those characteristics we can organise them in a so-called Electromagnetic (EM) Spectrum.

Ionising vs Non-Ionising Radiation

The EM spectrum includes both Ionising and Non-ionising radiation ranges. Ionising radiation is a type of electromagnetic field which carries enough energy to break down molecules (ionise atoms) and can be life-threatening. Examples include X-rays, gamma-rays and various types of radioactive materials.

On the other hand, non-ionising radiation doesn't carry enough energy to break molecular bonds. Power lines, microwaves, radio waves, infrared radiation, visible light, and lasers are all examples of this type of EMFs.

Electromagnetic Spectrum



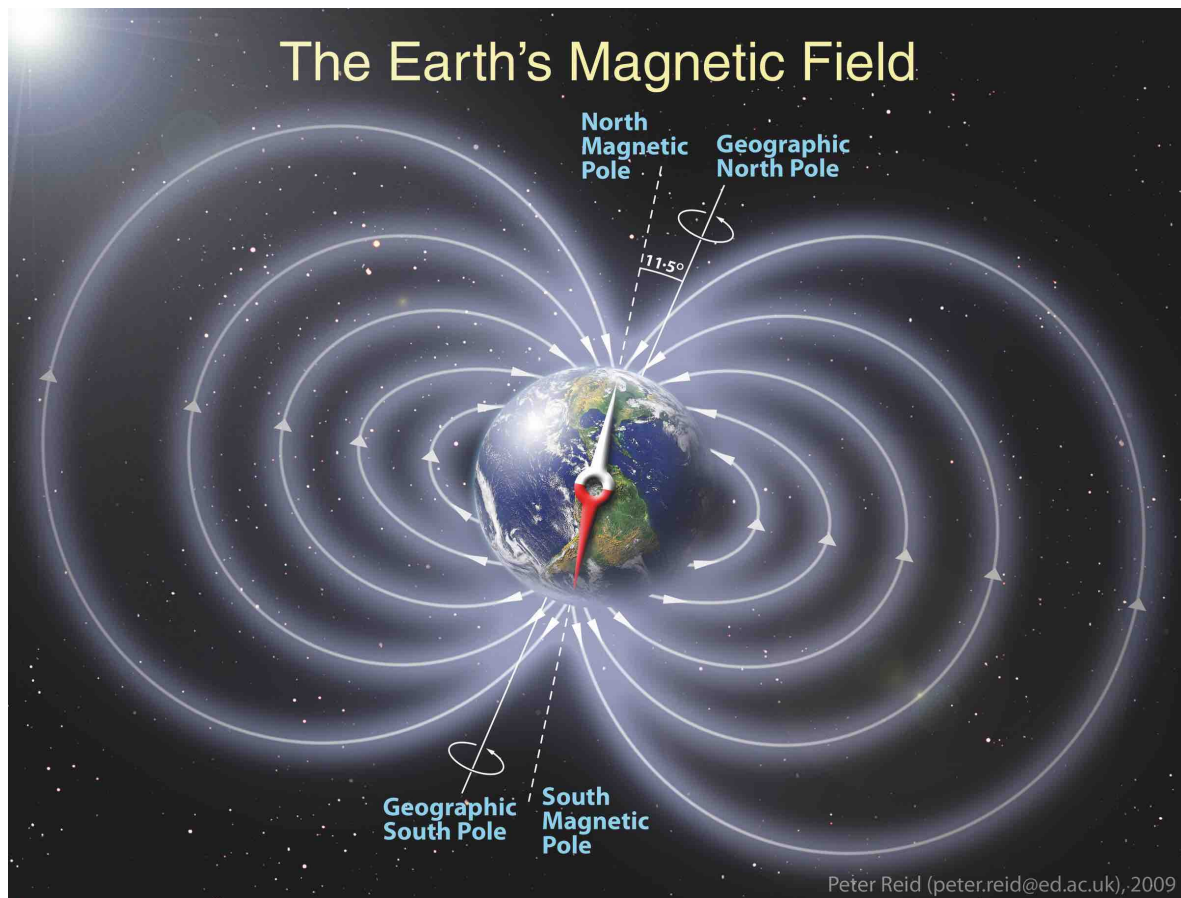
Source: <https://ehtrust.org/wp-content/uploads/2015/12/Dr-Devra-Davis-Melb-Uni-Lecture.pdf>

EMFs: a short explanation for the more technically minded

Electromagnetic fields are basically physical fields produced by electrically charged objects. They are able to influence the behaviour of other charged objects in their vicinity and can be viewed as the combination of an electric and magnetic field. The electric field is produced by stationary charges (no flow), and the magnetic field by moving charges (currents).

An electromagnetic field is defined by its frequency and wavelength. The field's frequency and wavelength are directly related to each other: the higher the frequency, the shorter the wavelength.

How do EMFs occur in Nature?



Credits: Peter Reid (peter.reid@ed.ac.uk), 2009

Source: <https://www.nasa.gov/topics/earth/features/2012-poleReversal.html>

Apart from some of the examples mentioned earlier, there are more sources of electric, magnetic and electromagnetic fields as we find them in nature. Many of them are not harmful to life:

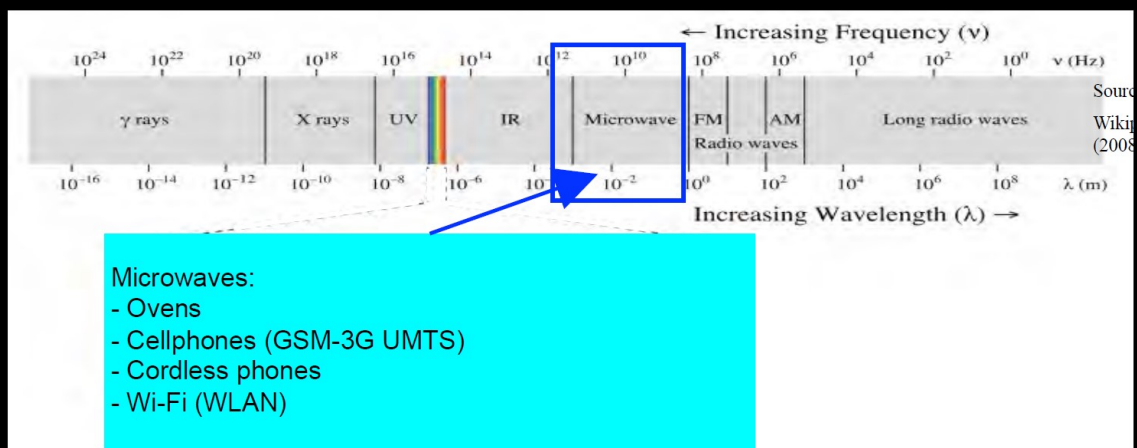
- We see **electric fields produced** by the local build-up of electric charges, such as s in the atmosphere associated with thunderstorms.
- Animals, such as birds or fish, use the **Earth's magnetic field** for navigation. A compass needle does the same things when it moves in a North-South direction.
- Your body creates its own **electromagnetic field** (we are all made of atoms!). It is the only way you can exist as one single entity.
- Light and colours are part of the naturally occurring electromagnetic spectrum.
- The UV light from the sun.

Human-made sources of EMFs

The ability to listen to your favourite radio station, using a mobile phone, watching TV, being connected to the wifi or using an X-ray to diagnose a broken bone, these are all examples of human-made EMFs in action.

Even electricity that powers our house, for instance, is associated with EMFs at a very low frequency.

Electromagnetic Spectrum



Source: <https://ehtrust.org/wp-content/uploads/2015/12/Dr-Devra-Davis-Melb-Uni-Lecture.pdf>

What's the problem with human made EMFs emitted from mobile phones, towers or wifi routers?

Dr Devra Davis, the president of the Environmental Health Trust, explains that the impact of any form of EMFs depends on the nature of the waves they emit.

For a moment, imagine listening to your favourite song. It has a regular beat to it, a melody and it makes you feel great.

Now imagine that whilst you're listening to it, someone is randomly increasing or decreasing the volume or muting the song on and off. Add a little bit of random

interference, like when you're driving in a car and the radio signal gets bad. Now that doesn't feel that great, does it?

The nature of microwaves that phones, phone masts, wifi, and similar technologies emit is just like that. It is pulsed, erratic and highly irregular.

Picture your cells 'hearing' and responding to this pulse for thousands of minutes per month, for many hours a week, over a lifetime. How does your body feel?

The truth is, our body doesn't have the mechanisms to adapt to such blasts of an irregular signal. And it is also difficult to know what dose of this pulsed signal is your body getting at any point in time, depending on where you are.

According to Dr Beverly Rubik, a biophysicist and researcher, experiencing this again and again can have an accumulative effect, in some cases leading to electrosensitivity.

And research already suggests some disturbing effects about these types of EMFs, including increased risk of infertility, neurological issues, increased inflammation or cancer.

How to protect your family from harmful EMFs?

Doctors, surgeons and biomedical scientists of the Global Campaign for Safer Cell Phones recommend:

1. **Do not hold the phone directly against your head or body:** Use speakerphone or another hands-free device.
2. **Use landline:** Corded landlines are safer. Cordless phones emit microwave radiation.

3. **Beware of a weak signal:** Your phone has to work harder and emit more radiation when the signal is weak or blocked.
4. **Protect children and the pregnant abdomen:** Children absorb twice as much radiation as adults.
5. **Men who want to become fathers – beware:** Sperm are especially vulnerable to radiation.
6. **Do not text while moving:** e.g. driving, biking, blading, walking, skiing. Milliseconds can make the difference between life or death.
7. You can also **opt-in for the use of shielding** materials in your home, such as shielding curtains or wall paints or use a Qi-Home Cell (link to shop) to protect your home from EMFs.

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5G: Is the health of your family at risk?



5G: Is the health of your family at risk?

In this article we want to help you clearly understand:

- What is 5G and why we need to talk about it
- Are there any health risks we need to aware of?
- What can you do about 5G?

What is 5G?

5G is the fifth Generation wireless network. Since upgrading from 1st (1G) to the 3rd and 4th generation (4G), you are able to enjoy the mobile phone experience of calling, texting, sending images, downloading data and browsing on the internet faster than ever before. 5G goes beyond that.

The telecom industry convinces us that this '5G' will bring us closer together, offering complete interconnectivity, the future with self-driving cars and intelligent home appliances. The face of our children's education is to be transformed with data speeds and responsiveness nearly 1,000% faster than 4G.

Germany is aiming for a full 5G connectivity before 2025 with Deutsche Telekom has starting the first 5G network rollout in March 2019.

There are currently 215,619 cell towers in Germany (according to Cellmapper, cellular towers and coverage mapping service) excluding 5G. This will rise by 300 5G towers during 2019 only.

In April 2019 Swisscom went live with the first operational 5G network in Switzerland with estimated completion and full coverage before the end of 2019.

The USA is pursuing the '5G FAST Plan' to make the US the leader in 5G technology. Eight mobile network operators, including Verizon, T-Mobile and AT&T already offer mobile 5G services in selected cities across the country.

Exciting, isn't it?

So it was during the 1940s and 50s when the tobacco industry did a great job at marketing cigarettes as just the thing for perfect health. Yet, many lost lives later, the lung cancer rates proved us all wrong.

What if the history is to repeat itself?

The International EMF Scientist Appeal

As of 15th June 2019 248 EMF (electromagnetic field) scientists from 42 nations have signed the 'The International EMF Scientist Appeal', urgently calling upon the United Nations and its sub-organizations, the WHO and UNEP, and all U.N. Member States, for greater health protection on EMF exposure.

They unanimously share their concern of the global public health crisis thanks to the levels of the ever rising environmental pollution from electrical and wireless infrastructure and devices.

The late Dr. Martin Blank (1933-2018), an EMF expert who originally announced the Appeal in 2015, shares a compelling message on behalf of the signatories:

[Download the transcript of his message.](#)

[Other organisations, such as the Environmental Health Trust](#) or the [Physician's Health Initiative for Radiation Protection \(PHIRE\)](#) follow suit, warning us about the effects and risks of EMFs, including 5G.

4G vs 5G

The 5G network will use everything the 4G does. But there is more:

1. It will operate at additional frequency ranges, including very high-frequency millimeter waves (20-300GHz), different modulation, higher amplitude, and rapid data bursts.
2. It will need smaller antennas at larger density (cell towers between 100m to several kilometers) to create greater connectivity.
3. One 4G cell tower currently supports about 2,000 devices with some traffic delays. A 5G tower will support more than one million connected devices per square kilometer with negligible delays.

With these added 'extras' we can be sure of one thing. More radiation for all living things.

5G: 10 risks you need to know about

If you care about your health and the health of your loved ones, be aware that even 5G comes with baggage:

1. Radiofrequencies (RF or EMFs) can cause serious biological effects including cancer, nervous system disruption or reproductive impairment. RF was classified as a Group 2B Possible Human Carcinogen by the World Health Organisation in 2011.
2. Children, pregnant and elderly are more vulnerable. (Read our blog 'The effects of EMFs on children').
3. Your pets and wild animals can be affected in the same way as humans.

4. Robust research into higher frequency millimeter waves, used by 5G, is missing. PHIRE states that there is evidence of biological harm to humans, animals including insects and plants.
5. A higher number of cell towers and transmitters close to the living areas means higher exposure rates.
6. If your child is bombarded by a 'soup' of frequencies now, the long-term effects might present themselves 20-30 years later, when it is already too late.
7. The higher frequency millimeter waves are most absorbed superficially. This brings up a question of any harmful effects on human skin, eyes, and testes.
8. No one has given you, the public, an option to opt out or sign an informed consent to be irradiated with radiofrequencies (see www.5Gappeal.eu).
9. No safety limits are being set to protect you against non-thermal effects of EMFs.
10. Current safety limits of the absorption rates of EMFs aren't reflecting how we use our phones (read our article 'What is SAR?' and 'Safety limits....')

What can you do about 5G?

If you feel concerned about EMFs and 5G, you have three options:

1. Raise awareness in your local community and share this article far and wide.
2. Join the 5G debate and educate yourself further with independent resources:

Appel-de-paris.com

5Gappeal.eu

Bioinitiative.org

Ehtrust.org

Emfcall.org

Emfscientist.org

Mdsafetech.org

Orsaa.org

Phiremedical.org

Radiationresearch.org

Saferemr.com

Wirelessriskassessment.org

Resources:

1. <http://www.bfs.de/EN/topics/emf/mobile-communication/basics/5g/5g.html>
2. <https://www.electricsense.com/is-5g-dangerous/>
3. <https://tobaccocontrol.bmj.com/content/21/2/87>
4. <https://www.gettingsmart.com/2019/04/5-ways-5g-will-make-classrooms-smarter/>
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How EMFs Affect Children's Health



How EMFs Affect Children's Health

As parents, grandparents, aunts, uncles, friends and guardians, we are responsible for ensuring that our children are healthy and thriving. With wireless technologies and devices all around us, we need to be well informed about safety and possible risks to protect those who are the most vulnerable: our children.

In this article we will help you understand:

- how microwave radiation, also called electromagnetic fields (EMFs), emitted by wireless devices and mobile phones can be detrimental to children's health
- why children are more at risk than adults
- what evidence we have to support this
- how we can protect children against EMFs at home

A baby and an iPhone

Picture this. A beautiful baby boy. He must be only a few weeks old. So fragile, with his little cute nose, soft cheeks, and the tiniest fingers. And an iPhone playing soothing music. Placed just a few centimeters away from his tiny head.

How could this originally well-intended act of parenting love, which I have witnessed myself, affect the baby's health?

If you'd like to know, read on.

Microwave radiation (EMFs): Class 2B possible carcinogen

The World Health Organisation's (WHO) International Agency for Research on Cancer (IARC) declared very well known compounds such as chloroform, DDT, lead, nickel, petrol, and diesel fuel Class 2B possible carcinogens.

We wouldn't dare to think about exposing a child to these chemicals and we really need to think the same way about microwave radiation. Since 2011 microwave radiation is now also on the Class B possible carcinogen list.

In 2014, researchers from the Environmental Health Trust and the University of California put together a comprehensive review of peer-reviewed mobile phone exposure studies between 2009 to 2014. This review pointed out to some concerning effects of microwave radiation, including an increased risk of oxidative stress, brain cancer and parotid gland tumors.

Do children absorb more microwave radiation than adults?

Multiple studies show that children indeed absorb more radiation than adults for the following reasons:

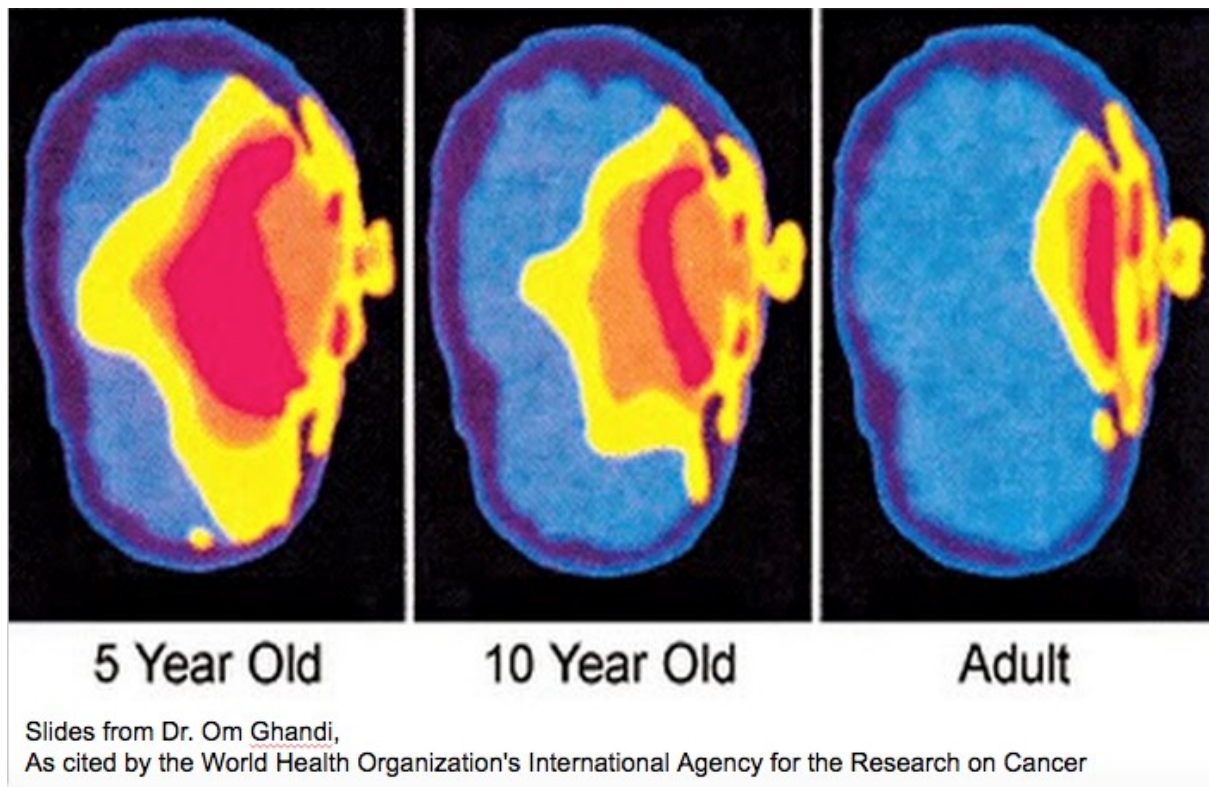
- their brain is more absorbent
- their skulls are thinner
- their head size is smaller

Practically speaking, if my 4-year old niece and I, a 36-year-old female, are both speaking on a phone placed to our head for the same amount of time, she, a child, will absorb at least twice to three times more radiation than me, an adult.

Joe Wiart, a senior researcher for French Telecom and Orange, confirmed this in a study published in 2008.

In 2010 yet another study carried out by a research team at the Institute of Physics and Engineering in Medicine showed that children's bone marrow specifically absorbs 10 times more radiation than in adults.

Radiation absorption rates in children vs adults:



[Source](#)

Other significant effects of EMFs on children's brain:

- Learning and memory deficits
- Symptoms related to attention deficit hyperactivity disorder
- Increased neural cells death
- Neural abnormalities and degeneration

We discuss the effects of EMFs on brain function more in details in our article titled 'The Effects of EMFs on brain function.' (link when it's ready).

How to keep your children safe from EMFs at home:

10 top tips

It is close to impossible to completely avoid exposure to microwave radiation, especially outside of the home. Having said that, there are still a few beneficial things we can do to protect our kids at home. Here are 10 top helpful tips:

1. Keep overall exposure to mobile phones, WLAN routers and baby monitors to the minimum.
2. Use phones and wireless devices with lower radiation / SAR values.
3. If you are using a baby monitor, place it as far away from the baby cot as possible. The Federal Office for Radiation Protection advises that baby monitors with rechargeable batteries emit less radiation than the ones with a power supply.
4. Ban mobile phones from children's bedrooms.
5. Use landline with a cord and avoid the use of cordless phones.
6. If you use a cordless phone, make sure it is placed in the hall. Avoid such phones bedrooms at all cost.
7. Switch off your wifi and mobile devices completely during the night.
8. Get your kids to make calls only when absolutely necessary.
9. Use parental controls and apps available such as FamilyTime to limit time spent on mobile devices.
10. Educate your kids about EMFs. Have a conversation. It's worth starting early.

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What is
**Specific
Absorption
Rate (SAR)**
Safety & Health
concerns



What is mobile phone Specific Absorption Rate (SAR): safety and health concerns

Both you and I are only two of the five billion mobile phone users out there. Our phones have become a daily necessity for us. Have you ever wondered how much radiation you absorb when making a phone call, downloading a file or simply when keeping a phone in your pocket? How safe is it? And how did SAR come about?

What is SAR?

SAR stands for Specific Absorption Rate and is defined as the power absorbed per mass of tissue and has units of watts per kilogram (W/kg). What does it really mean?

Electromagnetic Universe

Because we live in an electromagnetic (EM) universe (think light, colour, infrared – all of which are part of the electromagnetic spectrum) we interact with a variety of EM sources every day.

Some of them are natural to the body and can be beneficial to us. Others, although naturally occurring, can have damaging effects (think sunburn). In addition to the natural sources of EM waves, humanity was clever enough to come up with EM sources of our own, to initially win our wars and to eventually take the human race to the next level of our evolution (think mobile phones, Wifi, microwaves).

What happens when you make a call?

When you place a call to your loved one, your phone (through its sophisticated antenna) cleverly sends your order (the information in the form of a signal) to a much stronger tower nearby. This tower then passes on this information, via the huge network of mobile masts, all the way to the loved one of your choosing.

Your body is a sponge

This invisible transmitted signal is made of a type of energy, which we call the radiofrequency energy. It is measured in mili-Watts (mW).

Your body, on the other hand, is formed of biological tissues, whose mass we measure in kilograms (kg).

In the process of connecting and transmitting your call, the phone signal spreads out in many directions. The main bulk of this signal continues to the mobile tower but some of it gets absorbed into whatever it is in its close proximity. You, holding your phone by your head, become the 'sponge' or 'absorption pad' (in kg) of this energy.

How is SAR calculated?

When we measure SAR, the Specific Absorption Rate, we, in fact, calculate how much your body (biological tissues) absorbs a chunk of this energy (in Watts per kilogram).

In more technical terms, it is the measurement of radiofrequency (RF) energy absorbed within grams of biological tissues when exposed to a radiofrequency electromagnetic field.

Going back to the very beginning, now it might be a little bit clearer what it means when we say that SAR value is the power absorbed per mass of tissue and has units of watts per kilogram (W/kg).

It is usually averaged either over the whole body or over a sample volume (typically 1 g or 10 g of tissue). The SAR value you see published is then the maximum level measured in the body part (e.g. head) studied over the stated volume or mass.

What is the SAR value in an adult?

The current SAR value, which the maximum permitted exposure value, is 2W/kg in Europe and 1.6W/kg in the USA. This is enforced on the phone manufacturers by different regulatory bodies in Europe and the USA. The measurement is usually done with a phantom head and body at a small distance (around 5mm).

Where did the current SAR standards come from?

First safety standards were set up over 20 years ago around 1997 when a typical mobile phone user was the military, medical or business. At that time it was believed that the only thing to be avoided was the heating effect.

In one of the original tests in 1989, the military used the head of a 220 lb (around 100kg) male at the top 98% of their recruits. The standards they set were to avoid heating of their subject's brain after a 6min phone call.

Are current SAR standards sufficient?

Definitely not. Current standards might be a tool in judging whether the phone is 'safe' by the regulators' standards, but they don't accurately assess the full scope of how our health is impacted.

Recently, Prof Gandhi of the University of Utah reported [\[link to our blog post\]](#) that the SARs in W/kg that when held at zero distance from the body, the absorption rate was up to three times higher than the approved European limits and up to 11 times over the US limit.

Here are more reasons why current standards are not enough:

1. SAR actually refers to thermal effects but the vast majority of the recorded biological effects from chronic lifetime exposure are non-thermal.
2. A number of effects reported at [much lower SAR levels](#) than the current safety standard in over.
3. Not enough information provided about the amount of RF exposure under typical usage and real-life conditions. The tested exposures under laboratory conditions are only short-term, usually up to a few minutes long.
4. No reflection of the variety of head and body sizes. Most of the population have much smaller heads and bodies than the 100kg male military recruit.
5. The levels of radiation based on the current usage are much higher today than in the past.
6. Current lab testing doesn't include variations for energy absorption hotspots.
7. Different labs might conduct measurements at different distances from the body.
8. There is no consideration of the nature of the mobile phone signal. Because it is pulsed in nature, the average power can stay low but the individual signal bursts might be very high.
9. The developing brain of a child absorbs much more than the brain of an adult. SAR value in Children vs Adults.

How to reduce your phone SAR?

Research shows that the effects of radio frequencies have been reported at SAR as low as 0.2W/kg after two-hour exposure. This means that you won't be completely protected from the effects of radio frequencies, even if your phone SAR claims to sit way below the approved limit.

Having said that, there are a few helpful tips we can share with you for better safety:

- Reduce the amount of time you spend carrying your phone in your pockets or holding it in your hands.

- Stop holding your phone next to your ear when calling.
- Opt-in for a hands-free option or use headphones when making a call.
- Choose a mobile phone with a lower SAR rating. This will not necessarily be the key to safety but will still help.
- Keep your phone away from your body when on wifi, hotspotting or downloading data. During those times SAR levels increase significantly.
- Ask yourself – do I really need to spend four hours (on average) a day on my phone? Is it really necessary? If not, simply put your phone aside instead of constantly checking it.
- Switch your phone off or use airplane mode where possible. Not only will it make you safer, I bet you that you will also become less distractive, more productive and more focused on the task at hand.

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