

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

A free guide compiled by
Graham Arthur
for Electrosensitivity UK

(A charity providing support and information for all people sensitised by
electromagnetic fields and radiation)

Adverse health risks from EMFs have been documented in scientific literature since the late 1800s. These are **NOT** unfounded claims, fake news, paranoia, or conspiracy theory etc. as the **communications industry** and people who **don't want to believe** they can cause harm (due to their level of dependence on their mobiles and wireless gadgets) often assert to try to dismiss all such concerns. The information presented below comes from authoritative, **credible** sources such as the **World Health Organisation (WHO)**, **European Parliament**, **International Commission on Non-Ionizing Radiation Protection (ICNIRP)** etc. and authentic peer-reviewed papers published by **respected** scientific journals and institutions – and, where available, links are provided to the relevant source material for independent validation. Various **Governmental** and **Regulatory Bodies** have **acknowledged** that certain **Electromagnetic Fields (EMFs)** **DO disrupt** biological systems and that more research is required. The **ONLY DISAGREEMENT** is the **LEVEL AT WHICH HARM OCCURS** but, in the meantime, these bodies are failing to implement the **UNESCO PRECAUTIONARY PRINCIPLE**, which they all claim to endorse. There are also many legal challenges to the current safety limits taking place around the world...

Executive Summary

For further details on any of these topics click [More...](#) to go to the corresponding section below:

1. In **2011** the WHO / IARC reclassified radiofrequency electromagnetic fields, including **mobiles** and **cordless phones**, to **Group 2B - Possibly carcinogenic to humans**, however technology changes since have worsened the problem. Also in 2011 the **Parliamentary Assembly of the Council of Europe (PACE) Resolution 1815** stated “extremely low frequencies, power lines or certain high frequency waves used in the fields of radar, telecommunications and mobile telephony, appear to have **potentially harmful, non-thermal, biological effects** on plants, insects and animals as well as the human body, even when exposed to levels that are below the official threshold values” and called for a wide range of measures including a **review of safety limits** and raised awareness on **potential health risks** [More...](#)
2. **EU** (2011) recommended all members ban the use of Wi-Fi and mobiles in schools due to health risks. Some countries have banned Wi-Fi in kindergartens, and advocated switching over to wired networks or switching Wi-Fi off when not in use in schools, but UK has done nothing at all [More...](#)
3. International safety limits are based on **deeply flawed assumptions and omissions leading many countries to set their own much lower limits** e.g., between **25,000 $\mu\text{W}/\text{m}^2$** (Poland) - **450,000 $\mu\text{W}/\text{m}^2$** (India) versus the UK & International limits of **4,500,000 $\mu\text{W}/\text{m}^2$** @ 900MHz and **9,200,000 $\mu\text{W}/\text{m}^2$** @ 1.8GHz, but Regulatory Authorities never like to admit that they got it wrong [More...](#)
4. Following growing evidence of significant harm caused by microwave radiation **well below** the current ‘**safety**’ limits there are an increasing number of **legal challenges** and **appeals** from medical doctors, scientists and human rights lawyers around the world to get the limits reduced, restrict the location of masts and towers, and to stop the rollout of 5G and satellite systems (which have never been tested for potential harm) pending **further independent testing** to determine appropriate safety precautions. [More...](#)
5. Contrary to the **Precautionary Principle** advocated by **UNESCO**, the **European Parliament** and **many governments** and **advisory bodies** worldwide, many countries have taken no action and where action has been taken it has been minimal and does not address all the areas of risk. (NHS recommendations on mobile usage are inadequate, outdated and do not mention risks from Wi-Fi or cordless phones) [More...](#)
6. Some countries have taken *some* actions including making it illegal to sell mobile phones without headsets and more prominent warnings, making it illegal to target advertising at children or market mobiles specifically designed for children, reducing max power output of masts, and tearing down masts close to schools and hospitals – UK has done nothing at all [More...](#)
7. Manufacturers know the risks and now include hidden warnings in the small print in an attempt to protect themselves from future litigation for harm caused by the use of their products – product liability insurers will not give them cover for such claims [More...](#)
8. Commercial interests pressurise Governments not to take action by asserting that tighter controls will negatively impact the economy and any actions which reduce availability / performance or increase cost will make them unpopular with the electorate (standard tactics when profits are threatened) [More...](#)
9. The media are reluctant to report the risks as they are heavily dependent on using the technology and don’t want to lose revenue from all their advertisers who provide or use the technology. The stories they do report always negate the risks by quoting the biased, flawed and misguided research which says there’s not enough evidence of harm to worry, yet... (See ‘Precautionary Principle’ above) [More...](#)
10. Safety has always lagged well behind the introduction of new technologies (e.g. railways, aeroplanes, motor cars, mining, factories etc.) and safety measures have only been introduced after the harm and fatalities caused reach unacceptable levels, but do we really want to wait until then? [More...](#)
11. Microwave EMFs from Mobile Phones, Wi-Fi, and Cordless Phones have been shown to affect normal brain function, learning, memory, fertility, cause cancer, damage DNA, disturb the functioning of the immune system and also to help make bacteria resistant to antibiotics [More...](#)

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

12. Health conditions caused, or exacerbated, by prolonged exposure to EMFs (not just microwaves) include sleep disruption, headaches, fatigue, irritability, depression, anxiety, concentration & memory problems, speech disturbance, brain fog, dizziness, tinnitus, vertigo, muscle & joint pains, lethargy, earaches, skin complaints / tingling etc. (click 'More' for the biological effects of EMFs which cause these) [More...](#)
13. Simple measures to reduce exposure and the risks can be taken by everyone but they have not been publicised (e.g. use wired connections whenever possible, turn off mobiles and Wi-Fi etc. when not needed, keep your distance from sources of radiation by rearranging the furniture, etc.) [More...](#)

The sections below just give the 'edited highlights' on each topic, please follow the links to the original sources for further details / full texts.

1. Potential serious health risks from Mobile Phones, Wi-Fi, DECT Cordless Phones and other sources of electromagnetic radiation (EMFs)

In May 2011 the WHO / International Agency for Research on Cancer (IARC) reviewed all the evidence on radiofrequency electromagnetic fields, including **wireless** phones (mobiles and cordless) and upgraded the classification to [Group 2B Possibly carcinogenic to humans](#) – they said it is important to conduct additional research **and to take pragmatic precautions to reduce exposure**. The [IARC Press Release 208](#) announcing this change of classification also states “one study of past cell phone use (up to the year 2004), showed a 40% increased risk for gliomas in the highest category of heavy users (reported average: 30 minutes per day over a 10-year period)” – which shows just how out-of-date this view is both in respect of the particular study cited being only up to **2004** (different technology then) **and** the fact that a '**heavy user**' is defined as someone using a mobile phone for **only 30 minutes a day!**

In light of more recent research many experts are now calling for the WHO to upgrade the classification to **Group 2A Probably carcinogenic to humans**, while some say there is already sufficient evidence to make it **Group 1 Carcinogenic to humans**.

The IARC is **only** concerned with the **cancer risk NOT** any possible harmful effects of disruption to the body's electrical systems and biological processes now commonly referred to as '**non-thermal or biological effects**' – see Section 3 below for details.

[European Parliament resolution of 2 April 2009 on health concerns associated with electromagnetic fields](#) contains many important **statements** and **recommendations** a few of which are summarised as follows:

Taking into consideration the fact that:

- B. **wireless technology** (mobile phones, Wi-Fi/WiMAX, Bluetooth, DECT landline telephones) **emits EMFs that may have adverse effects on human health**
- C. young people aged from 10 to 20, use a mobile phone and there are continuing uncertainties about the possible health risks, particularly to young people whose brains are still developing
- D. the dispute within the scientific community regarding the potential health risks arising from EMFs has intensified since 1999, when exposure limits for fields in the **0 Hz to 300 GHz** range were laid down
- E. the fact that the scientific community has reached no definite conclusions has not prevented **China, Switzerland, and Russia, as well as at least nine EU Member States, from setting lower exposure limits** than those advocated by the Commission
- H. there is general agreement that reactions to microwave exposure vary from one person to another; **there is a need, as a matter of priority, to conduct exposure tests under actual conditions in order to assess the non-thermal (biological) effects associated with radio-frequency (RF) fields, and the fact that children exposed to EMFs are especially vulnerable**
- I. the EU has laid down **exposure limits to protect workers** from the effects of EMFs; on the basis of the precautionary principle **such measures should also be taken for residents and consumers**

- K. it is necessary to continue investigations into **intermediate** and **very low frequencies** so that conclusions can be drawn as to their effects on health
- 1. Urges the Commission to review the scientific basis and adequacy of the EMF limits as laid down in Recommendation 1999/519/EC....
- 2. Calls for particular consideration of **biological effects** when assessing the potential health impact of electromagnetic radiation... (i.e. not just **heating** effects which were the only basis of the existing limits)
- 9. Calls on the Member States to make available to the public, via the internet and media, maps showing exposure to high-voltage power lines, radio frequencies and microwaves, and especially those generated by telecommunications masts, radio repeaters and telephone antennas.
- 28. Calls on Member States to follow the example of Sweden and **to recognise persons that suffer from Electrohypersensitivity as being disabled** so as to grant them **adequate protection** as well as **equal opportunities**;

[Parliamentary Assembly of the Council of Europe \(PACE\) Resolution 1815 \(2011\) - The potential dangers of electromagnetic fields and their effect on the environment](#) includes these **statements / recommendations**:

- 4. ... extremely low frequencies, power lines or certain high frequency waves used in the fields of radar, telecommunications and mobile telephony, **appear to have more or less potentially harmful, non-thermal, biological effects on** plants, insects and animals as well as **the human body, even when exposed to levels that are below the official threshold values**
- 8.1.4. pay particular attention to “electrosensitive” people who suffer from a syndrome of intolerance to electromagnetic fields and introduce special measures to protect them, including the **creation of wave-free areas not covered by the wireless network**;
- 8.2.4. raise awareness on **potential health risks of DECT wireless telephones, baby monitors and other domestic appliances** which emit continuous pulse waves, if all electrical equipment is left permanently on standby, and **recommend the use of wired, fixed telephones at home** or, failing that, models which do not permanently emit pulse waves;

[\[back to first page\]](#)

2. EU (2011) recommended all governments ban the use of Wi-Fi and mobiles in schools

At its meeting in Kiel, the Parliamentary Assembly of the Council of Europe adopted [Resolution 1815 \(2011\)](#) in which it considered that there was sufficient proof of the potentially harmful effects of electromagnetic fields (EMF) on the environment and human health. In this document, the Council proposed that its member states take measures concerning the use of mobile phones and Wi-Fi networks and [specifically asked for a ban on such devices in schools](#).

[PACE Resolution 1815 \(2011\) - The potential dangers of electromagnetic fields](#) includes the following **recommendations**:

- 8.1.1. take all reasonable measures to reduce exposure to electromagnetic fields, especially to radio frequencies from mobile phones, and particularly the exposure to children and young people who seem to be most at risk from head tumours;
- 8.3. concerning the protection of children:
 - 8.3.1. develop within different ministries (education, environment and health) targeted information campaigns aimed at teachers, parents and children to alert them to the specific risks of early, ill-considered and prolonged use of mobiles and other devices emitting microwaves;

8.3.2. for children ... particularly in schools and classrooms, give preference to wired Internet connections, and strictly regulate the use of mobile phones by schoolchildren on school premises;

[\[back to first page\]](#)

3. International safety limits are flawed and unreliable

[International Commission on Non-Ionising Radiation Protection \(ICNIRP\) RF EMF Guidelines 2020](#)

Around 1998 when the WHO / ANICR safety standards were first set (based on an invalidated hypothesis used by Schwan in 1953) they considered that the **only** cause of concern is the **heat** produced by the phone radiation and tests were based on a measure called the Specific Absorption Rate (SAR). Adverse **non-thermal** RFR effects have been known since 1893 and although **ICNIRP**, who set the safety limits, and the **World Health Organisation (WHO)** **both now acknowledge** that EMFs have detrimental effects on cells, tissues and nerves within the body they still **assert that no harm is caused at levels below the international safety limits**. The 'safety' limits are deeply flawed as the original ICNIRP tests in 1998, and the review leading to the new 2020 guidelines did not take account of the following facts which has led to **demands for a complete re-evaluation**:

- The limits were set at a level which would prevent body tissue from being damaged by the **heating effect** (only) of the microwaves **during just a 6 minute call**, whereas nowadays many people make calls or use the phone for other purposes for much longer than 6 mins
- The tests used a simulated head of a very large, 220lb male military recruit which ignored the fact that most of us have smaller heads which will heat-up more quickly (especially children)
- SAR is not an adequate approach to predict many important biological effects in studies that report increased risks for cancer, neurological diseases, impairments to immune function, fertility and reproduction, and neurological function (cognition, behaviour, performance, mood status, disruption of sleep, increased risk for auto collisions, etc.)
- SAR fails to adequately address known effects from modulation of the signal
- SAR values are not valid for organic matter as cell material conductivity is assumed to be constant when it is highly variable throughout even one cell let alone across multiple cells / structures
- the tests used simulated signals with constant regular pulses which are not at all analogous to real life waveforms (the variability of the pulses is the critical, damaging factor as the body cannot adapt to / tolerate constantly changing disruptions)
- studies with Real Exposures were not taken into account due to "unreliable dosimetry" as signal levels can't be accurately measured in the '[near field](#)'
- The tests were conducted **without** Wi-Fi or Bluetooth transmitting at the same time as the call, as these were not a common feature at the time of the original ICNIRP tests (1998)
- Even though nowadays Wi-Fi and Bluetooth are common features, their **default setting is ON** (i.e., **transmitting continuously**, whether being used or not), and they often **radiate much higher power levels than the phone call itself**, these factors were **not taken into account** in the review leading to the new 2020 guidelines
- The tests were **not repeated** as part of the review leading to the new 2020 guidelines, despite the above factors and other technology changes since the original ICNIRP tests (1998)
- All the evidence of harm from **non-thermal effects** (i.e. the disruption of the body's electrical potentials and signals) that was submitted was totally disregarded as not being relevant without any detailed evaluation at the time of setting the original limits, and was discounted as 'unproven' at the 2018 review. (See also Section 4 – Legal Challenges & Appeals)

[Aspects on the International Commission on Non-Ionizing Radiation Protection \(ICNIRP\) 2020 Guidelines on Radiofrequency Radiation](#) gives a detailed account of all the **conflicts of interest** within ICNIRP and **biased / flawed** studies which have been used to set the current **totally unfounded** international safety limits – backed-up by a multitude of specific, fully traceable and verifiable references to the sources of information.

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

See also the **Appendix – conflicts of interest and flawed conclusions in science** (page 6) of the open letter from Dr Andrew Tressider “[Electrosensitivity – an Environmental illness, an Authentic Diagnosis, not a Delusional Disorder](#)” which further explains why the limits set by the ICNIRP are **fundamentally flawed**.

Parliamentary Assembly of the Council of Europe (PACE) Resolution 1815

Whereas, in contrast, **PACE acknowledges** that EMFS can cause “**potentially harmful, non-thermal, biological effects on plants, insects and animals as well as the human body, even when exposed to levels that are below the official threshold values**”

The fact that EMFs have the potential to cause harm is **no longer disputed**, the **ONLY** arguments now are the **types of harm** they can cause and **the level** of EMFs at **which harm occurs**. Both **researchers** and **PACE** say that **EMFs cause harm at levels well below the current safety standards**, and many government bodies and regulatory authorities now say that **more research is needed** to provide the evidence required to determine if any changes to the limits are necessary, and what they should be. However there is no evidence that the research that they are calling for has been initiated or that anyone has made provision to fund it.

[PACE Resolution 1815 \(2011\) - The potential dangers of electromagnetic fields](#) includes the following **statement** (5) and **recommendation** (8.1.2):

5. As regards standards or threshold values for emissions of **electromagnetic fields of all types and frequencies**, the Assembly strongly recommends that the ALARA (as low as reasonably achievable) principle is applied, covering both the so-called ‘thermal’ effects and the **biological effects of electromagnetic emissions or radiation.....**
- 8.1.2. **reconsider** the scientific basis for the **present standards** on exposure to electromagnetic fields set by the International Commission on Non-Ionising Radiation Protection, **which have serious limitations**, and apply ALARA principles, covering both thermal effects and the athermic or biological effects of electromagnetic emissions or radiation;

Omissions and Flaws in World Health Organisation (WHO) Advice

The WHO web page [Radiation: Electromagnetic fields](#) has **not been updated since** August **2016** and there have been very significant changes in the technology, its deployment and usage since then.

There are fundamental flaws in the views expressed in the texts under each of these headings as follows:

“What happens when you are exposed to electromagnetic fields?”

It is noteworthy in this section that although they acknowledge that biological effects **are** caused by exposure to low-frequency EMFs and are not **necessarily** harmful, they assert that **only** the **heating** effects are harmful but this is prevented by the current safety limits. Although they do conclude with “The **heating effect** of radiowaves **forms the underlying basis for current guidelines**. **Scientists are also investigating the possibility that effects below the threshold level for body heating occur as a result of long-term exposure**. To date (2016) no adverse health effects from low level, long-term exposure to radiofrequency or power frequency fields have been **confirmed, but scientists are actively continuing to research this area.**” **There is a wealth of evidence now...**

The guidelines they reference are based on a study which was carried out in **1996** and technology has changed a lot since then – Wi-Fi only started to appear in 1997 and Bluetooth in 1999, also mobile phones have become far more advanced, more widely used and for much longer periods, and transmit Wi-Fi and Bluetooth continuously as the default, even when they are not being used.

The study did not take into account the additional microwave output from DECT Cordless phones and since it was conducted not only has there been the widespread introduction of Wi-Fi and Bluetooth but there has also been a proliferation of public Wi-Fi hotspots. Additionally DECT Cordless phones and Wi-Fi signal output power is much, much higher than from mobile phone call signals. All of these facts together with the latest home hubs having a range of 100m mean there is now the possibility that many homes and workplaces can be affected by as many as 40-120 sources simultaneously, so many people are subjected to much higher

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

levels of exposure for much longer periods than was ever considered to be likely at the time of the study, therefore the relevance of that study's conclusions in today's environment is highly questionable.

Biological effects or health effects? What is a health hazard?

The WHO International EMF Project (1996 to 2016) referred to in this section included a review of 25,000 scientific articles from the previous 30 years concluded there is no evidence of harm caused by EMF levels within the current guidelines. However there has been 7 years of research and evidence since then and a **Science and Technology Assessments Office (STOA)** presentation to the **European Parliament** [re 'Health impact of 5G' and 'Environmental impacts of 5G'](#) * on 31st May 2021 concluded there is clear evidence of the potential for harm from 5G (and 2-4G) which should invoke the **Precautionary Principle** requiring the implementation of precautionary measures whilst further urgent research by an independent task force is carried out. (*click on the 'Webstreaming' link at the bottom of the page to watch a recording)

What are typical exposure levels at home and in the environment?

In this section the tables of typical field strengths **do not include mobiles, Wi-Fi / Bluetooth devices or cordless phones** and although they are mentioned in the text further down no figures for the levels are given. The statement that **portable phone levels are lower than mobiles and are negligible** is definitely **not** the case according to the tests I have conducted; they are much, much higher and very significant. (See Electrosensitivity – Tips for Reducing EMF Exposure)

Additionally their '**Guideline Limit**' for **electric** fields of **5,000 V/m** is way in excess of the widely used maximum limits of **10 V/m** and their limit for **magnetic** fields is **100 μT** compared to the IGNIR recommended maximum of **1 μT** (1000 nT). (Note that the IGNIR recommended average level is 0.3 μT and other bodies recommend much lower levels)

What are the current standards?

Here the first table '**Summary of the ICNIRP exposure guidelines**' does not include **mobiles** themselves (only base stations), **Wi-Fi** or **cordless phones** and their '**Public Exposure Limit**' for **electric fields** is again **5,000 V/m** compared with the widely used limits of **10 - 50 V/m**, and for **base station** and **microwave oven fields** is **4,500,000 – 10,000,000 μW/m²** (**4.5 – 10 W/m²**) compared with the recommended constant exposure maximum of **100 μW/m²**! (They also reference [ICNIRP EMF Guidelines](#) 1998 when the latest version is 2020)

In the second table of '**Typical maximum public exposure**' they state that **Natural fields** are **200 V/m** and **70 μT** which, although I have only tested my garden and the local area, does not compare favourably with the readings I obtained which were much lower at only **3 – 4 V/m** and **0.004 – 0.006 μT** (4 – 6 nT).

Similarly they state that for '**Mains power (in homes not close to power lines)**' it is typically a maximum of **100 V/m** when I measured up to **320 V/m 3cm** from the mains wiring. (Up to **1200 V/m** in contact with an electric blanket) It is also very curious to note that they state a typical maximum of **10 V/m** from a computer (at operator position) when their typical maximum value in the home is **100 V/m**, so it is extremely unlikely to be much less than that in front of a computer even if it is at arm's length and you are a little further away from all the mains wiring in the walls, floors and ceilings in that position.

[Electromagnetic fields and public health: mobile phones](#) (Not updated since October 2014)

This article **only** considers **mobile phones** (**not Wi-Fi, Bluetooth and cordless phones** which have higher outputs) and both the technology and usage has changed considerably since it was published, however it does acknowledge the reduction in exposure of keeping the phone at a distance and limiting the number and duration of calls. The article also does **not** take account of the higher frequency ranges encountered when using a mobile to connect to Wi-Fi or 5G (up to 6 GHz currently but 5G is will go up to 33 GHz eventually).

US Federal Communications Commission (FCC) Guidelines

According to the 2001 US FCC guidelines, testing of the device in a "body-worn" configuration should be done with the device in a belt clip or holster. If a belt clip or holster was not supplied with the phone, the

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

FCC told testers to assume a **separation distance** of between **15 mm to 25 mm** from the **body** during a test – this is very rarely the case when a mobile is put in your pocket!

UK vs World Limits

The UK adopts the ICNIRP safety limits for Radio Frequency Radiation (RFR) which are way, way above the limits set by many other countries e.g., between **25,000 $\mu\text{W}/\text{m}^2$** (Poland) - **450,000 $\mu\text{W}/\text{m}^2$** (India) versus the UK & International limits of **4,500,000 $\mu\text{W}/\text{m}^2$** @ 900MHz and **9,200,000 $\mu\text{W}/\text{m}^2$** @ 1.8GHz - see [Radio Frequency Radiation Safety Limits](#)

ELF Magnetic Fields Safety Limits:

- the globally recognized TCO Standard for low-emission computer monitors is **200 nT**
- international studies warn of problems with Alzheimer's, brain tumours and cancer above **200 nT**
- WHO declares **300 to 400 nT** as a "possible cancer risk to humans"

But despite all the above the official, legally binding **international exposure limit is 100,000 nT** which is **333 times greater** than the **WHO lower threshold for cancer risk!**

Don't Expect Any Change Soon...

Despite the evidence that the current limits are unsafe no Regulatory Authority (for any discipline) likes to admit that they got anything wrong after the fact as that would then tend to undermine public confidence in everything else they are responsible for and also make it harder for them to argue the case for future limits / regulations as they are then likely to be accused by industry of being over-cautious as a result of the previous error. Furthermore conflicts of interest of committee members may not always be declared, or be known or obvious, at the outset and, if discovered later, may be attempted to be covered-up or played-down purely to avoid causing the organisation embarrassment or confidence in them to be undermined.

Meanwhile industry maintains that there is no cause for concern (based on the seriously flawed testing and analysis) as they don't want to have to make any changes that will significantly affect their profits.

There are currently many legal cases ongoing around the world challenging the validity of national and international safety limits and, in particular, their failure to take account of the ever-growing evidence of non-thermal effects, see **Section 4 – Legal Challenges & Appeals**.

Naturally, as with the health concerns over asbestos, smoking and lead in petrol, there is a very great reluctance for any government, regulatory body or industry sector to accept and admit that there is a problem due to the huge costs and loss in profits of rectifying the situation, not to mention the possibility of crippling liability claims. **So there is no point in waiting to see if any government will take the necessary steps to protect you, you need to do what you can to protect yourself now.** [\[back to first page\]](#)

4. Legal Challenges & Appeals

In light of the growing evidence of significant harm caused to humans, plants and wildlife from the current levels of microwave radiation in the environment there are an increasing number of legal challenges and appeals around the world to variously, reduce the safety limits, restrict the location of masts and towers, and to stop the rollout of 5G and satellite systems until further **independent** testing has taken place to determine the necessary safety precautions.

Federal Communications Commission (FCC) US Court Ruling (Aug 2021)

One of the more notable recent cases to have reached a judgement is the **failure** of the US Regulatory Authority the **FCC** to **properly evaluate the evidence of harm** caused by the existing levels of microwave radiation and **provide justification for retaining the safety limits** that they set in 1996:

On 13th August 2021 [US Court of Appeals for the District of Columbia Circuit ruled](#) in the historic case of the **Environmental Health Trust et al. v. the FCC** that the FCC **violated** the Administrative Procedure Act, **failed to respond** to comments on **environmental harm**, **failed to adequately justify** the basis for retaining its 1996 limits, and **failed to properly evaluate evidence of harm** caused by exposure to RF radiation **below the**

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

current limits, and furthermore that the FCC's December 2019 **decision to retain** its 1996 safety limits for human exposure to wireless radiation was "**arbitrary and capricious**."

- The court held that the FCC **failed to respond to "recorded evidence that exposure to RF radiation at levels below the Commission's current limits may cause negative health effects unrelated to cancer."**
- and further, the agency demonstrated "**a complete failure to respond to comments concerning environmental harm caused by RF radiation.**"

The court highlighted that the FCC **failed to respond** to approximately 200 comments on the record by people who experienced illness or injury from electromagnetic radiation sickness.

The court **ordered the commission to:**

- **provide a reasoned explanation** for its decision to retain its testing procedures for determining whether cell phones and other portable electronic devices comply with its guidelines
- **address the impacts of RF radiation on children**, the **health implications of long-term exposure** to RF radiation, the **ubiquity of wireless devices**, and **other technological developments** that have occurred **since the Commission last updated its guidelines**
- **address the impacts of RF radiation on the environment**

These actions could take years, especially as another law suit is proposing to challenge that after cut-backs years ago the FCC no longer has the facilities, expertise or competence to carry out the task to the standard required, and possibility that they didn't at the time the limits were originally set.

[August 13, 2021 United States Court of Appeals, District of Columbia Circuit ENVIRONMENTAL HEALTH TRUST, ET AL., PETITIONERS v. FEDERAL COMMUNICATIONS COMMISSION AND UNITED STATES OF AMERICA](#)

This judgment although significant in itself, can also be expected to have repercussions on other cases and appeals around the world as regulatory authorities in many other countries have historically (now seemingly unwisely) tended to be influenced by the standards set by the FCC, as well as others of a similar standing.

In response to the court's historic ruling, **Environmental Health Trust** and petitioners released the additional statements which included:

"If cell phones were a drug they would have been banned years ago. 5G would never have been allowed to market. An ever mounting body of published studies — ignored by the FCC — clearly indicates that exposure to wireless radiation can lead to numerous health effects, especially for children. Research indicates wireless radiation increases cancer risk, damages memory, alters brain development, impacts reproductive health, and much more. Furthermore, the way the FCC measures our daily exposure to cell phone and cell tower radiation is **fatally flawed and provides a false sense of security."**

"Environmental Health Trust submitted hundreds of pages of scientific evidence to the FCC over the last several years documenting the scientific data showing harm, the need for health agencies to create safety limits that protect against biological effects, and the urgency for infrastructure policy that prioritizes wired rather wireless communications to reduce public exposure."

See [EHT Takes the FCC to Court](#) for further details. [The Environmental Health Trust](#) has a lot of useful information on research and science concerning wireless radiation, as well as details of examples of other [Lawsuits on 5G, Wi-Fi, Wireless Radiation and Health Effects](#) in the US and UK.

In the meantime no immediate changes are likely despite the fact that **action is required right now** by the [Precautionary Principle \(UNESCO 2005\)](#) (See Section 5 for further details)

Although the FCC judgement is a big step forward and ought to have significant repercussions on all the other law suits regarding EMF limits, it will no doubt be years before safety limits are revised to a sensible level, if ever. Even if the limits are revised industry will be given an implementation period which will

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

probably be a minimum of 5 years. (It took 100 years after the first suspicions that asbestos was harmful to get it banned – and it is still not banned in all countries or in all forms)

Swedish Radiation Protection Foundation Appeal (Dec 2021)

[Nordic Appeal from 11 NGO's – calling for better protection against wireless technology](#) demands:

1. **New safety limits must be established** that protect against the evident health and environmental risks at levels that are far below current guidelines. This must be done **by experts who are free from any ties to the industry** concerned, and with participation by researchers within the research community, who consider the **risks to be considerable even at levels well below the current guidelines**.
2. **Before further deployment, a risk assessment of 5G systems must be carried out**, also in this instance **by experts who are free from ties to the industry** concerned, and with participation by researchers within the research community who point to evidence that the risks are considerable.
3. To prevent injuries, **education about the risks must be carried out at all levels of society**, for example in healthcare, **schools**, and the general public.
4. The best possible technology should be used to protect human health and the environment. **Wired technology that minimizes harmful radiation must be a priority**.

The Nordic Appeal also asserts that:

The **responsible authorities** continue to **ignore** the **increasingly clear evidence of risks**, despite the research and the repeated appeals from the qualified research community, the medical profession as well as elected representatives. They even claim that the risks shown do not exist and that the current, **severely outdated** safety limits, are sufficient as protection. In support of their positions, the authorities rely on a small group of experts, **who are not representative of the scientific community at large, and the majority of whom are shown to have ties to the telecommunications companies**.

Legal Action Against 5G (Challenging the UK Government)

Michael Mansfield QC (who has led legal teams in high profile cases of civil liberty and miscarriages of justice, including representing the families of Grenfell Tower, Lockerbie, the Ballymurphy Massacre and Stephen Lawrence) is leading a legal team challenging the UK Government over **its failure to take notice of the health risks** and public concern related to 5G. Legal Action Against 5G asserts that there is **solid evidence** of the harm caused citing:

Numerous recent scientific publications have shown that **electro-magnetic radiation affects living organisms at levels well below most international and national guidelines**.

Proven effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of the reproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being in humans.

Damage goes well beyond the human race, as there is growing evidence of harmful effects to both plants and animals.

The **deployment on this scale** of pulsed microwave radiation **is reckless**

See [Legal Action Against 5G](#) for more details on, 'Why people are concerned', 'Why a legal case?', '**No safety testing for 5G**', and 'Consequence of 5G implementation' and their [Appeals](#) page for more details on 'International and Individual Actions', 'History of warnings against wireless technology', '**Doctors and Scientists Calling for Stricter Regulation** and/or a Moratorium on Wireless Technology'. [\[back to first page\]](#)

5. Contrary to the Precautionary Principle advocated by UNESCO

[Precautionary Principle \(UNESCO 2005\)](#)

The Precautionary Principle was established by the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), a section of UNESCO, in March 2005 to promote an ethical approach to risks of harm associated with scientific and technological developments in order to prevent the mistakes of the past being repeated e.g. the first concerns regarding asbestos were raised in 1898 but it took until 1998-1999 before EU and France banned all forms of asbestos. There are still many countries that have not banned (all forms of) asbestos.

All members of the UN are supposed to observe the Precautionary Principle which states that:

- The Precautionary Principle (PP) applies when there exist considerable scientific uncertainties about causality, magnitude, probability, and nature of harm
- Because the PP deals with risks with poorly known outcomes and poorly known probability, the unquantified possibility is sufficient to trigger the consideration of the PP
- **Interventions are required before possible harm occurs, or before certainty about such harm can be achieved (that is, a wait-and-see strategy is excluded)**
- Interventions should be proportional to the chosen level of protection and magnitude of possible harm

[PACE Resolution 1815 \(2011\) - The potential dangers of electromagnetic fields](#) includes the following statements:

5. As regards standards or threshold values for emissions of **electromagnetic fields of all types and frequencies**, the Assembly strongly recommends that the ALARA (as low as reasonably achievable) principle is applied, covering both the so-called thermal effects and the athermic or **biological effects** of electromagnetic emissions or radiation. Moreover, the **precautionary principle should be applied** when scientific evaluation does not allow the risk to be determined with sufficient certainty. Given the context of growing exposure of the population, in particular that of vulnerable groups such as young people and children, there could be extremely high human and economic costs if early warnings are neglected.
6. The Assembly regrets that, despite **calls for the respect of the precautionary principle** and despite all the recommendations, declarations and a number of statutory and legislative advances, there is still a lack of reaction to known or emerging environmental and health risks and virtually systematic delays in adopting and implementing effective preventive measures. Waiting for high levels of scientific and clinical proof before taking action to prevent well-known risks can lead to very high health and economic costs, as was the case with asbestos, leaded petrol and tobacco.

Therefore it is clear that although it is acknowledged that in many cases further research is required there is currently sufficient evidence of harm / potential harm from EMFs to determine that the PP should be applied and that safety precautions should be reviewed and maximum permissible levels of radiation reduced – the reclassification of EMFs from mobiles by the WHO in 2011 alone should have triggered this, let alone the wealth of evidence of other forms of harm. However no action has been taken and no such review has been commissioned which is another outrageous example of ‘profits before people’. [\[back to first page\]](#)

6. Some other countries have taken *some* actions

- In France, Israel, and Belgium **headsets** and **safety information** must be supplied with all mobile phones
- France have banned mobile phone advertising to children under 12
- Israel - **no Wi-Fi in kindergarten**, wired preferred over wireless in schools
- Belgium – no phones to be designed or sold for children under 7

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

- India have **lowered the limit** for mobile tower transmission to **one-tenth*** of the ICNIRP international short-term heating limit and **increased the safe distance of towers to people** (some towers have been torn down as a result), official guidelines also recommend **headsets** or **hands-free use**. (*this is still way above the international biological limits recommended by Bioinitiative, EUROPAEM, IGNIR, and Seletun)
- Canada – issue official advice as above

Sweden and Canada routinely recognise ES as a disability AND provide support for home and workplaces to be adapted to suit the needs of sufferers. Courts and employers in the UK, USA and many other countries recognise ES as a disability, sometimes following disability assessment and legal appeals. The support provided is seldom as comprehensive and extensive as in Canada and Sweden. Sweden also has '**white zones**' where **mobile masts and Wi-Fi are banned** to create safe communities for EHS sufferers. A court in the Netherlands has recognised as person with EHS as an interested party in the siting of mobile phone tower, while a court in the UK fined an employer for being too slow in providing accommodations for a person intolerant of EMFs. [\[back to first page\]](#)

7. Manufacturers know the risks

The following are examples of what some manufacturers are doing in an attempt to protect themselves from future litigation for harm caused by their products:

The safety manual for **Apple's iPhone 4** (2010-2014) contains the warning: "When using iPhone near your body for voice calls or for wireless data transmission over a cellular network, keep iPhone **at least 15 mm** away from the **body**, and only use carrying cases, belt clips, or holders that do not have metal parts and that maintain **at least 15 mm** separation between **iPhone** and the **body**".

The safety manual for **BlackBerry 9000** phone tells users that they may violate FCC guidelines for radio-frequency energy exposure by carrying the phone outside a holster and **within 25 mm** of their **body**.

The safety manual of the **Motorola W180** phone tells users to always keep the active device **25 mm away** from their **body**, if not using a company-approved "clip, holder, holster, case or body harness."

Note that the above references to the "**body**" include the **hands** so you **cannot hold the phone** whilst using it **without violating the safety limits!**

In Australia Telstra sends a safety message to all their new customers advising them to:

1. Use a hands-free device to keep the mobile phone away from the **head and body**
2. Limit the number and length of calls
3. Use the phone in areas of good reception as the lower power output reduces exposure

Tests on iPads, tablets etc. are carried out 200mm from the body, hence these devices are not designed to be used on the lap and Apple have stopped calling their portable computers 'Laptops' accordingly.

Vodafone's report to US Government Security and Exchange Commission on Principal Risk Factors includes the statement "**Risk:** Concerns have been expressed that electromagnetic signals emitted by mobile telephone handsets and base stations may pose health risks. Authorities including WHO agree there is no evidence that convinces experts that exposure to radio frequency fields from mobile devices and base stations **operated within guideline limits*** has any adverse health effects. A change to this view could result in a range of impacts from a **change to national legislation**, to a **major reduction in mobile phone usage** or to **major litigation**." China Mobile and AT&T have also made similar statements. (*i.e. the new '**hidden**' **guidelines not to hold / keep / use the mobile close to your body**) [\[back to first page\]](#)

8. Governments are pressurised by commercial interests

As with previous public health concerns (smoking, leaded petrol, asbestos etc.) commercial interests have always fought vigorously to oppose any change in regulations which might adversely affect their profits by increasing their costs, or reducing sales, by denying there is any problem, rubbishing claims, producing their own biased research and, if they can't counter the scientific arguments, attempting to discredit the researchers.

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

Even if you believe bribery and corruption has been completely eradicated these days commercial interests still 'legitimately' apply pressure to governments by warning them that taking any hasty actions to impose tighter controls / limits will have an adverse impact on:

- jobs / economic growth / tax revenues by implying it will result in increased costs / reduced profits by forcing 'unnecessary' and expensive design changes; which is not necessarily true as it depends on the design solutions adopted (e.g. reducing power output would normally enable the use of cheaper components which could outweigh the cost of making the design changes)
- product performance making the product less desirable and, therefore, reducing sales / profits; again not necessarily true – you don't need 100m Wi-Fi range unless your garden is the size of a football pitch and your house is at one end and you want to use Wi-Fi devices in the shed right at the other end, a range of 10-20m is perfectly adequate for the average home
- the government's popularity and chance of re-election due to both of the above [\[back to first page\]](#)

9. The media are reluctant to report the risks

Very little is reported in the media, and what is reported is usually reported negatively as being unfounded and alarmist and almost always accompanied by references to dubious studies which say that mobiles etc. are safe, because all the media are heavily dependent on:

- using the technology both within their internal business processes and to engage with the general public
- the income both from advertising by the technology providers and other businesses which use the technology to engage with their customers (e.g. via phone Apps) whom they don't want to upset and risk losing their business [\[back to first page\]](#)

10. Safety has always lagged behind the introduction of new technologies

Safety standards have always lagged well behind the introduction of new technology (e.g. ships, trains, cars, passenger planes, mining, petrochemicals, nuclear power etc.) due to the time taken admitting that there is an unacceptable problem (often only after overwhelming public pressure), deciding what to do about it, and agreeing the limits / standards to be imposed; especially as commercial interests always apply pressure and counterarguments (including biased / unsound research) so that the revised limits / standards will require them to do as little as possible in order to minimise the impact on their profits. [\[back to first page\]](#)

11. EMFs from Mobile Phones, Wi-Fi, and Cordless Phones (all microwave devices) have been shown to affect...

Cancer

See "[The truth about mobile phone and wireless radiation](#)" – a lecture by [Dr Devra Davis](#) at Melbourne University Dec 2015. Dr Davis has an impressive record in public health, including helping to expose the dangers of tobacco, asbestos and passive smoking. Her team used computer modelling designed to ensure safety of therapeutic medical radiation treatments to determine the effects of mobile phones and found deep, high energy penetration of the brain and eye which is extremely likely to cause brain cancer. But brain cancer takes much longer to develop than other cancers – it took 40 years for an increase in brain cancer to show in survivors of Hiroshima and Nagasaki (do we want to wait that long to find out if that's the case with mobiles?) Young developing brains are widely considered to be more susceptible to harm from mobile radiation than adults – hence the EU recommendation to [ban Wi-Fi and mobiles in schools](#).

Breast tumours have been seen in the exact shape and location of the phone antennas in 38 women (by 2015) where they have kept / used mobiles tucked in their bras! This is an area of the breast where tumours do not normally form.

Fertility

Many studies have shown lower sperm count in men who put mobiles in their trouser pockets and/or who use laptops with Wi-Fi enabled on their laps. High levels of RFR in the general environment have also been shown to lower sperm counts. See [A review on Electromagnetic fields \(EMFs\) and the reproductive system](#)

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

[PACE Resolution 1815 \(2011\) - The potential dangers of electromagnetic fields](#) includes the following recommendation:

8.1.3. put in place information and awareness-raising campaigns on the risks of potentially harmful long-term biological effects on the environment and on human health, **especially targeting children, teenagers and young people of reproductive age**

Immune System:

[Disturbance of the immune system by electromagnetic fields](#)—A potentially underlying cause for cellular damage and tissue repair reduction which could lead to disease and impairment

Antibiotic Resistance:

[Evaluation of the Effect of Radiofrequency Radiation from Wi-Fi Router and Mobile Phone Simulator on the Antibacterial Susceptibility of Pathogenic Bacteria *Listeria monocytogenes* and *Escherichia coli*](#)

Leukaemia, Brain Tumours, Alzheimer's, ALS, Sperm Damage, DNA Strand Breaks, Neurological Diseases, and Impairment of Cognition, Behaviour, Performance, Mood, and Disruption of Sleep:

[Scientific Panel on Electromagnetic Field Health Risks: Consensus Points, Recommendations, and Rationales](#)

Prolonged exposure appears to disrupt biological processes that are fundamental to plant, animal and human growth and health

+ specific references to the above conditions.

[Effects of electromagnetic fields exposure on the antioxidant defence system](#) – The Journal of Microscopy & Ultrastructure – US National Library of Medicine National Institutes of Health

2. Electromagnetic field effects

... One study reported that **extremely low exposure to EMF from mobile phones** may cause health problems. Several studies have reported findings such as **stress, headache, tiredness, anxiety, decreased learning potential, impairment in cognitive functions and poor concentration** in case of exposure to microwave radiation emitted from mobile phones. EMFs influence metabolic processes in the human body and exert various biological effects on cells through a range of mechanisms. EMF disrupts the chemical structures of tissue since a high degree electromagnetic energy absorption can change the electric current in the body. **As a result of this exposure, the functions of organs are affected.** Electric fields exert an oscillatory force on every free ion on the both sides of the plasma membrane and cause them to cross it. This movement of ions causes deterioration in the ion channels on the membrane, biochemical changes in the membrane and **consequently impairment of all cellular functions.**

[\[back to first page\]](#)

12. Health conditions caused, or exacerbated, by prolonged exposure to ALL types of EMFs

Potential Health Effects of EMFs

An increasing number of doctors and researchers believe that ES is a major factor in the appearance of Chronic Fatigue, ME, and Fibromyalgia (all 'modern-day' diagnoses), and also for the **increase** in Alzheimer's, Depression, Type 2 Diabetes, Restless Legs Syndrome (RLS) as well as many common everyday symptoms such as headaches, fatigue, non-specific aches & pains, anxiety, tinnitus, insomnia, confusion, difficulty talking coherently, attention deficit, low fertility etc. and **impaired** memory, coordination, and concentration which have all seen significant increases in the **developed world** in recent decades, **coinciding with the increase in prevalence of wireless technology.** A multitude of different studies have shown that modern-day prolonged exposure to high levels of man-made electromagnetic fields has disruptive effects on many of the basic biological processes of the human body.

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

(See [Talking To Your Doctor](#) and [ES/EHS Key Facts: Non-Thermal Science and Functional Disability](#) for all the conditions that can be caused, or made worse by, man-made EMFs and the biological effects responsible)

Some researchers have estimated that approximately 3% of the population has severe symptoms of ES, and another 35% have moderate symptoms such as an impaired immune system, chronic illness, disturbed sleep etc. although they don't associate any of their symptoms with ES as they have never heard of it being a possible cause, and neither have a majority of the health professionals they consult.

The harmful effects of prolonged exposure to EMFs are cumulative over time and can take decades to develop fully, so even if you are not suffering now from any of the conditions known to be affected, or are only slightly affected now, it is still advisable to minimise your exposure as a preventative measure.

There are also indications that prolonged exposure to high levels of EMF radiation can also make you less responsive to medication and it is commonly reported that natural therapies are more effective and 'hold' for longer on people who minimise their exposure to EMF radiation.

The biological effects of EMFs which cause or exacerbate the various symptoms listed above

Naturally occurring microwave radiation and man-made microwave radiation are fundamentally different in nature. Man-made microwave radiation is polarised and the polarised waves disrupt the ion channels in cell walls impairing the intake of nutrients and expulsion of waste products, and generating free radicals which disrupt the functioning of mitochondria.

Continued exposure to EMFs has been shown to cause:

- Oxidative damage
- Abnormal influx of calcium into cells or calcium 'overload' (voltage-gated calcium channel disruption)
- Mitochondria dysfunction
- Depolarisation of the body's red blood cells
- Decrease in the numbers of Natural Killer (NK) cells
- Increase in viruses, bacteria, mould, parasites, and yeast in the blood of the human host
- "Subliminal" stress (upregulation of the sympathetic nervous system)
- Decrease of 5-HT in the blood
- Decrease in levels of the brain hormones norepinephrine and dopamine
- Alterations in production of melatonin
- Abnormal drop in the levels of the neurotransmitter acetylcholine
- Restlessness (may be responsible restless leg syndrome)
- Alterations in regional cerebral blood flow
- Failure of DNA recombination due to the radical spin pair mechanism (DNA damage)
- Adverse effects on blood brain barrier permeability
- Production of heat shock proteins
- Interference with intercellular microsignalling and circadian rhythms
- Sperm / testicular damage
- Neuropsychiatric effects including EEG changes
- Apoptosis (cell death)
- Endocrines changes

Symptoms vary from patient to patient depending on their physical biology and exposure intensity and duration. Symptoms quickly improve when away from EMF sources, particularly computers, fluorescent lighting, transformers, wireless antenna, cell and cordless phones, other electrical appliances and out of proximity to cell phone towers, electrical substations and power lines. Symptoms recur on returning to the irradiated environment. **Over time, sensitivity is increased to smaller and smaller EMF exposures and lower and lower frequencies.**

See [Talking To Your Doctor](#) and [Electrosensitivity – an Environmental illness, an Authentic Diagnosis, not a Delusional Disorder](#) for more details. [\[back to first page\]](#)

13. Simple and easy measures to reduce your exposure

- Turn OFF mobiles and Wi-Fi devices, or switch to 'Airplane Mode' (not just standby) when not in use
- Replace cordless phones with corded ones
- Use mobiles only for emergencies, keep calls short and keep mobiles as far away as possible – use a landline whenever possible if it is a corded, NOT cordless, phone
- Use wired connections instead of wireless (always faster, more reliable, and more secure anyway)
- Keep your distance from ALL electrical and electronic devices and power cables / wiring – even a small increase in distance is better than nothing (as a matter of physics, radio-frequency energy **decreases significantly as the distance from the source is increased**)
- Turn ALL electrical and electronic devices OFF when not in use, not just to STANDBY

Many people suffer after prolonged exposure to higher levels of EMFs, with symptoms often accumulating gradually over many years, and it is not yet known what percentage of the population is likely to be susceptible. **Is it worth taking the risk when the precautionary measures are so simple** and reducing exposure has the **potential to bring the benefits of better sleep, general health and vitality** even if have no major symptoms **yet**. (See [Section 14 - Electrohypersensitivity \(ES / EHS\) – Could it be affecting me?](#))

None of the precautionary measures are irreversible, you can go back to your old ways at any time if you don't feel any significant improvement or if you find it is just too much hassle, so why not try reducing your exposure to see how much better you could feel? For details of many more simple actions to take, and the pitfalls to avoid, see the separate document on ES-UK web site '[Electrosensitivity – Tips for Reducing EMF Exposure](#)'

[Scientific Panel on Electromagnetic Field Health Risks: Consensus Points, Recommendations, and Rationales](#) – **includes** the following **statements**:

The Seletun Scientific Panel **recommends**:

- **users keep mobile phones away from head and body**
- users keep mobile phones and PDAs* **switched off** if worn or carried in a pocket or holster, **or on a belt near the body**. *PDA is generic for any type of Personal Digital Assistant or hand-held computer device
- **against** the use of **mobile and cordless phones and PDAs by children of any age**
- **against** the use of **mobile and cordless phones and PDAs by pregnant women**
- **use of mobile and cordless phones and PDAs be curtailed near children or pregnant women**, in keeping with preventative and precautionary strategies. The most vulnerable members of society should have access to public places without fear of harm to health
- access to public places and public transport should be available without undue risk of EMF exposure, particularly in enclosed spaces (trains, planes, buses, cars, etc.) where the exposure is involuntary
- **wired internet access in schools**, and strongly recommends that schools do not install wireless internet connections that create pervasive and prolonged EMF exposures for children
- preservation of existing land-line connections and public telephone networks
- **against** the use of **cordless phones (DECT phones) and other wireless devices, toys and baby monitors***, **wireless internet, wireless security systems, and wireless power transmitters** in SmartGrid-type connections that may produce unnecessary and potentially harmful EMF exposures and recognizes that wired internet access (cable modem, wired Ethernet connections, etc.) is available as a substitute
- use of **wired headsets, preferably with hollow-tube segments** (not speakers in the ear pieces)
- **avoidance of wireless (Bluetooth-type) headsets in general**
- use of telephone land-lines or fibre optic cables for SmartGrid type energy conservation infrastructure

The Panel **encourages**:

- the removal of speakers from headsets on wireless phones and PDAs (i.e. use hollow-tube type instead)
- 'auto-off switches' for mobiles and PDAs that automatically turn off the device when placed in a holster

The Panel **strongly discourages**:

- technology that allows one mobile phone to act as a repeater for other phones in the area. This increases exposure to EMF to the person whose phone is piggy-backed on without their knowledge or permission

Specific Recommendations - Extremely Low Frequency (Fields from Electrical Power)

The Panel **recommends electric field reductions from electrical wiring in buildings** based on evidence of increased **cancer risk** from prolonged or repetitive electric field exposure.

Governmental codes relating to building design and construction should be revised so **that all new electrical wiring is enclosed in a grounded metal shield**;

The above scientific panel also recommend exposure limits to be applied to new installations, power distribution, all new electrical equipment, **minimum distances** from residences, hospitals, schools, parks, and playgrounds (and similar locations occupied by children, as well as all new electronic devices, including compact fluorescent lamps (CFLs), to be constructed with filters to block high-frequency voltage transients from being conducted back onto electrical wiring systems.

* 'old style' baby monitors which connect to each other via the mains wiring use much lower frequencies and, therefore, are safer but should still be kept at a good distance (>3ft)

A study undertaken for the Swiss Federal Offices of Health and Energy reported low- and medium-frequency magnetic and electric fields can induce electric currents in the body which, above a certain frequency, can stimulate nerves and muscles and recommended that people **stay at least 30 centimetres away from energy-saving light bulbs**. See [Health effects from the electromagnetic fields of Compact Fluorescent Lights \(CFLs\)](#) for further information, including reports that migraines, epilepsy and blurred vision can be triggered by EMFs from CFLs and other sources. [\[back to first page\]](#)

ADDITIONAL INFORMATION

14. Could Electrohypersensitivity be affecting me?

The **WHO** states that Electrosensitivity (ES) is an idiopathic environmental intolerance which can be a "disabling condition" **and its symptoms are "certainly real"** and also defines Electrohypersensitivity (EHS) as: "...a phenomenon where individuals experience adverse health effects while in the vicinity of devices emanating electric, magnetic, or electromagnetic fields."

In Sweden ES / EHS is classified as a disability and health care facilities with low levels of exposure to electromagnetic fields and radiofrequency radiation are available. Also assistance is available to have homes and workplaces adapted for those affected.

Researchers estimate that approximately 3% of the population has severe symptoms of EHS, and another 35% of the population has moderate symptoms such as an impaired immune system and chronic illness, although most probably don't associate any of their symptoms with the cause as they have never heard of it as a possibility, nor have a vast majority of health professionals.

Medical studies now focus on the autonomic nervous system and cell membrane permeability, with calcium efflux at ion cyclotron resonance and reduced melatonin as pathways.

Some common initiators associated with the development of EHS which have been proposed are:

- Living, or working near overhead power lines, substations, underground cables or electrified railways
- Working in environments with high EMFs (including photocopiers which also give off ozone)

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

- Radar
- Use of electrical appliances
- Electric shocks or lightning strikes
- Dental amalgam fillings
- Chemical exposures (Paint, pesticides, insecticides, lice & flea treatments, bleaches and cleansers, field and garden sprays, furniture and carpet treatments, wood glue and varnish). Many of these have been found to cause neurological damage, which may then be made worse by EMF exposure.

It makes little difference what the initial provocation is; environmental exposure of the immune system by chemicals inside the home or outside, pesticides, or electromagnetic fields, **once a person is exposed to any of these, it seems the likelihood of reacting to all of them increases dramatically.**

Commonly Overlapping Conditions:

Fibromyalgia, Myalgic encephalomyelitis (ME) Chronic fatigue syndrome, Post-viral fatigue syndrome, Post-infectious Neuromyasthenia, Yuppie flu, Chronic Pain, Migraine, Arthritis, Allergies, Rhinitis, Asthma, Food Intolerance Syndrome, Celiac Disease, Irritable Bowel Syndrome, Major Depression, Anxiety or Panic.

I Don't Currently Have Any Symptoms - Could Electrohypersensitivity (EHS) be Affecting Me?

Everyone is different physiologically and may react differently to the same stimuli e.g. some people suffer from hay fever, asthma, eczema, allergies, food intolerances etc. and others don't, and those that do suffer to differing degrees from the same level of stimulus. Similarly some people are more susceptible to colds and flu etc. than others. Therefore it is not surprising that some people appear to have a greater tolerance to EMFs than others and either show no symptoms or only very mild symptoms, at least to begin with. However recent research by Dr Dimitris J Panagopoulos from the Dept. of Biology, University of Athens has shown that even individuals who currently manifest no symptoms at all still show the same abnormalities in skin cells when subjected to man-made EMFs. Other research has found that **the harmful effects are cumulative over time and can take decades to develop fully** so the fact that many people are not suffering any symptoms yet, or do not attribute any of their current symptoms to EMF exposure (often because they are not aware that it is a possible cause), **is not proof that no action is required** to prevent future harm.

Did you used to feel more refreshed, energised and clearer-headed by sleep, a day out in the country or at the beach, going for a run or to the gym, or walking the dog etc. and now you don't so much? If you used to do these kind of activities without a mobile phone (or other Wi-Fi device) and now you have one with you, or are surrounded by other people using them, that could be the reason – why not try **turning your mobile off** or to 'airplane mode' whilst you do these things, or if you really must have it on to be contactable, try keeping it much **further away from your body** and **switching-off the Wi-Fi, Bluetooth and Mobile Data / Location Data** functions when you don't actually need them, and see if it makes a difference?

Similarly if you have more headaches, aches and pains, feel more stressed and fatigued, sleep worse or have memory problems or more difficulty concentrating etc. than you used to, do you spend more time using computers and mobiles etc. (or spend more time in close proximity to others using them) than you used to? If so why not try significantly reducing this for a week or two to see if it makes a difference?

If you notice an improvement by doing any of the above see the separate document '**Electrosensitivity – Tips for Reducing EMF Exposure**' for more simple actions to take for the possibility of feeling better still.

15. A Personal Case Study

I have had a history of severe migraine-like headaches every day for decades which included, at times, difficulty talking, walking, finding the right words, concentrating, focusing etc. When the symptoms escalated into more severe problems with coordination (e.g. I would reach out for one object but pick-up another, go to operate one control and operate another, and constantly drop, spill, damage things and injure myself whilst cooking, washing-up and doing DIY etc.) I was given a diagnosis of 'impaired brain function due to severely disturbed sleep' by a consultant neurologist who organised a sleep study. The study concluded

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

the disturbed sleep was due to Restless Legs Syndrome (RLS). I was prescribed a variety of drugs designed to treat Parkinson's and MS but none did much good and all had really bad side-effects and so were stopped.

More recently I developed all-over body pain which ultimately became so severe it was slightly less than the pain of kidney stones and a severed nerve. This was diagnosed as Fibromyalgia and was not helped by the medication offered, which again had really bad side-effects. At this point I was starting to consider that daily life was intolerable and not worth living. But being a stubborn individual I wasn't quite ready to give up just yet, so as the NHS had done all the tests they considered worthwhile and found nothing other than 'Fibromyalgia,' which they had no idea how to treat, I started doing my own research...

Starting with what was published by the NHS, Arthritis Research UK, and Fibromyalgia Association UK about the levels of serotonin, noradrenaline, dopamine, cortisol, and neurotransmitter substance P in Fibromyalgia sufferers my research eventually led me to the possibility that conditions such as these were caused, or exacerbated, by prolonged exposure to EMFs from mobiles, Wi-Fi, cordless phones and other electrical / electronic sources so as it:

- a) Made perfect sense to me from my 30+ years of experience in the electronics industry (including telecommunications, radar, EMC and safety standards / testing etc.) together with my understanding of human anatomy and biochemistry
- b) Was easy for me to identify EMF sources and implement the basic measures to reduce my exposure given my experience in the industry (after determining and acquiring suitable test equipment)
- c) Had absolutely no possibility of any risks to my health or making matters worse by 'giving it a try'
- d) Was fully reversible if it didn't bring about any significant improvements

I decided to give it a try as I had little to lose, and potentially a lot to gain...

From working with radar I knew the risks from microwaves and so had never fully trusted mobiles right from the start and had always minimised their use, kept them well away from my body and hardly ever had one switched on about my person – so there wasn't much to do in that respect.

At first I implemented just the most simple measures to reduce my exposure to all sources of EMFs :

- using my mobile ONLY for emergencies or internet banking OTPs and switching it off or to 'airplane mode' at ALL other times
- using a wired desktop computer with everything but the keyboard, mouse and monitor at maximum distance from my body for all internet use (bought extended USB and Ethernet cables to achieve this)
- connecting all Wi-Fi devices by Ethernet cables AND permanently disabling Wi-Fi functions on everything
- replacing cordless phones with corded ones
- replacing fluorescent tubes and low-energy compact fluorescent lamps (CFLs) with 'old-style' incandescent bulbs or (mains voltage) halogen lamps
- switching **off** / unplugging all electrical / electronic items when not needed (not just to 'standby')
- removing ALL mains-powered items from the bedroom (the sleep zone is the most important)
- rearranging the furniture and electrical / electronic items to maximise the distance between sofa /chairs and TV, Hi-Fi, computer, printer, lamps, mains leads / sockets, light switches etc.
- rearranging the kitchen to minimise electrical items close to where I stand to prepare food and wash-up, also turning the cooker, dishwasher and other things I couldn't avoid standing next to off (at the wall, where possible) when not in use
- keeping my distance from all things electrical and electronic as much as possible when 'out and about' especially when standing or sitting anywhere for any length of time

As a result ALL my symptoms improved significantly. Spurred-on by this I took further measures (see the separate document '**Electrosensitivity – Tips for Reducing EMF Exposure**') and the symptoms improved still further.

Most of the severe constant background pain has gone, the constant daily headaches have reduced, I have more energy, the tinnitus is reducing, I am sleeping much better so brain function and mood is generally better. However when I spend any length of time in 'hostile' environments (e.g. shops and public places with

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

Wi-Fi, DECT Phones, Bluetooth and mobiles) things start to deteriorate quite quickly and it then takes some time to recover afterwards (for prolonged / high-level exposure it can take a few days). There is still room for further improvement in my symptoms so I plan to relocate away from any immediate neighbours and problematic infrastructure and to take further steps as outlined in the aforementioned document.

16. Prepared to do Anything in the Pursuit of Profit?

I find it very hard to believe that any savvy businesses would have invested so heavily in the technology if they had known at the very beginning there was any likelihood of it causing significant harm and hence be doomed to failure, or to lay them open to huge compensation claims, as there is no profit in doing so and profits are what they care about most of all. Similarly, it is hard to believe that Regulatory Authorities or politicians would have backed such technology if at the outset they knew it was at all likely to be found to cause harm and hence adversely affect their reputations, careers / promotion prospects and consequently their earning potential, which is what they care about most.

However I think it is entirely plausible that if the potential for harm came to light after the technology was already in use, which seems generally to be the case, that there has since been a widespread 'conspiracy' to play-down the claims of harm, produce biased studies to disprove them, and to try to suppress or discredit the news of the potential dangers in order to protect profits, reputations, careers and votes.

All the denials of the potential for harm, and the refusal to accept that there is 'currently'* sufficient evidence of it, is all about trying to avoid the huge economic and political fallout that will inevitably follow any official admission that the current 'safety' limits are in fact unsafe... (* and to kick the problem further down the line so it becomes someone else's)

As in so many matters, to get to the truth you need to 'follow the money' – many organisations / researchers say the current levels are not a problem but check who they work for, who funds their research, pays for their seat at the table, makes donations or sponsors new facilities at their universities etc., and also who (and what types of business, e.g. mobiles, ISPs, online businesses) are the major advertisers of newspapers, magazines, TV channels etc. that only carry the stories that are dismissive of any claims of harm.

17. Reference Sources

[BioInitiative Report 2012](#) - A Rationale for Biologically-based Public Exposure Standards for Electromagnetic Fields (ELF and RF) which contains scientific evidence of the many harmful effects on the human body

[Disturbance of the immune system by electromagnetic fields](#)—A potentially underlying cause for cellular damage and tissue repair reduction which could lead to disease and impairment – Prof. Olle Johansson

[Electrosensitivity UK](#) – A charity providing support and information for all people sensitised by electromagnetic fields and radiation – Trustees include Dr Andrew Tresidder an **NHS GP**, and their Scientific Advisors include Denis Henshaw, Professor of Human Radiation Effects at Bristol University and Olle Johansson, Associate Professor, Department of Neuroscience, Karolinska Institute, Stockholm

[Electrosensitivity – an Environmental illness, an Authentic Diagnosis, not a Delusional Disorder](#) – Written by a practising NHS GP, Dr Andrew Tresidder, it explains what Electrosensitivity is, the biological mechanisms by which it causes health problems, and why the current international safety limits are fundamentally flawed.
Well worth reading in full

[European Parliament resolution of 2 April 2009 on health concerns associated with electromagnetic fields](#) (NB: EU documents use the term 'whereas' in the legal interpretation to mean "taking into consideration the fact that") – **Well worth reading in full – the serious concerns and uncertainties they acknowledge, and the actions and precautions they call for are quite an eye-opener!**

Health Risks of EMFs from Mobile Phones, Wi-Fi, Cordless Phones & other Sources

[Evaluation of the Effect of Radiofrequency Radiation from Wi-Fi Router and Mobile Phone Simulator on the Antibacterial Susceptibility of Pathogenic Bacteria *Listeria monocytogenes* and *Escherichia coli*](#) – M Taheri, Prof. SMJ Mortazavi, Dr M Moradi, Dr S Mansouri, GR Hatam, and F Nouri

[Health effects from the electromagnetic fields of Compact Fluorescent Lights \(CFLs\)](#) – M Bevington, ES-UK

[IARC Classifies Radiofrequency Electromagnetic Fields as Possibly Carcinogenic to Humans](#) – WHO / IACR Press Release 208

[ICNIRP Guidelines on Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields \(100 kHz to 300 GHz\) - DRAFT July 2018](#) (ICNIRP = International Commission on Non-Ionizing Radiation Protection)

[ICNIRP Guidelines on Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields \(100 kHz to 300 GHz\) - APPENDIX A: Review of Studies on Dosimetry – DRAFT July 2018](#)

[ICNIRP Guidelines on Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields \(100 kHz to 300 GHz\) - APPENDIX B: Health Risk Assessment Literature – DRAFT July 2018](#)

[Health & Self-Care - For Health Professionals](#) Dr Andrew Tresidder MBBS Cert Med Ed MRCGP (1989) – see especially **Electromagnetic Pollution and Electromagnetic Stress** section, pages 49 - 51

[Institute of Building Biology](#) The documents available in the 'Downloads' panel on the right-hand side of the home page are well worth reading, especially '**Building Biology Evaluation Guidelines** (PDF)'.

[Parliamentary Assembly of the Council of Europe \(PACE\) Resolution 1815 \(2011\) - The potential dangers of electromagnetic fields and their effect on the environment](#) – **Also well worth reading in full!**

[Polarization: A Key Difference between Man-made and Natural Electromagnetic Fields, in regard to Biological Activity](#) – Dr Dimitris J Panagopoulos, Prof. Olle Johansson & George L Carlo

[Precautionary Principle \(UNESCO 2005\)](#)

[Radio Frequency Radiation Safety Limits](#) – M Bevington, ES-UK

[Scientific Panel on Electromagnetic Field Health Risks: Consensus Points, Recommendations, and Rationales](#) – Dr Adamantia Fragopoulou, Prof. Yuri A Grigoriev, Prof. Olle Johansson, Prof. Lukas H Margaritis, Lloyd Morgan, Prof. Elihu Richter and Cindy Sage

[Talking To Your Doctor](#) – WEEP Canadian Initiative to stop **Wireless, Electric, and Electromagnetic Pollution**

[The London Resolution](#) – Prof. Olle Johansson et al

[The truth about mobile phone and wireless radiation](#) – Dr Devra Davis Lecture at Melbourne University

18. **Articles of Interest**

[BBC TV South news item from 8 February 2017](#) with Mary Coales and Dr Andrew Tresidder

[Time Magazine - Cell-Phone Safety: What the FCC Didn't Test](#) – Michael Scherer