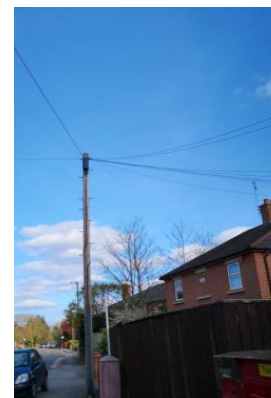


Note: In case this document is served to a person having any authority to intervene in the process of deploying and using the 4G/5G/6G technology in any areas where civilian people are exposed to it, this may also serve as a legal **notice of personal liability** for the court if needed in the future, when finally, the subject of the **countless crimes committed against the people and their environment via wireless, non-ionising radiation** by those who were meant to serve and protect them, will be brought forward by the survivors. This, and the proof that it has been addressed to such a person, may be used as evidence in court, in order to attract **civil and criminal liability** in relation to his/her actions and/or omissions surrounding the deployment of 4G/5G/6G technology within his/her area of authority. There is no copyright for this document. Please use it so to serve its purpose for your family and your community.

TO: _____

**SUBJECT: ON THE EXTREME DANGERS OF RF/ NON-IONISED RADIATION (4G, 5G & 6G)
& THE DENSE NETWORK OF 5G SMALL CELLS & MIMO TOWERS IN OUR COMMUNITIES**



"I'm here with disturbing news about our favourite gadgets, cell phones, tablets, Wi-Fi etc. Putting it bluntly, they are damaging the living cells in our bodies and killing many of us prematurely... I am here to tell you that we have created something that is harming us and it is getting out of control. ...

Wireless utility meters and cell phones are blanketing our neighbourhoods with radiation. ... radiation from our telecommunication technology is damaging the DNA in our cells. It is clear to many biologists that this accounts for the rising cancer rates. Future generations, our children, are at risk.

...Although we are in the midst of a great technological transformation, the time to deal with the biological and health effects is long overdue. ... To protect our children, ourselves and our eco-system, we must reduce exposure by establishing more protective guidelines.'

(2015 - Martin Blank PhD, Department of Physiology and Bio-physics, Colombia University, author of 'Overpowered')

*‘All life pulsates in time to the Earth and our artificial fields cause abnormal reactions in all organisms.
Increasing electro-pollution could set in motion irreversible changes leading to our extinction.’*

(Dr Robert Becker, researcher and author of ‘The Body Electric’)

Driven by the urgency of our time, we come to you with the conviction that we will be able to demonstrate that **the science of the health impact of non-ionising, RF radiation that our authorities rely on, is minimalistic, contradictory and confusing**, most probably completely adjusted to the vested interests of the wealthy owners of the big telecommunication corporations. That, on the other side, **there are tens of thousands of scientific studies, old and new, thousands of independent doctors, scientists and professionals** involved in this field who are voicing their concerns worldwide, millions of people who, understanding that they and their dear ones will be suffering or even losing their lives because of the increased exposure to high power, high frequency RF radiation, **oppose the rollout of 5G on earth and in space and the deployment of wifi**, some of them temporarily managing to protect in a certain measure their homes, their children and their communities. This is not a conspiracy theory.

We will show you that **the impact of this huge deployment and densification of increasingly higher RF is beyond any financial, economic or military consideration, as it fundamentally affects all human and non-human life, putting a question mark on our very survival as a species.**

We will show you that you (and your dear ones) are unavoidably impacted by this very dangerous and insidious factor wherever you are – in your home, your car, on the street, at the bus stop or in the train station, in your office, your school, your hospital, your local shops or retail parks, whenever you or people in your proximity use mobile phones, Wifi, Bluetooth or are directly exposed to masts or small cells radiation and that **it is impossible not to, sooner or later, suffer the bitter consequences of the cumulative, irreversible effects of this radiation which has and will hugely increase with the deployment of fiber optic & small cells and which also potentiate the effect of any other toxic agent affecting the body.**

We hope that you will finally understand that right now it is not a matter of professionalism or of altruism, for somebody to pay attention and do their necessary part in mitigating this unfolding disaster, at their own level of authority and capacity, **but it is truly and urgently, a matter of SURVIVAL**. A matter of physical survival, of course... but, allow us to suggest, also of spiritual survival, as there is in the world overwhelming proof that an afterlife expects all of us and in this, everything there depends on the moral choices we make in this life. The much trumpeted transhumanist myth of the augmented human- cyborg, ‘homo deus’, a wifi connected creature devoid of free-will enjoying an extended life in a perfectly controlled smart city is an utter absurdity; this direction will certainly not prolong or preserve the existence or individuality of anybody, but on the contrary.

Below in this letter, you will find an expanded summary of references to resources we have encountered while doing our research on this topic, which we dedicate with priority to **children, immune-suppressed and electro-sensitive people**. The later ones are not a myth (see [Electrosensitivity UKⁱ](#), [ES-UK.info](#), [ElectrosensitiveSociety.com](#), [EHS & MCSⁱⁱ](#)). We strongly encourage everybody around us to buy or make sure they have access to a good **EMF meter**, to continue to research and fight for their families and their communities’ survival. For this time indeed, **we are all in it together.**

.....
.....

Date:
.....

**THE VITAL INTERNATIONAL DOCUMENTS THAT EVERY PERSON OF REASON AND GOOD WILL SHOULD SUPPORT, FOR THE
PRESERVATION OF HUMAN SPECIES AND LIFE ON EARTH:**

INTERNATIONAL APPEAL Stop 5G on Earth and in Spaceⁱⁱⁱ

**Initiated by Arthur Firstenberg and 10 international scientists and experts
305,109 signatories from 218 nations and territories
as of May 11th, 2024**

**Addressed To the UN, WHO, EU, Council of Europe
and governments of all nations**

EMF Scientists Appeal to the United Nations^{iv}

**MEDICAL DOCTORS AND PUBLIC HEALTH ORGANIZATIONS^v
Consensus Statements and Recommendations on Cell Phones and Wireless Radiation**

SUMMARY OF THIS PAPER:

THE BIASED & VERY LIMITED SCIENCE ON THE HEALTH IMPACT OF NON-IONISING RADIATION THAT THE UK & WESTERN GOVERNMENTS CHOSE TO BE GUIDED BY

THE INDEPENDENT SCIENCE TESTIFYING FOR THE REALITY OF THE EXTREME DANGERS OF NON-IONIZING RADIATION (PARTICULARLY FOR CHILDREN)

MORE ON CHILDREN AND THE IMPACT OF RF/ NON-IONISING RADIATION. CELL TOWERS' DANGERS

WHAT IS THE REAL SAFETY LEVEL FOR RF EXPOSURE? - THREE INDEPENDENT EMF GUIDELINES: THE BIOINITIATIVE REPORT, EUROPAEM EMF GUIDELINE & BUILDING BIOLOGY INSTITUTE

THE DAMAGING EFFECT OF RF RADIATION ON THE ENVIRONMENT

MOST OF THE HEALTH-RELATED EMF STUDIES DO NOT REPLICATE THE COMPLEXITY OF TOXICITY AFFECTING HUMANS IN THE REAL WORLD

5G AND THE KILLING GRID OF THE HIGH FREQUENCY SMALL CELLS

THE SMALLER THE CELLS, THE HIGHER THE FREQUENCIES, THE POWER, THE COVERAGE AND THE DENSIFICATION
THE UNSURVIVABLE WIRELESS SMART CITY

5G AND SUSTAINABILITY. THE 60 GHZ PECULIAR DANGERS. RISK OF FIRE

LIVE BLOOD ANALYSIS AND OTHER ACCESSIBLE EXPERIMENTS PROVING THE DANGER OF NON-IONISING RADIATION

6G, FIBER OPTIC AND TERRAHERTZ COMMUNICATION – THE END OF ALL PHYSICAL LIFE

ANNEXES:

ANNEX A – LITERATURE REVIEWS (SUMMARIES) – mentioned in the UK Derbyshire County Council Paper: ‘THE HEALTH IMPACT OF 5G TECHNOLOGY’

ANNEX B - CRITICISM OF ICNIRP GUIDELINES FROM DOCTORS, SCIENTISTS AND EXPERTS

ANNEX C - CRITICISM OF AGNIR REPORT

ANNEX D – CRITICISM OF SCENIHR REPORT

Annex E – Measurements of RF radiation power in Scotland

ANNEX F - THE BIOINITIATIVE REPORT 2012 (Conclusions)

ANNEX G - EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses

ANNEX H - Other examples of peer-reviewed studies on RF radiation on rats

“The adverse wireless radiation health effects that have been identified already from the incomplete literature openly available are massive in scope and magnitude. They support the conclusion that wireless radiation as already implemented is extremely dangerous to human health. It acts as both a promoter/accelerator and initiator of adverse health effects.”

(Ron Kostoff – Largest Unethical Human Experiment in History, 2020)

THE BIASED & VERY LIMITED SCIENCE ON THE HEALTH IMPACT OF NON-IONISING RADIATION THAT THE UK AND WESTERN GOVERNMENTS CHOSE TO BE GUIDED BY:

In 2018, **William Wragg MP**, addressed a written question to the Secretary of State for Digital, Culture, Media and Sport, inquiring if his department has done any assessment about **the safety of 5G with respect to human health**: [5G: Health Hazards: Written question - 176372](#)^{vi}

In the answer, given by **Margot James**, we find the following: ‘**A considerable amount of research has been carried out on radio waves and we anticipate no negative effects on public health.**’ As also, ‘**These standards draw on the International Commission on Non-Ionizing Radiation Protection (ICNIRP), which takes into account the well-researched effects of radio waves.**’

[Ofcom \(the British Telecom regulator\) gives us the official UK relevant EMF’s limits](#)^{vii}: This Guidance requires spectrum users to ensure their use of radio equipment does not exceed the basic restrictions in either: a) Tables 4 and 5 of the [ICNIRP Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields \(up to 300 GHz\)](#)^{viii}, published in: Health Physics 74(4):494-522, dated April 1998 (“1998 Guidelines”)¹; or b) Tables 2, 3 and 4 of the [ICNIRP Guidelines for limiting exposure to electromagnetic fields \(100 kHz to 300 GHz\), published in: Health Physics 118\(5\): 483–524; 2020 \(“2020 Guidelines”\)](#).^{ix}

We see from here that the mainly privately funded non-governmental organisation **ICNIRP**^x, based in Germany and endorsed by the **WHO**, is placed as **the ultimate authority in this field by the governmental authorities, requiring no verification or added studies on the part of the very numerous**

¹ Basic restrictions for power density for frequencies between 10 and 300 GHz.: **Occupational exposure 50 W/m² (50,000,000 uW/m²); General public 10W/m² (10,000,000 uW/m²)– this exposure refers only to a duration of 6-30 minutes and takes into account just the thermal effects of it (heating of tissues)**

British experts, doctors and engineers who could obviously contribute to the elaboration of protective EMF guidelines for the industry and the public of the UK.

Let's observe, therefore, what are the main **RESOURCES ON RF RADIATION IMPACT ON HEALTH AND LIFE** that the UK AUTHORITIES take into consideration (see a summary-chart of the mentioned guidelines with their main conclusions, together with a few other scientific literature reviews, as presented by the **Derbyshire Council** in 'The Health Impact of 5G Technologies' in **ANNEX A**):

- **ICNIRP (International Commission on Non-Ionizing Radiation Protection):** *ICNIRP Guidelines (100 kHz to 300 GHz²)* 11th July 2018 (https://www.icnirp.org/cms/upload/consultation_upload/ICNIRP_RF_Guidelines_PCD_Appendix_A_2018_07_11.pdf). **ICNIRP safety guidelines** claim that: 1. **There are no proven health effects from current levels of radiofrequency radiation.** 2. **There are no health effects other than thermal effects.** However, both assumptions of ICNIRP have been invalidated by tens of thousands of studies recorded in the last 25 years, please see **the critique of these ICNIRP Guidelines in ANNEX B**
- **HPA (Public Health England): 2012 AGNIR (Advisory Group on Non-ionizing Radiation) Report on 'Health Effects from Radiofrequency Electromagnetic Fields'**^{xi}. This is a biased and very limited review, that doesn't even apply to much of the technology now in use, so the conclusions are flawed and irrelevant. For example, the part referring to 'Neurocognitive effects in humans', page 235 to 240 refers to RF frequencies from hundreds of MHz up to 1.8 GHz, thus lower than those currently used today even for Wi-Fi (2.4 – 5GHz). For a documented **critique of the AGNIR Report**, please see the paper of scientist **dr. Sarah Starkey in ANNEX C**

² FREQUENCIES

The frequencies of mobile phone technology:

2G operates between 0.825 – 0.960 GHz (1 GHz = 1000 MHz = 1,000,000 Hz)

3G operates between 1.800 – 1.990 GHz

4G operates between 2.620 – 2.690 GHz

5G operates now mainly between 24.25 – 48 GHz (the more than 37 GHz being open for now just in US, Canada, China and Australia); at the upper frequency level we have a combination of two other levels of frequency, the middle being 3.4 – 3.8GHz and the lower range .7 GHz. **The FCC has already opened up the 64GHz to 71 GHz frequency bands for 5G.**

The frequencies of average human brains: From Delta to Gamma, 0 – 100Hz (this can escalate to 400Hz in an epileptic's brain.)

The frequency of the planetary electromagnetic field, the 'electromagnetic home' which all biological lifeforms have evolved in synchronization with:

Schumann resonance 7.83Hz (fundamental) fluctuating between 3Hz and 60Hz.

The higher range electromagnetic frequencies of 5G will pulse through the planetary electromagnetic field and into our bodies at very close range:

24,250,000,000Hz – 71,000,000,000Hz. These are tens of billions of times higher than the natural planetary and human frequencies.

Despite this, the governmental authorities completely endorse the AGNIR and ICNIRP recommendations: **HPA response to the 2012 AGNIR report on the health effects from radiofrequency electromagnetic fields**^{xii}. There is, still, some research meant to be done by British experts, as we find references to the page of **Mobile Telecommunications and Health Research Programme**^{xiii} (but which does not allow public access), and to the page of the **Independent Expert Group on Mobile Phones (2000)**^{xiv} - which has been archived!

- **UK Health and Security Agency: Mobile phone base stations: radio waves and health** – updated August 2021^{xv}.

Here we find again a reference to the **2000 report** of the **Independent Expert Group on Mobile Phones (IEGMP)** which, as said before, has been archived. However, in the archive, we found a very interesting *Summaries of Oral Evidence* by **Professor R.H. Clarke, The National Radiological Protection Board (NRPB)**^{xvi} which ends up with the following: “***NRPB has always been very proactive with Government and has not hesitated to recommend lower dose limits for ionising radiation exposure in advance of international consensus. It has examined the recent ICNIRP guidance. However, the Government has made it clear that it expects advice to be based on scientific evidence and that the decision on whether to take other factors into account rests with Government. This effectively restricts advice on non-ionising radiation to risk assessment and excludes risk management. This is not the case with ionising radiation, where NRPB has been actively involved with risk management***”

Also, we could find archived the significant **NRPB Report: Mobiles Phones and Health**^{xvii}, which comprises a more documented review of science at that time and **promotes the precautionary principle**^{xviii}; **in chapter 5. Scientific Evidence**^{xix} we find the following important points that were never taken into consideration by the governmental authorities:

“Although thermal effects may account for the positive reports that RF radiation enhances the actions of genotoxic agents, the evidence for epigenetic effects must be taken seriously. Further research is needed in this area to clarify the position”. [...] “We propose that large case-control studies of brain cancer, acoustic neuroma, salivary gland cancer, and leukaemia should be funded.” [...] “There is also good evidence that exposure to mobile phone signals at intensities within existing ICNIRP guidelines has direct, short-term effects on the electrical activity of the human brain and on cognitive function.”

Speaking about the NRPB, the Government’s page **RadioWaves: Reducing Exposure from Mobile Phones**^{xx} still refers to NRPB’s **Advice on Limiting Exposure to Electromagnetic Fields (0–300 GHz)**^{xxi} - this warns about greater protection needed for people with epilepsy or other medical conditions, foetuses, babies and young children – par. 111 (never however applied by the authorities)

The other references on the page **UK Health and Security Agency: Mobile phone base stations: radio waves and health** (updated August 2021) direct us to the **2012 AGNIR Report** we have mentioned above, the **EU - SCENIHR Reports** (also called ‘opinions’ – that we will present below) and (just) 2 supportive studies: **Cohort Study of Mobile Phone Use and Health (COSMOS)**^{xxii} - Finland based (2007-2009) and **the Study of Cognition, Adolescents and Mobile Phone studies (SCAMP)**^{xxiii} at Imperial College London. **Both studies are epidemiological, thus based on questionnaires addressed to mobile phone users; no real experimental science on the effect of RF on the human body or other living organisms is mentioned.** Another reference on the mentioned page is to the telecom industry’s regulator **OFCOM**^{xxiv} and also to an **audit link** (which is not working). OFCOM itself appears

concerned only with the exposure of the workers and not of the public, in matters of general protection referring to the HSE page on non-ionising radiation^{xxv}. The referenced document provided by HSE (Health and Safety Executive) is The Control of Electromagnetic Fields at Work Regulations 2016^{xxvi}

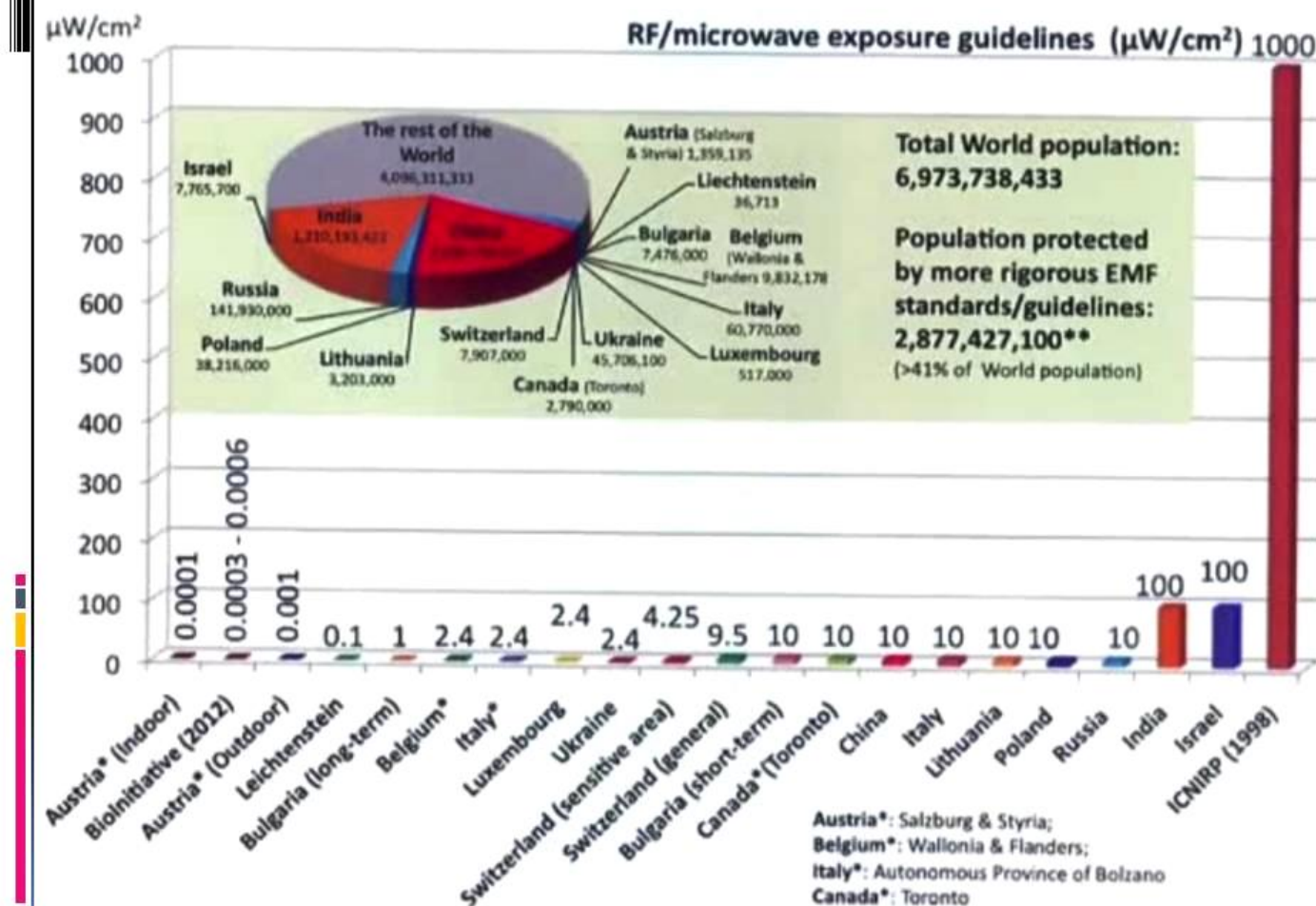
We can observe that **the safety thresholds indicated for frequencies between 6 and 300 GHz are in this guide, are 140 V/m (Table AL3) and 50 W/m², meaning 50,000,000 microW/m² which, corresponds to the ICNIRP limit for occupational exposure, which is five times greater than for the general population** (Table ELV6)

- HSE on the page Elecromagnetic radiation in the telecommunication sector^{xxvii} also mentions NRBP and their report that was archived and we discussed before. It is most interesting to observed that **no other authority or science in matters of EMF radiation** is mentioned on this important page. The Non-Ionising Radiation: FAQ page on the HSE website^{xxviii} sends us to the ICNIRP guidelines and in matters of **Mobile phone masts/base station** to the Mobile Telecommunications and Health Research Programme^{xxix} – that, as said above, is not working and to **Public Health England (which has been replaced by HSE itself!)**. So as observed, the scientific reports on this issue offered by the governmental authorities are actually, circular, redundant, archived, not functional and, generally speaking, minimal.
- UK Govt - Smart meters: radio waves and health^{xxx} - updated 28th June 2017 . This page refers again to the ICNIRP guidelines, the UKHSA position that “*exposure to radio waves does not provide a basis to decline having a smart meter*”,. and the above mentioned **AGNIR 2012 Report** confirming ICNIRP’s guidelines. There are a few phrases regarding ‘**sensitivity to radio waves**’ which lead only to a single report from 2008 accomplished by an Irish epidemiologist: Definition, epidemiology and management of electrical sensitivity^{xxxi} (again, no experimental science presented)
- SCENIHR^{xxxii} (The European Commission's 'Scientific Committee on Emerging and Newly Identified Health Risks'), which presented **SCENIHR 2015 Report 'Opinion on Potential health effects of exposure to electromagnetic fields'**^{xxxiii}. This review discusses a few dozens of studies on animals or cells (including human cells), but within very limited parameters: **the period of exposure is generally between less than an hour to a couple of days and the RF frequencies used are of maximum 2.45 GHz**. Indeed, in this summary, just a minority of the studies show a damaging effect of the RF radiation, but according to a few open-access databases, there are many thousands of studies old and new, showing the contrary. Two important critical reports on the **SCENIHR Report** coming from **Prof. Emeritus Martin Pall** and **The International Electromagnetic Fields Alliance, IEMFA** can be found in ANNEX D

The European Parliament commissioned a research report which was finalised in July 2021: “**Health Impact of 5G**” (by dr. Fiorella Bellpogi PhD et al.)^{xxxiv} ; its conclusions in regards to the commonly used RFR frequencies (450 to 6,000 MHz) were the following :

I) CANCER: FR1 (450 to 6 000 MHz): EMF are probably carcinogenic for humans, in particular related to gliomas and acoustic neuromas; FR2 (24 to 100 GHz): no adequate studies were performed on the higher frequencies; 2) REPRODUCTIVE DEVELOPMENTAL EFFECTS: FR1 (450 to 6 000 MHz): these frequencies clearly affect male fertility and possibly female fertility too. They may have possible adverse effects on the development of embryos, fetuses and newborns; FR2 (24 to 100 GHz): no adequate studies were performed on non-thermal effects of the higher frequencies”.

10 uW/cm2 = 100,000 uW/m2; 1000 uW/cm2 =10,000,000uW/m2



Finally, in matters of governmental RF guidelines worldwide, let's consider that, despite being used as an argument by the supporters of wireless communications, **there is no scientific consensus at a global level. Countries like Switzerland, Italy, France, Austria, Luxembourg, Bulgaria, Poland, Hungary, Israel, Russia and China have set exposure limits 100 to 10,000 times less than the USA and Canada", respectively the ICNIRP guidelines.** (EHT: Schools and Wireless^{xxxv} - 2015)

We may have to assume that these nations do allow their own professionals and experts to come with their research on the effect of non-ionising radiation on humans and life and do take their conclusions into consideration, even if they contradict in a great measure the methods and conclusions of ICNIRP.

As for the **older national standards of RFsafety**, you can find some important critical facts on **prof. Magda Havas'** page: [Review of International Microwave Exposure Guidelines from 1957 to 1968.](#)^{xxxvi}

The reality is that far from having a consensus, the world has witnessed a continuous battle against the imposition of the flawed ICNIRP guidelines, that allowed the industry to fill the world with increasingly powerful wireless radiation – for details, please see the following resources:

- **GOVERNMENTS AND ORGANIZATIONS THAT BAN OR WARN AGAINST WIRELESS TECHNOLOGY - DOCTORS AND SCIENTISTS CALLING FOR STRICTER REGULATION AND/OR A MORATORIUM ON WIRELESS TECHNOLOGY**^{xxxvii} (1993 - 2018)
- **INTERNATIONAL POLICY: PRECAUTIONARY ACTIONS ON WIRELESS RADIATION**^{xxxviii}
- **MEDICAL DOCTORS AND PUBLIC HEALTH ORGANIZATIONS**^{xxxix} **CONSENSUS STATEMENTS AND RECOMMENDATIONS ON CELL PHONES AND WIRELESS RADIATION**

A legal endeavour addressed to the UK Government shows **some of the breaches of the 5G rollout in regards to actual UK legislation: Challenge under Schedule 8 paragraph 39(5) of EU Withdrawal Act 2018 Filed with UK Government Legal Department**^{xl} - 12th September 2023 by N. McDougall and K. Churchill (can also be supported [here](#)^{xli})

More recently, some shocking discoveries of UK activists in matters of **5G planning in the UK** show that **some operators installing masts appear to be no (more) existing companies, and the so-called 'ICNIRP safety certificates' are also bogus and most what we can get is self-certification of safety from involved companies**³. Please watch:

- **5G - microwave beam technology, surveillance capabilities and bogus safety certificates** (with telecom eng. Dir.

³ ICNIRP declares on their website that they do not emit such papers

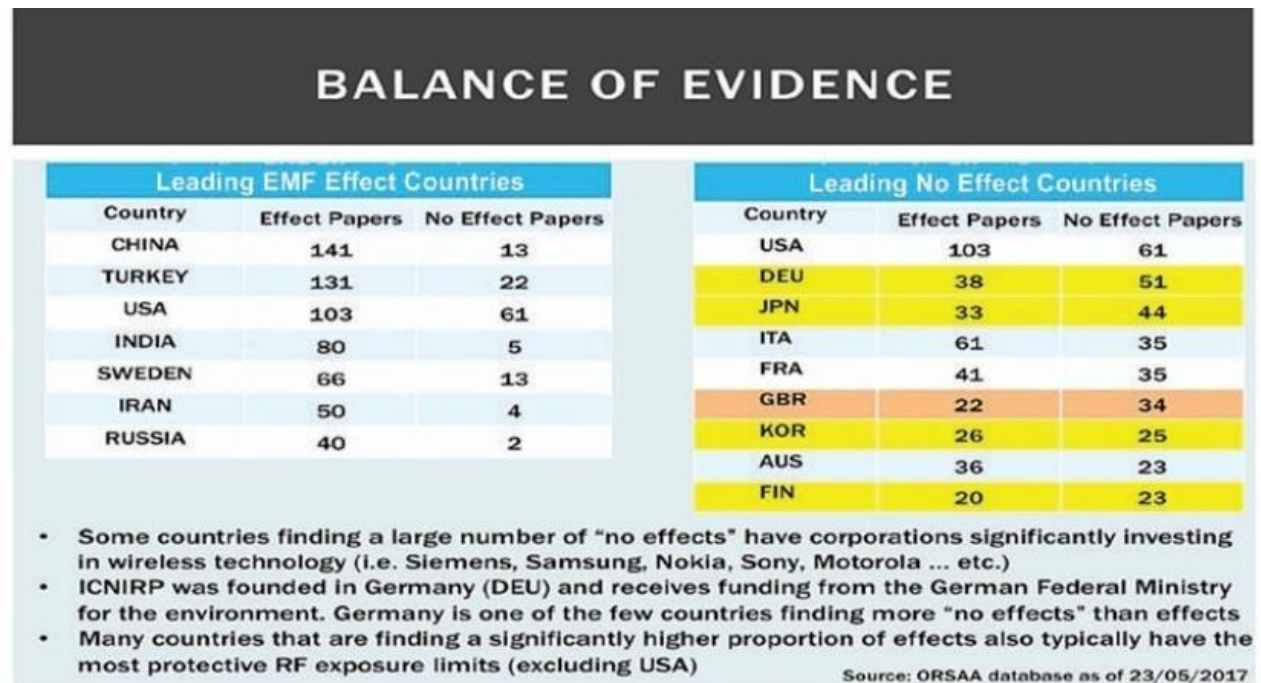


Figure 5
Review of research by country of origin

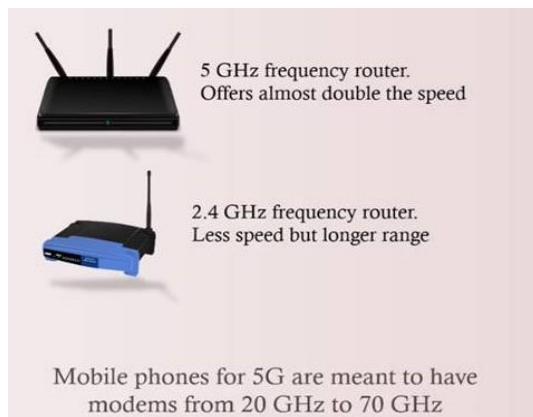
ORSAA

Nicholas Martin, founder of ACHES International) The papers presented in this video show the industry has got knowledge of the harms of non-ionising radiation and the fake companies and safety certificates can be easily identified (see the letter sent to the police pointing to the crime of forgery related to these planning papers^{xlii}); also some important hints are given in regards to the deployment of 5G on the new LED light poles (more on this here^{xliii})

- 5G - Is it safe? Bogus safety certificates - Discussion with Lara Hurley^{xliv} (Heritage Party). We find in this interview a few important observations on the complete lack of risk and Health and Safety assessments related to the 5G deployment, the lack of concern for the particular case of people with metallic implants (nobody carries liability for potential health effects!) and again, about the dissolved companies involved in the rollout.
- The 5G operators that don't exist!^{xlv} Researcher Ian Jarvis also confirms the problem of non-existing companies mentioned in the 5G planning papers. More important documents on planning permissions, complaints etc, as also tutorials on how to deal with authorities can be found on his page: <https://standupwolverhampton.com/emf-radiation-5g/>)

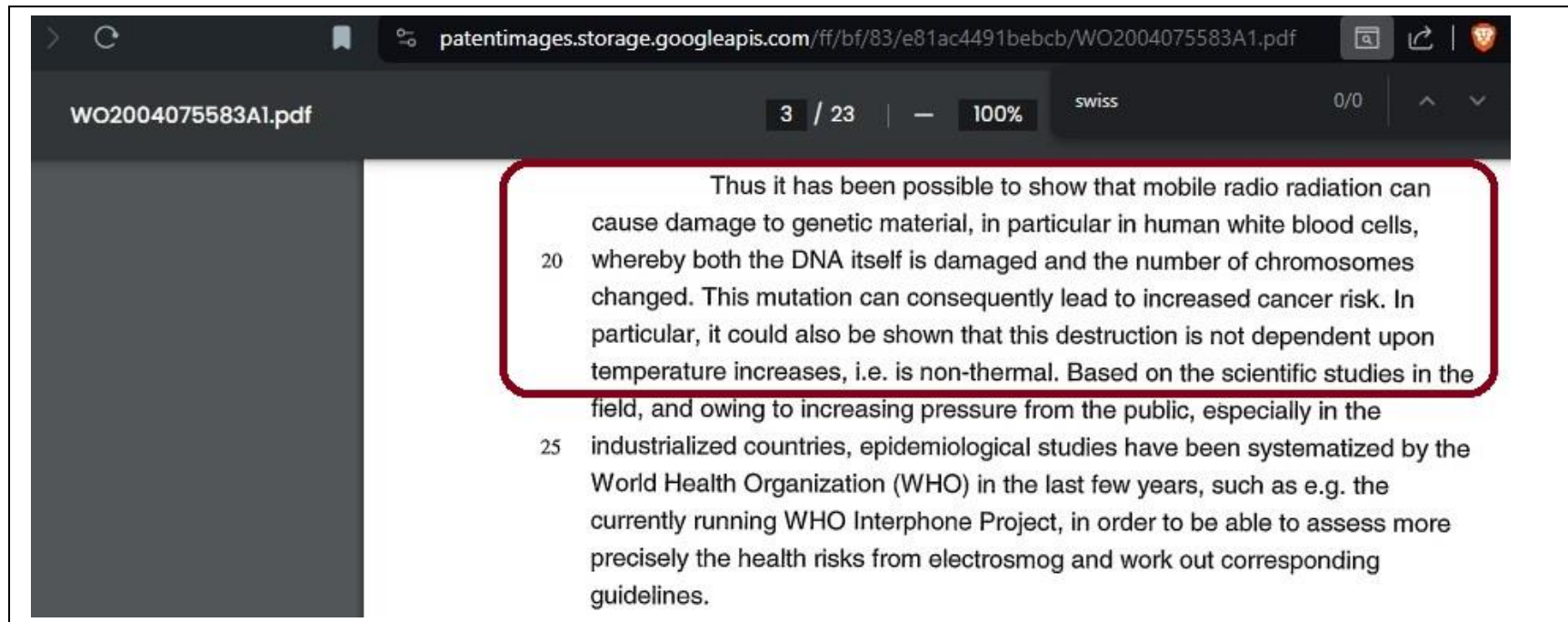
Now, let's point out that beyond the wide accessibility and the (disputable) financial advantages relative to the Ethernet fiber (wired^{xlvi}) solution which was the start of the Internet, the wireless communications have also important disadvantages admitted even by the industry:

WiFi also has many disadvantages. For one, WiFi connections tend to be unsecure. Its lack of security generally comes from its wide signal range, allowing the network to be accessed within a 20 to 50-meter radius. This allows others to access the network as long as they remain within range. Even when the connection is protected with a password, others may attempt to hack into the network, leaving all private data vulnerable. In order to counter this, most employ sophisticated techniques using high-end technologies to protect their data. However, such techniques also have their own weaknesses that can be exploited to gain access. They are also very expensive to implement. Another disadvantage of WiFi connections is that signals tend to be unreliable. That is because radio frequencies are still subject to various external interferences. These interferences can cause a variety of connection problems such as providing weak signals, poor reception, or even loss of connection. Add to that the fact that WiFi connections are inherently slower than wired connections. Typically, wireless connections have speeds ranging from 1 to 54 Mbps whereas wired connections have speeds of 100 Mbps or higher.” (LiFi vs WiFi^{xlvii})



THE INDEPENDENT SCIENCE TESTIFYING FOR THE REALITY OF THE EXTREME DANGERS OF NON-IONIZING RADIATION (PARTICULARLY FOR CHILDREN)

The 2004 patent filled by the actually best telecom company in Switzerland, Swiss Telecom^{xlvi}: WO2004075583A1 - REDUCTION OF ELECTROSMOG IN WIRELESS NETWORKS shows that the industry is aware of the harmful effects of RF/ non-ionising radiation^{xlix}.



Let's add here that **the problem of liability for damage** is taken into account by some of telecom's industry's internal reports:

- From **Verizon Communications Inc.**, United States Securities and Exchange Commission Form10-K, Annual Report, fiscal year ended December 31st 2014: *'We are subject to a significant amount of legislation which could require us to pay significant damages or settlements. Our wireless business also faces personal injury and consumer class action lawsuits relating to alleged health effects of wireless phones or radio frequency transmitters ... In addition, we may be required to pay significant awards or settlements.'*

- **AT&T annual report 2014: 'As we deploy newer technologies, especially in the wireless area, we also face current and potential litigation relating to alleged adverse health effects on customers or employees who use such technologies.'**

George Carlo PhD, former Chairman, International Association for the Wireless Telecommunications Industry (CTIA) Wireless Technology Research Program (WTR) warned: *'Severe and potentially deadly diseases have been associated with the use of wireless technology for at least two decades, yet the truth about the risks has never emerged in mainstream media outlets due to the telecommunications industry being one step ahead of the 'game'.'*

Robert C Kane PhD, Motorola Senior Research Scientist, who worked in the telecommunications industry for a total of thirty years, in his 2001 book, *'Cellular Telephone Russian Roulette - a Historical and Scientific Perspective'* affirmed that *'the manufacturers of portable and mobile transmitting communication devices then lobbied the IEEE/ANSI standard setting committee. The industry convinced the committee to exempt portable hand-held communications devices from the safe exposure limits of the safety standard'.*

George Carlo PhD also observed that *"Ordinarily, in a regulatory context, new technologies would be tested extensively before they reached the market place in order to make sure they didn't present any danger to consumers. In the case of cell phones and the wireless industry as a whole, this crucial stage was bypassed"*

As seen above, based on very little and biased science conveyed mainly by foreign NGO's, the governmental authorities have concluded that RF radiation, including 5G, pose no perceived threat to human health or the environment. However it has been scientifically and repeatedly proven by a large body of research, going back to the 1930's, that radiofrequency radiation well below ICNIRP guidelines, and related to non-thermal effects, can inflict biological harm.

From the introduction to **Robert C Kane's** book *'Cellular Telephone Russian Roulette'*, we read: *'...what you will find here is a commentary that presents a litany of past research studies, hundreds of research studies from the 1950s through the mid-1990s. But don't be misled. These older studies are equally alarming in their findings of radiation exposure, DNA damage, chromosome damage, tissue damage, radiation absorption, cataract formation, tumour formation, memory loss, motor skills degradation, and more. There are many more studies, hundreds that might have been added.'*

Indeed, the mobile phone industry has never been held to the regulatory safety standards that the motor industry, the pharmaceutical industry, the electrical industry, and most other industries are forced to comply with and this despite all the accumulated knowledge on the effects of non-ionising radiation.

With the rollout of the 5G infrastructure, using various RF detectors, we can now see thousands and even tens of thousands of microW/m² in very populated areas of our towns and cities such as hospitals, education centres, retail parks and shopping areas, train and bus stations etc. Our own phones can give us in the UK tens of thousands of uW/m² (microW/m²) and we have recorded even **a record of +100,000 uW/m² on calling another**

number or browsing the Internet on a couple of mobile phones - which is the upper limit of our main measuring device, an Acoustimeter and also the RF safety level in countries like China and Russia (for pictures and references, please see [ANNEX E](#)).

It is almost never mentioned by authorities or by the mainstream media and therefore ignored by the vast majority of the population that in 2011,

radiofrequency EMFs has been classified as a Class 2B “possible carcinogen” by the IARC group^l, subordinated to the World Health Organization (WHO). Several scientists who were on the international committee looking at the available science at the time are now saying that using the exact same scientific criteria, **EMFs should be re-classified as a Class 2A or 1 carcinogen (just like smoking and asbestos)**, a fact supported today by many other leading EMF scientists - see [a recent epidemiology update by Dr. Anthony Miller^{li}](#)

It is assumed that there are now **over 40,000 published studies^{lii} on the topic of the damaging effect of non-ionising radiation** but for non-professionals, a good introduction to the science of the harmful effect of RF radiation on humans and living organisms can be found in the article: [Understanding the Science^{liii}](#).

A paper of great importance addressing the **infiltration of private interests in the WHO’s decisions on EMF/ RF radiation, the intentional ignorance and denial of science and testified harm** (especially in the case of children and aviation industry) is Olga Sheen’s 2017 **‘WORLD HEALTH ORGANIZATION is setting the**

Powerwatch
Peer-reviewed scientific studies on EMF related subjects
Science index • Overview | Article library | List of studies | Basic guide to EMFs | International guidance levels | Unit conversion | Frequently asked questions | Other resources
When it comes to EMF issues, one of the most frequently heard phrases is "There is no evidence to support EMFs having health effects" or simply "There is no conclusive evidence".
This is completely wrong; there is an enormous body of evidence out there, but public and even academic assessments seems to be very poor. Therefore, we will be presenting a list of papers and odds ratios which either show serious effects or are considered important papers on the subject which we have collected over the years. This page will be updated regularly.
[[This study has found effects from the exposure or radiation category
[[This study has found no effects from the exposure or radiation category
[[This study has offered important insights or findings but is neither a positive or null finding
Contents (click on subjects to be taken to that section of the page)
[Mobile Phones] [Phone Masts] [Radio Transmitters] [Powerlines and Substations] [WIFI] [Electromagnetic Sensitivity] [IEC and Brain Response] [RF Mechanisms] [ELF Mechanisms]
(Click on subjects to be taken to that section of the page)
Mobile and Cordless Phones
[Back to the top]
[[Vile J et al. (July 2018) Occupational exposure to high-frequency electromagnetic fields and brain tumor risk in the INTEROCC study: An individualized assessment approach, *Environ Int.* 2018 Jul 8;119:353-365. doi: 10.1016/j.envint.2018.06.038. [Epub ahead of print] [View Author's abstract conclusions] [View on PubMed]
[[Wang P et al. (July 2018) Wireless Phone Use and Risk of Adult Glioma: Evidence from a Meta-Analysis, *World Neurosurg.* 2018 Jul;113:e629-e636. doi: 10.1016/j.wneu.2018.04.028. [View Author's abstract conclusions] [View on PubMed]
[[Hardell L et al. (May 2018) Radiofrequency radiation from nearby base stations gives high levels in an apartment in Stockholm, Sweden: A case report., *Cancer* 2018 May 16;129(10):2018-2025. Epub 2018 Mar 16. [View Author's abstract conclusions] [View on PubMed]
[[Sagar S et al. (May 2018) Comparison of radiofrequency electromagnetic field exposure levels in different everyday microenvironments in an internet cafe, *Environ Int.* 2018 May 9. [View Author's abstract conclusions] [View on PubMed]
Dr. Zory Glaser
Documents by Title Documents by Author Documents by Date Annotated Papers Search
Zory Glaser Archives documents by title. Enter search term(s) below.
Show 25 per page Reset
Title * ID
4275 MICROWAVE RADIATION FREE-AIR DETECTOR INTRODUCED 1893
12TH ANNUAL CONFERENCE ON ELECTRICAL TECHNIQUES IN MEDICINE AND BIOLOGY - DIGEST OF TECHNICAL PAPERS - 460
12TH ANNUAL CONFERENCE ON ELECTRICAL TECHNIQUES IN 443
CLICK HERE TO JOIN OUR MAILING LIST
Dr. Zory Glaser has donated his RF/Microwave research archives to Professor Magda Havas of Trent University.
We thank Dr. Glaser for so generously sharing his body work on the effects of electromagnetic and radio frequency radiation.
Condition and legibility of original documents means the quality of the OCR-scanned PDF files found here varies.

Oceania Radiofrequency Scientific Advisory Association
About Us Team Resources Contact Don
SCIENTIFIC EVIDENCE THAT 5G AND 4G DENSIFICATION IS NOT SAFE
Jun 16, 2020 | 0 comments
5G

standard for a wireless world of harm^{liv4}:

The greatest scientific database on natural health therapies, **Green MedInfo** also offers us links to **99 peer-reviewed papers on Electromagnetic Radiation Mitigation**^{lv}, which point especially to **neurological, cognitive, DNA and cancer inducing damage**.

Figure 3
Typical funding source of DNA studies

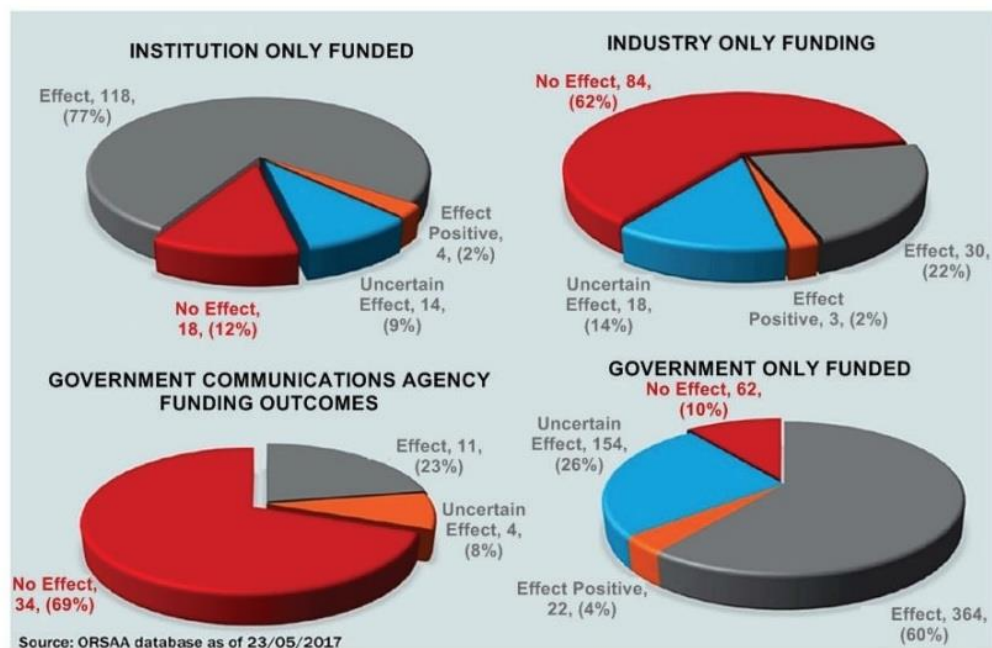


Figure 4
Review of funding sources in ORSAA database
Country of origin – issues of potential bias and potential industry and government influence?

The respected professional organisation **Oceania Radiofrequency Scientific Advisory Association**^{lvi} (ORSAA) has created a **huge, comprehensive, non-biased, multi-categorized, searchable database of papers on non-ionizing EMF/EMR**^{lvii} to help address the challenges of documenting a case, considering the vast amount of research in the area of RF biological harm. It is free, regularly updated and designed to allow data to be easily retrieved, sorted and analyzed.

The general conclusion is that the majority of non-industry funded studies show great evidence of biological harm at the non-thermal RF-EMR power levels, that are far below the ICNIRP level of 10,000,000 uW/m2. The mechanisms of harm have also been identified. Such facts and many other valuable ones are shown very clear in the **response addressed by ORSAA to ICNIRP in 2018**.^{lviii}

The scientific review “**Biological Effects of Electromagnetic Fields**^{lix}” by **W. Ross Adey**, published in 1993 in Journal of Cellular Biochemistry proves that the ICNIRP investigations based only on the detection of the thermal effects of the RF radiation are completely flawed, by pointing to the biochemical pathway of damage as revealed by more recent studies “**A clear emergent conclusion is that many observed interactions are not based on tissue heating. Modulation of cell surface chemical events by weak EM fields indicates a major amplification of initial weak triggers associated with binding of**

⁴ The document has been sent to Emilie van Deventer, PhD, Head of the International EMF Project, WHO; António Guterres, Secretary-General, United Nations; Catalina Devandas Aguilar, Special UN Rapporteur on the rights of persons with disabilities; WHO regional offices, government agencies, MPs, investigative journalists, relevant organizations, advocacy groups and scientists worldwide.

hormones, antibodies, and neurotransmitters to their specific binding sites. Calcium ions play a key role in this amplification.”

Prof. Emeritus Martin Pall continues on the same path, with groundbreaking discoveries of the **RF radiation’s mechanisms of harm**. A few of his papers can be found below:

- **Wi-Fi is an important threat to human health**^{lx} (2018)

*“Repeated Wi-Fi studies show that **Wi-Fi causes oxidative stress, sperm/testicular damage, neuropsychiatric effects including EEG changes, apoptosis, cellular DNA damage, endocrine changes, and calcium overload**. Each of these effects are also caused by exposures to other microwave frequency EMFs, with each such effect being documented in from 10 to 16 reviews. Therefore, each of these seven EMF effects are established effects of Wi-Fi and of other microwave frequency EMFs. Each of these seven is also produced by downstream effects of **the main action of such EMFs, voltage-gated calcium channel (VGCC) activation**. While VGCC activation via EMF interaction with the VGCC voltage sensor seems to be the predominant mechanism of action of EMFs, other mechanisms appear to have minor roles. Minor roles include activation of other voltage-gated ion channels, calcium cyclotron resonance and the geomagnetic magnetoreception mechanism. Five properties of non-thermal EMF effects are discussed. **These are that pulsed EMFs are, in most cases, more active than are non-pulsed EMFs; artificial EMFs are polarized and such polarized EMFs are much more active than non-polarized EMFs**⁵; dose response curves are non-linear and non-monotone; **EMF effects are often cumulative; and EMFs may impact young people more than adults**”*

- **5G: Great risk for EU, U.S. and International Health! Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them**^{lxi}

Another very comprehensive summary of science from prof. Pall – **in matters of RF radiation as a cause of cancer, 35 papers are cited and also 20 important scientific reviews and 17 cell phone studies that were completely ignored by SCENIHR** are presented. The end chapter refers to ‘the great risks of 5G’

- **Low Intensity Electromagnetic Fields Act via Voltage-Gated Calcium Channel (VGCC) Activation to Cause Very Early Onset Alzheimer’s Disease: 18 Distinct Types of Evidence**^{lxii}

A clear description of the main mechanisms of harm (via **free radicals’ creation, oxidative stress, mitochondrial dysfunction**) inflicted by non-ionising EMF, particularly **the pulsed radiation’s effects on the human brain**.

Some of **prof. Pall’s** videos and slides presentations can be found **on this page**^{lxiii}.

⁵ See for example, the 2015 study: **Polarization: A Key Difference between Man-made and Natural Electromagnetic Fields, in regard to Biological Activity** (<https://www.nature.com/articles/srep14914>)

Generally speaking, the peer-reviewed independent science generally shows harmful effects of RF radiation that include: **fatigue, headaches, sleep problems, anxiety, ringing in the ears, heart and cardio-vascular problems, learning and memory disorders, increased genotoxicity and cancer risk, fertility problems, etc.** In view of all this, the persistent claim of mainstream medicine that the EMF-related symptoms and health issues are simply **psychosomatic**, is completely flawed and the studies supporting this theory appear to hold very little scientific value, specifically “**psychological provocation studies are unreliable in testing EHS**”. (see Dariusz Leszczynski, PhD’s paper^{lxiv}). In fact, **top functional/ integrative medicine doctors are reporting that their patients clearly suffer from EMF-related symptoms, which are greatly reduced or eliminated when their exposure is reduced.** These practitioners include **Dr. Dietrich Klinghardt (Sophia Health Institute^{lxv}), Dr. Zach Bush^{lxvi}, Dr. Jay Davidson^{lxvii}, Dr. Lee Cowden^{lxviii}, Dr. Daniel Pompa^{lxix}**, and hundreds of other doctors specialized in environmental medicine worldwide; ex: the members of UK’s **PHIRE (Physicians Health Initiative for Radiation and Environment^{lxx})**, the **European Academy for Environmental Medicine^{lxxi}** and many other organisations.

As for other medical opinions, we want to add here the official position of the **American Academy of Environmental Medicine^{lxxii}** (founded 1965): **American Academy of Environmental Medicine Electromagnetic and Radiofrequency Fields Effect on Human Health^{lxxiii}** (more [here](#)) in which they confirm the scientific literature proving **non-ionising radiation at non-thermal levels causing genotoxic/ carcinogenic effects, neurologic and nephritic damage and electrosensitivity** and ask for:

• **an immediate caution on Smart Meter installation due to potentially harmful RF exposure.**

- **Accommodation for health considerations regarding EMF and RF exposure, including exposure to wireless Smart Meter technology. Independent studies to further understand the health effects from EMF and RF exposure.**
- **Recognition that electromagnetic hypersensitivity is a growing problem worldwide.**
- **Understanding and control of this electrical environmental bombardment for the protection of society.**
- **Consideration and independent research regarding the quantum effects of EMF and RF on human health.**
- **Use of safer technology, including for Smart Meters, such as hard-wiring, fiber optics or other non-harmful methods of data transmission.”**

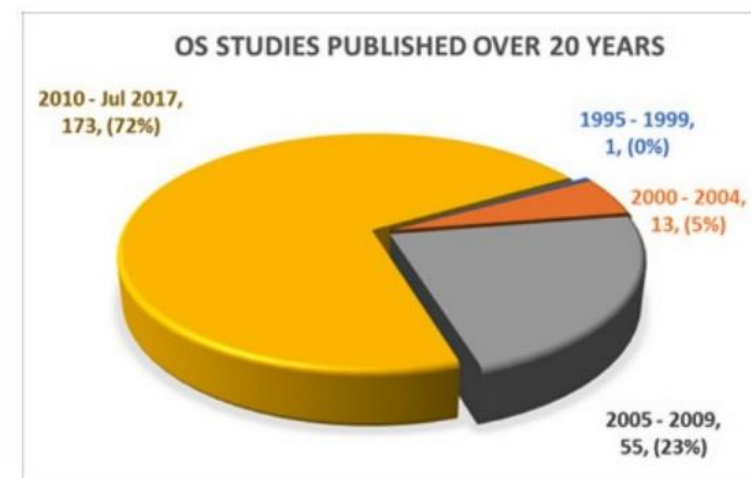


Figure 1. A. Oxidative stress-related significant findings were reported by 89% of 242 peer-reviewed experimental studies that investigated biomarkers of oxidative damage or altered antioxidant levels. B. Most of the studies on oxidative stress, i.e. 173 (72%) were published after 2010 and therefore comprise the more recent evidence for biological harm from RF-EMR.

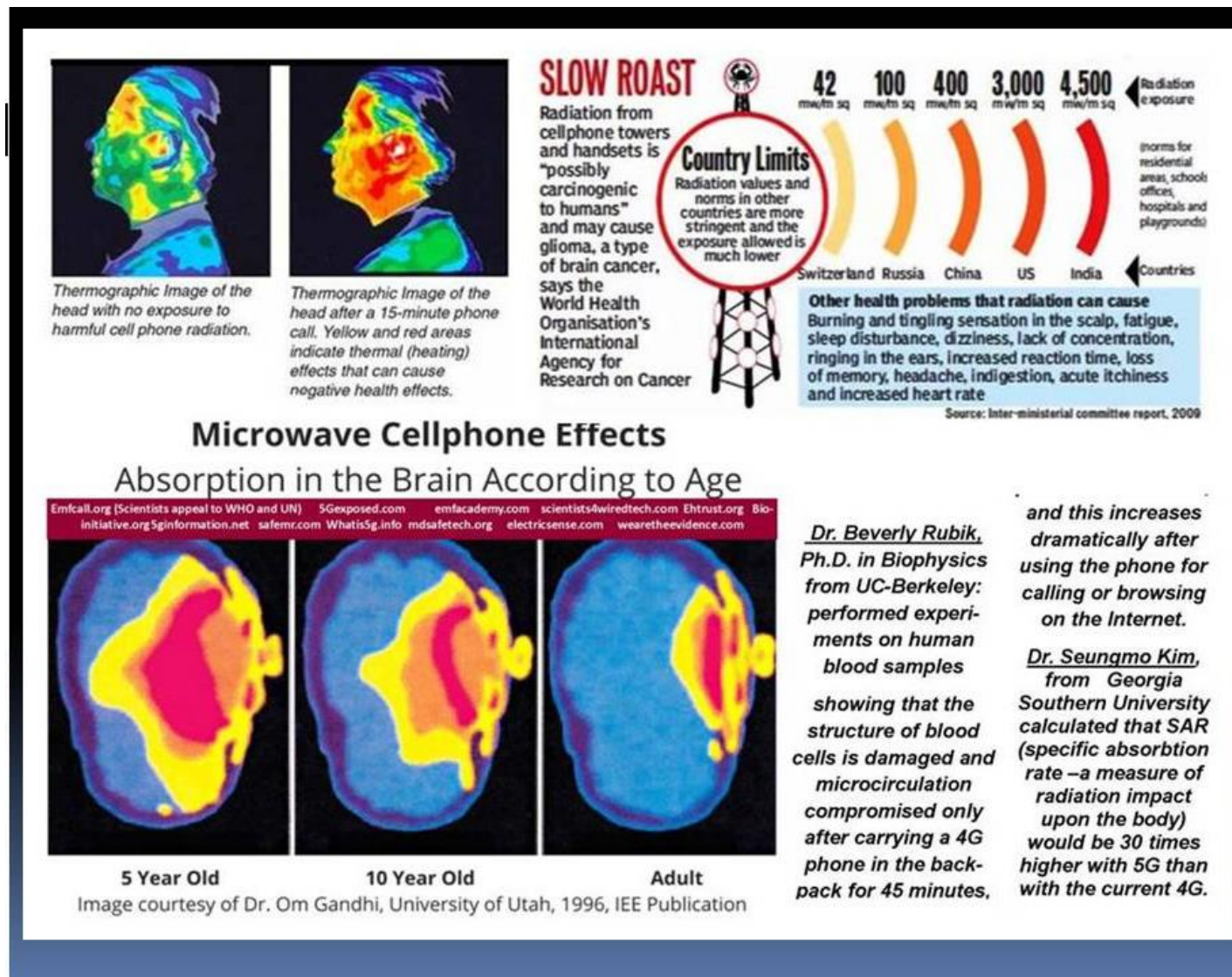
In 2014, 15 UK doctors including **dr. Erica Mallery Blythe** (founder of PHIRE) and **dr. Zac Cox** (The World Foundation for Natural Science for England) have released an **Open letter by British medical doctors: Health and safety of Wi-Fi and mobile phones**^{lxxxiv}, in which they cite a number of international conventions and research groups (incl. IARC, Bioinitiative and the American Academy for Environmental Medicine) and state that they “***urge health agencies and the public to act immediately to reduce exposure to radiofrequency/ microwave radiation. This is especially important for children, who are physiologically more vulnerable to this exposure, and for whom adults have a safeguarding responsibility.***”

In the report “**Medical And Scientific Experts Call for Safe Technologies in Schools**^{lxxv}” we get a list of official statements from Medical Associations (**Austrian Medical Association, American Academy of Environmental Medicine, International Society of Doctors for the Environment, Irish Doctors Environmental Association, Interdisciplinary Society for Environmental Medicine, Swiss Doctors for Environmental Protection**) as also from other independent scientists and medical doctors who **advocate for the removal of wireless technology in schools (including smart meters) and general protection of children from the harms of non-ionising radiation.**

For a very interesting review of the **use of RF/ microwave & millimetre wave radiation (5G) as a silent weapon post WW2 and its dire impact, especially on pregnant women and children**, one should read **Trower Report: Humanity at the Brink**^{lxxvi} authored by microwave warfare professional and globally recognized expert in the impact of wireless technologies on life, physicist **Barrie Trower**. Barrie is probably the first and most compelling activist in this field and many interviews with him, (as also with the other doctors and experts mentioned in this paper) can still be found on YT, bitchute.com, rumble.com, odysee.com and other platforms and there are a number of important papers that he has released for the public and authorities worldwide. The interview of **Barrie Trower** by **dr. Zac Cox** from April 2015: **The Danger of Microwave Technology**^{lxxvii}, for example, should not be missed by any responsible parent.

Let’s add up to this, the report written by **Professor Tom Butler: On the Clear Evidence of the Risks to Children from Non-Ionizing Radio Frequency Radiation: The Case of Digital Technologies in the Home, Classroom and Society**^{lxxviii}, which highlights some of the most recent published research, but delves also into past historic papers on RF/EMF radiation. He mentions “**the extensive bibliography published at the U.S. Naval Medical Research Institute by Dr. Zory Glaser and his team**^{lxxix}, the significant clinical and biological effects of RFR—both thermal and non-thermal—[that] were identified and accepted by Soviet and Eastern-Bloc scientists”, and also the gradual cover-up of the newer science on the harm of the RF radiation, that has been however introduced to the public by experts such as **Dr. George Carlo**, who directed the industry-financed Wireless Technology Research (WTR), **dr. Ron Melnick** (NTP study), **dr. Lenart Hardell** and others. Prof. Butler presents the **proof of toxicity and carcinogenicity of 2G, 3G in animals brought by the 16 years and \$25+ million National Toxicology Program (NTP)**^{lxxx} **which simulated the exposures of US cell phone users to RF Microwave Radiation from cell phones and from the wireless infrastructure (and update**^{lxxxi}) and the independent **confirmation of this research from the researchers of the Ramazzini Cancer Research Institute**^{lxxxii}. Also prof. Butler mentions some relevant epistemological studies pointing at **a possible link with a very high rise of glioblastoma tumours in England between 1995 and 2015 and also with temporal lobe tumours over a period of 20 years in the UK.**

The increase of glioma tumours is also mentioned by scientist **Ron Kostoff** in his 2020 work “**LARGEST UNETHICAL EXPERIMENT IN HUMAN HISTORY**”^{lxxxiii}: “There are different estimates of glioma incidence and trends in glioma incidence. For an approximate estimate, Rasmussen et al [2017] estimates the glioma incidence in the Danish population at about 7/100,000, a figure in line with other national and global estimates. Additionally, Phillips et al [2018] presents evidence of a 100% increase in Glioblastoma Multiforme from 1995-2015, a major component of glioma. Some of this increase may have been due to wireless radiation exposure, since that time period was associated with a major expansion of cell phone and other wireless device use. For approximate estimation purposes, assume the wireless-free glioma incidence to be about 5/100,000. Hardell et al [2011] showed, in a case-controlled study, that glioma incidence doubled for those who starting using cell phones as adults (>20 years old), were ‘heavy’ users (>30 minutes per day), and used cell phones for more than ten years. Hardell also showed glioma incidence quadrupled for those who started using cell phones younger than twenty years old, were heavy users, and used cell



phones for more than ten years.”

Power Watch UK^{lxxxiv} offers a huge database of references to thousands of studies on the harm of non-ionising radiation (see also: **Power Watch: 1,670 Peer-Reviewed Scientific Papers on Electromagnetic Fields and Biology or Health**^{lxxxv} (Oct 2018)) and also an educational presentation of the main concepts in this field and possible preventive measures; Among them, we note the studies showing the link with **Childhood leukaemia/ Childhood Cancer**^{lxxxvi}, **Brain Tumours**^{lxxxvii} and **Electromagnetic Sensitivity**^{lxxxviii}

In the 2009 paper ‘**Cellphones and Brain Tumors: 15 Reasons for Concern, Science, Spin and the Truth Behind Interphone**^{lxxxix}’, authored by L. Lloyd Morgan (a retired electronics engineer, member of the Bioelectromagnetics Society) and major representatives of Powerwatch UK, Electromagnetic Health US, EMR Policy Institute US, Radiation Research Trust UK, ThePeoplesInitiativeFoundation.org also backed by scientists and experts in this field from 14 countries, we find that **not only independent studies, but also industry funded ones show that cell phones cause cancer, the highest risk being in children, higher the younger the child was when starting using a phone.** Lloyd Morgan the primary author cautions that cell phone use might lead to an increased risk of more than just brain tumors: “*Exposure to cell phone radiation is the largest human health experiment ever undertaken, without informed consent, and has some four billion participants enrolled. Science has shown increased risk of brain tumors from use of cell phones, as well as increased risk of eye cancer, salivary gland tumors, testicular cancer, non-Hodgkin's lymphoma and leukemia. The public must be informed.*”

The image on the right shows you the main health impact of RF according to existing scientific literature, as compiled by Ron Kostoff PhD in **The Largest Unethical Medical Experiment in the History of Humanity**

Largest Unethical Medical Experiment in Human History		Copyright 2020	RN Kostof
Table A2-1 – Manual Taxonomy			
CATEGORY	KEY PHRASES		
Cancer/Tumors	cancer, leukemia, glioma, lymphoma, melanoma, Hodgkin's disease, tumor, acoustic neuroma, meningioma		
Neurodegenerative	memory, central nervous system, learning, neurodegenerative, Alzheimer's disease, cognition, amyotrophic lateral sclerosis, dementia, epilepsy, multiple sclerosis, cognitive impairment, seizures, autism		
Reproduction	pregnancy, reproductive, sperm, embryos, testicular, fertility, embryo, testosterone, infertility		
Genotoxicity	DNA damage, genotoxic, micronuclei, mutagenic, strand breaks, chromatin, mutation, chromosome aberrations,		
Cardiovascular	Cardiac, cardiovascular, pacemaker, implanted, Cardiovascular disease, arrhythmia, arterial blood pressure, ventricular fibrillation		
Immunity	lymphocytes, immune system, immunity, leukocytes, antibodies, neutrophils, autoimmune, macrophage,		
Biomarkers	apoptosis, oxidative stress, Malondialdehyde, reactive oxygen species, superoxide dismutase, lipid peroxidation, inflammation, oxidation, ornithine decarboxylase, barrier permeability, atrophy, C-reactive protein, oxidative damages		
Sensory Disorders	auditory, acoustic, hypersensitivity, electromagnetic hypersensitivity, cataract, tinnitus, dermatitis, cataractogenic, pain sensitivity, pain threshold		
Discomfort Symptoms	depression, anxiety, headache, dizziness, depressed, vertigo, nausea, low back pain		
Congenital Abnormalities	malformations, teratogenic, congenital malformations, cleft palate,		
Circadian Rhythm and Melatonin	melatonin, sleep, circadian, insomnia, pineal function		
Chronic Conditions	metabolism, glucose, endocrine, cholesterol, Diabetes, calcium homeostasis, obesity		

Finally, let's listen to **Prof. Denis L Henshaw**, Fellow Collegium Ramazzini Emeritus Professor of Human Radiation Effects Atmospheric Chemistry University of Bristol: ***"Here is a simple question: If cell phone radio waves cannot cause cancer because they are non-ionising, then how do asbestos particles, cancer viruses and carcinogenic chemicals cause cancer because none of these are ionising in the sense of ionising radiation?"*** (**'Cell phone radio waves have insufficient energy to damage DNA and cause serious illness – an enduring fallacy'**^{xc'})

MORE ON CHILDREN AND THE IMPACT OF RF/ NON-IONISING RADIATION. CELL TOWERS' DANGERS



As seen from the already mentioned references, the independent research, new and old shows clearly that **children and fetuses are especially vulnerable, as are the elderly and those with existing health conditions such as multiple chemical sensitivities, mould toxicity and chronic illnesses. Growing children's brains are especially at risk, as their head absorbs much more radiation compared to adults.** See for example, the 2018 study: **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality**^{xc}

Regardless of this, an US 2014 survey showed that up to 75% and in UK a quarter (2024) of 3-4 year old children^{xcii} possess their own cell phone! North Lanarkshire Council ensures the children in Cumbernauld can have 5G 'immersive experiences' since 2021: **New 5G facility brings limitless potential^{xciii}**

However, due to increasing awareness among the public of the great risk for children, Wi-fi has already been removed from many schools and other educational institutions worldwide^{xciv}. For example, Cyprus, France and Israel have banned totally or partially Wi-Fi in classrooms for young children and/or reduced microwave radiation exposure. A more detailed presentation of the problem of WiFi in schools, the effect on children and the worldwide measures that have been taken against it can be found in the Environmental Health Trust document **Schools and Wireless**^{xcv} (2015)

In it we can see that a considerable number of individual schools have removed Wi-Fi from their buildings in the US and Europe and there is legislation in place dealing with restricting Wi-Fi in schools and the use of mobile phones and other wireless devices by children also in Belgium, Spain, Australia, Italy, Germany, Austria, Canada and various US areas. Many medical and environmental groups have warned about the dangers of these technologies. The American Academy of Pediatrics has called on the FCC to “**Protect children’s health and wellbeing**^{xvii}” stating that “*Children are not little adults and are disproportionately impacted by all environmental exposures, including cell phone radiation. Current FCC standards do not account for the unique vulnerability and use patterns specific to pregnant women and children.*” A list with peer-reviewed studies indicating various diseases and symptoms induced by the exposure to RF radiation was added also.

It is interesting to observe that for the UK, this document shows the following:” *The UK National Health Service offers specific **Recommendations for children**^{xvii} and cell phones as “children are thought to be at higher risk of health implications”. • “Children should only use mobile phones for essential purposes and keep all calls short. “ • For the public they have “recommendations to help lower any potential long term risks” which include keeping calls short, keep phone away from the body on standby mode, only use it when the reception is strong and use a phone with an external antenna.”*

The above indicated page on the NHS website is now missing. As Public Health England does not exist anymore, their warning regarding the issue of mobile phone and children cannot be reached either, but in the context observed at the beginning of this document related to the official pages offered by the British authorities on this topic, none of these is a surprise to us.

Moreover, as shown by dr. Sarah Starkey in ‘Technology and Education. How safe are our children’ (2018) “*The UK Chief Medical Officers have recommended that children under the age of 16 use mobile phones for essential purposes only. **Unfortunately, almost no one knows about this.** Children cannot be protected when no one knows about the information.*”

In April 2020, EM Radiation Research Trust representatives Eileen O’Connor and Susan Foster have sent a very important and documented **OPEN LETTER**^{xviii} in regards to the lack of safety of 5G rollout particularly for the UK children and addressed it to Prime Minister Boris Johnson, public officials and other interested parties. “*The Radiation Research Trust (RRT) joins Robert F Kennedy Jr in calling on Prime Minister Boris and political leaders **to protect those who have been harmed already by this radiation and prevent further harm.** The RRT also call on Prime Minister Boris Johnson and political leaders **to question conflicts of interest between the WHO EMF project and ICNIRP as a matter of urgency.***” Obviously, the rollout of 5G and the deployment of WiFi in schools has continued unabated.

Very important presentations on the subject of the impact of EMF radiation on children, as also EHT and everything that can be medically attributed to the effect of EMF, can be found on **PHIRE**’s website^{xcix} where, particularly, dr. Erica Mallery-Blythe has got some great contributions, and also on the **Environmental Health Trust**’s website^c, whose founder, dr. Devra Davies, a Nobel Co-laureate, has been tireless in her endeavours to warn the public and the medical world about the plague of non-ionising radiation.

See for example: **Electromagnetic Radiation, Health and Children**^{ci} 2014 by dr. Erica Mallery-Blythe

& The Health Impacts of Wireless Radiation to Children: Cyprus Pediatric Symposium^{cii} by Devra Davis PhD:

PHIRE 2020 CONSENSUS STATEMENT ON NIR^{ciii} (Non-Ionising Radiation) “has been signed by medical groups representing over 3,500 medical doctors so far, including experienced clinicians and widely published and respected scientists who are experts in this field. **It declares current safety levels to be inadequate and highlights some of the disease processes linked with NIR (non-ionising radiation) exposure in peer-reviewed publications; it points out the vulnerabilities of children¹⁰ and other hypersensitive groups, whose symptoms may include sleep problems, impaired concentration, headaches, and mood disturbance;¹¹ it also highlights the contravention of Human Rights and Equalities acts and requests urgent responses from governments and health authorities to halt further deployment of emitting technology and address current public health failures.**”

Let’s finally take into consideration that, as early as 2007, 4 years before IARC declared EMF non-ionising radiation a possible carcinogen, **The European Environment Agency** put out the following compelling statement^{civ}: “**All reasonable measures to be taken to reduce exposures to electromagnetic fields, especially radiofrequencies from mobile phones and particularly the exposures to children and young adults. Current exposure limits to be reconsidered.**” More recently, however this issue is no more a subject of interest for EEA either, as they are mainly preoccupied with the climate change issue and the UN Sustainable Agenda.

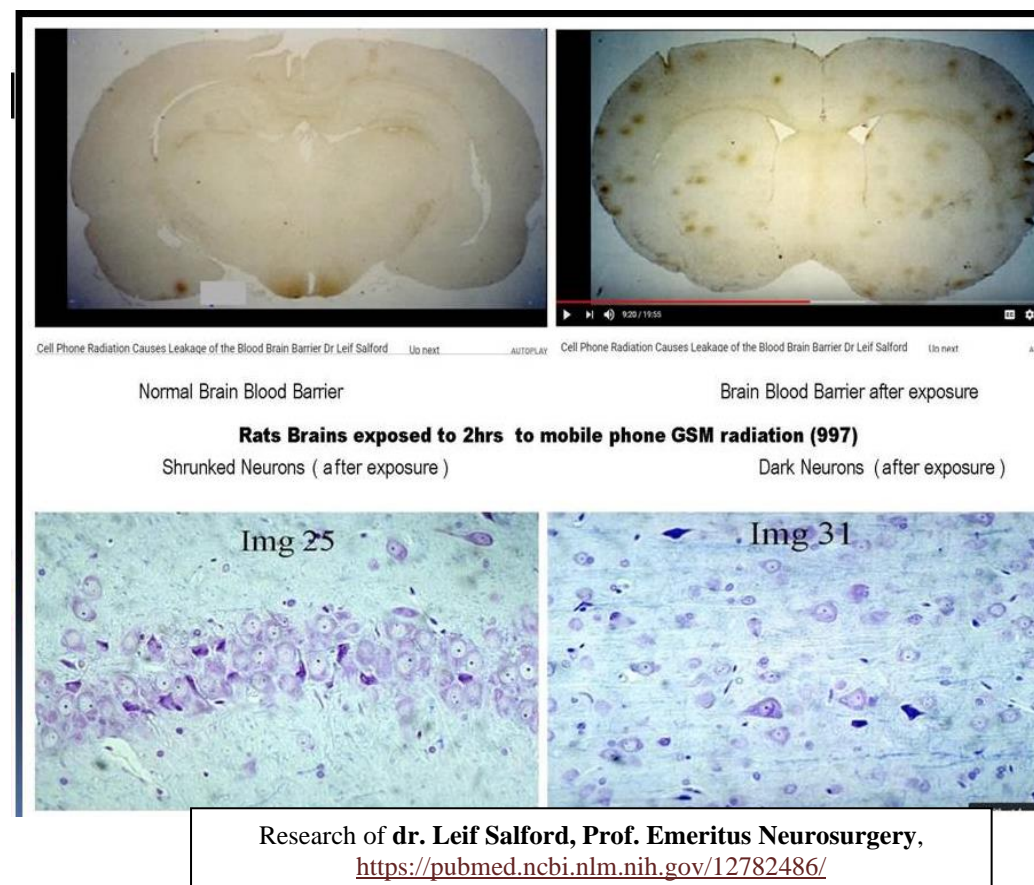
Some resources for schools and councils directed particularly at the protection of our children:

PARENTS FOR SAFE TECHNOLOGY RESOURCES FOR SCHOOLS^{cv}

WI-FI IN SCHOOLS^{cvi} (EHT Resources)

LETTERS AND TESTIMONIES FROM LENA PU^{cvi}

WIRELESS RADIATION HEALTH RISKS AND SAFE TECHNOLOGY IN SCHOOLS: LETTERS TO STATE EDUCATION AUTHORITIES AND UNIVERSITIES^{cvi}



SCIENTIFIC LETTER ON SCHOOL CELL TOWERS SENT TO THE ONTARIO MINISTER OF EDUCATION^{cix}

In matters of **CELL TOWERS RF RADIATION DANGERS**, anybody can see a multitude of critical testimonies from doctors and experts, as also from persons affected by their radiation on YT ([here^{cx}](#) is also a great page with many studies and testimonies about this). A more recent and documented presentation of Prof. Dr. Paul Theroux shows a summary of studies **linking incidence of cancer (particularly, brain tumours) with distance from cell towers**: [Dr. Paul Heroux Cell Tower Radiation Health Effects Research Presentation^{cx}](#) (see also his very important interview for Epoch Times: [Professor Kills Human Cells in His Lab With EMF, What This Means for Your Home | Dr. Paul Héroux^{cxii}](#)), while [Cell Tower Health Effects Safety Issues Presentation with Dr. Rob Brown, Vice President of Scientific Research and Clinical Affairs Environmental Health Trust^{cxiii}](#) shows **this problem in the context of international research and regulations.**

“The following peer-reviewed, published studies examine the adverse effects of wireless radiation in relation to antenna location.

- *Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays: “Both anecdotal reports and some epidemiology studies have found headaches, skin rashes, sleep disturbances, depression, decreased libido, increased rates of suicide, concentration problems, dizziness, memory changes, increased risk of cancer, tremors, and other neurophysiological effects in populations near base stations.”*

- *Neurobehavioral effects among inhabitants around mobile phone base stations: “The prevalence of neuropsychiatric complaints as headache (23.5%), memory changes (28.2%), dizziness (18.8%), tremors (9.4%), depressive symptoms (21.7%), and sleep disturbance (23.5%) were significantly higher among exposed inhabitants than controls...”*

- *Epidemiological Evidence for a Health Risk from Mobile Phone Base Stations: “We found that eight of the 10 studies reported increased prevalence of adverse neurobehavioral symptoms or cancer in populations living at distances < 500 meters from base stations. (Letter to Sebastopol Verizon 5G^{cxiv})*

A lot of information on the topic of CELL TOWERS’ IMPACT ON HEALTH AND LIFE can be found on the EHT’s website ([here^{cxv}](#)), particularly the review: [HEALTH EFFECTS OF CELL PHONES AND WIRELESS RADIATION- PUBLISHED CREDIBLE SCIENCE^{cxvi}](#) (more on cell towers on EHT and the [CELL TOWER pages of PARENTS FOR SAFE TECHNOLOGY^{cxvii}](#). More tower cells studies [here^{cxviii}](#).

As for some good news coming from EH, its president, dr. Devra Davis has announced that the **trial against the American Federal Communications Commission** - noted here by legal experts: [Scientists Sue FCC for Dismissing Studies Linking Cell Phone Radiation to Cancer^{cxix}](#) (2020) - has ended with a **partial success one year later**: [EHT WINS IN HISTORIC DECISION, FEDERAL COURT ORDERS FCC TO EXPLAIN WHY IT IGNORED SCIENTIFIC EVIDENCE SHOWING HARM FROM WIRELESS RADIATION^{cxx}](#) (2021, AUG)

Despite this official admission, at the level of governmental authorities, things have not changed for the better in the US, nor anywhere else at the state level⁶ (for example. in Switzerland some cantons have stopped 5G, but not the entire country, in Italy also only some localities stopped it). Officially RF radiation is not a problem at all and, as we all know, the large scale deployment of high power, high frequency masts and (countless) small cells has continued unabatedly, as seemingly the most important thing in the world. Some countries (US, Australia, some EU countries, Brasil and India included) have particularly rejected Huawei or ZTE 5G infrastructure^{cxxi}, but, despite the issue being hotly debated since 2020, the UK will still be using Huawei till 2027^{cxxii}.

In 5G Magazine's: 5G TOWER, SMALL CELLS, DAS EDITION | 5G MAGAZINE^{cxxiii} we find out that 5G TOWERS UPGRADING, as also the new 5G MASSIVE MIMO TOWERS involve a FIBER OPTIC backhaul, which means much more power and distance covered. Consider that now the frequencies for wireless backhaul involved are between 7 and 40 GHz – which can cover 5 to 30 km; V band (60 GHz) – can cover up to 1 km and E band (70/80 GHz) that can cover up to 0.3 km; E and V used to be for military (radar) and research purposes only; however the 80 GHz frequencies have been open for small cells communication in countries such as the US, France and Poland. The top 12 providers of cell towers can be found at the end of this paper.

Finally, let's note that the UK citizens can consult MASTDATA^{cxxiv} NPERF MAPS^{cxxv} STATUS CHECKER^{cxxvi} and UK PLANNING ALERTS^{cxxvii} to see and take action on the new tower cells and 5G networks appearing or existing in their areas. LOCAL LIBRAIRIES are meant also to display these planning alerts.



As this is a matter of survival for all of us and for our living environment, dealing with the local councils, MPs, medical professionals, governmental authorities and telecom executives and addressing them with liability papers can and should be attempted, but also more lawsuits (class action included) as the ones against FCC & Telecom in the US since 2020^{cxxviii} (the glyphosate-cancer related litigations in the US are a good example of citizens overcoming the power of great corporations). In the UK, the two notable attempts of challenging the 5G rollout have been blocked by the High Court: UK High Court case against EMFs and 5G (2021)^{cxxix} – Jessica Learmond Criqui's Case And Action Against 5G Case – lead by foremost UK Human Rights lawyer Michael Mansfield QC^{cxxx} (Judgment Received – May 2023^{cxxxi}). The arguments used in these cases are essential. Please continue to follow up and support such endeavours.

⁶ Though some countries have rejected Huawei or ZTE 5G infrastructure- see <https://dgtalearth.com/why-is-5g-banned-in-some-countries-2024/> UK is still using Huawei till 2027. How and in how many years will the countless towers and small cells in Britain be tackled so to take down the Huawei elements and replace them with other is another story.

In 2023 the 4 great telecom companies offering 5G in the UK “**EE, O2, Three and Vodafone have been hit with a class action lawsuit^{cxxxii}** that accuses them of **unfairly charging 28.2 millions of customers claiming £3.3 billion (up to 1,823 each)**. So yes, when it is a matter of money, people do react in the end... but unfortunately , not when it is about their health and their environment.

THREE INDEPENDENT EMF GUIDELINES – THE BIOINITIATIVE REPORT, EUROPAEM EMF GUIDELINE & BUILDING BIOLOGY INSTITUTE

Now, in view of such possible actions, we need more structured references and summaries of the actual, independent science concerning the EMF impact on health. If we want to link our measurements of RF radiation to the damages described in the literature, we have to look first and foremost to the work of the **Biointiative Group**, who provided the public and authorities with the **BIOINITIATIVE REPORT^{cxxxiii}**, from which we can select **Biological Effects from Radiofrequency Radiation^{cxxxiv}** and **The Biointiative Report Conclusions^{cxxxv}** that begin with:

'Overall, these 1800 or so new studies report abnormal gene transcription (Section 5); genotoxicity and single-and double-strand DNA damage (Section 6); stress proteins because of the fractal RF antenna like nature of DNA (Section 7); chromatin condensation and loss of DNA repair capacity in human stem cells (Sections 6 and 15); reduction in free-radical scavengers – particularly melatonin (Sections 5, 9, 13, 14, 15, 16 and 17); neurotoxicity in humans and animals (Section 9), carcinogenicity in humans (Sections 11, 12, 13, 14, 15, 16 and 17); serious impacts on human and animal sperm morphology and function...'

In the end, as guidelines, **the Biointiative Report points today to a threshold of safety of just 3-6 microW/m2** – see **ANNEX F**, which is still, however considerably higher than the old thresholds of less than 1 microW/m2 in the US.

Another very important independent summary of science coming from **Igor Belyaev and Colleagues** and published in The Journal of Environmental Health is **EUROPAEM EMF GUIDELINE 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses^{cxxxvi}** deals with all the sources of EMF pollution and their effects on the human body, particularly on EHS people, also providing recommendations aiming at restoring personal health - according to a great body of literature. As declared, **The EUROPAEM EMF Guideline 2016 “represents the current state of medical science”**, intended to give *“concepts for diagnosing and treating EMF-related health problems to improve/restore individual health outcomes and strategies for prevention”* and addressed to *“physicians of all disciplines and dentists, health authorities, health administrators and caseworkers”*

It is specified that the precautionary guidance values given in this guideline should be considered not only for humans, but also for other vertebrates and invertebrates. These **safety values** are provided in the following Tables 3 and 6 and show, for example **for Wi-Fi less than 10 uW/m² for day time, less than 1 for night time and less than 0.1 for sensitive population. For 4G is less than 10 uW/m² for day time, less than 1 for night time and less than 0.1 for sensitive population** – see **ANNEX G**. Obviously considering the presence of sensitive people in any community, the precautionary lowest level should be taken in consideration by the industry's regulators: The precautionary guidance values for the 5G technology should also be incorporated in the Guidelines.

We will also add to these two important references, the **BUILDING BIOLOGY INSTITUTE EVALUATION GUIDELINES FOR SLEEPING AREAS**^{cxxxvii} that shows for RF radiation:

No concern : less than 0.1 uW/m²; Slight concern: 0.1 – 10 uW/m²; Severe concern: 10 – 1000 uW/m²;

Extreme concern: more than 1000 uW/m²

Now, when thinking about **the extreme differences between the above guidelines and those of ICNIRP**, it is relevant to point out that, according to Electrosensitivity UK, **the chair of the ICNIRP stated in 2016 that everyone has the right to choose whether to follow the ICNIRP heating and short-term guidelines, or the international biological and long- and short-term guidelines such as Bioinitiative 2012 and EUROPAEM 2016.** (**Electrosensitivity UK Response to ICNIRP Consultation**)^{cxxxviii}

Of course, **in the case of Bioinitiative and EUROPAEM we're speaking here of thresholds of non-ionising radiated power that are 3 million to 100 million times lower than those of ICNIRP**, but really, **this is the most ridiculous condition of the scientific division in this field, function of the financial interests in cause.** Please remember that ICNIRP, whose declared aim is *“to protect people and the environment against adverse effects of non-ionizing radiation”*, **does not offer certificates of safety, but only recommendations and the responsibility for the protection of people is left with the national authorities/institutions**⁷. Also there are clear limitations of ICNIRP Guidelines in matters of the effects of RF on health which are admitted by it: **“ICNIRP acknowledges that RFR can interfere with individuals' implants, but states that is beyond the scope of its Guidelines. Further the Guidelines expressly state that while they “are based on the best science currently available, they recognise that there may be limitations to this knowledge that could have implications for the exposure restrictions”.**The Guidelines go on to note that *“There is not sufficient research addressing potential relations between radio frequency EMF's and the skeletal, muscular, respiratory, digestive, and excretory systems, and so these are not considered further”*. (**Application to the European Court of Human Rights**)^{cxxxix}

⁷ *“In preparing recommendations the Commission considers the principles upon which protection measures can be based while leaving to the various international and national authorities/institutions the responsibility of formulating appropriate regulations and codes of practice”* – ICNIRP STATUSES <https://www.icnirp.org/cms/upload/doc/ICNIRPstatutes.pdf> ”

It seems however, that, same as the telecom companies, the insurance companies are also very much aware of the implications of wireless technologies for the health of the population. For example, Lloyds of London writes that there is a standard over the market denying insurance for EMF damage:

*'The Electromagnetic Fields Exclusion (Exclusion 32) is a **General Insurance Exclusion and is applied across the market as standard. The purpose of the exclusions is to exclude cover for illnesses caused by continuous long-term non-ionising radiation exposure i.e. through mobile phone usage.**'*

From the article **The inconvenient truth about cancer and mobile phones** (2018)^{cxl} written by journalists **Mark Hertsgaard** and **Mark Dowie** we read: *'One key player has not been swayed by all this wireless friendly research: the insurance industry. In our reporting for this story, **we found not a single insurance company that would sell a product-liability policy that covered mobile phone radiation.**'*



THE EFFECT OF RF RADIATION ON THE ENVIRONMENT

The **devastating RF radiation impacts on the environment - wild birds, insects, trees, microorganisms** is, unfortunately, very underreported or reported in a misleading manner, such as the various unproven theories that **the great decline in the number of bees is caused by global warming** that the pages of mainstream media claimed more recently. Still, in May 2018, the Telegraph managed to put out an article promoting the review of science gathered in the EU funded **project Eclipse: Electromagnetic radiation from power lines and phone masts poses 'credible' threat to wildlife, report finds**^{cxli}

Eclipse^{cxlii} project studied over 97 studies on how electromagnetic radiation may affect the environment and reach the conclusion that, according to some of the available literature, **non-ionising (RF) radiation does indeed pose a potential risk to bird, insect and even mammal orientation, the behaviour and reproduction of insects (particularly bees), the embryogenesis process in birds and plant metabolism.**

In **Effects of non-ionizing electromagnetic fields on flora and fauna**^{cxliii}, Part 2 impacts: how species interact with natural and man-made EMF (2022), by evaluating the available literature, the authors come to much more firm and dramatic conclusions than the researchers involved in the Eclipse project. They affirm that **"any species of flora and fauna, because of unique physiologies and habitats, are sensitive to**

exogenous EMF in ways that surpass human reactivity. This can lead to complex endogenous reactions that are highly variable, largely unseen, and a possible contributing factor in species extinctions, sometimes localized. Non-human magnetoreception mechanisms are explored. Numerous studies across all frequencies and taxa indicate that current low-level anthropogenic EMF can have myriad adverse and synergistic effects, including on orientation and migration, food finding, reproduction, mating, nest and den building, territorial maintenance and defense, and on vitality, longevity and survivorship itself. Effects have been observed in mammals such as bats, cervids, cetaceans, and pinnipeds among others, and on birds, insects, amphibians, reptiles, microbes and many species of flora. Cyto- and geno-toxic effects have long been observed in laboratory research on animal models that can be extrapolated to wildlife. Unusual multi-system mechanisms can come into play with non-human species - including in aquatic environments - that rely on the Earth's natural geomagnetic fields for critical life-sustaining information. ”

THREE SUMMARIES OF RESEARCH ON THE IMPACT OF RF RADIATION ON THE ENVIRONMENT & MORE

ELECTROMAGNETIC FIELDS THREATEN WILDLIFE^{cxliv} (Dec 2023)- by **dr. Joel Moskowitz** (presents studies on insects – bees particularly, birds, cetaceans, ecosystems – flora and fauna)

EHTRUST – REVIEW OF SCIENCE ON THE EMF EFFECTS ON BEES, BUTTERFLIES, WILDLIFE^{cxlv} – very important summary of research, with excerpts and videos of researchers, all pointing out to the increasing danger of EMF to the vitality of wildlife and ecosystems.

5G AND SMALL CELL ENVIRONMENTAL EFFECTS: BIRDS, BEES TREES AND CLIMATE^{cxlvi} (2021) – this is an updated review of the environmental effects of 5G and cell network proliferation with a focus on trees, bees and birds, but also on the lack of sustainability of 5G/Internet of Things due to increased energy consumption and greenhouse gases impact.

Author and EMF expert **Arthur Firstenberg** has investigated **the death of an entire colony of sea birds**^{cxlvii} (sandwich terns) nesting on the Dutch island of Texel, which was blamed on ‘bird flu’. According to Firstenberg’s research, no less than **105 antennas (4G) within 7 miles of the island were aiming exactly at it and the number of frequencies increased suddenly in May from 5 to 11**. Another colony nesting 20 miles away from this which had just 35 antennas (4G) aimed at the spot from less than 8 miles escaped from disaster. Similar 2 distinct situation for colonies of terns were observed in France. The damaging effect of radio transmitters on pets and especially on small birds (case in which death is caused in matters of days) is documented in the article ‘**Don’t irradiate the birds**’^{cxlviii} which ends with a mentioning of the 2017 **Report for the United Nations Educational Scientific and Cultural Organization**^{cxlix} by ethno-botanist **Mark Broomhall**. In the report, Broomhall links **the exodus of 76 species of birds, but also the decrease up to extinction of various other species of bats, frogs, tadpoles, cicada, moths and butterfly from Mt Nardi with the RF technology installed there since 2002 (3G up to 4G+ masts)**. Firstenberg also has received numerous reports from people who observed the decline in the population of insects or birds in their areas since the deployment of 5G, as also the way the pets appeared to be affected by the radiation,



particularly in the case of animal sanctuaries. This points out also at the **huge danger represented by 5G Starlink satellites and receivers:** “*Starlink is 5G phased array technology from the sky. When a Starlink dish is online, that means a satellite is aiming a narrow beam at it. But by the time the beam reaches Earth from a few hundred miles up in space, the beam can be 8 miles in diameter or more. The dish also aims a beam of radiation directly at the satellite, and scatters radiation around it. If there are a lot of dishes in a 10-mile radius, as there are in Guffey, radiation from Earth and space is scattered far and wide.*” (Dogs, Cats, Birds and Maui^{cl})

For more information, please see also: 1. Animals And Plants Under Stress From Radiation - #1 How artificial EMF radiation harms life^{cli} (YT) and the corresponding article: Animals And Plants Under

Radiation Stress^{clii}

Particularly, in matters of the **impact of the microwave and MMW radiation on rats** a few references to significant studies can be found in ANNEX H (see more about the massive NTP study^{cliii})

MORE ON THE IMPACT OF RF RADIATION ON INSECTS:

Insects play a vital role in all earthly ecosystems, the food chain and the pollination of plants and are essential to the decomposition that keeps nutrients cycling, the soil and vegetation alive.

The article THE INSECT APOKALYPSE IS HERE^{cliv} points to various studies and observations testifying about **the global decline of the population of insects (more than 75% decline over 27 years)** according to peer-reviewed paper published in PLOS), not only the rare ones, but even the most common. Though pesticides such as **neocotinoids** - which are neurotoxic - for insects are known to kill bees, the Insect Inspector (bee keeper and citizen scientist)^{clv} has pointed out to **a correlation between the exposure to RF radiation and the decline of population of insects and particularly 5G**, as the only major factor intervening as a change in the environment in the last period (5G – The Digital Killing Fields – EMF/EMR^{clvi}) – thus, he called the insects “**the canary in the coal mine**”

Small insects such as the common D. Melanogaster are impacted by the radiation of a mobile phone at a genetic level that compromises their reproduction:

'Mobile-phone radiation-induced perturbation of gene expression profiling, redox equilibrium and sporadic-apoptosis control in the ovary of *Drosophila melanogaster*'. “Exposure of adult flies to mobile-phone radiation for 30 min has an immediate impact on ROS production in animal's ovary, which seems to cause a global, systemic and non-targeted transcriptional reprogramming of gene expression, 2 h post-exposure, being finally followed by induction of apoptosis 4 h after the end of exposure. **Conclusively, this unique type of pulsed radiation, mainly being derived from daily used mobile phones, seems capable of mobilizing critical cytopathic mechanisms, and altering fundamental genetic programs and networks in *D. melanogaster*.**”

The study [Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz](#)^{clvii} published in Nature shows that **the use of 5G above 6GHz may have catastrophic impact on insects**: “The insects show a maximum in absorbed radio frequency power at wavelengths that are comparable to their body size. **They show a general increase in absorbed radio-frequency power above 6 GHz** (until the frequencies where the wavelengths are comparable to their body size), which indicates that if the used power densities do not decrease, but shift (partly) to higher frequencies, the absorption in the studied insects will increase as well. A shift of 10% of the incident power density to frequencies above 6 GHz would lead to an increase in absorbed power between 3–370%. **This could lead to changes in insect behaviour, physiology, and morphology over time due to an increase in body temperatures, from dielectric heating.**” (see right picture showing the penetration effect of RF function of frequency on honey bees)

The UK charity [Buglife](#)^{clviii} urged that **plans to install 5G transmitters may have "serious impacts" on the environment**, The Telegraph reported. For this reason, **it suggests these transmitters not be placed on LED street lamps, which would attract insects and increase their exposure** (it would, in fact, surely increase the exposure of any form of life existing in such communities!)

Also on this topic, we would recommend the video [Study links bee decline to cell phones - Dr. Andrew Goldsworthy talks about cryptochromes \[2010\]](#)^{clix} and the corresponding article: [Study links bee decline to cell phones](#)^{clx}

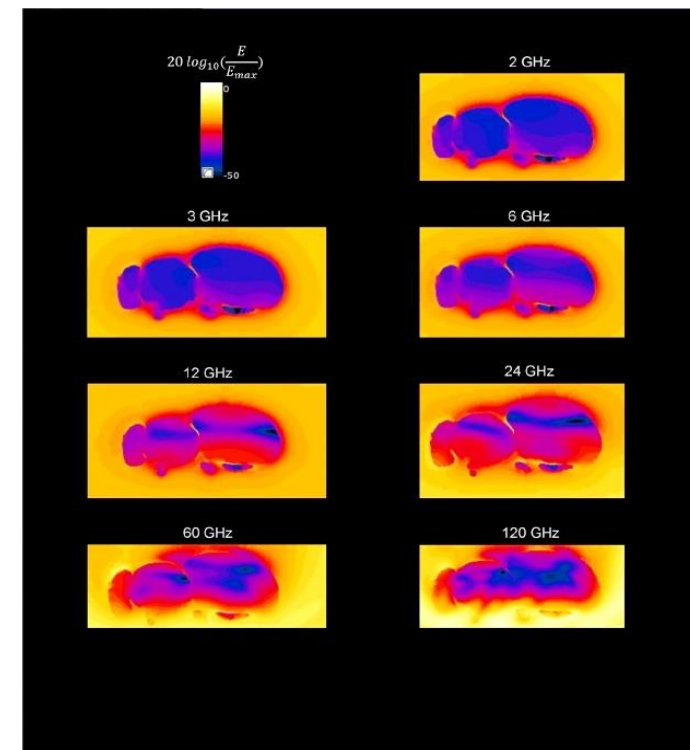


Figure 4. Normalized Electric field strength (dB) in a mid-transverse cross section of the Western Honey Bee as a function of frequency for a single plane wave incident from below with polarization orthogonal to the shown plane (No. 5 in Fig. 1). Normalization was executed for each simulation separately, i.e. E_{max} can be different in each subfigure.

IMPACT OF RF RADIATION ON PLANTS:



Plant^{clxv}, Wifi on/Wifi off/ the effect of Wifi on plant growth^{clxvi}.

In fact, we would invite any skeptic to repeat at home or work such very simple experiments and draw their own conclusions. We realised, by personal and unfortunate experience, that systematic exposure of small pets such as cats or rabbits to wireless routers or windows facing cell antennas has lead to **accelerated aging and cancers** in just a couple of years. It is well known across the world that a huge rise in **pets cancer, practically a true epidemic** has occurred in the last period and veterinarians have no explanation about the causes of this phenomenon.

See also: Andrew Goldsworthy ~ Tree damage: Effects of Electromagnetic Stress in Trees ~ 2011^{clxvii} (YT)

89.9% of studies on the effect of RFR on plants show effects, acc. to: Halgamuge, "Weak radiofrequency radiation exposure from mobile phone radiation on plants 2020" This analysis of 45 peer-reviewed scientific publications (1996-2016) on changes in plants due to the non-thermal RF-EMF effects from mobile phone radiation demonstrates that the **data from a substantial amount of the studies show physiological and/or morphological effects**. Just a few examples:

Researchgate: 'Radiofrequency radiation injures trees around mobile phone base stations'^{clxi}.

Oxford Academic: Exposure to 915 MHz radiation induces micronuclei in Vicia faba root tips^{clxii}. "**These findings are in agreement with the limited number of data on cytogenetic effects detected in other plant systems exposed to mobile phone RF-EMF frequencies and clearly show the capability of radiofrequency exposure to induce DNA damage in this eukaryotic cell system.**"

Bio Electro Magnetics report: Reduced growth of soybean seedlings after exposure to weak microwaveradiation from GSM 900 mobile phone and base station^{clxiii}.

Experiments with plants or seeds exposed (or not) to radiation from cell towers or wifi have been, however, realised by a variety of people, including school children and one can see the dramatic difference that the exposure makes (see reports about this in many YT videos, such as: The Effects of RF radiation on an Outdoor Dieffenbachia plant^{clxiv}, Final Review Of The 2015 Outdoor Radio Frequency RF Exposed

IMPACT OF RF RADIATION ON MICRO-ORGANISMS

Of a particular concern is the effect of RF radiation on the physical body's micro-organisms, which outnumber human cells by 10 to 1. Research increasingly shows that the **microbiome**, comprised of trillions of micro-organisms, **plays a vitally important role in both the maintenance and the degradation of health**. Let's take, for example, a study from the Journal of microbiology, involving the cultured skin bacteria *Escherichia coli*, *Pseudomonas aeruginosa*, and *Staphylococcus epidermidis*: 'The response of human bacteria to static magnetic field and radiofrequency electromagnetic field'^{clxviii}

states that: *"The bacterial isolates of skin microbiota from 4 subjects with different cell phone usage history also showed inconsistent growth responses. These findings led us to hypothesize that **cell phone level RF-EMF disrupts human skin microbiota**".* The implications of these findings are extremely serious.

In matters of **5G (MMW radiation)**, unicellular organisms are also affected by this. In 2016 a review of the research on the effects of MMWs on **bacteria** was published (Soghomonyan et al., 2016). The authors found that:

*"...bacteria and other cells might communicate with each other by electromagnetic field of sub-extremely high frequency range. **These MMW affected Escherichia coli and many other bacteria, mainly depressing their growth and changing properties and activity. These effects were non-thermal and depended on different factors. The significant cellular targets for MMW effects could be water, cell plasma membrane, and genome....The consequences of MMW interaction with bacteria are the changes in their sensitivity to different biologically active chemicals, including antibiotics....These effects are of significance for understanding changed metabolic pathways and distinguish role of bacteria in environment; they might be leading to antibiotic resistance in bacteria.**"*

*"Changing the sensitivity of bacteria to antibiotics by MMW irradiation can be important for the understanding of antibiotic resistance in the environment. In this respect, it is interesting that **bacteria [that] survived near telecommunication-based stations like Bacillus and Clostridium spp. have been found to be multidrug resistant**" (Adebayo et al. 2014)." (Soghomonyan et al., 2016)*

In sum, the peer-reviewed research demonstrates that short-term exposure to low-intensity millimeter wave (MMW) radiation not only affects human cells and good bacteria of the body, but can also cause the growth of multi-drug and especially antibiotic resistant bacteria harmful to humans. (<https://www.saferemr.com/2017/08/5g-wireless-technology-millimeter-wave.html>)

Let's note that **the other lower frequencies and the 4G frequencies will be increasingly propagated also, due to the densification necessary for the 5G small cell antennas**, so the toxicity that these inflict on the entire living ecosystem (micro-organisms, insects, plants and animals) will also increase.

However, in matters of **5G's impact on the environment**, **prof. Martin Pall makes the following dramatic statement**^{clxix}: *"Now what the telecommunications industry argues is that 5G radiation will be mostly absorbed in the outer 1 or 2 mm of the body, such that they claim that we don't*

have to worry about the effects. There is some truth to that, but there are also some caveats that make any conclusions made from that, much more suspect. In any case, these surface effects of 5G will have especially strongly impact organisms with much higher surface to volume ratios. Consequently, I predict that many organisms will be much more impacted than we will. This includes insects and other arthropods, birds and small mammals and amphibia. It includes plants and even large trees, because trees have leaves and reproductive organs that are highly exposed. I predict there will be major ecological disasters as a consequence of 5G. This will include vast conflagrations because EMF exposures make plants much more flammable. ^{cbxx??}

MOST OF THE HEALTH RELATED EMF STUDIES DO NOT REPLICATE THE COMPLEXITY OF TOXICITY AFFECTING HUMANS IN THE REAL WORLD

This fact is made clear by researchers as **Ron Kostoff** (in '**The Largest Unethical Medical Experiment in the History of Humanity**') based on his and other scientists' observations on the avoidable and unavoidable limitations of the scientific investigations in this field:

“There are three main reasons that laboratory tests do not reflect real-life exposure conditions for human beings. First, the laboratory tests have been performed mainly on animals, especially rats and mice. Because of physiological differences, there have been continual concerns about extrapolating small animal results to human beings [...]

Second, the typical incoming EMF signal for many/most laboratory tests performed in the past consisted of the single carrier wave frequency; the lower frequency superimposed signal containing the information was not always included. This omission may be important. As Panagopoulos states: “It is important to note that except for the RF/microwave carrier frequency, Extremely Low Frequencies – ELF (0–3000Hz) are always present in all telecommunication EMFs in the form of pulsing and modulation. There is

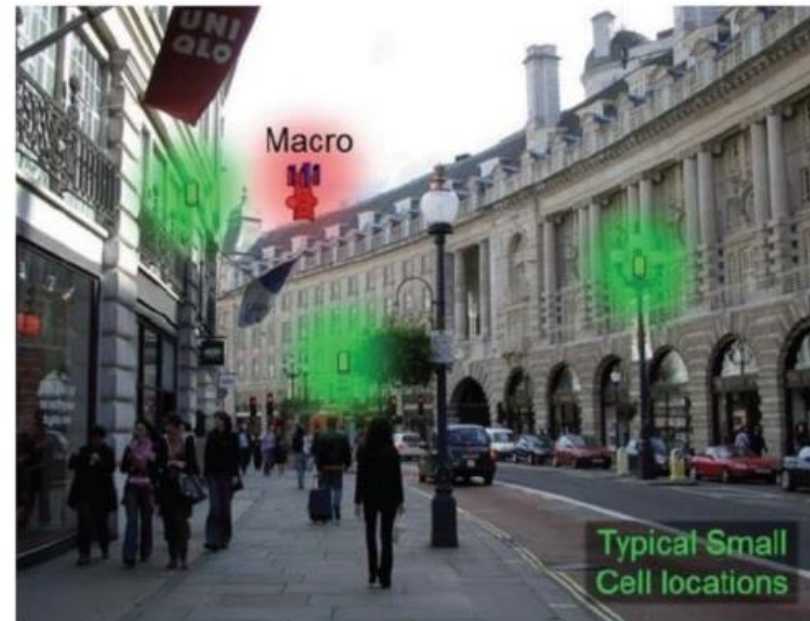


Figure 4: Picocells serving “urban canyons”

significant evidence indicating that the effects of telecommunication EMFs on living organisms are mainly due to the included ELF's.... While ~50% of the studies employing simulated exposures do not find any effects, studies employing real-life exposures from commercially available devices display an almost 100% consistency in showing adverse effects". [Panogopoulos, 2019]. These effects may be exacerbated further with 5G: "with every new generation of telecommunication devices.....the amount of information transmitted each moment.....is increased, resulting in higher variability and complexity of the signals with the living cells/ organisms even more unable to adapt [Panogopoulos, 2019]"

Real-world 5G signals are complex and variable. First, there are the variable low-frequency pulses (control, pilot, synchronization signals) and modulations being carried on the high-frequency 5G carrier waves. In addition, to send multiple signals simultaneously, many 4G/5G technologies use Orthogonal Frequency-Division Multiplexing (OFDM), which requires extremely high peak amplitudes. These methods of signal transfer create complexities in the waveforms that cannot be fully replicated using simulated signals created by frequency generators. Complex real-world signals are more bioactive (32) and are thus more likely to show bioeffects. Not surprisingly then, experiments that use signal generators are less likely to produce effects, while those that use real-world devices (e.g., mobile phones with, 50, 200, 500, or 217 Hz pulses embedded within the signals) are more likely to produce effects (32). That is, experiments that use real-world signals have a higher power (probability of finding an effect if there is one) than experiments that use simulated signals. (The assumption of safety is being used to justify the rollout of 5G technologies^{clxxi}, 2023)

Third, these laboratory tests typically involved one stressor (wireless radiation) and were performed under pristine conditions. This contradicts real-life exposures, where humans are exposed to multiple toxic stimuli, in parallel or over time. In perhaps five percent of the wireless radiation studies reported in the literature, a second stressor (mainly biological or chemical toxic stimuli) was added, to ascertain whether additive, synergistic, potentiative, or antagonistic effects were generated by the combination.

[...] Thus, the laboratory tests were conducted under very controlled conditions not reflective of the real-world, while the epidemiology studies were performed in the presence of many stressors, known and unknown, reflective of the real-world. The exposure levels of the epidemiology studies were, for the most part, uncontrolled." [Kostoff and Lau, 2013, 2017; Juutilainen et al, 2008; Juutilainen et al, 2006]

In Adverse health effects of 5G mobile networking technology under real-life conditions^{clxxii} " Kostoff, Heroux & Co show that there is a "wide-spectrum of adverse health effects of non-ionizing non-visible radiation; most laboratory experiments were not designed to identify the more severe adverse effects reflective of real-life conditions; Many experiments do not include the real-life pulsing and modulation of the carrier signal; Vast majority of experiments do not account for synergistic adverse effects of other toxic stimuli with wireless radiation; 5G mobile networking technology will affect not only the skin and eyes, but will have adverse systemic effects as well."

The official EU Report on 5G: European Union: 5G Deployment, State of Play in Europe, USA and Asia, In-Depth Analysis requested by the ITRE committee^{clxxiii}, admits that 5G is a massive, uncontrollable experiment and that it results in increase exposure:

“The problem is that currently, it is not possible to accurately simulate or measure 5G emissions in the real world ... concern is emerging over the possible impact on health and safety arising from potentially much higher exposure to radiofrequency electromagnetic radiation arising from 5G.”(page 11, 12) *“Increased exposure may result not only from the use of much higher frequencies in 5G but also from the potential for the aggregation of different signals, their dynamic nature, and the complex interference effects that may result, especially in dense urban areas.”*(page 11)

For a review of the recent literature on the damage done by EMF in association with other toxic factors, please see: [Recent Studies Showing Synergistic Effects](#)^{clxxiv}

We'll give here just a few of the many examples on the page:

“Research on 2.45 GHz radio frequency – the frequency used in WiFi networks- in combination with carbon black (Sueiro-Benavides et al, 2020^{clxxv}) concluded that “our results indicate that the interaction of BC and RF modifies macrophage immune response, activates apoptosis, and accelerates cell toxicity, by which it can activate the induction of hypersensitivity reactions and autoimmune disorders.”

In 2013 the WHO's International Agency for Research on Cancer (IARC) specifically notes, *“Four of six co-carcinogenesis studies showed increased cancer incidence after exposure to RF-EMF in combination with a known carcinogen...”* on [Page 2, WHO/IARC Press Release](#)^{clxxvi}. Tables showing this research are found on page 279 of the [IARC Monograph on Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields](#).^{clxxvii}

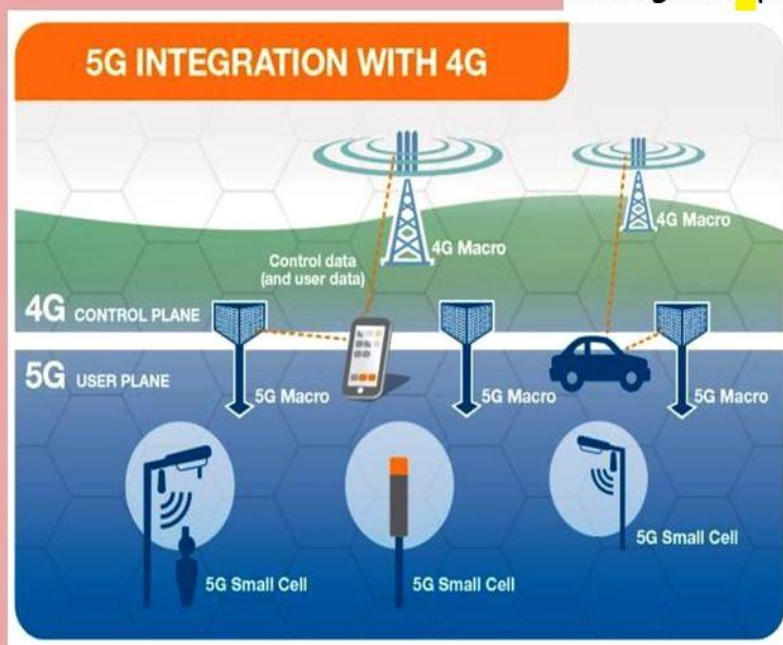
In the 2015 replication study *“Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans”*^{clxxviii}, published in Biochemical and Biophysical Research Communications, Jacobs University, researchers describe how their new study replicated an [earlier experiment](#),^{clxxix} finding that *weak cell phone signals promoted the growth of lung and liver tumors and lymphomas in mice.*” ([read the Jacobs University press release on the study](#)^{clxxx}). This shows again that RF radiation can promote existing toxicity or disease.

5G AND THE KILLING GRID OF THE HIGH FREQUENCY SMALL CELLS...

How does 5G work?

"No research that I am aware of has focused on exposure to MMWs combined with other radiofrequency radiation." (prof. Joel Moskowitz)

"It should also be realized that biological effects of a prolonged or chronic MMW exposure of the whole body or a large body area have never been investigated." (Pakhomov et al., 1998)



Courtesy of Mike Wood, ACMA RadComms 2018

- 5G works together with 4G (initially non standalone NSA)
- 4G acts as control plane
- 5G acts as data/user plane
- 5G will operate stand alone in later releases



Recommended resources: [Published Scientific Research on 5G, 4G Small Cells, Wireless Radiation and Health](#)^{clxxxi}

(EHT); [Wi-Cancer.info](#)^{clxxxii}

The neurosurgeon and researcher, **Dr Jack Kruse**⁸, recently warned, **"5G⁹ is going to be the biggest assault on the human race that we've ever seen"**. World expert on RF radiation health effects, **Prof. Emeritus Dr Martin Pall**, has described potential 5G health effects as **"chilling"**.

Dr. Pall ends his document on 5G risks with this message: *'Let me close, as follows. There have been certain points in our history where people have stood up to strong destructive forces against what often appeared to be insurmountable odds. Those people are THE most honoured people in our history. The people who failed to do so are among the most despised people in our history. I am not at all sure we will have historians to record us 100 years from now or even 30 years from now,*

⁸ [How The New "5G" EMFs Will Make Us Sick with Dr. Jack Kruse](#) (Electrosmog Rx free preview)

⁹ 5G will employ low- (0.6 GHz - 3.7 GHz), mid- (3.7 – 24 GHz), and high-band frequencies (24 GHz and higher up to 300 GHz).

given the direction in which we are heading, but if we do, rest assured that these are the standards by which you will be judged.'

Now, **5G masts and high frequency small cells** have been and continue to be ubiquitously deployed across the streets and roads of Britain. **These are being positioned within yards of homes, schools and places of work, emitting focused, pulsed, millimetre wave frequencies (the small cells are, in fact, the most dangerous, emitting in the range 25-39 GHz frequencies), making direct exposure unavoidable. 5G is not replacing, but adding up to the previous, already harmful, 3G and 4G frequencies.** And this has happened while **the industry provided ZERO biological studies prove their safety** - a fact admitted by the telecom representatives companies during a December 2018 US Senate hearing (<https://takebackyourpower.net/senate-hearing-wireless-industry-confesses-no-studies-showing-5g-safety/>)

Another interesting observation in the **EUROPAEM EMF Guideline 2016** is that, according to 4 new studies, **in matters of genotoxic effects, these appear to increase proportional with an increase in frequency**^{clxxxiii} (the perceived power increases also with frequency - see the **video presentation**^{clxxxiv} from Safe Living Technologies on YT):

Prof. Martin Pall confirms this^{clxxxv}, referring not only to the danger of 5G higher frequencies, but also to the great problem of **pulsed EMF** (which are spread over a range of frequencies and are more biologically active) in the **'phased array' system** specific for this technology – he says: ***"Here multiple antenna elements act together to produce highly pulsed fields which are designed for 5G, to produce increased penetration. 5G will entail particularly powerful pulsations to be used, which may, therefore, be particularly hazardous. The only data we have, to my knowledge, used non-pulsed EMFs in the frequency range of 5G, not genuine 5G. Any such data tells us almost nothing useful about 5G."***

Symptoms of Microwave Illness

<https://www.microwavedvets.com>

Headaches	Difficulty Concentrating	Tinnitus
Dizziness	Memory Loss	Hearing Loss
Nausea	Brain Damage	Irregular Sleep Pattern
Skin Rash	Mood Disorder	Insomnia
Itchy Skin	Personality Disorder	Chronic Fatigue
Burning Skin Sensation	Increased Irritability	Deteriorating Vision
Tingling Sensation	Decreasing Trust in People	Pressure in/behind eyes
Tremors	Depression	Eye Damage
Muscle Spasms	Anxiety	Cataracts
Muscle and Joint Pain	ADHD/ADD	Immune Abnormalities
Restless Leg Syndrome	Digestive Issues	Altered Sugar Metabolism
Foot Issues	Abdominal Pain	Asthma Attacks
Low/High Pressure	Enlarged Thyroid	Bronchitis
Facial Flushing	Hair Loss	Pneumonia
Dehydration	Testicular/Ovarian Pain Low	Inflamed Sinuses
Body Metals Redistribution	Sperm Motility	Chest Pain/Pressure
Leukemia	Miscarriage	Heart Arrhythmia
Lymphoma	Electromagnetic Sensitivity	Heart Palpitations

And further on:” Why does 5G need such high numbers of antennae? It is because **the 5G radiation is much more absorbed as it enters various materials**. The approach is to use many more antennae with one found every few houses, such that 5G can sufficiently penetrate local walls. Such absorption usually involves the interaction with electrically charged groups, such that such absorption is likely to involve placing forces on electrically charged groups. Because such forces are the way in which EMFs activate the VGCC¹⁰s, it seems highly likely, therefore, that 5G radiation will be particularly active in VGCC activation. In summary, then, **5G is predicted to be particularly dangerous for each of four different reasons: 1. The extraordinarily high numbers of antennae that are planned. 2. The very high energy outputs which will be used to ensure penetration. 3. The extraordinarily high pulsation levels. 4. The apparent high level interactions of the 5G frequency on charged groups presumably including the voltage sensor charged groups.**”

According to dr. Pall, **the effect of the much higher activation of VGCC with the increased pulse of 5G frequencies leads particularly to genotoxic effects and early onset of Alzheimer** - Low Intensity Electromagnetic Fields Act via Voltage-Gated Calcium Channel (VGCC) Activation to Cause Very Early Onset Alzheimer’s Disease: 18 Distinct Types of Evidence^{clxxxvi}

In its 2021 study ‘Millimeter (MM) wave and microwave frequency radiation produce deeply penetrating effects: the biology and the physics’^{clxxxvii} Prof. Martin Pall explains that the magnetic and not the electric field of MMW radiation is the cause why, as attested by various studies (and medical application) MMW can penetrate deep into the human body, affecting a variety of tissues and organs: **“Millimeter wave (MM-wave) electromagnetic fields (EMFs) are predicted to not produce penetrating effects in the body. The electric but not magnetic part of MM-EMFs are almost completely absorbed within the outer 1 mm of the body. Rodents are reported to have penetrating MM-wave impacts on the brain, the myocardium, liver, kidney and bone marrow. MM-waves produce electromagnetic sensitivity-like changes in rodent, frog and skate tissues. In humans, MM-waves have penetrating effects including impacts on the brain, producing EEG changes and other neurological/neuropsychiatric changes, increases in apparent electromagnetic hypersensitivity and produce changes on ulcers and cardiac activity. This review focuses on several issues required to understand penetrating effects of MM-waves and microwaves: 1. Electronically generated EMFs are coherent, producing much higher electrical and magnetic forces than do natural incoherent EMFs. 2. The fixed relationship between electrical and magnetic fields found in EMFs in a vacuum or highly permeable medium such as air, predicted by Maxwell’s equations, breaks down in other materials. Specifically, MM-wave electrical**

Study Outcome	Number of studies	Percentage of total
Effect	53	77.9%
No Effect	13	19.1%
Uncertain Effect	2	2.9%
Total	68	100%

Table 1: Outcomes of publications investigating millimetre waves based on the ORSAA database.

¹⁰ VGCC – Voltage Gated Calcium Channel https://en.wikipedia.org/wiki/Voltage-gated_calcium_channel “Excessive activation of VGCCs is a major component of excitotoxicity, as severely elevated levels of intracellular calcium activates enzymes which, at high enough levels, can degrade essential cellular structures”

fields are almost completely absorbed in the outer 1 mm of the body due to the high dielectric constant of biological aqueous phases. However, the magnetic fields are very highly penetrating. 3. Time-varying magnetic fields have central roles in producing highly penetrating effects.”

Scientist Ben-Ishai shares the perspective of prof. Pall on the capacity of deep penetration of 5G/ MMW radiation, proposing also a mechanism based on the fact that *these wavelengths “interact with the geometrical structure of our skin”, while the sweat ducts can act as helicoidal antennas, thus leading to the propagation of high frequency radiation into the body* (2017) 5G signals inside the human body in Potential Risks to Human Health from Future Sub-MM Communication Systems: Paul Ben-Ishai PhD (YT)^{clxxxviii} and also: The human skin as a sub-THz receiver – Does 5G pose a danger to it or not?^{clxxxix}

It is interesting to note that, according to the research of **prof. Martin Blank and Co**, even DNA is a fractal antenna in electromagnetic fields (2011)^{exc} – the conclusion of this paper is of the greatest significance: *“The wide frequency range of interaction with EMF is the functional characteristic of a fractal antenna, and DNA appears to possess the two structural characteristics of fractal antennas, electronic conduction and self symmetry. These properties contribute to greater reactivity of DNA with EMF in the environment, and the DNA damage could account for increases in cancer epidemiology, as well as variations in the rate of chemical evolution in early geologic history.”*

It appears, anyway, that the increased harm effectuated by pulsed non-ionising radiation in comparison with continuous radiation was well known before 1970, as the safety standard in Czechoslovakia – 1965, above 300 MHz for pulsed generation was a fifth of that for continuous generation^{exci}.

It was generally known for many decades that millimetre waves (5G/ radar) adversely affect health (Biological Effect of Milimeter Wave Radiation^{excii} – Zalyubovskaya, 1977) and some newer published science confirms it. Below is the abstract of the 1977 Russian scientist’s paper:

“Morphological, functional and biochemical studies conducted in humans and animals revealed that millimetre waves caused changes in the body manifested in structural alterations in the skin and internal organs, qualitative and quantitative changes of the blood and bone marrow composition and changes of the conditioned reflex activity, tissue respiration, activity of enzymes participating in the process of tissue respiration and nucleic metabolism. The degree of unfavourable effect of millimetre waves depended on the duration of the radiation and individual characteristics of the organism.”

Some newer and notable reviews on the more recent MMW research we have encountered are the following:

A Review Translated from the Russian and Ukrainian Research on Millimetre Waves (similar to 5G) published in 2001^{exciii} – which is referring to the following document: 2001. Influence of High-frequency Electromagnetic Radiation at Non-thermal Intensities on the Human Body (A review of work by Russian and Ukrainian researchers)^{exciv}

“Three possible channels were pointed out for conduction of operative signals within an organism over considerable distances: the nervous system, the humoral system and the system of acupuncture points. In addition, a number of peculiarities of these channels were discovered:

- *Conduction of signals through the nervous system is accomplished in the myelin sheaths of the axons.*

- Conduction of signals through the humoral system is connected with the movement of generating cells through the blood and lymphatic systems. In this way, within the organism, the transmission of signals is accomplished, apparently, not by conduction of radiation, not by movement of charges, but by the displacement of generator-cells, the oscillations of which reflect the information being carried.
- Water molecules strongly absorb EHF radiation, and play a big role in various biophysical effects involving mm waves”

State of knowledge on biological effects at 40–60 GHz^{cxcv} (Yves Le Drian and Co) 2013

“Another important property of MMWs is their shallow penetration depth into biological tissues and solutions [10]. It is of the order of a few tenths of millimetres to several millimetres, depending on frequency and tissues, indicating that the skin or near-surface zones of the tissues are the main targets for MMW radiations. One may wonder how radiations with such a shallow penetration into the body can have biological effects at the level of the whole organism. However, it should be noted that skin is not isolated from the rest of the body, and this organ contains capillaries and nerve endings. So, it is possible that MMW bio-effects could be transmitted through secreted molecular factors by the skin or through the nervous system”

The assumption of safety is being used to justify the rollout of 5G technologies (2023)^{cxevi}

“mmWaves may affect many biological and health categories that warrant further investigation. Several of these categories have potential implications for public health, e.g., cellular oxidative stress, changes in immune function, genotoxicity, brain/neuronal changes, and cell membrane permeability. In particular, effects have been found in all studies that have investigated oxidative stress [cellular stress due to the over-production of reactive oxygen species and the reduction of oxidative defenses (11)]. Oxidative stress underlies many auto-immune and chronic conditions, such as diabetes, cardiovascular disease, Alzheimer's disease and depression, some of which are becoming an increasing social and economic threat worldwide.

5G Wireless Technology: Millimeter Wave Health Effects^{cxcvii} (by Dr. Joel Moskowitz)”

Joel Moskowitz PhD, Director, Family and Community Health, University of California, Berkeley, also published in the Scientific American the famous article ‘We have no reason to believe that 5G is safe^{cxviii}’

MORE REFERENCES TO CRITICAL STUDIES ON MMW RADIATION can be found in 5G Safety -State of the art from scientific reviews and their findings (2023)^{cxcix} and in the more recent study ‘Bio-effects of 5th generation electromagnetic waves on organs of human beings^{cc}’ which concludes: “From the above discussion and analysis, it is concluded that the effects of 5G EMWs on the organs of human beings are possible as the frequency of these waves are very high. These photons of these waves will directly transfer their energy into organs of the human beings. The effects of EMWs are more near the 5 G mobile phone towers as the induction of electric fields are more. The energy absorption by the highly water content organs like pancreas, prostate, retina, skin wet, small intestine, Spinal Cord, Spleen, Stomach, tendon, testis, thymus, thyroid, tongue, are more. These types of organs are affected more by the 5 G waves of mobile phones. The energy absorption by the low water content organs like skin dry, tooth, trachea, uterus and virtuous humour are low and affected less by the 5 G EMWs. The energy absorption by the organs may become the cause of cancer, childhood leukaemia, brain tumour, headache, hypertension, adult leukaemia, and adult brain tumour etc. This work on the possible health effects of 5 G EMWs is an important factor in bio-electromagnetic research. Thus it is concluded that 5 G EMWs of mobile phones will produce more harmful effects on the

health of organs of human beings than 4 G waves. It is suggested that the people should keep away from the 5 G mobile tower and the towers should install away from the thickly populated areas of the society.”

As pointed out by Australian Doctors and Scientists^{cci}, *a research in ORSAA Database on the biological effects of MMW returns 77.9 % of the studies on this subject confirming biological effects.*

It can be observed that, in the newer Western approach to this technology's impact on health, besides the very small and limited number of studies, quite a number of them refer to **the beneficial use of MMW in medicine** (esp. in Russia/USSR and Eastern Europe) – however, they all refer to **the use of very low powers (ex. 1 uW/m²) and obviously for a very limited duration, under medical control** - Current state and implications of research on biological effects of millimeter waves: a review of the literature^{ccii}

The first common sense observation is that **if such MMW therapy using low powers for very short duration can penetrate the body and affect cell proliferation and differentiation, the immune and inflammatory systems, the peripheral and central nervous systems and potentially having an activating, beneficial influence... once used at very high power, with intense pulsations and in convergence with other lower frequencies that penetrate that body, at powers of thousands or tens of thousand of uW/m² under long duration exposure, as we can get today in many places, the impact cannot be but nefarious.** In fact, the use of these frequencies in military technologies such as Active Denial System^{cciii} (95 GHz, 100 KW, non-lethal methods that can be used in instantly dispersing crowds, for example) based on the heat-shock response of the body, is very well know. Obviously, above all the other factors discussed above, the power and the duration of exposure make a difference, no matter the individual specificity.

Let's again emphasize that **with the necessary densification needed for 5G small cell system, what we, the people get is not only MMW, but also the known microwaves (4G) and also the ELF's that have been largely investigated for the plethora of harm they cumulatively and, in a certain measure, irreversibly**^{cciv} **inflict on human bodies and living organisms, in general. Beam formation (phased array) characteristics can produce hotspots of high unknown powers, pulsations and frequencies.** The vast number of antenna arrays (MIMO cells) and the countless and various types of small cells will multiply immensely the harm already done to human and life, in general, by the exposure to these artificial powerful frequencies.

Indeed, this is a **great, global experiment** – in the words of prof. Joel Moskowitz^{ccv} **“no research that I am aware of has focused on exposure to MMWs combined with other radiofrequency radiation.”**

Also **“It should also be realized that biological effects of a prolonged or chronic MMW exposure of the whole body or a large body area have never been investigated.”** (Pakhomov et al., 1998)

And these are, of course just aspects of this very complex problem, **However, what we know so far is that the outcome cannot ever be positive, but only increasingly catastrophic for all earthly life.**

Kevin Mottus, Outreach Director of the CA Brain Tumour Association, speaking about 5G, said: *"We are literally microwave radiating our population and we're wondering why there's so much cancer and chronic illness. ... We already know the lower frequencies cause cancer and neurological problems. We expect this to be much worse, much quicker. We are literally experimenting with people's lives. ... We need to start pushing back and stop allowing them to use us literally like rats in an experiment. ... 56 billion dollars to roll out 5G (in the US), zero money to look at the health effects."*

Severe warnings against the deployment of the 5G technology, based on the accumulated independent science are to be found in several documents addressed to national and international authorities by a considerable number of scientists and professionals. We'll mention here just a few of the most notable ones:

• **Dr. Martin Pall - 5g Hazard Letter**^{ccvi} - **5G: Great risk for EU, U.S. and International Health! Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them** – the most scientifically documented petition addressed by one of the foremost experts in the field of EMF biological effects. Here is a summary of Dr. Pall's main concerns related to 5G:

emfa.org

THE ALLIANCE PUBLICATIONS MEDIA EU INSTITUTIONS UN/WHO APPEAL 5G & BEYOND NEW

EMF Scientist Appeal to the United Nations

This page is dedicated to advocating support for the International EMF Scientist Appeal to the United Nations and the World Health Organization.

Announcement from the International EMF Alliance

Request to NGOs worldwide to support the International EMF Scientist Appeal to the United Nations

UPDATE: See February 4, 2016 letter from Sissel Halmøy, President of IEMFA, to the leaders of the UN, the WHO and UNEP advising them of widespread international NGO support for the International EMF Scientist Appeal.

The International Electromagnetic Field Alliance (IEMFA) has received a statement of support for the International EMF Scientist Appeal submitted to the United Nations on May 11, 2015, from 105 NGOs in 25 nations, including for-profit entities that market physical shielding materials and EMF detection equipment. See the Appeal at: EMFscientist.org

To date, 220 scientists from 41 nations have signed the Appeal. Each has published peer-reviewed research on biological or health effects of non-ionizing radiation, including extremely low frequency fields (ELF) used for electricity or radio frequency radiation (RFR) used for wireless communications.


These EMF scientists are raising serious concerns regarding the risks for humankind and nature from exposure to EMF sources (electromagnetic fields and

INTERNATIONAL APPEAL

Stop 5G on Earth and in Space

SIGN HERE DONATE

THE



Read as PDF in:

Organizations

Organizations

As of January 7, 2020, 188,653 people and organizations from 203 nations and territories have signed this Appeal.

FREIBURGER APPEAL


Interdisciplinary Society for Environmental Medicine e. V.

Out of great concern for the health of our fellow human beings do we - as established physicians of all fields, especially that of environmental medicine - turn to the medical establishment and those in public health and political domains, as well as to the public. We have observed, in recent years, a dramatic rise in severe and chronic diseases among our patients, especially:

- Learning, concentration, and behavioural disorders (e.g. attention deficit disorder, ADD)
- Extreme fluctuations in blood pressure, ever harder to influence with medications
- Heart rhythm disorders
- Heart attacks and strokes among an increasingly younger population
- Brain-degenerative diseases (e.g. Alzheimer's) and epilepsy
- Cancerous afflictions: leukemia, brain tumors

Scientists warn of potential serious health effects of 5G

September 13, 2017



We the undersigned, more than 180 scientists and doctors from 35 countries, recommend a moratorium on the roll-out of the fifth generation, 5G, for telecommunication until potential hazards for human health and the environment have been fully investigated by scientists independent from industry. 5G will substantially increase exposure to radiofrequency electromagnetic fields (RF-EMF) on top of the 2G, 3G, 4G, Wi-Fi, etc. for telecommunications already in place. RF-EMF has been proven to be harmful for humans and the environment.

(Note: [Blue links](#) below are references.)

5G leads to massive increase of mandatory exposure to wireless radiation

5G technology is effective only over short distance. It is poorly transmitted through solid material. Many new antennas will be required and full-scale implementation will result in antennas every 10 to 12 houses in urban areas, thus massively increasing mandatory exposure.

With "the ever more extensive use of wireless technologies," nobody can avoid to be exposed. Because on top of the increased number of 5G-transmitters (even within housing, shops and in hospitals) according to estimates, "10 to 20 billion connections" (to refrigerators, washing machines, surveillance cameras, self-driving cars and buses, etc.) will be parts of the Internet of Things. All these together can cause a substantial increase in the total, long term RF-EMF exposure to all EU citizens.

Harmful effects of RF-EMF exposure are already proven

More than 230 scientists from 41 countries have expressed their "serious concerns" regarding the ubiquitous and increasing exposure to EMF generated by electric and wireless devices already before the

44

- *“I am very concerned that 5G may produce effects like those we already see produced from lower frequency EMFs but are much more severe. I am also concerned that we will also see responses that are qualitatively different. Let me give you three possible examples of the latter type and one quantitative example. Each of the four types of blindness, have downstream effects of VGCC activation as causal factors: cataracts, detached retinas, glaucoma and macular degeneration. The aqueous and vitreous humors in the eye may be an ideal environment for the regeneration of the electrical fields within the eye. We may, therefore have a gigantic epidemic of each of the four types of blindness. Another concern focuses on kidney dysfunction, which was shown in Chapter 5 to be impacted by EMFs. The kidneys have much fluid, both blood and also what will become urine, which may allow efficient the regeneration of electrical fields. Such regeneration may be expected to impact both the glomerular filtration and also the reabsorption, both essential to kidney function. Does this mean that 5G will produce very large increases in kidney failure? The only way to find out is to do biological safety testing of genuine 5G radiation. Let me give you a third example. Fetuses and very young babies have much more water in their bodies than do adults. Therefore, they may be a special risk for impacts of 5G, because of great increases in the regeneration of the electrical fields. Here one can think of all kinds of possibilities. Let me suggest two. We may have a gigantic (sorry about using that word again) epidemic of spontaneous abortion due the teratogenic effects.”*
- **EU 5G Appeal**^{ccvii} – addressed to the European Commission by 64 international scientists, “demanding EU to take all reasonable measures to halt the 5G RF-EMF expansion until independent scientists can assure that 5G and the total radiation levels caused by RF-EMF (5G together with 2G, 3G, 4G, and WiFi) will not be harmful for EU-citizens, especially infants, children and pregnant women, as well as the environment” (and a number of other precautionary measures).
- **EMF scientists appeal to UN,WHO**^{ccviii} calling for protection from electromagnetic fields exposure – the 270 scientists signatories state that: “Numerous recent scientific publications have shown that EMF affects living organisms at levels well below most international and national guidelines. 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 plant and animal life. These findings justify our appeal to the United Nations (UN) and, all member States in the world, to encourage the World Health Organization (WHO) to exert strong leadership in fostering the development of more protective EMF guidelines, encouraging precautionary measures, and educating the public about health risks, particularly risk to children and fetal development. By not taking action, the WHO is failing to fulfil its role as the preeminent international public health agency.”
- **International Society of Doctors for Environment 5G Appeal (2018)**- 5G networks in European Countries: appeal for a standstill in the respect of the **precautionary principle**^{ccix} : “in the respect of the precautionary principle and of the WHO principle “health in all policies”, we believe suitable the request of a standstill for the “5G experimentations” throughout Europe until an adequate and active involvement of public institutions operating in the field of environmental health (health ministry, environmental ministry, national environmental and health agencies) will be effectively

planned. This involvement should be aimed to correctly and preliminarily perform risk analyses and environmental health monitoring plans, possibly suggesting alternative or adequate measures to reduce the level of risk in the exposed population.”

- **5G Space Appeal**^{ccx} – maybe the most important and documented international document today - signed by 63,000 scientists and supporters, in total 305,108 signatories from 218 nations and territories and demanding a stop of the rollout of 5G on earth and in space (deployment of 5G satellites). “A major evolution of 5G constitutes the integration of non-terrestrial networks including geostationary and low Earth orbit satellites.” ***“If the telecommunications industry’s plans for 5G come to fruition, no person, no animal, no bird, no insect and no plant on Earth will be able to avoid exposure, 24 hours a day, 365 days a year, to levels of RF radiation that are tens to hundreds of times greater than what exists today, without any possibility of escape anywhere on the planet. These 5G plans threaten to provoke serious, irreversible effects on humans and permanent damage to all of the Earth’s ecosystems.”*** (see as a reference from the industry Field Trial on 5G New Radio Over Satellite^{ccxi})
- **Serious Safety Concerns about 5G Wireless Deployment in Australia and New Zealand**^{ccxii}

In order to make the warnings of these doctors and scientists more clear for the public, we would recommend a basic presentation of the ‘phased array’ 5G technology that can be found in the article of EMF expert **Arthur Firstenberg** (author of ‘The Invisible Rainbow’): **5G Wavelengths – From Blankets to Bullets**^{ccxiii} where we find that **the radar like focused beams of millimetre wave radiation can interfere with each other in the search of various 5G phones/ receivers and thus greatly multiply their power – even beyond the anyway incredibly permissive official (US -FCC) guidelines. In a crowd, the overlapping of multiple beams becomes unavoidable.**

Environmental Health Trust offers updated pages on: **INTERNATIONAL ACTIONS TO HALT AND DELAY 5G**^{ccxiv}

USA POLICY ACTION ON 5G & 4G SMALL CELLS^{ccxv}

...and some very important documentation on: **LEGAL LIABILITY AND FINANCIAL RISKS OF 5G, WIRELESS AND CELL TOWERS**^{ccxvi}
LIABILITY, 5G AND CELL TOWER RADIATION HEALTH EFFECTS^{ccxvii}

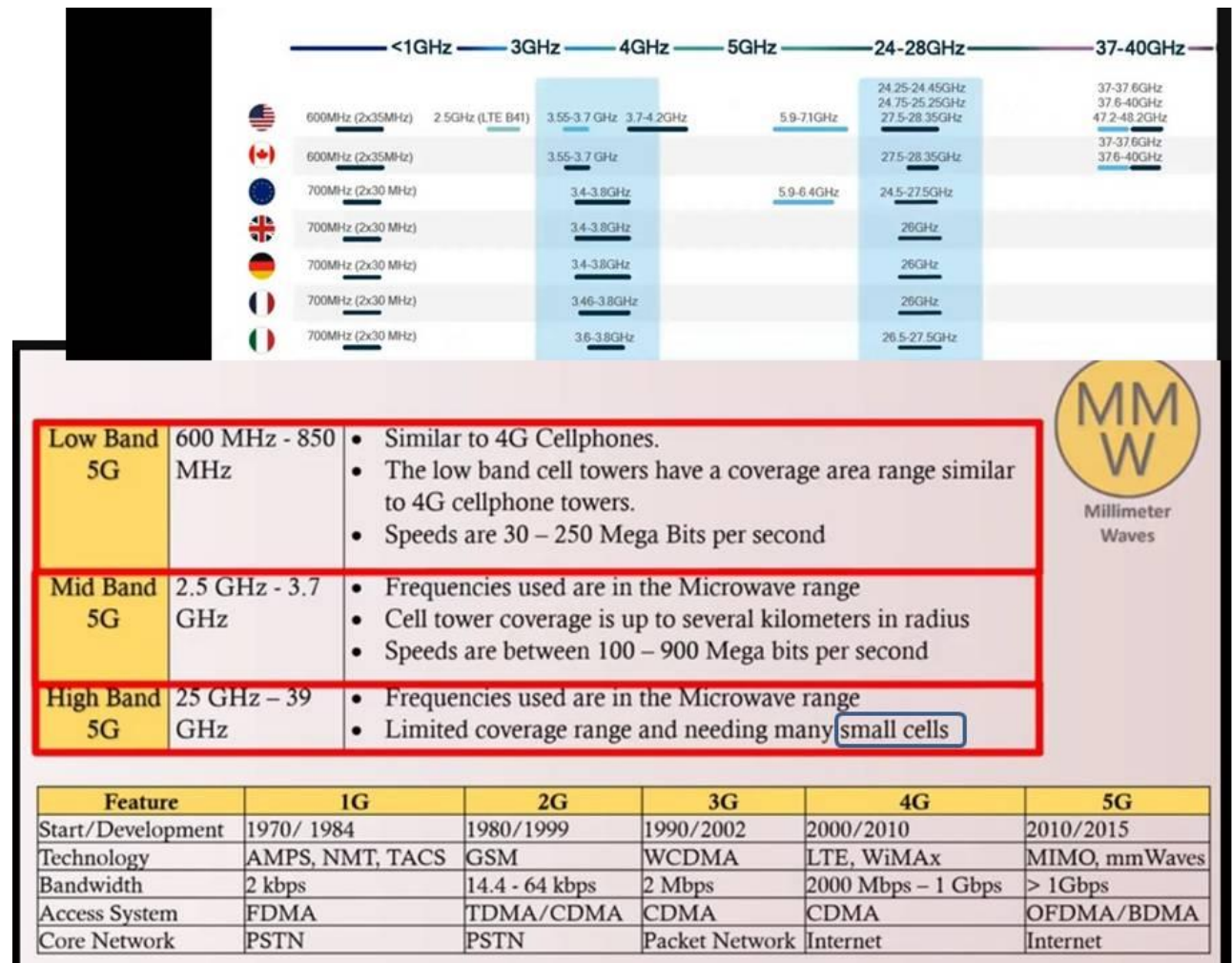
THE SMALLER THE CELLS MEANS THE HIGHER FREQUENCIES, DENSIFICATION & EXPOSURE

The 5G small cells (emitting high frequency RF and located at short distances around 100 m on poles or even on the walls of buildings) present the greatest dangers for living organisms, because the added power can go up to thousands of Watts indoors and outdoors and also because, the technology involves beaming a concentrated flux of radiation towards the target. The higher the frequency, the smaller their size needs to be (at 48 GHz, an array of 1,024 antennas measures only 4 inches square.) and therefore, they can be hidden anywhere.


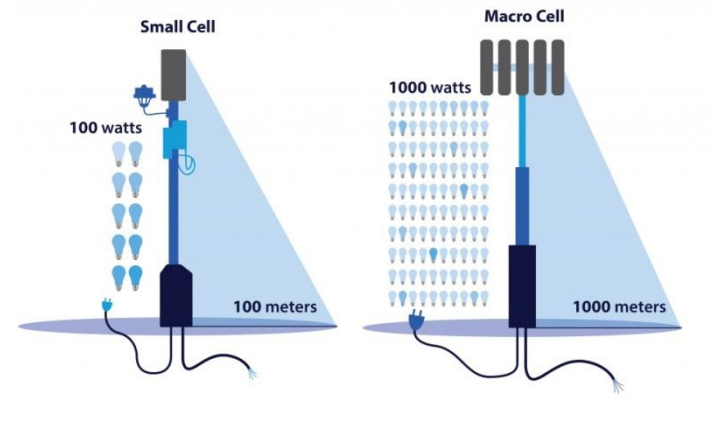


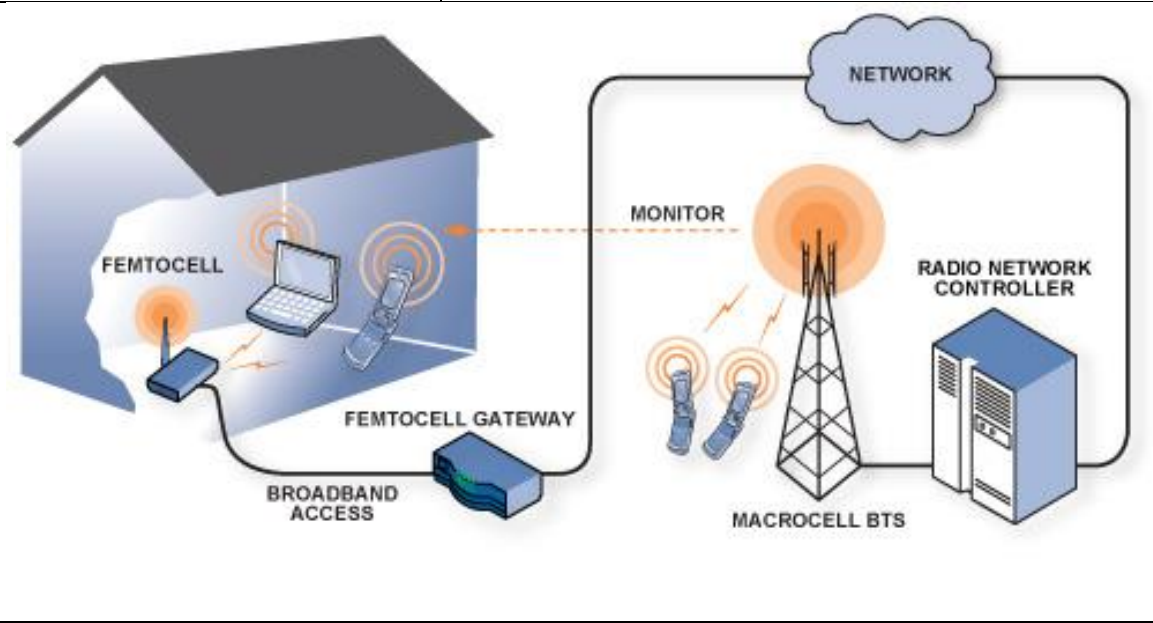
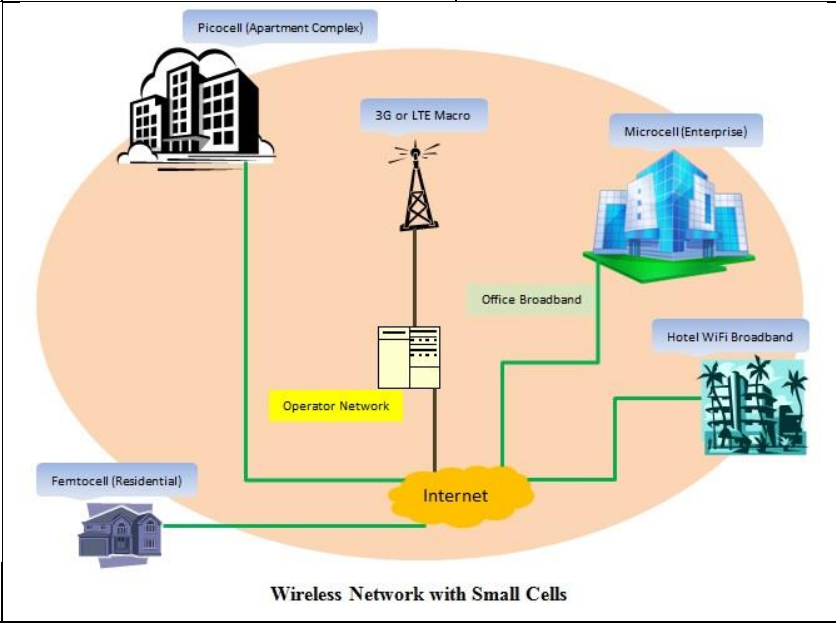
As an introduction in the topic of macrocells and small cells, we got some indications from the 5G Magazine presentation: 5G CELLS – WHAT ARE MACRO CELLS, SMALL CELLS AND DAS?^{ccxviii}

Note: The numbers and measurements in the previous source have been adjusted^{ccxix} acc. to: A guide to 5G small cells and macrocells^{ccxx}

- **Macro Cell:** Macro Cell typically provides coverage to a large geographic area. They are typically installed **on rooftops, poles, and in some instances, on Ground-Based Towers**. The major advantage of using Macrocell in 5G is that it can provide 5G services to a large geographic area. 5G macro



cells also use **Massive MIMO technology**, which allows large transmission and reception of data. A macro cell (Massive MIMO) can cover **8-30 km**, connect more than 2500 users, have an output power of **60 to 80 W_{ccxxi}**.

			
<p>Small Cell (up)</p>	<p>Small Cell vs Macro Cell</p>	<p>Femto Cell</p>	<p>Pico Cell</p>
			

Micro Cells: *Micro Cell* has been used to deploy legacy technologies like 3G and 4G and would play a more important role in 5G deployment. It will empower wireless carriers to deploy cell sites in strategic locations and offer higher capacities in the small coverage area.” A microcell or a classic small cell can cover **up to 1.2 miles**, connect up to 200 users, have an output power of **2 to 5 W**. And can be used not only outdoor, but also **indoor**! They are small enough to be attached to lamp posts.

Pico Cell: *Pico Cells* are small cellular base stations covering areas like buildings, hotels, hospitals, and shopping malls. It is generally used to extend coverage and increase throughput.

Pico cell can cover **up to 656 feet**, connect 32 to 64 users, have an output power of **0.25 W**.

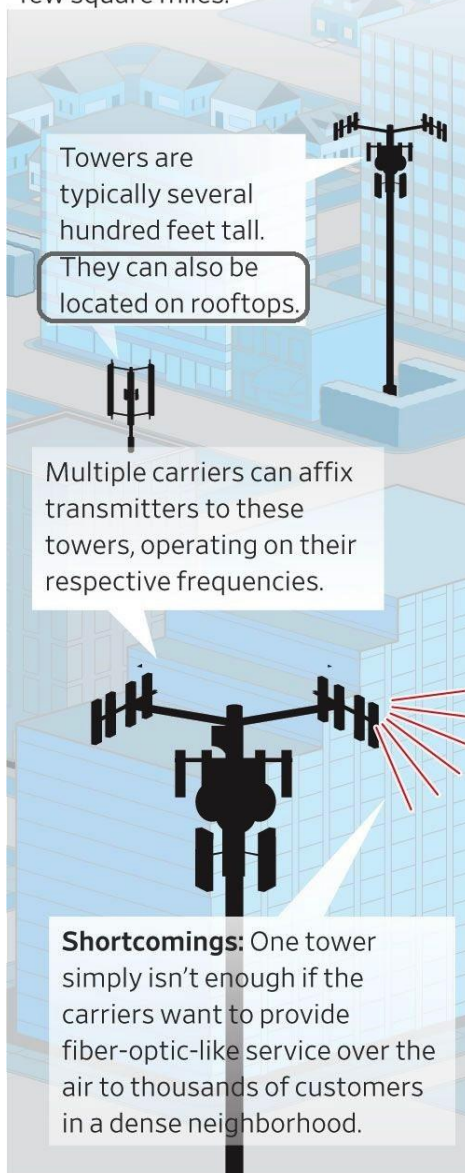
Femto Cell: *Femto cells* are small mobile base stations that are used to extend coverage in the residential or small office complexes. They are used in areas with network congestion, and it acts to offload a Macro Cell. It can also serve to provide **in-building coverage**.

A Femto cell can cover **up to 32 feet**, connect more 8 to 16 users, have an output power of **0.1 W**.

With all these types of small cells, **FIBER OPTIC** is used as backhaul, so they can emit higher frequencies and higher powers, thus covering greater areas.

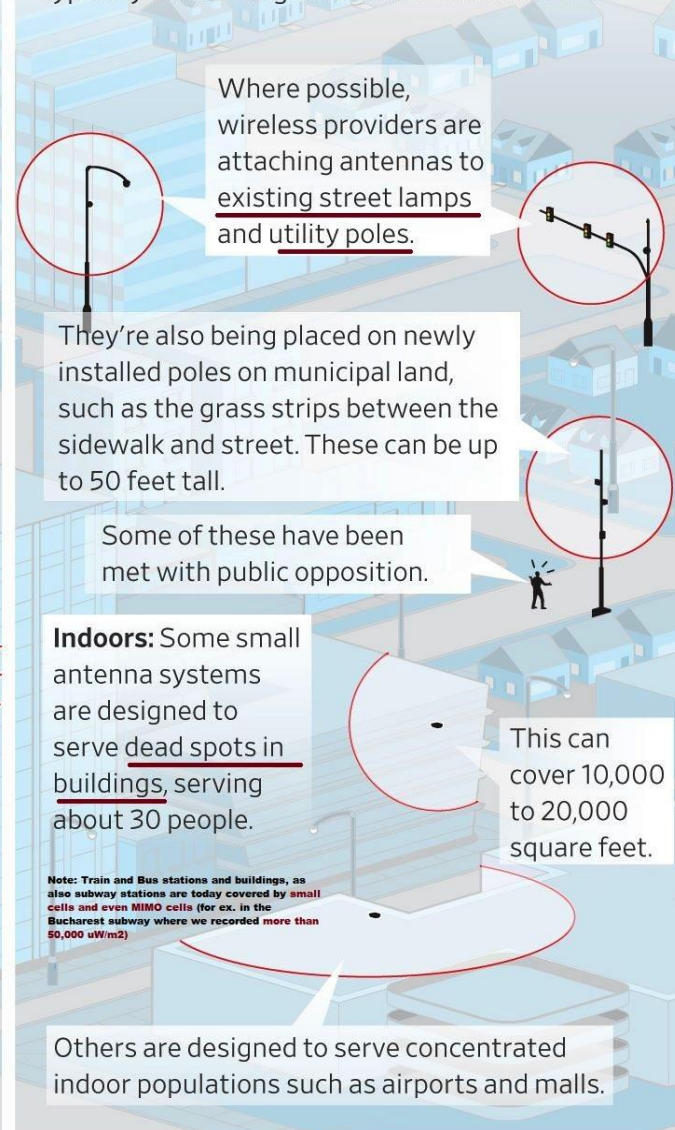
Traditional Tower

Tall towers can provide coverage to several thousand people across a few square miles.



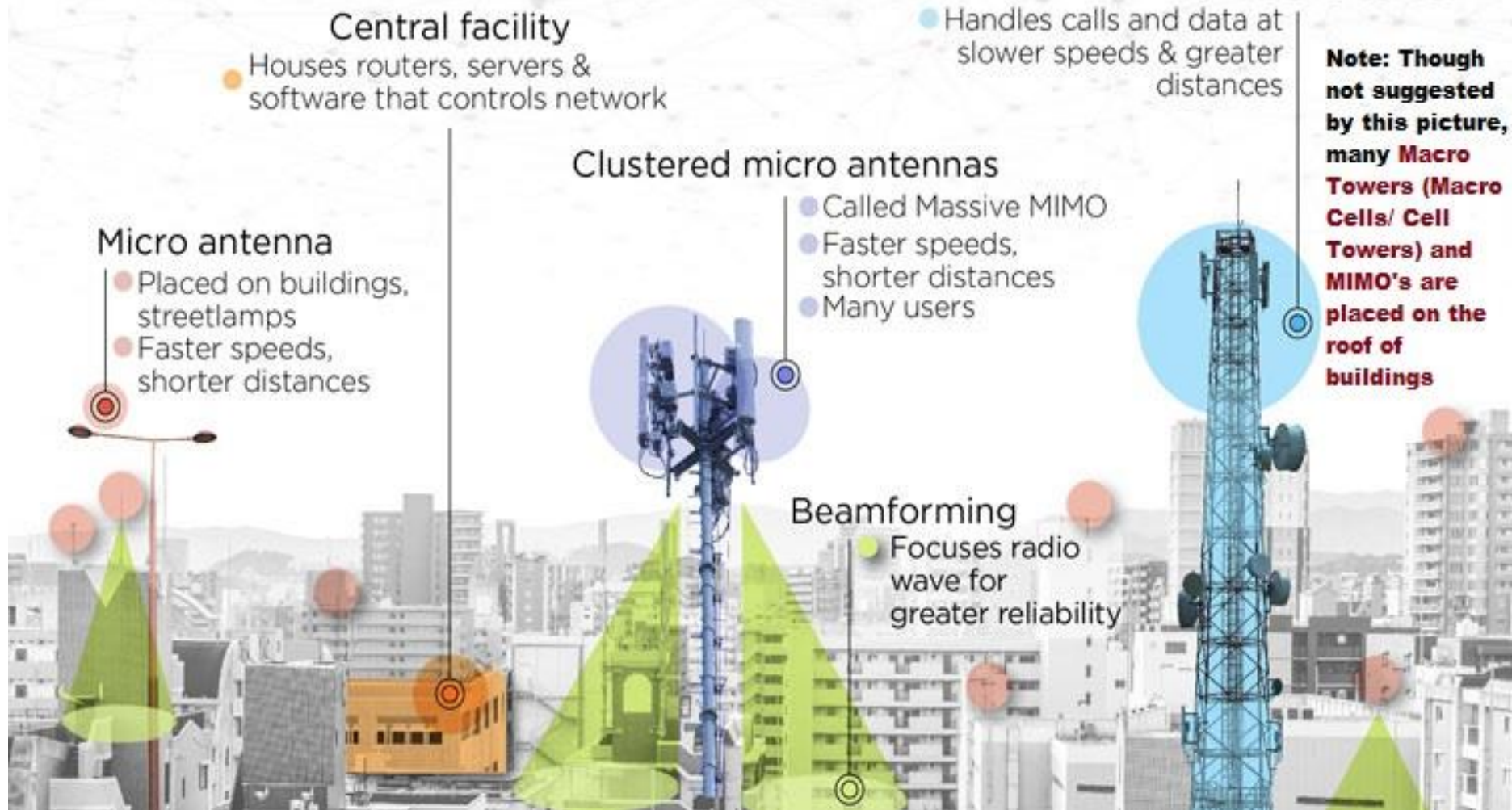
Distributed Technology

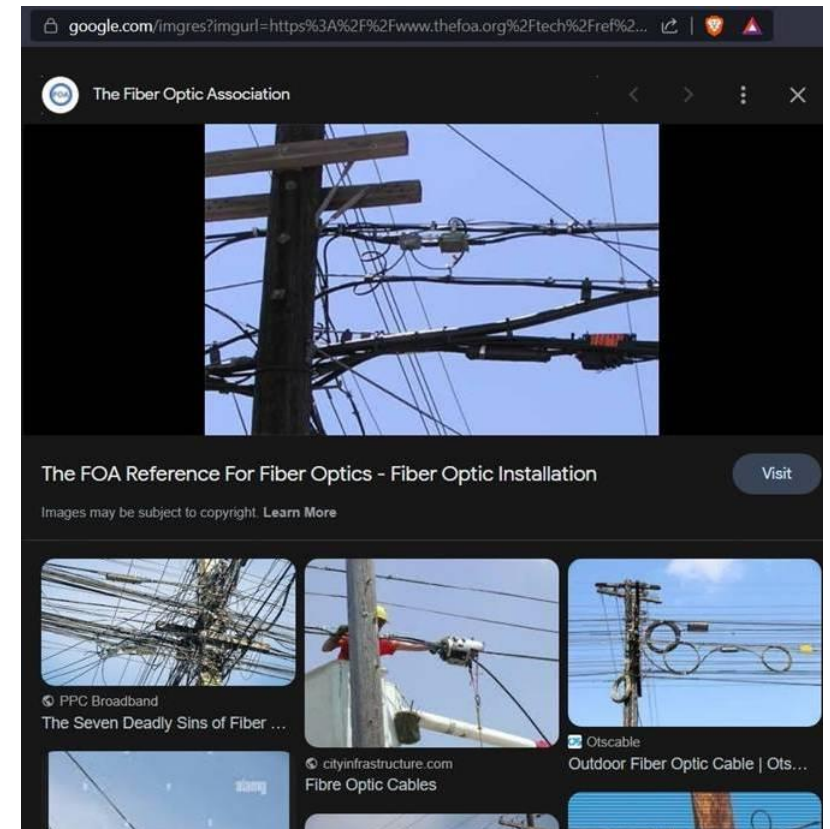
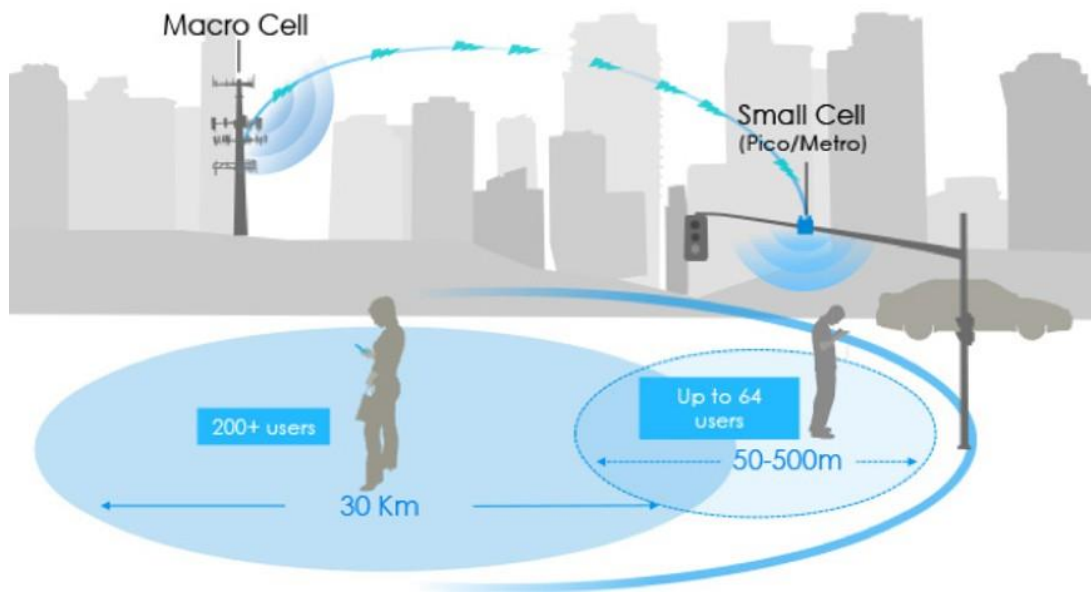
Small-cell transmitters, which have been used to fill gaps in 4G coverage, will be required in much greater numbers to fully deliver on 5G's promise. They typically have a range of a few hundred feet.



5G NETWORK INFRASTRUCTURE

How 5G wireless reaches users

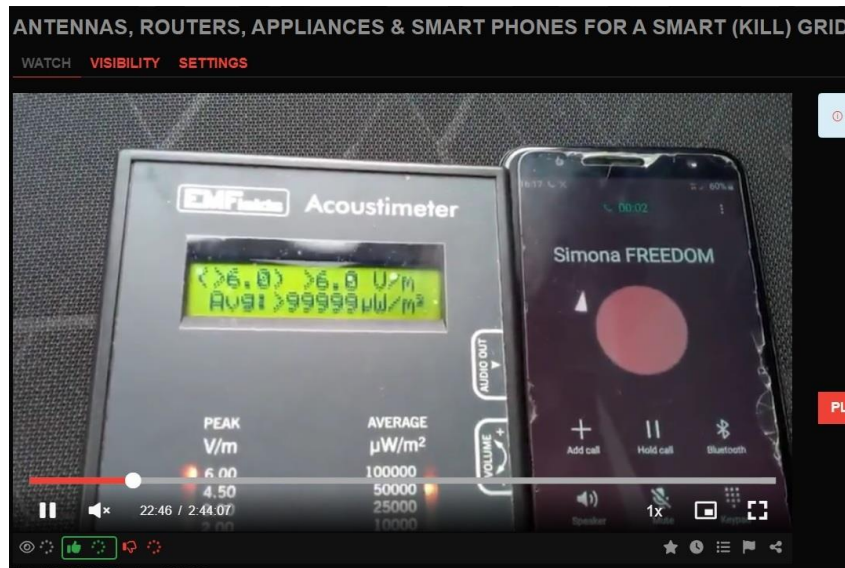




Using our Acoustimeter we have been able to observe a **dramatic increase in RF power in community areas where small cells have been placed (from practical zero to thousands and even more than 20,000 $\mu\text{W}/\text{m}^2$. In UK phones also we have seen however shocking recordings of tens of thousands up to 100,000 $\mu\text{W}/\text{m}^2$, though we**

have experienced in Europe that they can function

at less than 10 $\mu\text{W}/\text{m}^2$ (even on Data Mobile) . So in the UK mobile phones appear to be the most important source of RF pollution and harm, not only for the users, but also for the people around them, especially in smaller rooms, vehicles or crowded environments – see [Annex E](#)

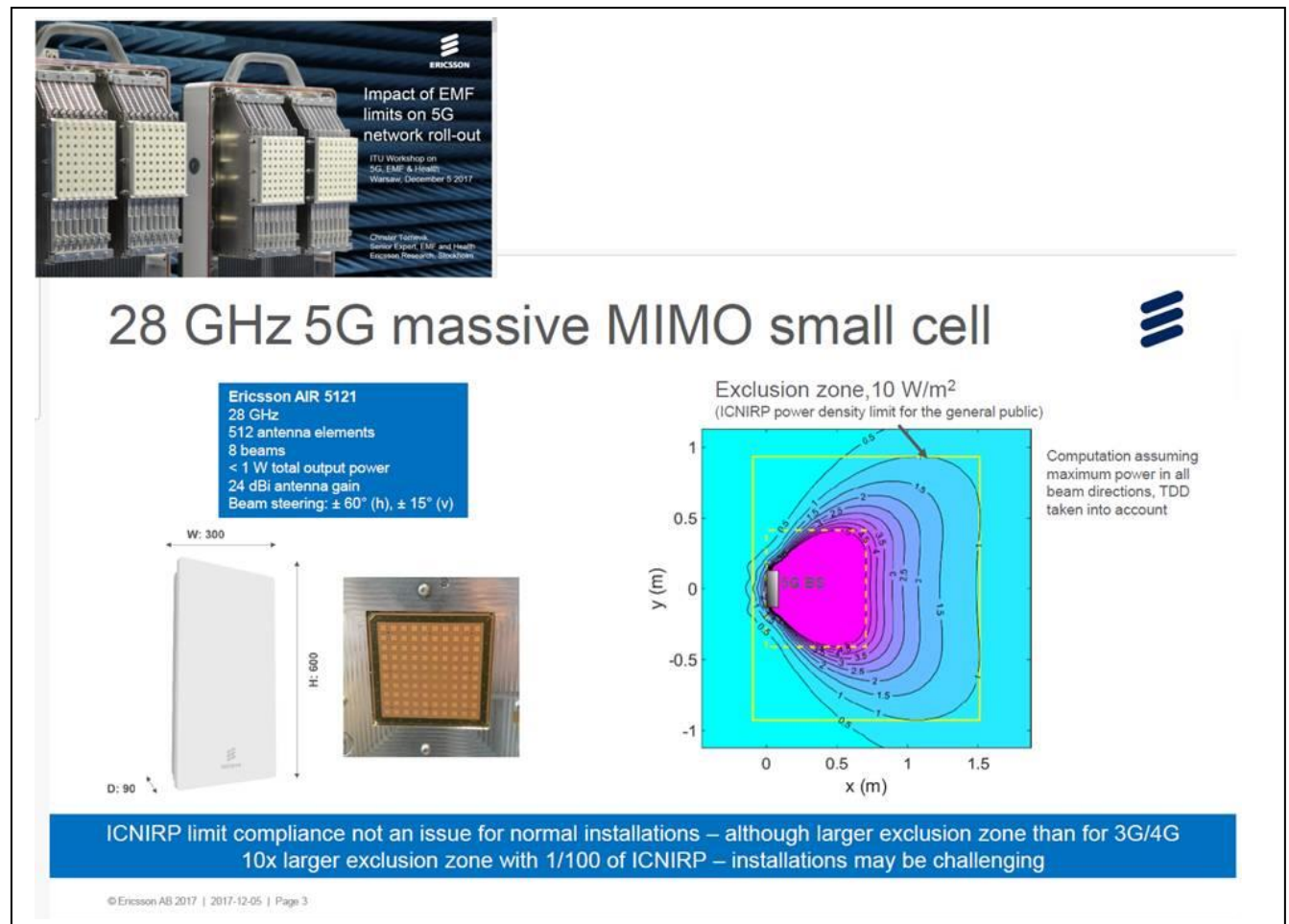


The industry may find an argument in the fact that the coverage is poor in the respective area for a certain network (of course all of them must have coverage, thus greatly multiplying the radiation), therefore the phone will emit more radiation in search for a signal. Their solution is to increase the radiation in the entire area by placing small cells everywhere and putting up more optic fibre macro cells, so the signal would finally be ideal for all the networks. Indeed, we now see **the deployment**

of optic fibre cables everywhere, even in the most remote rural areas (on light and telegraph poles from where numerous other cables are directed towards houses or other various buildings). An important thing people need to know is that **these new networks are duplicating the existing telecommunication networks already in place¹¹** and that **not in order to substitute the harmful wireless RF radiation, but, on the contrary, to very much increase it everywhere, outside and inside buildings, because all these optic fiber will all end up in small cells or WiFi routers¹²**. . If one sees anything wrong in this reasoning and suggests optic fibre (plus normal Ethernet) hardwiring is the best solution from both health and technical perspectives, for sure he must be a conspiracy theorist!

Let's also consider that **these considerable amounts of power are concentrated in a beam directed towards the receiver** (mobile phone, router etc) **and everything in between.**

“Rollouts in 5G mmWave technology benefit from massive MIMO. Massive antenna arrays intensify the signal, minimizing attenuation that a



¹¹ **New broadband poles in Hull and East Yorkshire explained: the rules, the backlash and the benefits** (<https://www.hulldailymail.co.uk/news/hull-east-yorkshire-news/broadband-poles-hull-explained-rules-8187429>)

¹² Indeed the Wifi routers for Internet can be turned off from the website of the provider and the wireless on computers or laptops also, replacing wifi with a wired Ethernet cable. This is the way Internet began and it is the only safe and also much more secure and sustainable solution. The optic fibre cables could have been the right thing if used only for wiring the Internet, but instead, they are used to much increase the destruction through adding higher powers and higher frequencies.

signal encounters at frequencies above 27 GHz.

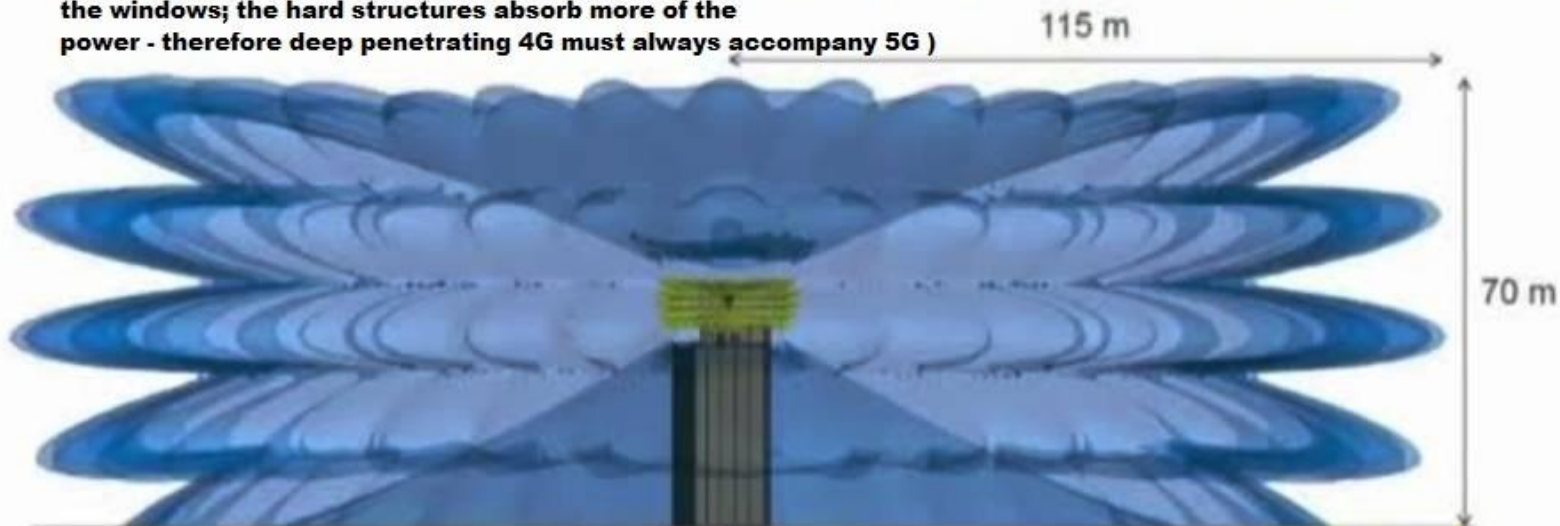
[...] Because massive MIMO relies on beamforming, its use minimizes stray radiation in the environment. Beamforming focuses the signal in a specific direction: think laser pointer instead of flashlight. (MASSIVE MIMO – IEEE FUTURE NETWORKS^{ccxxii})

Here we can see the exclusion zone for countries such as **Russia, Bulgaria, Italy, Poland, Switzerland**) with safety standards of **0.1uW/m²** (=1/100 of ICNIRP)

Exclusion zone makes 5G impossible in countries with lower guidelines; 0.1 W/m² gives 115 m exclusion zone!

$$0.1 \mu\text{W}/\text{m}^2 = 100,000 \mu\text{W}/\text{m}^2 = 10 \mu\text{W}/\text{cm}^2$$

NOTE: This shows the exclusion zone for a Massive MIMO comprising the inside of the building which is blasted with more than 100,000 $\mu\text{W}/\text{m}^2$. Obviously in this range of 115m/75m we usually get other buildings, streets and various community assets in which people get exposed (if indoor, esp. through the windows; the hard structures absorb more of the power - therefore deep penetrating 4G must always accompany 5G)



Size of exclusion zone makes 5G network roll-out a major problem or impossible

Exclusion zone
10 W/m²
ICNIRP limit

Exclusion zone
0.1 W/m²
1/100 of ICNIRP limit

For countries with safety limit
1/100 of ICNIRP Guidelines
meaning 0.1 $\mu\text{W}/\text{m}^2$

Källa: https://www.itu.int/en/ITU-T/Workshops-and-Seminars/20171205/Documents/S3_Christer_Tornevik.pdf

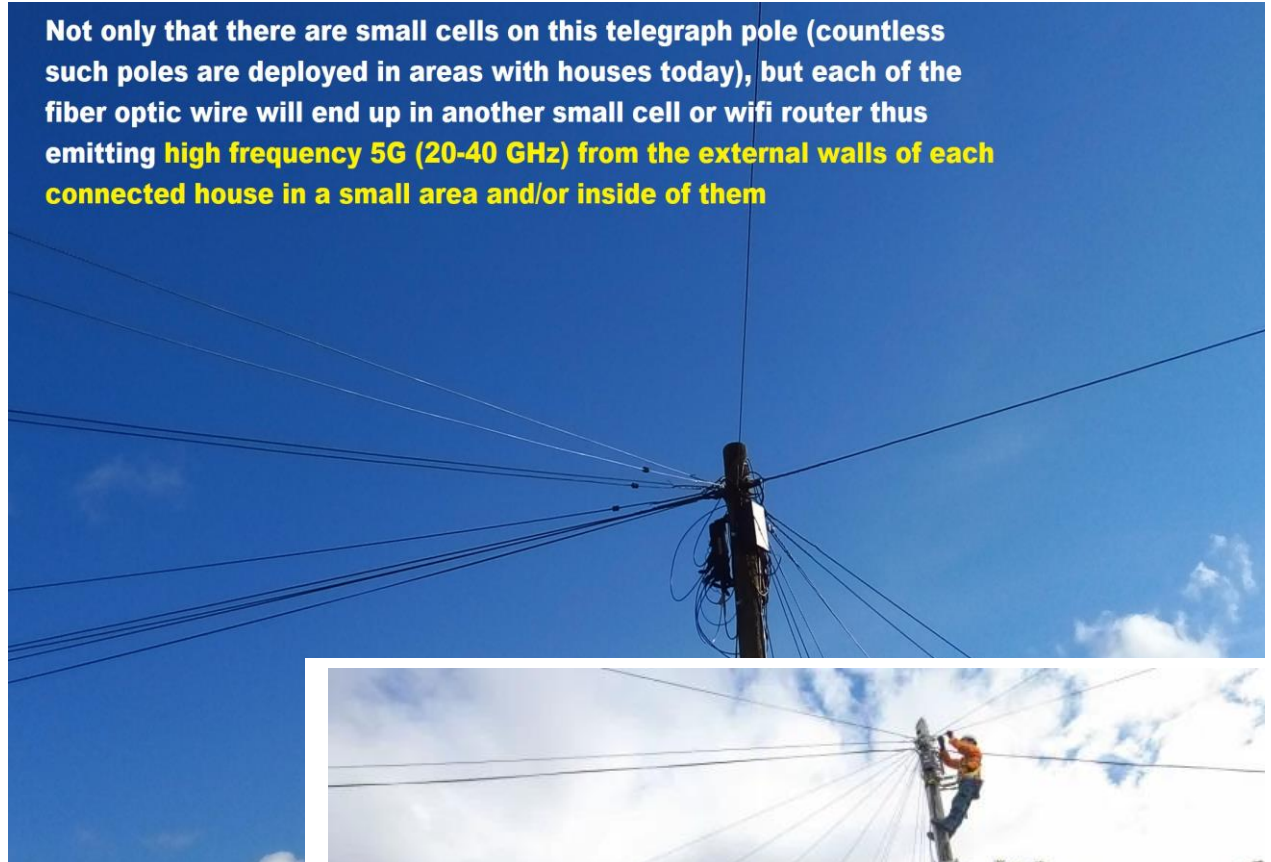
This simplified scheme obviously doesn't take into account **the range of power that such MIMO antennas can have, nor the interference with waves coming from other masts or small cells that also cover the same area.**

MIMO increases the output in a system of antennas with 135%, according to: EMF Radiation in Mobile Networks: A Closer Look at Emission Limits & Safe Distances^{ccxxiii}

The fiber optic associated with small cells leads to greater coverage and powers for each one of them. Consider how much cumulative radiation may result in an area where we have tens of such fiber optic wired cells in a common back garden shared by a dozen of houses or on a small street with houses or flats on both sides, where they are positioned in clusters at every 100 m on light and telegraph poles. Not to mention the exposure from all the Macro Cells (MIMO Towers) that are all in a range of 30 km from the place!

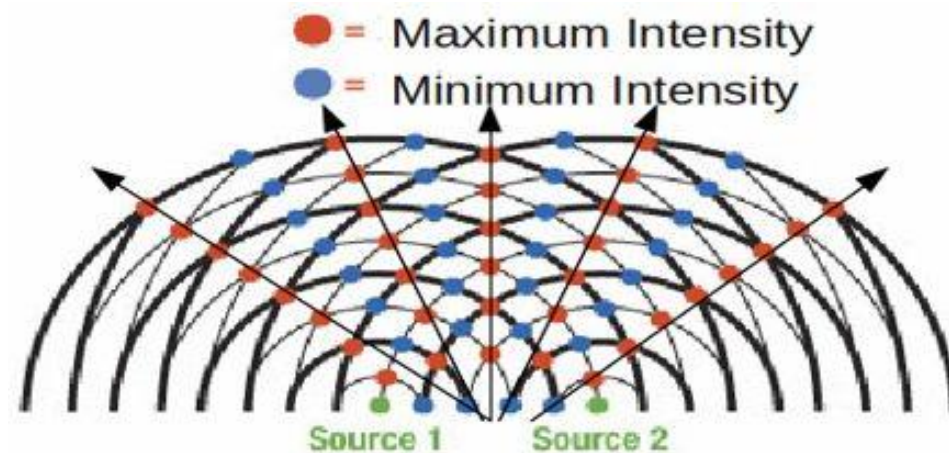
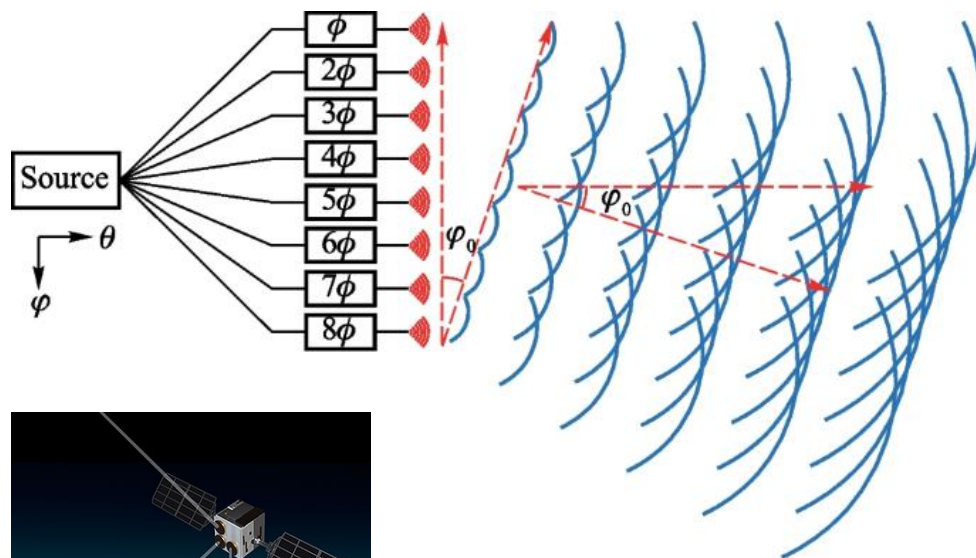
But there's more than this. We need to speak about **5G most dangerous technology that beams focused bursts of radiation towards the receiver**. In the words of **Jeremy Naydler PhD**, author of **5G: The Final Assault**^{ccxxiv} the meaning of **PHASED ARRAY**, the principle that governs the functioning of 5G antennas is the following: *'Both 5G satellites and 5G land-based masts will use a system called the "phased array". In the phased array, groups of antennas are co-ordinated to radiate pulses in a specific direction and in a specified time sequence. This allows a concentrated beam of radio waves to be exactly aimed at designated targets, to enable signals to be sent or received. Because the beams are concentrated in this way, this adds to their power, which means they are able more easily to penetrate buildings. But it also means that any living creature that gets in the way of such a concentrated beam will be subjected to a powerful dose of extremely high frequency radiant electricity. A study published earlier this year demonstrated that certain insects, because of their small body-size, are particularly vulnerable to the millimetre waves of the higher frequencies to be utilised by 5G. Other studies*

Not only that there are small cells on this telegraph pole (countless such poles are deployed in areas with houses today), but each of the fiber optic wire will end up in another small cell or wifi router thus emitting **high frequency 5G (20-40 GHz) from the external walls of each connected house in a small area and/or inside of them**



have shown that bacteria and plants are also vulnerable, and so also (as one might expect) are the skin and the eyes of animals including, of course, human beings.

As well as its ability to concentrate power in focused beams, phased array technology has a further complicating factor. Either side of the main beam, the time intervals between the pulses are different from the time intervals between those of the main beam, but they may overlap each other in such a way as to produce extremely rapid changes in the electromagnetic field. This can have a particularly detrimental effect on living organisms, because instead of the radiation decaying when it is absorbed into living tissue, it can be re-radiated within the body. The moving charges streaming into the body effectively become antennas that re-radiate the electromagnetic field and send it deeper into the organism. These re-radiated waves are known as Brillouin precursors, named after the French physicist Leon Brillouin, who first described them in 1914.



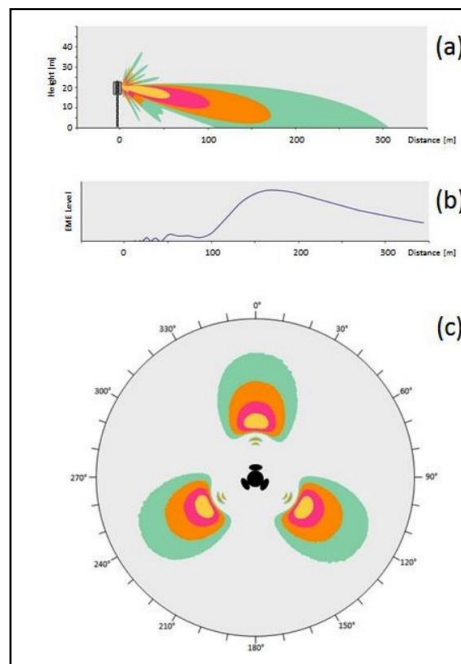
Research suggests that they can have a significant and highly detrimental impact on living cells.'

You can see in the images above how the electromagnetic waves overlap with each other in a phased array system that gathers a group of RF antennas, giving rises to points of maximum intensity and minimum intensity. Each of the smalls cells contain this technology and, as known in a Massive MIMO we have clusters of many small cells each one giving such waves that interfere with each other and with the ones coming from the neighbouring small cells and 4G towers. They are now common to the satellites also, that can control such small antennas and MIMO from space.

Let's return to the most powerful ones, the MASSIVE MIMO or MACRO CELLS. Assuredly, the councils which admit the deployment of such structures, should have been informed about the powers per distance of such beams (and range of frequencies) emitted by each one of them. In fact wherever the deployment of small cells is achieved, somewhere in the area of the community we usually observe one or more such structures, sometimes in very close proximity of homes, schools and colleges, shops, bus stops, hospitals and health centres, train stations etc

"Massive MIMO will greatly increase the network capacity by locating tens (or even more than a hundred) small antennae at the Base Station, which will form multiple signal beams directed at the devices connected to it" (TECHMONITOR.AI^{ccxxv})

In matters of emitted power (in dB or microW/m², you have in the image at the right the recordings of a group of researchers with an antenna having just a few elements &



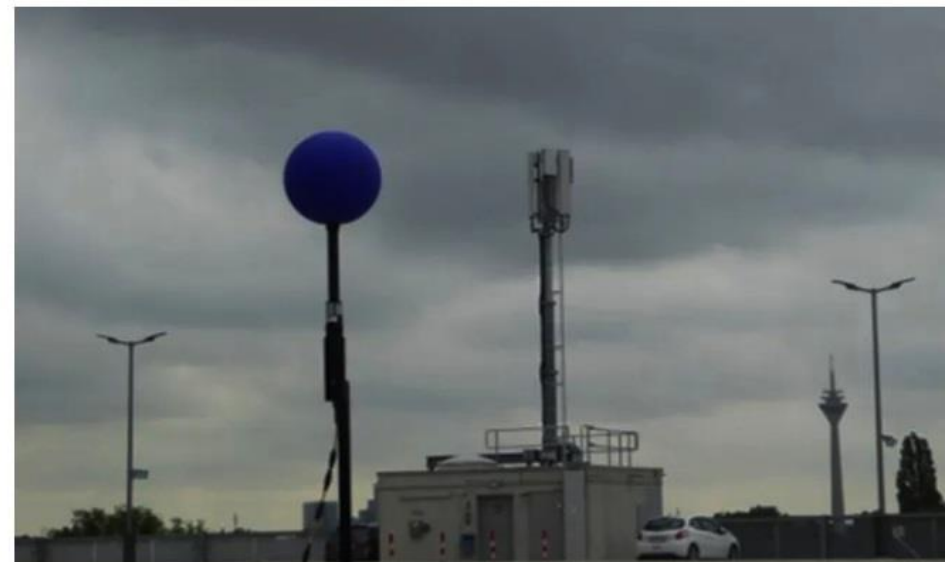
Conducting live tests in Düsseldorf (Germany) and Lille (France)

Massive MIMO EMF Exposure Estimation:
Tools, Models, And Initial Measurements
imec-int.com

To confirm their findings, the researchers conducted experiments at 5G test sites in the cities of Düsseldorf and Lille. Different scenarios — ranging from a telephone call and a video chat to loading the network to its theoretical maximum — were evaluated (Fig. 2).

At a distance of 60 to 70 meters from the 5G base stations, following EMF radiation levels were registered:

- Phone call: 0.3 V/m (average) to 5.5 V/m (worst-case) **80,239 uW/sqm**
- Video chat: 0.3 V/m (average) to 5.4 V/m (worst-case) **77,347 uW/sqm**
- Maximum network load: 3.7 V/m to 5.3 V/m (worst-case) **74,509 uW/sqm**



emitting up to **80,000 microW/m2 at a distance of 60-70 m from the base station.**

A Guide For The Environmental EME Report of the Australian regulator **ARPANSA**, shows the example of a classic cell tower that operates **on less than 3.5 GHz** and presents the the power density of the emitted RF waves function of distance. One can observe (picture on previous page) that the distribution follows the position of the antennas and that is lower around the base and increasingly higher for up to 300 m, then decreasing gradually, as can be seen clearer from the table above. The emitted power is **between 7,200 uW/m2 at the base**

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A Guide to the Environmental EME Report7 of 10

Example Table of an In-depth Look at Calculated EME Levels

Distance from the site	Existing configuration			Proposed configuration		
	Electric field (V/m)	Power density (mW/m²)	Percentage of the public exposure limit	Electric field (V/m)	Power density (mW/m²)	Percentage of the public exposure limit
0–50 m	0.57	0.87	0.01%	1.7	7.2	0.09%
50–100 m	0.96	2.5	0.04%	1.9	9.2	0.16%
100–200 m	3.4	31	0.46%	5.0	66	1.0%
200–300 m	3.2	27	0.40%	4.6	56	0.88%
300–400 m	2.3	13	0.20%	3.2	28	0.43%
400–500 m	1.7	7.7	0.11%	2.4	16	0.24%

and 66,000 $\mu\text{W}/\text{m}^2$ (max), at a distance of 100-200 m from the base. However even at 500 m it is still more than double than that on the base, 16,000 $\mu\text{W}/\text{m}^2$. According to ICNIRP, ARPANSA OFCOM and FCC, all these numbers represent safe emissions. According to the summaries and guidelines of

Bioinitiative, EuropaEM, Building Biology Institute & other independent experts, they are extremely dangerous.

So now, considering the kind of antennas with just a couple of elements we had in the two discussed examples above, we wonder how much could emit the MASSIVE MIMO pictured here?!



For now we could not discover any reference to an output in V/m or W/m² for such a structure, but as said, we have seen and recorded that even one small cell can give up to more than 10,000 $\mu\text{W}/\text{m}^2$ at a distance of less than 20 m.

But let's take another reference. In 2017, Scientists for Wired Technology^{ccxxvi} have done some recordings around 4G small cells in Palo Alto, in a very populated area of flats with a professionally certified RF/MW Meter. This is their conclusion:



“The screen of the HF-59B meter (equipped with a DG20_G10 -20 dB attenuator) shows peak RF/MW radiation readings of 72,000 to 123,000 $\mu\text{W}/\text{m}^2$ when standing on the sidewalk below the “Small Cells”. Applying the correction factor for the high-speed, pulsed, digital signals of 4G/LTE, the peak levels of 4G/LTE RF/MW radiation are actually over 720,000 to 1,230,000 $\mu\text{W}/\text{m}^2$, per the GigaHertz Solutions’ product manual and product video^{ccxxvii}”

MORE REFERENCES:

99 Problems & 5G is 1... Actually Over 150 Studies into Dangerous Radio Frequency <https://smombiegate.org/99-problems-and-5g-is-one-actually-over-150-studies-into-dangerous-radio-frequency/>

Dr. Joseph Mercola has published recently on his [website](#)^{ccxxviii} a study called: **Ten New Studies Detail Health Risks of 5G** (now archived, but mirrored [here](#)^{ccxxix})

(see also dr. Mercola's book: [EMF*D: 5G, Wi-Fi & Cell Phones: Hidden Harms and How to Protect Yourself on Amazon](#)^{ccxxx})

STORY AT-A-GLANCE

- *“Several studies published between 2022 and 2024 underscore the health risks posed by 5G technology*
- *Research contradicts the International Commission on Non-Ionizing Radiation Protection guidelines, demonstrating various harmful biological effects of radiofrequency radiation (RFR) on humans and the environment, including potential cancer risk*
- *Studies reveal 5G's potential to induce neurological damage and psychiatric problems, highlighting its effects on brain development, including the increased risk of conditions like dementia through mechanisms such as the impairment of neurosin*
- *A December 2023 study illustrates the detrimental effects of 5G RFR on rat sperm, showing decreased sperm count and quality, with melatonin offering a protective effect*
- *February 2024 research indicates significant changes in the fecal microbiome and metabolome profiles in mice exposed to 5G RFR, hinting at broader implications for health, including mental well-being and immune function”*
 - **2024 Feb (Wang et al) – Effects of radiofrequency field from 5G communication on fecal microbiome and metabolome profiles in mice**
 - *“After RF exposure, the mice fecal samples were collected to detect gut microorganisms and metabolites”*
 - *“Results showed that **intestinal microbial compositions were altered in RF group**, as evidenced by reduced microbial diversity and changed microbial community distribution.”*
 - *“Metabolomics profiling identified 258 significantly differentially abundant metabolites in RF group”*
 - *“**4.9 GHz radiofrequency radiation may cause intestinal microbiota dysbiosis in mice**”*
 - *“At present, we only suspect that the gut microbiota and metabolism imbalance were associated with **depression-like behavior induced by RF**, and metabolic profile imbalance may be related to the alterations of immune regulation or inflammation”*
 - **2024 Jan.31 (Hardell et al) – An Eight Year Old Boy Developed Severe Headache in A School Close to A Mast with 5G Base Stations**
 - *“In this case study we present an eight year old boy who attends a school with a mobile phone tower with 5G base stations 200 meters from the school area and 285 meters from his classroom.”*

- *“Relatively soon after the boy began attending class at the school, he started to suffer from headache, although not every day or not even every week at first.”*
- *“However during the autumn of 2023, the headache has become daily and more intense at school, grade 10 on the 10-grade scale; 0 corresponds to no discomfort and 10 to unbearable discomfort. He may also experience some fatigue (grade 5), and sometimes dizziness (grade 7) at school.”*
- *“The boy is symptom free in general at home but he may also occasionally have headache at home, grade 2 on the 10-grade scale, but this headache disappears relatively quickly.”*
- *“Since the autumn 2023, the boy has been wearing a protective cap (which shields against RF radiation) both outdoors and also indoors in the classroom.”*
- *“Outdoors, he also uses a RF-protective jacket and scarf. With the protective cap, he does not suffer from headache according to experience so far.”*
- **2023 Dec (Ozgen et al) – Therapeutic effects of melatonin in long-term exposure to 2100 MHz radiofrequency radiation on rat sperm characteristics**
 - *“Radiofrequency electromagnetic fields (RF-EMFs) are one of the risk factors for male reproductive health and **melatonin** can be an ideal candidate for therapeutic development against **RF-induced male fertility problems** due to its antioxidant properties.”*
 - *“The possible therapeutic role of melatonin in the destructive effects of 2100 MHz RF radiation on rat sperm characteristics is investigated in the present study.”*
 - *“The percentages of abnormal sperm morphology were significantly increased with RF exposure, while the total sperm count was significantly decreased.”*
 - *“RF exposure also showed harmful effects on acrosome, axoneme, mitochondrial sheath, and outer dense fibers at the ultrastructural level.”*
 - *“The number of total sperms, sperms with normal morphology increased, and ultrastructural appearance returned to normal by melatonin administration.”*
- **2023 Oct (Bodin et al) – Sex-dependent impact of perinatal 5G electromagnetic field exposure in the adolescent rat behavior**
 - *“The current study aimed to investigate the effects of daily 5G electromagnetic field (EMF) perinatal exposure on the neurodevelopment of rats”*
 - *“results indicated that both male and female pups showed delayed incisor eruption in the EMF-exposed group”*
 - *“Regarding activity in the open field, adolescent females showed less stereotyped movements (– 70%), while adolescent males showed more stereotyped movements (+ 50%)”*
 - *present study suggested that **perinatal exposure to 5G at SAR level below reglementary threshold led to perturbations in the descendants seen in juveniles and adolescents.***
- **2023 Aug (Canovi et al) – In vitro exposure of neuronal networks to the 5G-3.5 GHz signal**

- “Our experimental findings extend our previous results, showing that RF, at 1.8 to 3.5 GHz, inhibits the electrical activity of neurons in vitro at levels above environmental standards.”
- **2023 Apr (Zheng et al)** – Biological effects of exposure to 2650 MHz electromagnetic radiation on the behavior, learning, and memory of mice
 - “Our results indicate that exposure to 2650 MHz-EMR (WBSAR: 2.06 W/kg, 28 days, 4 h per day) may be associated with anxiety-like behavior in mice but not related to depression-like behavior in mice.”
- **2023 Jan (Singh et al)** – Acute radiofrequency electromagnetic radiation exposure impairs neurogenesis and causes neuronal DNA damage in the young rat brain
 - “The study investigates the harmful effects of radiofrequency electromagnetic radiation (RF-EMR) exposure on the young rat brain.”
 - Higher level of lipid peroxidation, carbon-centered lipid radicals, and single-strand DNA damage was observed in the brain of rat exposed to RF-EMR.
 - “Results indicate that short-term acute exposure to RF-EMR induced the generation of carbon-centered lipid radicals and nuclear DNA damage, both of which likely played a role in the impaired neurogenesis and neuronal degeneration seen in the young brain’s hippocampus region”
 - “RF-EMR exposure induces degenerative changes in dentate gyrus neurons.”
- **2023 (Zhou)** – Effect of radiofrequency radiation from 5G mobile phone on blood-brain barrier in mice
 - “The continuous exposure of mobile phone RF at 3.5 GHz or 4.9 GHz for 35 d (1 h/d) induces an increase of BBB permeability in the mouse cerebral cortex”
- **2022 Nov (Qin et al)** – Effects of radiofrequency field from 5G communications on the spatial memory and emotionality in mice
 - “We investigated the effects of 4.9 GHz (one of working frequencies of 5G communication) radiofrequency (RF) field on emotional behaviors and spatial memory in adult male mice.”
 - “depression-like behavior was induced in mice after 4.9 GHz RF exposure. In addition, the number of neurons significantly reduced and the level of pyroptosis obviously increased in amygdala rather than hippocampus.”
 - “These results suggested that 4.9 GHz RF exposure could induce depression-like behaviour, which might be associated with the neuronal pyroptosis in amygdala.”
- **2022 Sep (Nyberg)** – The European Union prioritizes economics over health in the rollout of radiofrequency technologies
 - “Since September 2017, the EU 5G Appeal has been sent six times to the EU, requesting a moratorium on the rollout of 5G.”
 - “evidence...drawn from studies showing changes to neurotransmitters and receptors, damage to cells, proteins, DNA, sperm, the immune system, and human health, including cancer.”
 - “The 2021 Appeal goes on to warn that 5G signals are likely to additionally alter the behaviour of oxygen and water molecules at the quantum level, unfold proteins, damage skin, and cause harm to insects, birds, frogs, plants and animals.”


EMF-PORTAL offers us a database of more than one thousand **5G/MMW related studies**, majority in English, out of which **353 are Medical/ biological**^{ccxxxi}.

Some of them reveal uses of MMW for medical purposes, at various frequencies but very low power, using continuous or pulse generation, obviously in a controlled environment, without other EMF interferences. Some other however, leave a lot of room for reflection and critical assessment, especially considering the fact that **the small cells are allowed to beam anything less than 10 W/m² = 10,000,000 microW/m², same as the the previous 2G, 3G, 4G (ICNIRP), and this happens at any distance that is bigger than 1.5 m.** Let's see some examples:

Apoptosis-Promoting Effects on A375 Human Melanoma Cells Induced by Exposure to 35.2-GHz Millimeter Wave^{ccxxxii} (2020) After exposure times of 15, 30, 60 and 90 minutes, **reduced viability and apoptosis has been observed among the cells subjected to 35.2 GHZ MMW radiation** (which definitely correspond with the potential of some of the new 5G small cells). Though the 5G penetration is theoretical very superficial, it could at least, affect the cells of the skin in a similar manner, be they healthy or not.

WORLDWIDE POLICY

5G & CELL TOWERS



EUROPE

- Resolutions to halt 5G in numerous European cities including Trafford, UK, Lille, France, Ormidia, Cyprus, Balchik, Bulgaria & 6 Councils in Ireland

SWITZERLAND

- Parliament refused to weaken restrictions on radio frequency radiation (RFR) after 5G Report.

FRANCE

- 60 mayors/officials petition to halt 5G.
- Federal health agency investigating 5G
- 5G antenna RFR measured.

ITALY

- 600 municipalities have passed resolutions to halt 5G.

CANADA

- Toronto "Prudent Avoidance Policy" for Cell Towers.

ISRAEL

- Cell tower setback 100m from schools and homes.

UNITED STATES

- Resolutions to halt 5G passed in Hawaii County HI, Farragut TN, Keene NH & Easton CT.
- Numerous cities restrict cell antennas near homes including: Los Altos, Petaluma, Mill Valley, Malibu and San Diego County CA, Bedford NH and more.
- New Hampshire 5G Commission's 15 Recommendations include increasing transparency, reduce public exposure, research health effects and protect wildlife and trees.
- Oregon investigating health effects of wireless.
- Los Angeles CA Public Schools: RFR Limit 10,000x less than FCC.
- Palo Alto, Los Angeles LA Schools Greenbelt MD, Bar Harbor ME: No school cell towers.

LITHUANIA

- Cell antennas prohibited on kindergartens and hospitals.

NETHERLANDS

- Health Council recommends against 26 GHz for 5G due to lack of safety data.

CYPRUS

- Cyprus National Committee on Environment and Child Health 5G Position Paper calls for 5G-free zones.

AUSTRALIA

- New South Wales Dept. of Education policy objects to towers on/near schools.

INDIA

- RFR limit tightened to 1/10 of CNIRP limits after Inter-Ministerial Report on impacts to wildlife.
- Mumbai, Zilla Parishad & Karnataka: Cell towers prohibited/removed near schools, colleges, orphanages and old age homes.
- Brihanmumbai Municipal: Cell towers banned at parks and playgrounds.
- State of Rajasthan: Supreme Court of India upheld removal of cell towers from the vicinity of schools, hospitals and playgrounds because they were "hazardous to life."

CHILE

- Cell antennas prohibited in "sensitive areas" - kindergartens, hospitals and nursing homes.

BANGLADESH

- No cell towers on homes, schools, colleges, playing fields, populated areas and heritage areas.

Ocular Effects of Exposure to 40, 75, and 95 GHz Millimeter Waves^{ccxxxiii} (2018) – Japanese experiment on five rabbits

*“Although exposure to 40, 75, and 95 GHz at 50 mW/cm² for 6 min did not induce ocular disorder in any eye, **corneal epithelial damage was observed in all five eyes exposed to 75 GHz MMW at 50 mW/cm² for 30 min.**”* Again, let’s observe that 40 GHz is (at the upper limit) in the range of the frequencies that can be given by majority of the 5G small cells now.

Acute ocular injuries caused by 60-ghz millimeter-wave exposure^{ccxxxiv} (2009) *The experiment was carried out on 6 rabbits. In conclusion “These findings indicate that the **three types of millimeter-wave antennas can cause thermal injuries of varying types and levels. The thermal effects induced by millimeter-waves can apparently penetrate below the surface of the eye.**”*

EEG changes as heat stress reactions in rats irradiated by high intensity 35 GHz millimeter waves^{ccxxxv}

The time of exposure for all the 24 rats in the experiment was just 30 seconds, but the power of the **35 GHz MMW was between 0.5 and 7.5W/cm². The data showed skin thermal pain and stress response.**

Evaluation of genotoxic effects in male Wistar rats following microwave exposure^{ccxxxvi}

The 24 rats involved in this experiment were subjected to either 10 GHz radiation for 2hr/day for 45 days at 0.214 mW/cm² or to 50 GHz radiation for 2hr/day for 45 days at 0.86 microW/cm²

*The data showed that **microwave exposure induced micronuclei formation and a significant increase in reactive oxygen species production (both more pronounced at 50 GHz).** Significant changes in the enzyme activities of serum glutathione peroxidase (decrease), superoxide dismutase (decrease) and catalase (increase) were observed in exposed group as compared with control group.*

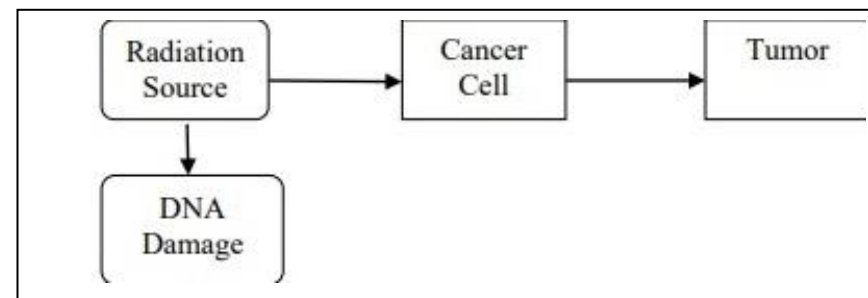
*The authors conclude that **microwave exposure can be effective at genetic level.***

As a proof that some of the experts in engineering and technology are very aware of the harmful effects of the 5G technology and do try to warn humanity about it, here we have an excerpt of an important study realised by a group of Indian academics:

Core Technologies and Harmful Effects of 5G Wireless Technology^{ccxxxvii} (M Deivakani et al 2021 J. Phys.: Conf. Ser. 1817 012006)

*“4.1 Health issues on Human - **Skin or human tissues are the basic effects of radiation, millimetre waves are absorbed within 1-2 mm of skin and on the surface of the cornea. Hence, mm-wave bio-effects are transmitted through the skin or nervous system. The high spectrum range of 5G leads to mutation of cells which creates tumors and results in cancer.** The Effects of Radiation using 5G are shown in figure 5 (to the right)*

Eyes receive more radiation and risk factors for cataract development include



smoking, diabetes, age, UVB exposure which lead to blindness. Microwave radiation is another cause of cataracts in which eyes lack enough flow of blood to dissipate heat. More research is needed on repeated exposure to radiation that causes an effect on cataracts. 5G spectrums also induce electromagnetic sensitivity which has characteristics such as lack of concentration, headaches, depression, dizziness, insomnia, nausea, and heart palpitations. If morphological, EMR, electrophysiological, and chemical changes occur, then the brain or nervous system is disturbed in which behavior changes occur. Short-term health issues such as aches and pains, headaches, burning sensations, anxiety, stress, irritability, and long-term issues such as cancers, brain tumors, fragmented DNA, mutated cells, neurological problems, and Electrical sensitivity problems such as sleeping, cognitive impairment, concentration, or memory loss, brain fog, etc. are caused due to radiation effects.

4.2. *Issues on Environment* - The horrible frequencies generating from devices are killing birds, other wildlife from areas saturated with 4G “non-ionizing” radiation. Next is mankind, for any amount of time, no life withstands using 5G. The damage in a plant because of radiation can be computed by the amount of radiation absorbed with time and results in reduced sperm germination.

4.3. *Health Issues on birds and animals* - Birds abandoning their nests and health problems such as locomotion, plumage deterioration, death, reduced survivorship since the implementation of 3G technology. This non-ionizing mm-Wave radiation affects bird species such as Rock Doves, House Sparrows, Collared Doves, Magpies, White Storks, and others. Not only are the birds, but the bee population also declined due to this non-ionizing EMF radiation. In November 2018, there has been an incident in the Netherlands that 287 birds were killed because of experimenting with the 5G implementation.”

Of a peculiar importance is the fact that, as observed by prof. Martin Pall in 5G: Great risk for EU, U.S. and International Health^{ccxxxviii}, according to the available statistics, in Northern Italy, the presence of 5G may have substantially exacerbated the lethality of covid pandemic. This has been observed by other researchers also, see for example the article of prof. Magda Havas and Angela Tsiang: COVID -19 Attributed Cases and Deaths are Statistically Higher in States and Counties with 5th Generation Millimeter Wave Wireless Telecommunications in the US^{ccxxxix13} and also the study of prof. Beverly Rubik and Brown in ‘Evidence for a connection between COVID-19 and exposure to radiofrequency radiation from wireless communications including 5G^{ccxli}’ where they note “several mechanisms by which WCR may have contributed to the COVID-19 pandemic as a toxic environmental cofactor.” (1. Changes to the red cells in the blood 2. Impair micro-circulation of the blood leading to reduced oxygen to tissue (hypoxia) 3. Increase dysfunction of the immune system including excess inflammation 4. Increase cellular oxidative stress (free radicals) 5. Increase (via Calcium) the intra-cell entry, replication and release of viruses 6. Affect heart rhythms and other heart disorders)

¹³ “Based on multiple linear regression, if there was no mmW exposure, case and death rates would be 18 - 30% lower for 5G mmW states and 39 - 57% lower for 5G mmW counties. This assessment clearly shows exposure to 5G mmW technology is statistically significantly associated with higher COVID -19 case and death rates in the U.S.A.

The mechanism – should this be a causal relationship – may relate to changes in blood chemistry, oxidative stress, an impaired immune response, an altered cardiovascular and/or neurological response”

Prof. Andrew Goldsworthy, Honorary Lecturer at Imperial College London also affirmed in 2020 that considering the modulation effect of non-ionising radiation, “We cannot assume that because the 5G radiation is mainly absorbed by the skin that it cannot damage the rest of our bodies. If the energy of the radiation is disproportionately absorbed by the skin, then the damage to the skin and the blood and lymph circulating through it will also be disproportionately large. The effects of 5G on lymphocytes could be particularly damaging. They too will have their energy drained by the calcium influx caused by the radiation, have less to spare to generate their protective antibodies and so make the immune system less efficient. So, I guess you could say that **5G can promote the spread of COVID-19**. That said, most other forms of information carrying (i.e. modulated) frequencies may be even more dangerous, particularly **WiFi with its extremely low frequency (10Hz) beacon signal being possibly the most dangerous**” (Dr. Andrew Goldsworthy about 5G, and Covid19^{ccxli})

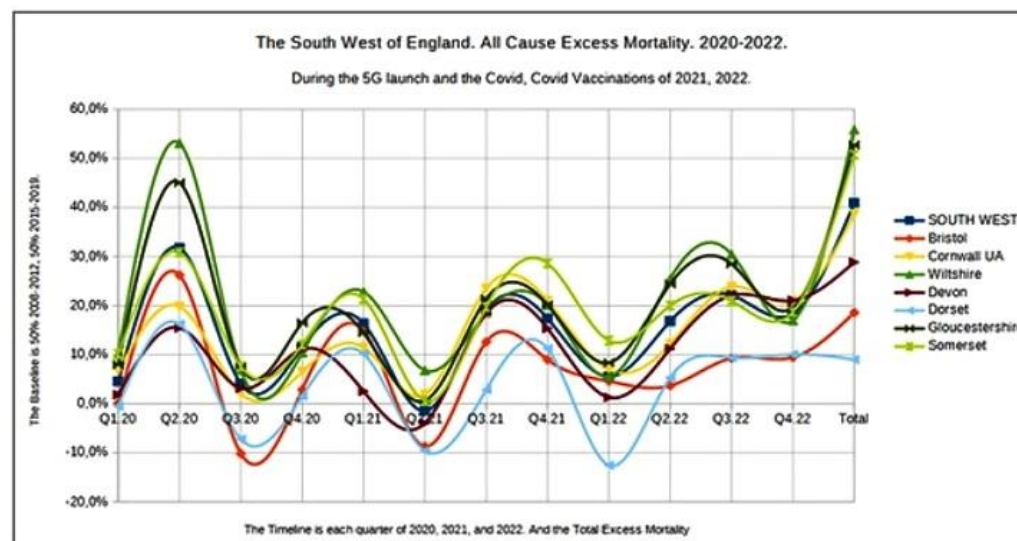
Anders Brunstad presented several studies that showed a correlation between the launch of 3G, 4G, and 5G technologies and increased mortality rates, particularly in certain age groups.

England and Wales. Part 4.

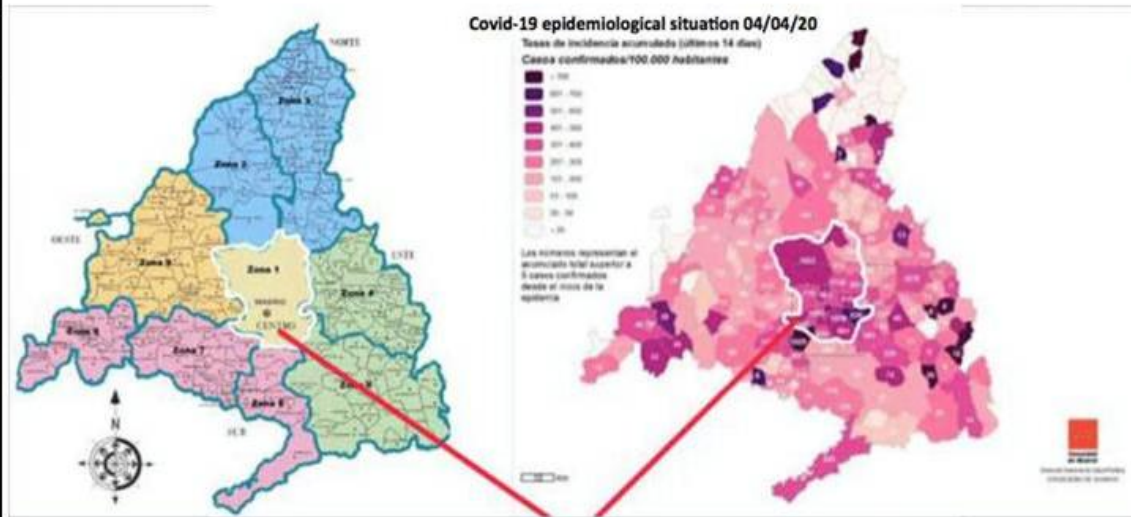
(2) 5G 2020-2022 Counties and regions.

Lets add to this, the research of Norwegian engineer **Anders Brunstad**, who presents some statistics **showing a good correlation between excess death and the presence of 5G in various cities between 2020 and 2022** (Norway, USA, Switzerland, Canada) in a conversation with dr. Robert Young: **“5G Cities Excess Mortality Explosion” with Anders Brunstad and dr. Robert Young**^{ccxlii}

See also the related articles on dr. Rober Young’s website: **Is EMF Exposure From 4G+ & 5G Pulsating Modulated Frequencies Harmful? How Can I Protect Myself?**^{ccxliii} (see right image from the page) and **Excess Deaths From Radiation Poisoning in ALL Major Cities of California**^{ccxliv}



Incidence of coronavirus



MADRID CAPITAL



Still, even as early as September 2022, the Spanish biologist **Bartomeu Payeras**^{ccxlv} (see left image) has shown using basic probabilistic and statistics methods that there is a **very good correlation between 5G endowed localities and states (in Europe and across the world) and the incidence of infections and fatalities of covid**. He also observed the difference between areas in which 4G cell towers are positioned and the higher incidence of covid in places such as Barcelona. See also, the 2020 Mordachev paper: **Correlation between the potential level of electromagnetic pollution and the hazard of COVID-19. 4G / 5G / 6G can be safe for people**^{ccxlv}

“The paper considers a hypothesis about a possible, along with other factors, influence on the mortality rate of the population from coronavirus infection of the level of electromagnetic pollution of the habitat. The hypothesis is indirectly confirmed by the presence of a correlation between the degree of severity of hygienic rationing of radio frequency electromagnetic background levels for the population, the main source of which is mobile (cellular) communication systems, and the mortality rate from COVID-19 in various countries. Special measures to ensure safety are discussed.

The rapid development of technologies, systems and services of mobile communications of the fourth (4G), fifth (5G), and by 2030 and sixth (6G) generation, is associated with an increase in the number of emitting

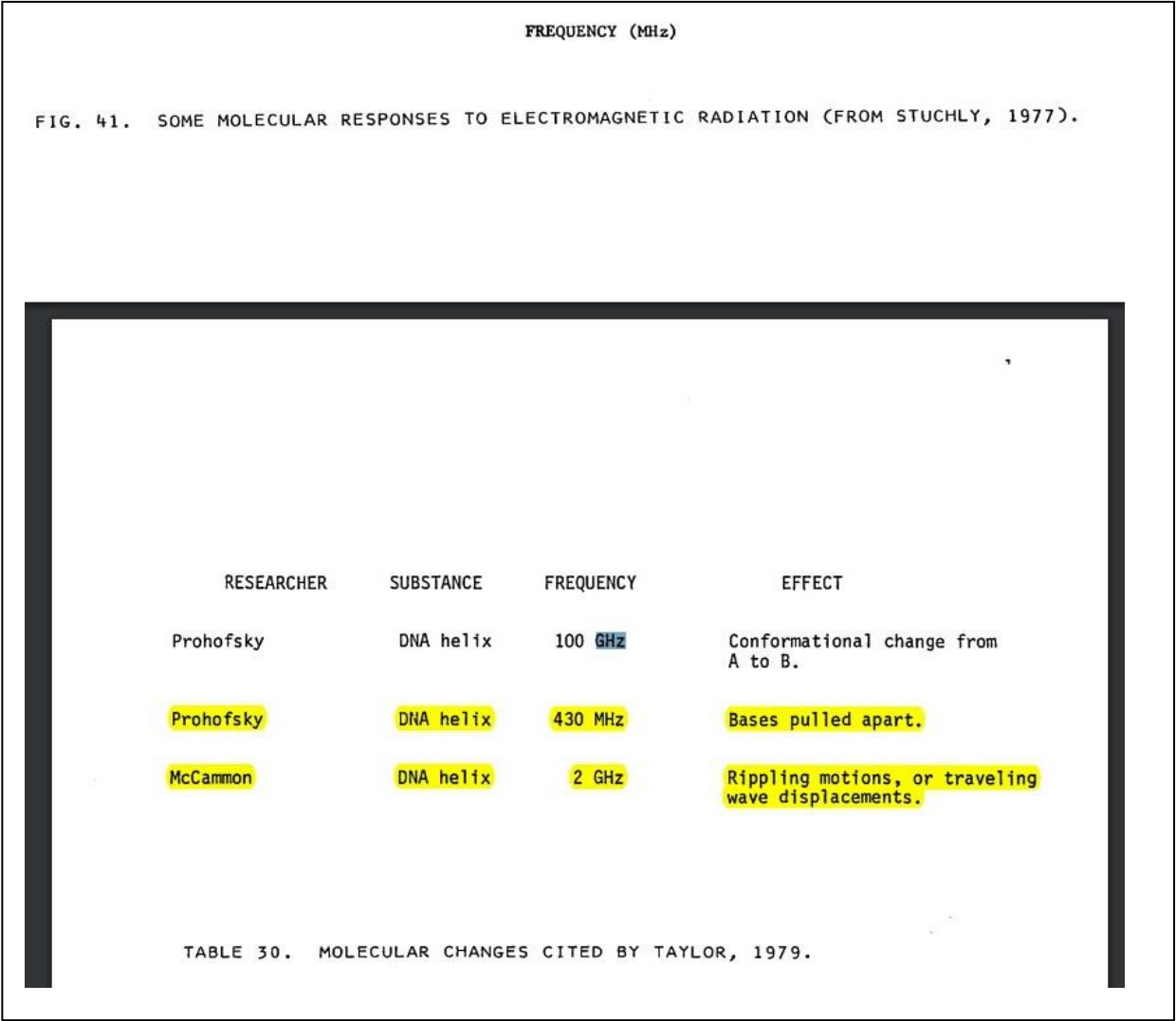
devices by several orders of magnitude, data transfer speeds on radio frequency channels and territorial traffic density of mobile communications. ”

As a matter of correlation, the above considerations do not indicate the fact that covid is 5G or that 5G is the only one factor responsible for any and all pathology that is significant among exposed population. However, the fact that **5G (& associated 4G) constitute an important promoting or contributing factor to a multitude of notable health conditions** appears as undeniable to the honest researcher.

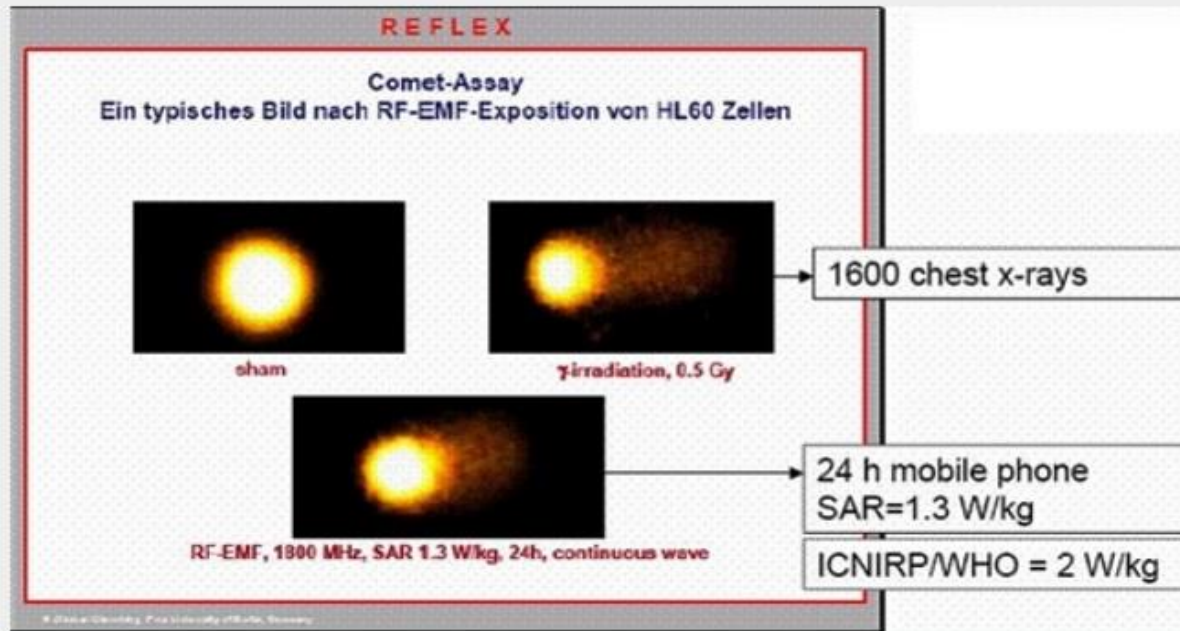
In view of all what has been shown above , it is easy to **understand that as all RF has got an impact resulting in a weakening of the immune system and various critical organs of the body, the GHz frequencies of 5G, added to the previous 4G frequencies, cannot but contribute considerably to the harm done to the unavoidably exposed population. The industry and the officials continue to affirm that the impact of GHz frequencies reaches only the superficial layers of the skin, but not only the experts quoted above, but also the MMW therapies themselves prove that any organ of the body can be addressed by this radiation.**

The reality is that **the impact of MMW on the living organism, even on the level of DNA was already known in the old scientific literature about RF**, as it can be seen from the reference in the image on the right: **Molecular responses to Electromagnetic Radiation (Stuchly 1977)**

However there is more in the newer research referring to the **DNA damage inflicted by RF**, and particularly the higher frequencies. See for example the shocking impact on the DNA observed by the massive group of international scientists of the project **REFLEX**^{cexlvii} below.



Below is an image produced by REFLEX scientists who represented twelve research institutions in seven nations. In this image we can clearly see that non-ionizing microwaves, generated by tower antennas, Wi-Fi and personal wireless devices, produce DNA damage identical to ionizing X-ray damage. [32]



**WHAT ALL PEOPLE
TODAY
SHOULD BE AWARE
OF**

**-COMMON RF
FREQUENCIES IN USE
TODAY DO CAUSE
DNA DAMAGE &
THEREFORE, IN TIME,
CANCER!**

Image and text:
Wi-Cancer.Info

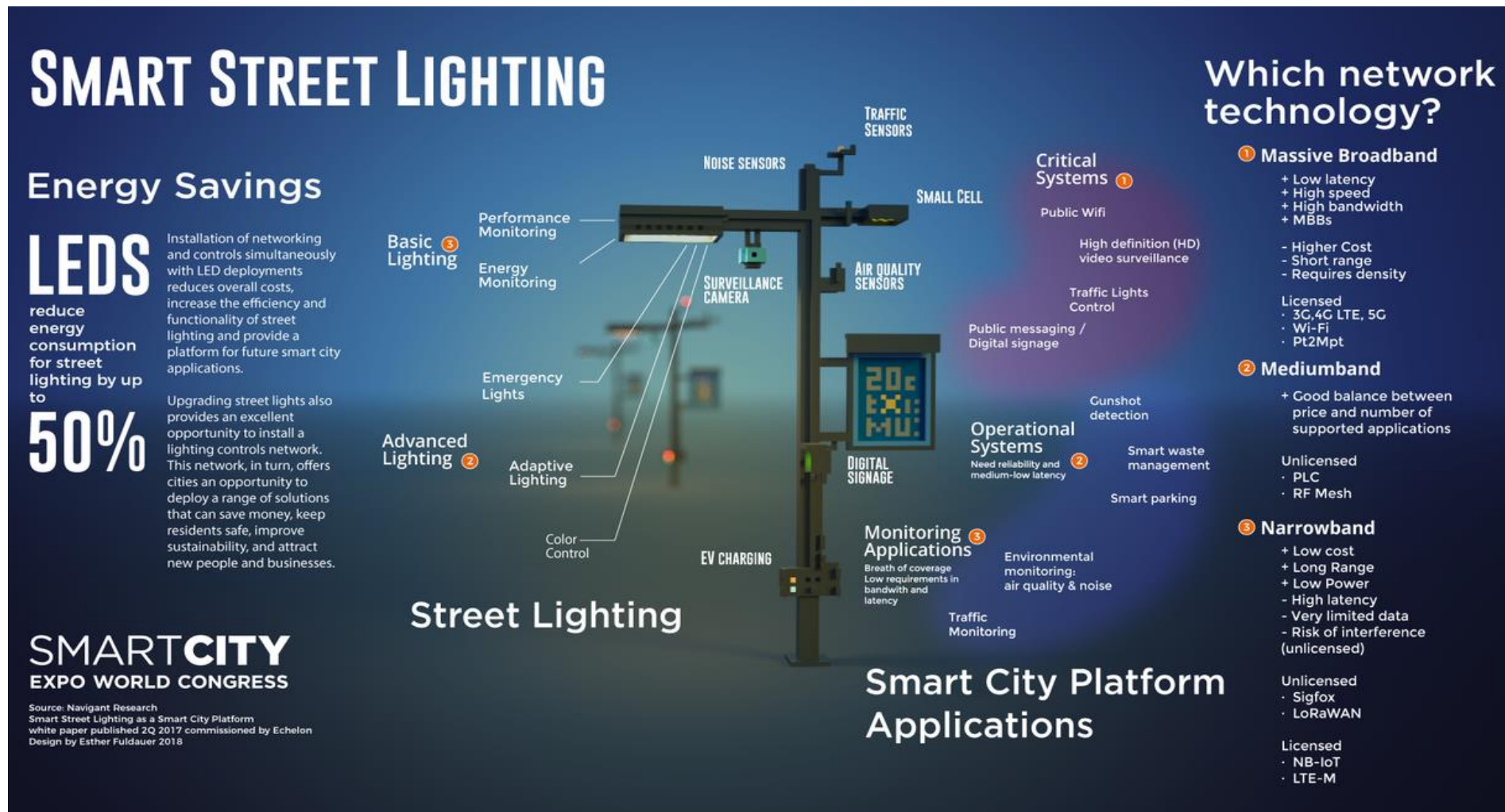
Upper left: normal human DNA with no damage (sham photo)

Upper right: human DNA damage after 1600 chest X-rays

Bottom: DNA damage after 24-hours of 1.8 gigahertz cell phone radiation propagated at a power density that yields a specific absorption rate (SAR) of 1.3 W/kilogram (a SAR of 1.6 is approved by the FCC and FDA)

THE UNSURVIVABLE WIRELESS SMART CITY^{ccxlvi}

The plan for the smart cities and towns is 100% based on wireless radiation expressed in a huge densification and variety of frequencies and radiant powers, as it can be discovered in the image below of a light pole as a 'SMART NODE'. Numerous references to this concept and applications of it from the industry can be found online, on YT particularly.



But how would it look if not only the light and electricity poles would be associated with 5G, but also the buildings themselves, by cladding them with PROGRAMMABLE (INTELLIGENT) SURFACES that can reflect the beams coming from the most dangerous phased array antennas in small cells and MIMO masts according to the AI controlled smart grid's directions?

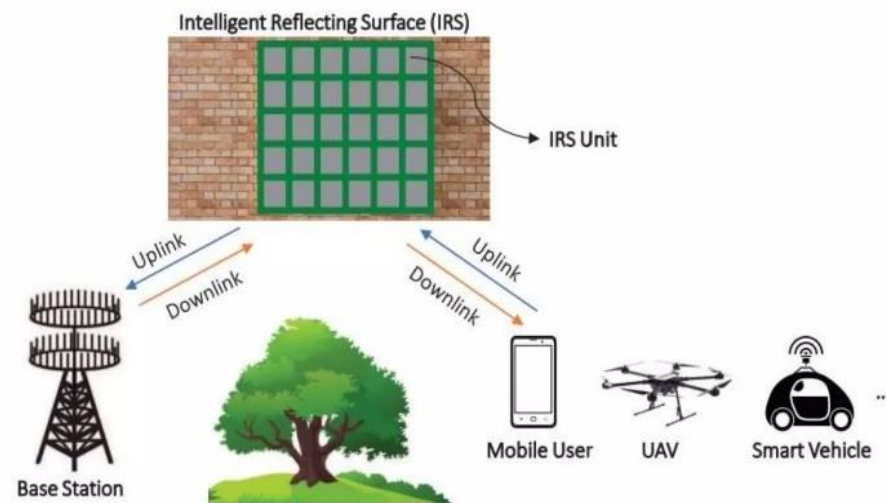
Yes, this is possible, the walls and also the windows of buildings can benefit of such 'improvements': Ofcom UK Explore Reflective Surfaces to Boost Mobile Coverage^{ccxlix}. Many such surfaces are based on GRAPHENE^{ccl} (see: A Hybrid Intelligent Reflecting Surface with Graphene-based Control Elements for THz Communications and Intelligent Reflecting Surfaces for 5G and Beyond^{ccli} as also A Promising Technology for 6G Wireless Networks: Intelligent Reflecting Surface^{cclii}). **Graphene is known to be very flammable**, though solutions^{ccliii} have apparently been found for this problem. Metallic surfaces are good reflectors of EMF - remember Greenfell Towers^{ccliv}!

BUS SHELTERS^{cclv} are also part of the 'street furniture' which is meant to contribute to the 'necessary' 5G small cell densification.



Intelligent Reflecting Surfaces – by A.S.M. Jannatul Islam - Khulna University of Engineering & Technology

4



IRS is a new and revolutionizing technology that is able to significantly improve the performance of wireless communication networks, by smartly reconfiguring the wireless propagation environment with the use of

Do the people know and agree to have street lamps, bus shelters, traffic lights, lamp and telegraph poles endowed with 5G small cells in excess of the massive MIMO Towers in their communities?

It does not really matter, because their authorities are doing this anyway and they are paying for it not only with their health, but also with their money.

Indeed, the problem of the biological impact of all this 4G/5G deployment presents no interest to our authorities (who speak enthusiastically **in their plans and reports on 5G only about money, economic development, digitalisation and sustainability**¹⁴) and not even to the **medical professionals** to whom we are still entrusting our health and eventually our lives. **The fact that the UK and the entire West deal with an explosion of cardiovascular and neurological issues, cancers and autoimmune problems and with a most worrying rate of excess death which is far above that recorded in 2020, when the entire world entered into panic mode, all these are not a secret anymore.**

We are aware that many independent doctors and scientists link this today to the mass deployment of the covid vaccines, while the media and authorities ascribe this to climate change, pollution, life habits or simply to some deeply mysterious factors ‘that baffle the doctors’. Anyway, **the increasing exposure to harmful and high frequency EMF radiation is very seldom added into equation by the first party and never by the second..** But unfortunately, **what expects the already weakened population of the West with this new and increasingly dense web of fiber optic + high frequency 5G cells +IRS, in virtue of all what we have seen above, cannot be but catastrophic, as this will amplify not only the previous named problems, but will possibly make any toxic factor (including of a bacterial, fungal or viral nature) much worse and even deadly for many people.** Indeed, **once the 5G small grid is in place and fully functional, even a cold or a flu can turn into a new pandemic and possibly, with much higher lethality than the previous one; we can also expect that this time, it will be targeting with priority the immune-suppressed, the electro-sensitive and, especially, the youngest ones among us. Just think at the high power, high frequency routers installed these days in many classrooms, and this while the children are anyway, much more sensitive than the adults to EMF exposure!**

And beyond all this, it appears clearer and clearer that the **5G deployment is not even sustainable, but a true financial and environmental burden**, as it can be seen in the next chapter. This may explain why our councils seem to have no money left even for keeping the streets or the buildings they own in a minimally decent condition. But yes, **they have money to demolish and build back better... some unsurvivable smart cities!**

¹⁴ **BT Wants Open Access to Lampposts for 5G (March 2019)** (<https://5g.co.uk/news/open-access-lampposts/4812/>)

UK Govt: Street lamps and bus shelters to help boost 5G roll out in £4 million trial (Sep 2021) <https://www.gov.uk/government/news/street-lamps-and-bus-shelters-to-help-boost-5g-roll-out-in-4-million-trial#:~:text=Press%20release-.Street%20lamps%20and%20bus%20shelters%20to%20help%20boost%205G%20roll.to%20host%205G%20radio%20equipment.>

1,000 schools connected to top-of-the-class full fibre broadband (<https://www.gov.uk/government/news/1000-schools-connected-to-top-of-the-class-full-fibre-broadband>)

UK Govt: More street lights to be home to 5G antennas as part of UK Government scheme (Feb 2022) (<https://www.dailyrecord.co.uk/news/scottish-news/more-street-lights-home-5g-26178015>)

UK Govt: Boost for broadband and 5G coverage revolution rollout as government explores plan to open £160 million satellites fund (<https://www.gov.uk/government/news/boost-for-broadband-and-5g-coverage-revolution-rollout-as-government-explores-plan-to-open-160-million-satellites-fund>)

5G AND SUSTAINABILITY. THE 60 GHz FREQUENCY PECULIAR DANGERS. RISK OF FIRE

5G is affecting the environment not only directly, as all wireless radiation does, but also through the **much increased need of electricity and related emissions of greenhouse gases, besides the huge cost of the huge infrastructure** itself. THIS MAKES THE ASSOCIATION OF THIS INFRASTRUCTURE WITH THE IDEA OF SUSTAINABILITY RIDICULOUS (See also the above chapter: THE EFFECT OF RF RADIATION ON THE ENVIRONMENT). To add up another sad aspect pointing to another mass manipulation, many people's direct experience with 5G proves to be **very disappointing in matters of the promised Internet speed**^{cclvi}

A FEW REFERENCES ON THE 5G's SUSTAINABILITY PROBLEM:

While UK and the entire West have become generally incapable even to properly repair the streets and or their state owned buildings, it's worth considering how expensive it is, in fact, this rollout of 5G. The industry itself declares openly that **"we're going to need countless new antennas, fiber optic cables, satellites and other network gear necessary to extend 5G signals beyond city centers."**(The Truth about 6G^{cclvii} – Forbes, 2020)

An analysis of the energy consumption of wireless cloud published by The Centre of Energy-Efficient Communications (Bell Labs and University of Melbourne) in 2013 starts with declaring **"these networks (wireless) are inherently energy inefficient and a disproportionate contributor to cloud energy consumption."** -THE POWER OF WIRELESS CLOUD^{cclviii}

"Researchers are warning us that the energy consumption of 5G and the IOT is growing and projected to skyrocket. 5G is NOT Sustainable, The demand for technology is outstripping the increase in efficiency. Energy consumption will rise sharply due to the ever-increasing IOT energy demands at every stage of the lifecycle of 5G equipment, from device manufacture to data centers to data transmissions, and networks". (Climate Change and 5G^{cclix})

An investigation of the adverse environmental impact of unrestrained Telco rollout and operation shows that this conflicts with ALL stated sustainable objectives – How Green is 5G^{cclx} **"Coma has produced, in a detailed critique of Huawei's paper 'Green 5G: Building a Sustainable World', a surprising bar chart showing that making and using devices has the biggest footprint of all."**

The Carbon footprint is a real issue for this technology: **Each 5G mast requires approximately 3 x more power than a 4G mast**^{cclxi} (as much as 73 typical homes). The industry itself is obliged to admit the reality of the immense expenses involved in the 5G rollout: **"A 5G base station is generally expected to consume roughly three times as much power as a 4G base station. And more 5G base stations are needed to cover the same area."** 5G's Waveform Is a Battery Vampire^{cclxii} (For IEEE SPECTRUM, 2019)

With 5G's greatly increased mobile traffic, electricity usage from telecommunications could create up to 23% of global greenhouse gas emissions by 2030; power demand would be the equivalent of 36 nuclear reactors or 7800 massive offshore wind farms worldwide, as shown in the articles:

On Global Electricity Usage of Communication Technology: Trends to 2030^{cclxiii}: *"The analysis shows that for the worst-case scenario, CT could use as much as 51% of global electricity in 2030. This will happen if not enough improvement in electricity efficiency of wireless access networks and fixed access networks/data centers is possible."*

Green 5G or red alert? A letter to Greta Thunberg: questioning Huawei's Green 5G report^{cclxiv}: *"For today, I want us to realize how much energy 5G would consume: over three times the total amount of energy that Sweden uses for industries, transportation, electricity, residences, schools, etc., combined. ³ Powering 5G globally would require building 36 new-generation nuclear reactors,⁴ 7800 massive offshore wind turbines⁵ or equivalent power plants using other energy sources." [..] "5G would increase CO₂ emissions by 250 megatons (Mt CO₂).⁶ This is seven times Sweden's total CO₂ emissions, or one fourth of the emissions generated by aviation worldwide (before Covid-19).⁷ It would most likely compromise our targets for carbon neutrality and reduced emissions"*

France, Spain and California's Green Parties, the France Climate Change Council, and Greenpeace East Asia have all warned of the climate footprint of 5G - **China, 5G and Data Center Carbon Emissions Outlook 2035**^{cclxv} (greenpeace.org)

The French Climate Council states **that an extra 7 billion tonnes of carbon dioxide could be released into the atmosphere by 5G** - **Deploying 5G will lead to spike in CO2 emissions, French climate council warns**^{cclxvi}

Legal firm **Client Earth** and telecoms consultants **Strand Consult** have expressed concerns about **greenwashing** ("a deceptive marketing that an organization is environmentally friendly") by providers:

- **Accountability Emergency February 2021 A review of UK-listed companies' climate change-related reporting (2019-20)**^{cclxvii}
- **Telecom operators want to be green. Some have the real deal in renewable energy; others, like Vodafone, greenwash**^{cclxviii} (2021)

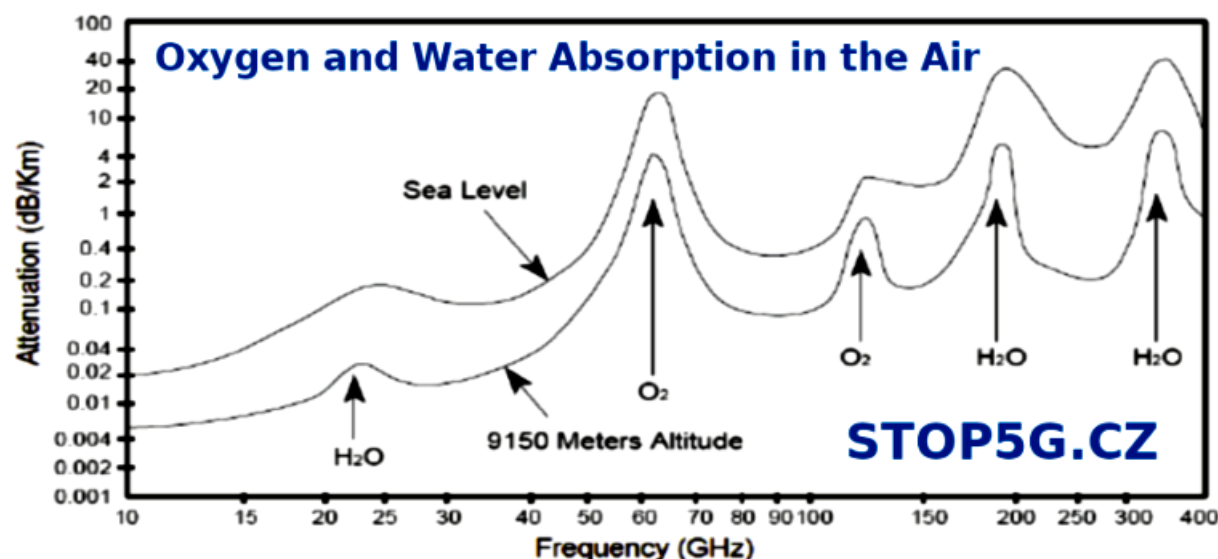
British expert campaigner **Asif Naqvi** criticizes the ICNIRP guidelines based only on thermal reaction and indicates that beyond the uninvestigated problems related to Health and Safety, there is **indeed a problem of sustainability when rolling out 5G and the smart/AI systems based on it: Huge energy consumption of 5G (Asif Naqvi)**^{cclxix}

Robert C Kane PhD, who worked for more than thirty years in the telecom industry affirmed that *'never in human history has there been such a practice as we now encounter with the marketing and distributing of products hostile to the human biological system by an industry with foreknowledge of those effects. ... The telecommunications industry would never have grown to the global force, with the virtually unlimited power that we know it to have today, if it accepted the scientific research. So the industry did as has been done throughout history. The industry developed a "belief" system. The*

wonderful thing about a "belief" system is that it doesn't require any scientific findings. And any contrary findings that do develop are easily dismissed as being unbelievable.'

We can add here that, being in contradiction with accumulated knowledge and health and safety legislation, what has been developed here was rather **a system of lies**, than a 'belief system'. The truth is that the British authorities have not been preoccupied in providing the nation with independent, peer reviewed, indubitable, scientific evidence that RF frequencies and, most important, the high frequencies used for 4G, 5G or 6G (Terahertz), as also their densification, pose no biological risk to people, but have instead, effectively ignored all the independent scientists' scientific work and warnings, as well as the old science referring to RF and MM wave radiation.

It is quite obvious now to many of us that the purpose of this deployment cannot be that of simply serving the common people with a higher Internet speed, but rather that of enabling AI, the Internet of Things and a complete, continuous digital surveillance on earth and in space.



A lot is researched now in matters of **using THE 60 GHZ FREQUENCY for 5G, Wi-GIG** (see the rollout^{cclxx} and some research and presentation videos on YT); we add here some critical arguments:

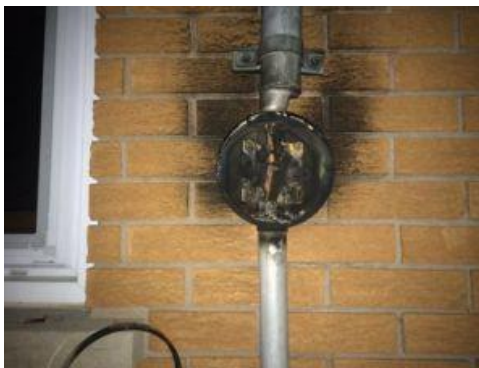
1. All GHZ frequencies from 10 GHz on are increasingly absorbed by water and oxygen molecules; **60 GHz is a peak radiofrequency that is much more absorbed by the molecules of oxygen**^{cclxxi}, **therefore also a potential existential threat** - according to some researchers (Mike Adams, Joe Imbriano, dr. Tom Cowan), because of the **difficulty of blood's haemoglobin to capture the oxygen under such excited condition**

2. **58.5 GHz pulsed RF can cause a five time increase of apoptosis markers**^{cclxxii} **(programmed**

cellular death- in comparison to continuous RF)

3. **60 GHz at powers as low as 9,000 uW/m2 can structurally alter the cells' biomembranes creating permeability**^{cclxxiii} **-**

4. there also might be a potential risk of fire, as an enhancer of atmospheric electricity (think of **CORONA DISCHARGE**^{cclxxiv} which “occurs when the electric field is strong enough to create a chain reaction; electrons in the air collide with atoms hard enough to ionize them, creating more free electrons that ionize more atoms”; oxygen’s activated electrons may potentially induce this). Let’s also not forget that combustible methane is now at the highest levels ever recorded, and there are other combustible gases^{cclxxv} are emanated especially in oil and gas industrial areas. So we may have to add this also to the already known and far from negligible **RISK OF FIRE ASSOCIATED TO THE WIRELESS INFRASTRUCTURE**.



THE SMART METERS a common asset on the list of ‘sustainable’ devices for our homes are known to attract complaints due to numerous related health issues^{cclxxvi} experienced by the inhabitants of the properties on which they have been installed, as also sometimes causing sudden fires and explosions^{cclxxvii}, even hundreds at a time^{cclxxviii} (especially in cases of power surges). Also the cell towers have sometimes caught on fire^{cclxxix} and this has been often observed for many years (even before this would have been suspected as a deliberate attack to these structures) and it needs to be said that the lithium-ion or other lithium -based batteries on which many elements of this infrastructure^{cclxxx} rely on, as also much of the related smart micro grids^{cclxxxi} and electric vehicles^{cclxxxii} are known for their risk of uncontrollable fires, due to runaway thermal reaction^{cclxxxiii}. Various conditions of temperature, air pressure or humidity are

known to potentially facilitate such events.

LIVE BLOOD ANALYSIS AND OTHER ACCESSIBLE EXPERIMENTS PROVING THE DANGER OF NON-IONISING RADIATION

As seen in the experiments of **prof. Magda Havas** and **dr. Robert Young** (among others), the means by which **the direct influence of the RF radiation even from a mobile phone or a wifi router on the human blood** may not necessarily involve teams of experts and peer-reviewed papers. **The gradual coagulation of the blood (Rouleaux formation) under the effect of microwaves, leading to poor circulation and difficulties in the elimination of waste, various physical symptoms and, if exposure is persistent, to disease can be seen in LIVE BLOOD ANALYSIS.**

Here is **prof. Havas** article and video on such an experiment performed using her own blood before and after subjecting herself to RF exposure from her mobile phone and wifi: **Live Blood Cells and Electrosmog**^{cclxxxiv} (2010) (image below)

A young mother, **Mrs. Lena Pu** has replicated the experiment on herself and then on a friend, a young, fit teacher **before and after exposure to wifi in school** and the result was also stunning in matters of **massive blood coagulation** (see a presentation here: **5G Health Risks, Surveillance and Bioweaponry Lena Pu Sept 2019**^{cclxxxv})

The most compelling scientific analysis of blood exposed to RF radiation comes probably from **dr. Robert Young**, who for a long time used darkfield microscopy, spectrometry and other modern means of analysis and started sounding the alarm on this topic decades ago – see **The Negative Effects of ElectroMagnetic Frequencies (EMF) on the Human Blood and Biological Terrain Live and Dried Blood Analysis with Electro-Magnetic Pollution Exposure**^{cclxxxvi}



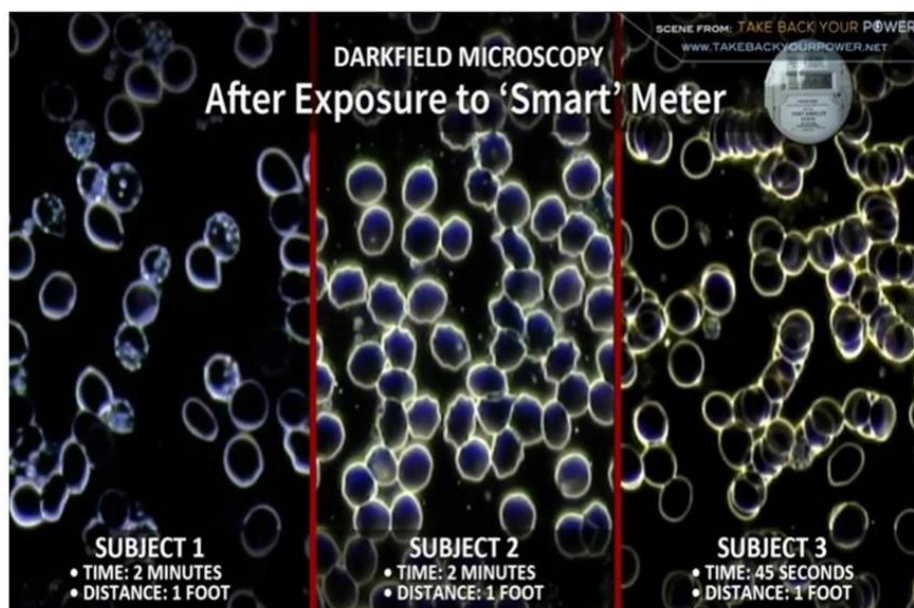
Teacher with WiFi & Wireless Exposure Entire School Day 3pm Day 2

5G: Health Risks, Surveillance and BioWeaponry - Lena Pu (Sept 2019)

Symptoms	Consequences
	✓ poor circulation
	✓ lower oxygen transport
	✓ reduced waste removal
	✓ diabetes mellitus
	✓ stroke
⇒ headache, fatigue	✓ myocardial infarction
⇒ difficulty concentrating	✓ Alzheimer disease . . .
⇒ numbness, tingling, cold extremities	
⇒ heart & blood pressure problems . . .	

Prof. Magda Havas

A video associated with the article above, highlights the **research on the effects of microwave radiation on human blood [that] was carried out by Dr. Robert O. Young using phase Contrast Microscopy.** The research was published in the International Journal of Complementary and Alternative Medicine in 2001 by **Dr. Beverly Rubik** in 2001. – **The Effects of EMF Radiation on the Human Blood Cells Researched by Dr. Robert Young – 1998** cclxxxvii

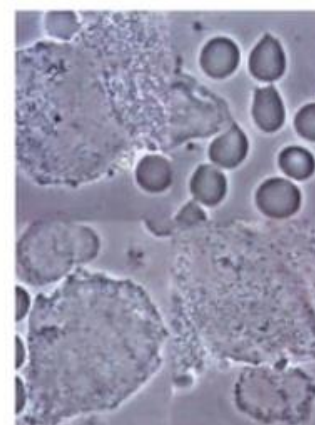


More about Smart meters, the high risk of fire, hacking and health damage, the increased bills of many beneficiaries and the corporate and government corruption (US) leading to an attack on human rights in the name of "smart" and "green" in this awarded documentary from Josh Del Sol. LIVE BLOOD ANALYSIS shows the damage in real time, after exposure to an Smart Meter. To learn about Smart Meters and their effect on health and privacy please see: [WHY STOP SMART METERS?](https://stopsmartmeters.org/why-stop-smart-meters/) <https://stopsmartmeters.org/why-stop-smart-meters/>

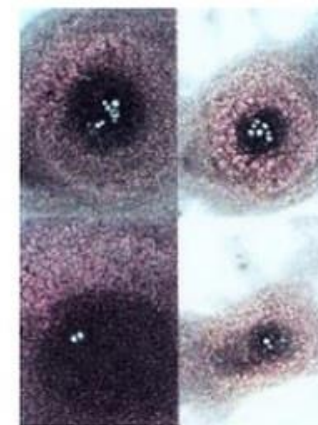
SMART GRID AWARENESS <https://smartgridawareness.org/> SMART METERS <http://www.eiwellspring.org/smartmeter.html>

TAKE BACK YOUR POWER Documentary <https://youtu.be/2uMfx-FsJlE>

To the left you can see images from the famous documentary of Josh del Sol, '[Take Back Your Power](#)' (2017) – which presents **the live blood analysis of 3 persons exposed for a 1 to 2 minutes to the radiation of a smart meter placed at 1 foot distance from the subjects.**

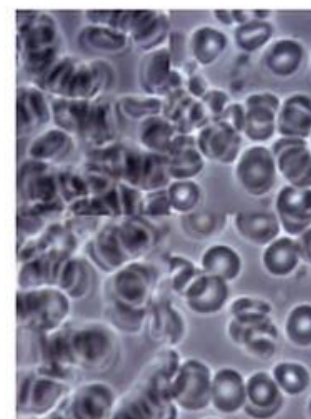


(a)

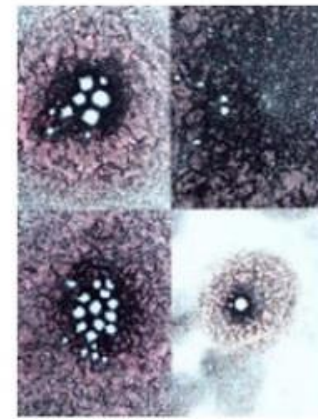


(b)

Figure 6. Subject III – (a) Live red blood cell photos before EMF exposure (no QLink). (b) Dried blood cell photos before EMF exposure (no QLink).



(a)



(b)

Figure 7. Subject III – (a) Live red blood cell photos after EMF exposure (no QLink). (b) Dried blood cell photos after EMF exposure (no QLink).

Now, even if people may not have a microscope to examine their blood or an EMF meter to measure their exposure in various places, they can surely do **their own experiments, exposing seeds, plants or bugs** (they would better serve for this than for food!) **to areas closer to wifi routers, smart meters or windows from where they can see antennas or small cells and compare their development with other similar life forms which are not exposed to EMF radiation.** Even children have performed such small experiments with conclusive results, that made them reconsider their wifi and mobile phones. The EMF meters are however essential for a decent protection and they can show immediately that distance from exposed windows, a wall (or more) can really make a critical difference. Even the application of several layers of **aluminium foil,**^{cclxxxviii} metallic surfaces or EMF protective materials (incl. curtains) can stop much of the direct radiation, though once a protective measure is in place, the EMF meter should not lack either, as the reflected waves may focus with increased power in other parts of the room. There are EMF reflective paints also, but care needs to be taken again to the reflexion of possible waves inside the house from other sources, neighbours, antennas outside, satellites etc... adding to this, some of them use novel materials such as graphene which has got a recognised toxicity, especially in nanoparticle form. Many other ideas of protection both for the individual and the living place can be found today on the Internet, particularly on YT. Certain **plants that are EMF resistant**^{cclxxxix} are also included.

Ex: Wireless Radiation and DC Voltage Exposure Effects on Plants and Humans (YT)^{ccxc}

Experiment Netgear N750 Wifi Radiation effects on cress seeds Lepidium sativum germination^{ccxi}

This Great Student Experiment Using Plants Shows The Potential Dangers Of WiFi^{ccxii}



6G, FIBER OPTIC AND TERRAHERTZ COMMUNICATION – THE END OF ALL PHYSICAL LIFE



6G is meant to cover the ranges 95 GHz up to 3 THz (=3,000 GHz) which is the upper limit of the RF spectrum and is expected to be launched commercially around 2030. Terahertz frequencies - with low-photon energy (THz) have never before been used for public communication, but they surely appear to be at the heart of all the plans for the near future of A.I. and Internet of Things.

The **optic fiber infrastructure that is vital for high frequency, high speed 5G communications (up to 71 GHz in the US)**, ensures also that the actual EMF transmitters can be eventually updated so to transmit in the terahertz range. Both **5G and 6G will be able to propagate over each single fiber optic** –inside this new system called radio-over-fibre (RoF)-based distributed antenna system (DAS) (**Fibre Wireless Distributed Antenna Systems for 5G and 6G Services**^{ccxciii}). The fibre optic cables are called OTN – Optical Transport Networks and their capacity to transport data is far superior to that of the common copper based cables.

Much has been spoken about **the harmful effect of blue light**^{ccxciv} which is dominant in LED illumination. The highest speed Internet – hundreds of times fastest than with RF - is meant to be transmitted exactly through LED light, the so-called Li-Fi (Light – Fidelity)¹⁵ that can be modulated or digitalised and can cover the entire light spectrum (430,000 to 770,000 GHz). There are limitations and disadvantages, that are mainly covered by a huge densification of the LiFi network via LED Light poles that are meant to emit digitalised light permanently and also to be associated with the existent wireless network. This is considered to be the bright future of communication industry and much is spoken about it in the frame of the IoT (Internet of Things) by **IEEE**^{ccxcv} engineers and especially, by expert **prof. Ian Akyldiz**^{ccxcvi}, from Georgia Institute of Technology, who brings light on the topic of **wireless driven nanotechnology as an essential element of the Internet of Things to which even human beings are to be connected**¹⁶. Also **INFRARED LIGHT COMMUNICATION** which is between 300 THz and 400 THz can be transmitted through optic fibres and LEDs (though invisible) as a solution for short ranges

and it appears that it is already in use in various sectors such as automobile, aerospace, defense and IoT (**The future of Li-Fi Technology – Trends and**

¹⁵ Invented by Edinburgh University **professor Harald Haas**

¹⁶ See the work on this topic of La Quinta Columna (<https://www.laquintacolumna.net/>), dr. Ana Mihalcea (<https://anamihalceamdphd.substack.com/>), dr. Robert Young (<https://www.drrobertyoung.com/blog>), dr. David Nixon (<https://substack.com/@davidnixon>), en. Mat Taylor (<https://woodnstone820.substack.com/>), eng. Tivon & Hope (<https://www.ftwproject.com/blog/>), biotech analyst Karen Kingston (<https://karenkingston.substack.com/>)

Predictions for 2024^{ccxcvii}). Infrared communication also thus require a great densification of emitters, avoidance of sun or incandescent light, but no approval is required to use it and it's got worldwide compatibility.

However, same as in the case of LiFi using visible light, the effects of digitalisation by pulsation on living organisms constitute an issue that is not taken into consideration, though it is of the greatest concern. In matters of the general use of Terrahertz communication, a look into more recent literature will show us **some frightening effects at a genetic level.**

Medical/biological study (experimental study)

Terahertz radiation increases genomic instability in human lymphocytes [med./bio.](#)

By: Korenstein-Ilan A, Barbul A, Hasin P, Eliran A, Gover A, Korenstein R

Published in: Radiat Res 2008; 170 (2): 224-234

Journal [PubMed](#), doi:10.1667/RR0944.1

Download citation in RIS format

Aim of study (acc. to author)

To explore the genetic and epigenetic consequences of exposing dividing human peripheral lymphocytes to low-intensity continuous wave 0.1 THz irradiation. Aneuploidy of the chromosomes as well as replication timing and synchronization of the centromeres were examined.

Background/further details

Increased levels of aneuploidy and asynchronous replication are typical of both hematological malignancies and various solid tumors. Lymphocytes were obtained from nine male volunteers. Three groups were examined: a control group that was undisturbed for the duration of the culturing, a sham-exposed group and an exposed sample. To ascertain that the effects induced by exposing the cells were not thermal, temperature rise was monitored during exposure.

Endpoint

- genotoxicity/mutation: genomic instability (aneuploidy and changes in replication timing and synchronization of their centromeres)

Exposure

- 0.1 THz, millimeter waves, TeraHz
- CW continuous wave

Officially terahertz frequencies have been declared safe by the industry, simply due to their non-ionizing nature. Moreover, there is quite an amount of literature dealing with the potentially healing effects of terahertz therapies, same as in the case of MMW, but we just need to remember that the medical applications deal with a very controlled environment, one frequency only, targeted, generally of low power and duration. What we would have in the real life, by adding the Terahertz frequencies into the actual soup of frequencies, considering the huge densification of emitters, not to mention the particular conditions of

health, age etc of the people exposed, is an entirely different thing than a medical therapy...

Let's observe just a small number of critical studies on this subject showing cellular, molecular and DNA effects of Terahertz frequencies:

The interaction between electromagnetic fields at megahertz, gigahertz and terahertz frequencies with cells, tissues and organisms: risks and potential^{ccxcviii} (2017): “*MMWs are known to alter active transport across cell membranes, and it has been reported that terahertz radiation may interfere with DNA and cause genomic instabilities.*”

Advances in the biological effects of terahertz wave radiation^{ccxcix} (2014) “*recently, several studies have indicated that the non-thermal effects of THz radiation may affect the stability of DNA by establishing a system in vitro, leading to chromosomal aberrations of human lymphocytes and genetic changes during the differentiation of mouse stem cells [...] They observed that the THz radiation primarily affected genes encoding inflammatory cytokines, [...]Bock et al. [13] have investigated the relationship between broad-spectrum THz radiation and genetic changes and have found that the application of THz irradiation accelerated cell differentiation by activating the transcription factor peroxisome proliferator-activated receptor gamma (PPAR γ), indicating that THz radiation may be a potential tool for cellular reprogramming.* Alexandrov et al.”

Cellular effects of terahertz waves^{ccc} (2021) “*As mentioned above, THz waves are capable of regulating the gene expression, changing the membrane permeability, and DNA demethylation.*”

Terahertz radiation can disrupt proteins in living cells^{ccci} (2020) “*“Researchers from the RIKEN Center for Advanced Photonics, Tohoku University, National Institutes for Quantum and Radiological Science and Technology, Kyoto University, and Osaka University have discovered that terahertz radiation, contradicting conventional belief, can disrupt proteins in living cells without killing the cells. This finding implies that terahertz radiation, which was long considered impractical to use, may have applications in manipulating cell functions for the treatment of cancer, for example, but also that there may be safety issues to consider.”*

Invited Review Article: Current State of Research on Biological Effects of Terahertz Radiation^{cccii} (2011) “*In several in vitro cell culture studies, low doses of THz radiation stimulated cellular proliferation, whereas higher exposures caused visible morphological changes, induction of cellular stress response mechanisms, and cell death. THz radiation (both CW and pulsed) caused direct effects on the plasma membrane: increases in membrane permeability, membrane reorganization, and destruction. For the studies examining the effects on biomolecules, THz exposures were observed to affect both the structure and functional activity of several enzymatic processes.*”

Dangerous Side Effects of Terahertz Radiation Discovered by Korean Researchers^{ccciiii} (2014) “*Researchers from the Korea Advanced Institute of Science and Technology (KAIST) announced findings from a research project that exposure to terahertz radiation on an animal showed signs of infections on skin tissue. Previously, terahertz radiation was thought to be harmless to humans, because of its low energy and wider applications than*

x-radiation.[...] A genetically-engineered mouse was exposed to high-terahertz radiation for 30 minutes, and the skin of the mouse was monitored with the microscope. The team found that **the number of infected cells increased more than six times after six hours of exposure.**"

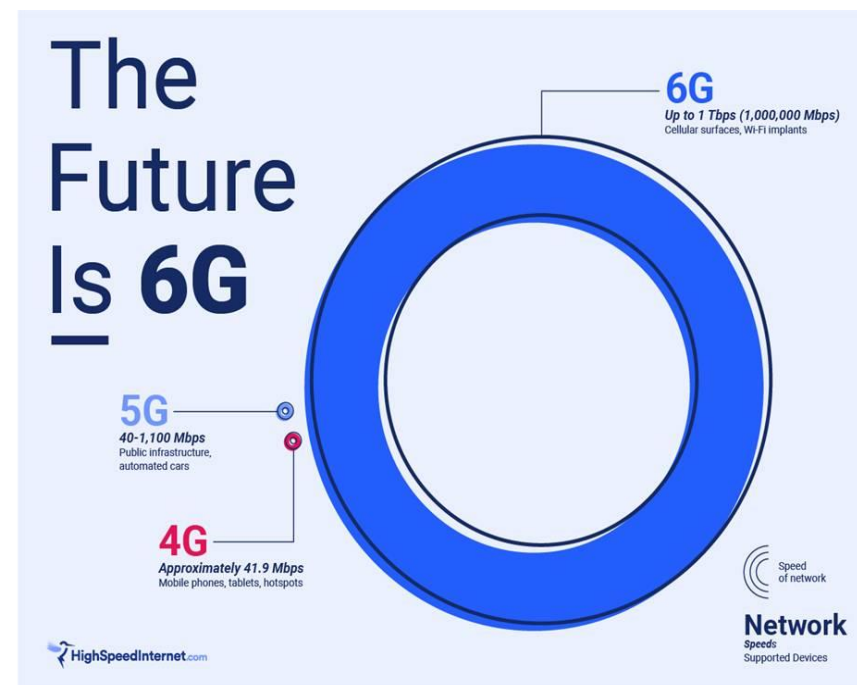
DNA Breathing Dynamics in the Presence of a Terahertz Field^{cciv} (2009) "**a specific terahertz radiation exposure may significantly affect the natural dynamics of DNA, and thereby influence intricate molecular processes involved in gene expression and DNA replication.**"

Exposure Effects of Terahertz Waves on Primary Neurons and Neuron-like Cells Under Nonthermal Conditions^{ccv}

"THz waves with an output power of 50 (0.16 THz) and 10 (0.17 THz) mW with exposure times of 6 and 60 min were used in this study. Analysis of temperature change, neurite growth, cell membrane roughness, micromorphology, neurotransmitters and synaptic-related proteins (SYN and PSD95) was used to evaluate the potential effects. Results: **Temperature increase caused by the THz wave was negligible. THz waves induced significant neurotransmitter changes in primary hippocampal, cerebellar, and brainstem neurons and in MN9D and PC12 cells. THz wave downregulated SYN expression in primary hippocampal neurons and downregulated PSD95 expression in primary cortical neurons.**

How Terahertz Tear Apart DNA (2009)^{ccvi} *The evidence that terahertz radiation damages biological systems is mixed. "Some studies reported significant genetic damage while others, although similar, showed none," say Boian Alexandrov at the Center for Nonlinear Studies at Los Alamos National Laboratory in New Mexico and a few buddies. Now these guys think they know why.*

*Alexandrov and co have created a model to investigate how THz fields interact with double-stranded DNA and what they've found is remarkable. **They say that although the forces generated are tiny, resonant effects allow THz waves to unzip double-stranded DNA, creating bubbles in the double strand that could significantly interfere with processes such as gene expression and DNA replication. That's a jaw dropping conclusion.***"



Intense terahertz pulses cause DNA damage and repair (2013)^{cccvi} “Short yet powerful bursts of terahertz radiation can damage DNA and also increase the production of proteins that help the cells to repair this damage. That is the conclusion of physicists and biologists in Canada, who have studied how the electromagnetic radiation interacts with human skin cells. [...]

Recent theoretical work suggests that externally applied terahertz radiation can couple to these modes and amplify them. Now, Titova and colleagues have found evidence that **intense, picosecond-duration pulses of terahertz radiation can actually cause DNA strands to break in human skin cells.**”

Intense Terahertz Pulses Cause DNA Damage But Also Induce DNA Repair^{cccviii} (2014) “Recent theoretical studies, however, suggest that **intense THz pulses of picosecond (one trillionth of a second) duration may directly affect DNA by amplifying natural vibrations (the so-called “breathing” mode) of the hydrogen bonds that bind together the two strands of DNA.** As a result, “bubbles” or openings in DNA strands can form. According to the researchers, this raised the question: “Can intense THz pulses destabilize DNA structure enough to cause DNA strand breaks?” As shown in earlier animal cell culture studies, **THz exposure may indeed affect biological function under specific conditions such as high power and extended exposure.** There is, however, a vast gulf between animal research and conclusions that can be drawn about human health. In a first of its kind study, the Canadian researchers **exposed laboratory-grown human skin tissue to intense pulses of THz electromagnetic radiation and have detected the telltale signs of DNA damage**”

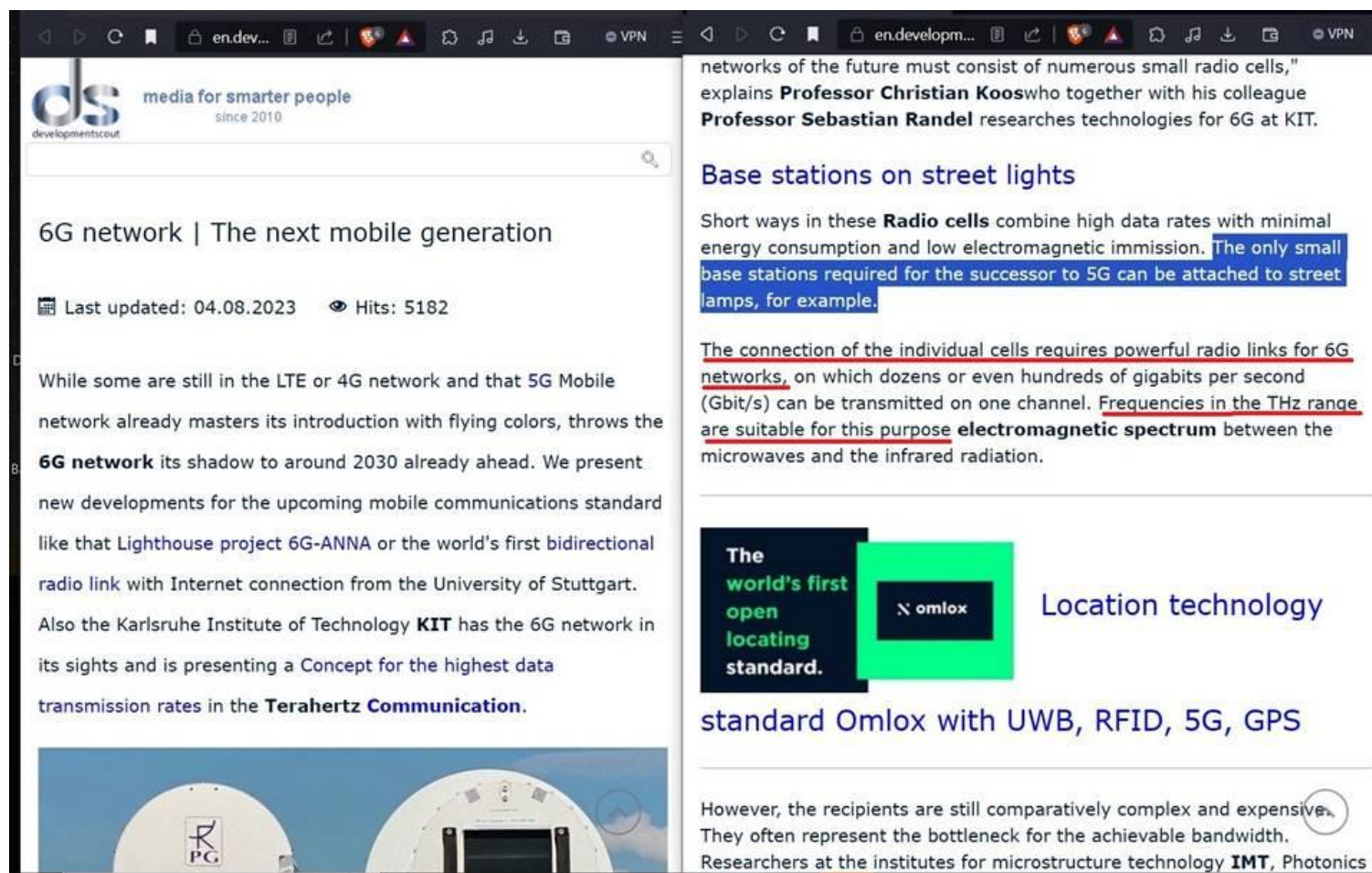
Introduction to the Biological Effects of Terahertz Radiation^{cccix} (2023) “**Terahertz radiation may be able to penetrate the soil to a considerable depth and, having in mind its effects on tissues of animals and plants alike, disturb local ecological systems.**[...]

Terahertz radiation has also seen therapeutic usage. **It can demethylate cancer cells and increase the speed of regeneration at injuries’ site [46, 47, 48]. It has even been found to be beneficial against psoriasis [49] and in the recovery from an acute ischemic stroke [50].**

However, the use of these therapeutic effects faces barriers due to the adverse effects often caused by terahertz radiation exposure. Most reports describe general inflammation responses and apoptosis that have been recorded across a vast array of cell types and species. Loss of adhesion to basal membrane, cellular permeability increases, lysis and marked increases in cell growth factors and cytokines have all been connected to T-rays exposure, although these seem to mainly stem from its thermal effects [51, 52, 53]. However, there are also reports that contrast these findings, albeit very few [54, 55].

Nervous tissue cells in particular have been found to release their intracellular proteolytic enzymes and suffer membrane protein changes under THz. No great morphological changes such as axon number or size have been recorded [56, 57]. Various types of neurons also show different reactions to T-rays as seen by their marked changes in neurotransmitter production [58]. There also seems to be a threshold of 0.1 here also seems to be a threshold of 0.15 THz under which exposure will not induce any detectable adverse reactions.”

Non-thermal effects of terahertz radiation on gene expression in mouse stem cells^{ccc} “THz radiation may affect gene expression by perturbing the conformational dynamics of double-stranded DNA. This suggestion is rooted in our prior work [33,34] that establishes a strong relationship between conformational dynamics of double-stranded DNA and cellular function, coupled with the fact that THz photons possess the energy required to influence the dynamics of dsDNA. Given the prior experimental findings and the theoretically suggested mechanism, we designed the experiments described herein to explore the existence of THz related effects on gene expression that can be unambiguously distinguished from thermal effects. The results of this study shows that mouse mesenchymal stem cells exposed to THz radiation exhibit specific changes in cellular function that are



closely related to the gene expression. Our qRT-PCR gene expression survey reveals that some genes in irradiated Mouse stem cell cultures are activated, while other genes are suppressed. The fact that most genes do not respond to the used radiation conditions used here, demonstrates a specific rather than a general response. It is important that these effects were observed under irradiation conditions that caused minimal temperature changes, and in the explicit absence of any discernable response of heat shock and cellular stress genes.

Further investigations involving a large number of genes and variation in THz radiation characteristics and exposure duration are needed to generalize our findings. Also, more direct experimental investigations of THz radiation's ability to induce specific openings of the DNA double-strand are needed in order to fully determine how THz radiation may work through DNA dynamics to influence cellular function."

Research progress in the effects of terahertz waves on biomacromolecules^{cccxi} (2021) *"At the DNA level, it has been reported that specific terahertz waves interfere with DNA replication and gene expression [3]. Under certain conditions, linear and nonlinear interactions between the terahertz electromagnetic field and DNA resonance might significantly alter DNA replication and synthesis and even induce local bubbles in the DNA strands [48]. Hintzsche et al. [49] found that 0.106 THz terahertz waves prevented the separation of chromatids during anaphase and telophase of mitosis in hamster hybrid cells. Berns et al. [50] showed that exposure to 1.5 THz FEL at 100 pulses directly reduced absorption in DNA molecules and inhibited DNA synthesis in mammalian cells. Studies from Cheon et al. [51] suggested that 1.7 THz high-power terahertz exposure resulted in DNA demethylation in hematological tumor cells. Titova et al. [39] revealed that terahertz radiation caused DNA damage in human skin tissue at a strong terahertz pulse of 1.0 μ J and a repetition rate of 1 kHz. "*

Are smartphones about to get smarter^{cccxi} *"Smartphones now routinely include sensors and microprocessors capable of processing large amounts of data in record times, making it possible to use a smartphone at home to perform complex health monitoring measurements. As an example, using visible light, smartphones and other smart devices can measure heart rate, monitor physical activity and sleep, and monitor organs such as the lungs, eyes, and skin.*

A recent patent granted to Apple Inc. suggests it could start equipping its smartphones with terahertz (THz) emitting and sensing modules to provide further functionality, giving some insight into the next general trend of health Apps. "

Terahertz radiation increases genomic instability in human lymphocytes^{cccxi} (2008) *"Our results demonstrate that exposure of lymphocytes in vitro to a low power density of 0.1 THz radiation induces genomic instability. These findings, if verified, may suggest that such exposure may result in an increased risk of cancer. "*

The laws and effects of terahertz wave interactions with neurons^{cccxi} *"Terahertz waves lie within the energy range of hydrogen bonding and van der Waals forces. They can couple directly with proteins to excite non-linear resonance effects in proteins, and thus affect the structure of neurons. However, it remains unclear which terahertz radiation protocols modulate the structure of neurons. Furthermore, guidelines and methods for selecting terahertz radiation parameters are lacking. Methods: In this study, the propagation and thermal effects of 0.3-3 THz wave interactions with neurons were modelled, and the field strength and temperature variations were used as evaluation criteria. On this basis, we experimentally investigated the*

*effects of cumulative radiation from terahertz waves on neuron structure. Results: The results show that **the frequency and power of terahertz waves are the main factors influencing field strength and temperature in neurons, and that there is a positive correlation between them.***”

CONCLUSIONS:

The industry, the governmental and medical authorities do not need, in fact, to undergo any new research on the safety of 4G, 5G and 6G for human life and the environment, so to justify their large scale deployment in our communities and practically everywhere on earth and also in space. All they need to do is to stop suppressing or ignoring the actual independent science on the harmful effects of RF radiation and start allowing the press and professionals to inform the masses about this.

The massive amount of independent science and the countless related testimonies of doctors, scientists, as also people that have been adversely affected by the RF radiation are more than sufficient to convince any person of good will of the great danger that these technologies pose now even on a short term to human, animal, plant and microbial life. Therefore, despite the pressure of the financial elites who are interested in the art of surveillance and war, for which the power of AI based on 5G/6G communication has become essential, humanity needs with urgency to adopt a precautionary approach that involves a full stop of the deployment of these harmful wireless technologies and a gradual withdrawal of them from all our communities and living habitats, in parallel with their replacement with wired technologies (including based on fiber optic) which are faster, safer not only for life but also for the integrity of information and much more sustainable. Also the dangerous energy containers such as lithium based batteries and other devices which present a high risk of devastating, electric fire and which accompany the actual wireless/ SMART structure must go.

These requirements may appear as enormously utopian today, when no country has chosen to give up even the most risky 5G communication, but it is indeed the only way out, in order to avoid a massive and unstoppable depopulation and irreversible environmental destruction in most of the countries. People need to finally wake up from their addictions to instant wireless gratification, inform each other and their authorities about these critical issues and demand with absolute necessity that these measures be taken, starting with priority in schools, hospitals, care homes and residential areas. All these places can be wired NOW. This is as urgent as the necessity for the people of the earth to firmly demand a stop to all wars, while there is still time to prevent a series of cataclysmic events that will impact the very survival of humanity and life on our planet. Finally, as said in the beginning, we truly are all in this together... indeed, for the second time, as at the time of Noah. If we do not stop this destructive misuse of technology and chose instead the path of reason and commonsense, only God will still be able to help us to survive what is coming.

ANNEXES

ANNEX A – LITERATURE REVIEWS (SUMMARIES) – mentioned in the UK Derbyshire County Council Paper: THE HEALTH IMPACT OF 5G TECHNOLOGY

ICNIRP (2018)6 (raft update on the 1998 guidelines)	Guidelines	General RF-EMF (all frequencies between 100kHz to 300GHz)	<p>The ICNIRP’s guidelines for protecting humans includes evidence on RF-EMFs between 100kHz and 300GHz and distinguishes between those working with NIR and members of the public. It aims to establish guidelines for limiting exposure to RF-EMF.</p> <p>The guidelines reports consideration of three primary biological effects from RF-EMF:</p> <p>Nerve Stimulation: frequencies up to 10MHz can stimulate nerves, this is below the frequency ranges for 5G.</p> <p>Membrane permeabilization: Pulsed EMF at low frequencies can cause cells to become permeable leading to cellular level changes. Cell permeabilization has been reported at frequencies of 18GHz in Vitro, but these were seen at</p>
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high level, that exceed the guidelines.

Temperature elevations: RF can generate heat in the body, however research has shown that for low levels of exposure the amount of heat generated is not sufficient to cause harm.

The guidelines report that of frequencies at 6-300 GHz (5G range) are absorbed superficially into the surface of skin; any small temperature rises are easily dissipated via thermoregulation.

There is no evidence of the 5G frequencies affecting core body temperature, or causing harm.

The guideline report to be conservative when setting the references levels:

The paper does acknowledge that there are gaps in the evidence and states guidelines will be revised as scientific knowledge develops.

ICNIRP- Health Risk Assessment Literature (2018)⁷ (draft update on the 1998 guidelines)

Supporting literature review for the ICNIRP guidelines

General RF-EMF (all frequencies between 100kHz to 300GHz)

An appendix item to the above ICNIRP guidelines that summarises research on biological and health effects of RF-EMF; it includes experimental research on cells and animals, and epidemiological studies.

The paper reviews evidence on the following areas:

Brain function: No substantiated experimental or epidemiological evidence that RF-RMF affects cognitive function.

Auditory, vestibular and ocular function: No effect on these systems has been substantiated.

Neuroendocrine system: In vitro studies have shown RF-EMF can have an effect on the neuroendocrine system at 4W kg⁻¹, but there is no evidence this translates to humans.

Neurodegenerative diseases: At the time of the review, **no human experimental studies have been reported.** No adverse health effects have therefore be reported.

The Advisory Group on Non-Ionising Radiation AGNIR (2012)2

Literature review

General RF-EMF (100kHz to 300GHz)

The AGNIR have published a full review on the scientific research related to the potential health effects from exposure to RF fields. Concentrating on evidence since their original report in 2003. The 2012 report incorporates experimental and epidemiological studies. It highlights that there are a lot more experimental studies (in vitro and in vivo) than there are epidemiological studies. The review includes research on RF-EMF frequencies between 100kHz-300GHz

The report conclude that research of cells in vitro found no convincing evidence that RF fields cause genetic damage or risk of malignant. Animal studies of the RF-EMF below internationally accepted guidelines had no effects.

There report also concluded that **short term exposure to levels above limits can cause thermal effects.** (humans/IV)

Cellular Studies: There are

conflicting results and no study has provided robust evidence of effect.

Animal Studies: No evidence of harmful effects with low-level exposures.

Neurocognitive effects in Humans:

Symptoms in Humans: Effects commonly attributed to RF are acute subjective symptoms such as headaches and nausea. Studies that have found associations have methodological false, making it difficult to draw robust conclusions from their findings.

Other (non-cancer) effects in humans: No evidence to indicate adverse effects on the cardiovascular system or other non-cancer morbidity outcomes.

Cancer in Humans: Available epidemiological studies have various weakness but show no casual association between phone use and fast growing brain tumors (glioma).

SCENIHR (2015)8

Literature review

General RF-EMF (100kHz to 300GHz)

This publication is an opinion update on the 2009 health effects EMF. That explores research on the mechanisms and health effects of EMF.

Similar to other guidelines, this publication includes research on the entire frequency range. It foresees the future use of 5G frequencies and reports this will operate at lower exposure levels, it also reports there will be less penetration and 5G will only affect superficial tissues.

IARC (2012)9

Monograph

General RF-EMF (30kHz to 300GHz)

This is a monograph on the carcinogenic hazards to humans of RF-EMF. **The paper states there is limited evidence in humans. Positive associations have been observed between exposure to radiofrequency radiation from wireless phones and glioma, and acoustic neuroma. The IARC have categorised RF-EMF as possibly carcinogenic to humans (Group 2b),** this is within the same category as caffeine, talc powder, pickled

Bio initiative Report (2014)¹⁰

Literature review

General RF-EMF (100kHz to 300GHz)

vegetables (traditional Asian) and petrol engine exhaust (a full list can be found at:

<https://monographs.iarc.fr/list-of-classifications-volumes/>)

A report produced by a group of international scientist and health experts. The report explores the possible risks of wireless technology and electromagnetic fields.

It argues that the current guidelines are not adequate and insufficiently protective for public health due only considering the energy absorption and thermal effects of RF-EMF. And do not consider the non-thermal effects of RF-EMF exposure. ^{CCCXV}

The authors suggest that action should be precautionary and the use of 5G should be deferred till final proof/causal evidence is established.

Di Ciaula, A (2018)11

Literature Review

General RF-EMF (100kHz to 300GHz)

This summary explores peer reviewed studies on the biological and health effects of RF-EMF since the IARC statement 2011.

A large part of the paper discusses the effects of RF-RMF generally, however does provide specific information about the possible health effects of 5G:

-5G would increase the chance of exposure to RF-EMF due to the increase in the number of antennae.

-Preliminary evidence suggest exposure over 30GHz could alter gene expression.

- 5G could increase human skin temperature, stimulate cell proliferation, and alter the function of the cell membrane (effects limited to superficial tissues).

-In vivo studies have seen mixed finding on ocular effects.

The review concludes that evidence is accumulating of the biological impacts of RF-EMF, which have

seen biological effects below the ICNIRP standards and suggests there is a need for further experimental and epidemiological studies to fully explore the health effects caused by generic and specific frequencies.

Russel, CL (2018)¹²

Literature Review

General RF-EMF (100kHz to 300GHz)

This paper reviews *literature* on the health effects of wireless technology including 5G. The paper highlights that is a controversial area and that **some researchers feel that the IARC classifications are not appropriate and RF-EMF should be listed as probably or possible carcinogenic**. It also highlights that there are a number of studies that have shown health effects well below the current safety standards, however most are experimental studies.

The paper suggests **there is a growing body of literature that non ionising radiation affects cause non-thermal cellular damage; including DNA integrity, cell membranes, protein synthesis, sperm damage, immune**

			<p>dysfunction and also impacts the oxidation mechanism. It also reports there is an increasing number of people experiencing Electrosensitivity. The paper suggests that the thermal effects of 5G could be a concern for the eyes.</p> <p>It concludes that there may be significant consequences to human health and ecosystems.</p>
Belpomme et al, (2018)¹⁴	Summary of evidence	General RF-EMF	<p>A report providing an overview of the effects of EMF exposure summarising evidence for cancer, Alzheimer's, hypo fertility and electro-sensitivity.</p> <p>Case control studies found consistent findings of increased of glioma and acoustic neuroma associated with phone use. However these are assessing frequencies below those of 5G.</p> <p>Reports on Low intensity EMF.</p> <p>Author suggests there is sufficient evidence to categorise Electro hypersensitivity as a pathological disorder.</p>

			Studies focus on RF-EMF generally, no mention of 5G frequencies.
Yakymenko, et al. (2018)19	Review of experimental data	10GHz, 2.4Ghz	A review of experimental data on the oxidative effects of low intensity radiofrequency in living cells. Of 100 reviews 93 reported radio frequency radiation caused an oxidative effect in biological systems. Only one study include in the review reported on frequencies in the 5G range, this study showed an increased level of malondialdehyde and decreased level of glutathione, these changes can cause oxidative stress.
Wu, T (2015)17	literature survey/review	30-300GHz	This paper looks at the biological impact of millimeter wave radiation and on the human body. The paper highlights that the skin and the eyes would receive the most exposure to 5G frequencies, however it reports no ocular damage or unsafe temperature increase at the suggested exposure levels of 5G technology.

ANNEX B - CRITICISM OF ICNIRP GUIDELINES FROM DOCTORS, SCIENTISTS AND EXPERTS

Ref: ICNIRP GUIDELINES, 2020^{cccxi}, ICNIRP GUIDELINES, JULY 2018^{cccxvii}

Note: Please observe the small number of scientific studies mentioned in these ICNIRP reports, as also their subject related almost exclusively to the thermal effects of RF.

DR NEIL CHERRY, (Associate Professor of environmental health, Lincoln University, NZ) published numerous **papers and articles on the impact of EMF on living beings^{cccxviii}**. From his 2002 paper, '**CRITICISM OF THE HEALTH ASSESSMENT IN THE ICNIRP GUIDELINES FOR RADIOFREQUENCY AND MICROWAVE RADIATION' (100kHz - 300GHz^{cccxi}**', we read : '*It is simply not scientifically credible to claim that there are no established non-thermal effects and hence it is wrong to adopt a guideline such as the ICNIRP guideline as a public exposure standard.*

The ICNIRP assessment is grossly biased by selectively choosing studies, consistently misrepresenting the results, the significance of results, the implications of the results of cellular experiments, animal experiments and human studies. ... There is compelling and consistent evidence of cancer, especially leukaemia and brain cancer. There is very strong evidence, from multiple, independent studies, ... that radio frequency and microwave radiation is a genotoxic carcinogen. Therefore it causes cellular mutations, and increased rates of cancer and apoptosis (n.b.: cellular death) in exposed populations, with no safe threshold level. This is backed up by a massive body of epidemiological studies.'

In '**The EMF Call' to the UN and WHO^{cccxx} (2018)**, we read: '*Scientists and NGOs Call for Truly Protective Limits for Exposure to Electromagnetic Fields (100 kHz to 300 GHz)' - 244 scientists signatories (up to May 2024)*

'In order to protect the public and the environment from the known harmful effects from electromagnetic fields (EMF) we ask the United Nations, the World Health Organization and all governments not to accept the ICNIRP guidelines. They are not protective, rather they pose a serious risk to human health and the environment since they allow harmful exposure to the world population, including the most vulnerable, under the unscientific pretext that they are “protective”.

Background: The International Commission on Non-Ionizing Radiation Protection (ICNIRP) issued draft Guidelines on 11th July 2018 for limiting exposure to electric, magnetic and electromagnetic fields (100 kHz to 300 GHz).

- 1. These guidelines are unscientific, obsolete and do not represent an objective evaluation of the available science on effects from this form of radiation. They ignore the vast amount of scientific findings that clearly and convincingly show harmful effects at intensities well below ICNIRP guidelines.*
- 2. The guidelines are inadequate to protect humans and the environment.*

ICNIRP guidelines only protect against acute thermal effects from very short and intense exposure. The guidelines do not protect against harmful effects from low-intensity and long-term exposure, such as cancer, reproductive harm, or effects on the nervous system, although these effects are convincingly shown to appear from chronic exposure at intensities below ICNIRP limits.'

In **The Electrosensitivity UK Response to ICNIRP Consultation**^{cccxxi} we read: „ *It should be clearly stated in the title that these Guidelines are for Heating and Short-term effects, so that they are not confused with existing international Guidelines for Biological and Long-term and Short-term effects (e.g. Bioinitiative 2012, EUROPAEM 2016).“ And „It is essential that it is explained that these guidelines are based on Schwan’s invalidated hypothesis of 1953, rejected by the majority of scientists and almost half the regulators and governments around the world, that the only adverse health effects of radio frequency EMFs are the result of raising the body temperature by one degree in six minutes. Since it is possible to raise the body temperature by one degree within six minutes (or 30 minutes, averaged) through exercise or sitting in strong sunlight, but without the established health harm from pulsed RF EMFs such as cancer promotion or co-promotion, cardiovascular and neurological harm, including Electromagnetic Hypersensitivity, and fertility damage, all of which have been known since the 1930s onwards in the published scientific literature, it should be clearly stated that these guidelines are not „for the protection of humans“ but only „for the protection from heating and short-term effects in some humans“.*“

An sharp critique of ICNIRP Guidelines is provided by **Frank Clegg (ex-Microsoft executive)** on behalf of **Canadians for Safe Technology** , in response to the ICNIRP consultation (2018): *“The current ICNIRP Draft has failed to capture a significant portion of the pertinent scientific literature and it is therefore impossible to state that the revisions of the ICNIRP RF guidelines are based on all of the available scientific evidence. The ICNIRP Draft with Appendix B, identified less than 20 studies in its own report, and only one additional study contained in the reports it cited, for 2015 to 2018, inclusive (Table 1). C4ST lists over 400 studies over this time period as examples of the literature that the ICNIRP PG missed (Appendix 1).*

Of the biological effects the ICNIRP PG does report, the PG has failed to identify the specific scientific studies being referred to and it has failed to provide thorough substantiations for dismissing the evidence of adverse health consequences of exposure to non-thermal, low intensities of RF radiation.”

The author also suggests a necessary change in the team of ICNIRP dedicated to this project, so to include scientists able to offer a more pertinent and expert view on the available literature such as **Dr. Lennart Hardell** and **Dr. Anthony Miller**

Dr. Fiorella Belpoggi on behalf of the **Ramazzini Institute** response to the ICNIRP consultation (2018) points at the essential fact that *“ICNIRP is not a public health agency that routinely evaluates carcinogens. On the other hand, an independent agency that has evaluated over 1000 agents, IARC, as early as 2011 classified RFR as a possible carcinogen on the basis of limited evidence in humans and less than sufficient evidence in animals.”*

Dr. Lennart Hardell (The Environment and Cancer Research Foundation, Örebro, Sweden) and Dept Radiation Sciences, Umeå University, Sweden (Hansson Mild) also responded to the ICNIRP consultation (2018) by presenting the most relevant new or updated (at the time) peer-reviewed papers showing the carcinogenic potential of RF radiation.

- Falcioni L& Co (2018). Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission. Environ Res. Aug;165:496-503. doi: 10.1016/j.envres.2018.01.037. Epub 2018 Mar 7.
- IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. (2013). Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields, IARC Monographs on the Evaluation of Carcinogenic Risks Humans. [Online]. 102(2), pp. 1–460. Available: <https://monographs.iarc.fr/ENG/Monographs/vol102/mono102.pdf>
- Lin JS. (2018). Clear evidence of cell-phone RF radiation cancer risk. IEEE microwave magazine, Sept/Oct 2018, pp 16-24.
- Melnick RL. (2018). Commentary on the utility of the National Toxicology Program study on cell phone radiofrequency radiation data for assessing human health risks despite unfounded criticisms aimed at minimizing the findings of adverse health effects. Environ Res. 2018 Sep 19;168:1-6. doi: 10.1016/j.envres.2018.09.010. [Epub ahead of print]
- Miller AB, Morgan LL, Udasin I, Davis DL. (2018). Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102). Environ Res. 2018 Jul 17. pii: S0013-9351(18)30347-5. doi: 10.1016/j.envres.2018.06.043. [Epub ahead of print]
- National Toxicology Program. (2018, Mar.). Peer review of the draft NTP technical reports on cell phone radiofrequency radiation. [Online]. Available: <https://ntp.niehs.nih.gov/events/past/index.html>

Dr. Hardell's study: Mobile phone and cordless phone use and the risk for glioma – Analysis of pooled case-control studies in Sweden, 1997–2003 and 2007–2009^{cccxii} concludes: “**This study clearly shows an increased risk for glioma associated with use of both mobile and cordless phones, a risk that increased significantly with latency and cumulative use. The highest risk was in the longest latency.**”

From ICBE-EMF: Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G International by Commission on the Biological Effects of Electromagnetic Fields

Abstract

*“In the late-1990s, the FCC and ICNIRP adopted radiofrequency radiation (RFR) exposure limits to protect the public and workers from adverse effects of RFR. These limits were based on results from behavioral studies conducted in the 1980s involving 40–60-minute exposures in 5 monkeys and 8 rats, and then applying arbitrary safety factors to an apparent threshold specific absorption rate (SAR) of 4W/kg. The limits were also based on two major assumptions: any biological effects were due to excessive tissue heating and no effects would occur below the putative threshold SAR, as well as twelve assumptions that were not specified by either the FCC or ICNIRP. In this paper, we show how **the past 25 years of extensive research on RFR***

demonstrates that the assumptions underlying the FCC's and ICNIRP's exposure limits are invalid and continue to present a public health harm. Adverse effects observed at exposures below the assumed threshold SAR include non-thermal induction of reactive oxygen species, DNA damage, cardiomyopathy, carcinogenicity, sperm damage, and neurological effects, including electromagnetic hypersensitivity. Also, multiple human studies have found statistically significant associations between RFR exposure and increased brain and thyroid cancer risk. Yet, in 2020, and in light of the body of evidence reviewed in this article, the FCC and ICNIRP reaffirmed the same limits that were established in the 1990s. Consequently, these exposure limits, which are based on false suppositions, do not adequately protect workers, children, hypersensitive individuals, and the general population from short-term or long-term RFR exposures. Thus, urgently needed are health protective exposure limits for humans and the environment. These limits must be based on scientific evidence rather than on erroneous assumptions, especially given the increasing worldwide exposures of people and the environment to RFR, including novel forms of radiation from 5G telecommunications for which there are no adequate health effects studies."

Dariusz Leszczynski (2022: 1–2), Professor of Biochemistry and Biotechnology, Chief Editor of the specialty Radiation and Health for Frontiers in Public Health, points out also to several **EMF guidelines given by groups of independent scientists**, that oppose the conclusions of ICNIRP: *"The evaluations of the same scientific evidence come to different conclusions depending on the scientists performing the analysis. Evaluations of the research conducted by two groups of scientists, forming the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the International Committee on Electromagnetic Safety of the Institute of Electrical and Electronics Engineers (IEEE-ICES) [both prolonged arms of industry], are used to set international safety guidelines. Both ICNIRP and IEEE-ICES claim that scientific evidence shows a lack of harmful health effects. The opinion of ICNIRP is, historically already, recommended by the World Health Organization (WHO) [...] and the majority of the national governments. However, the evaluation of the same scientific evidence by other teams of scientists including the BioInitiative, the International Committee on Electromagnetic Safety (ICEMS), or the recently established International Commission on Biological Effects of the Electromagnetic fields (ICBE-EMFs) [industry-independent organizations] leads to conclusions that the scientific evidence shows definite harm to health."*

Mikko Ahonen PhD, researcher in bioelectromagnetics and computer science from Finland, shares [a presentation](#)^{cccxxiii} on the need to change current FCC and ICNIRP standards to protect the public.

Here we can observe two important problems that even ICNIRP itself suggests – **the possibility that other toxic factors or particular health conditions or particular ages may render their guidelines inapplicable**. This argument only should have been sufficient for health and governmental authorities to consider adding much more research into this subject before allowing the telecom companies to install their infrastructure in our communities.

Problems with ICNIRP Guidelines: Simultaneous exposure of agents

“Some guidelines may still not provide adequate protection for certain sensitive individuals nor for normal individuals exposed concomitantly to other agents....”

<http://www.icnirp.de/documents/philosophy.pdf> , page 546

→ If simultaneously exposed chemicals and RF, guideline does not protect.

See for example Lerchl *et al.* (2015) and Tillman *et al.* (2010)

<http://www.ncbi.nlm.nih.gov/pubmed/25749340,20545575>

Problems with ICNIRP Guidelines: Special groups

“Different groups in a population may have differences in their ability to tolerate a particular NIR exposure. For example, children, the elderly, and some chronically ill people might have a lower tolerance for one or more forms of NIR exposure than the rest of the population.” (NIR = Non Ionising Radiation)

page 546, <http://www.icnirp.de/documents/philosophy.pdf>

→ Guideline does not protect children, elderly or chronically ill.

(See for example: Gandhi *et al.* (2012) → SAR-values are based on (adult) military recruit head model, not children's.

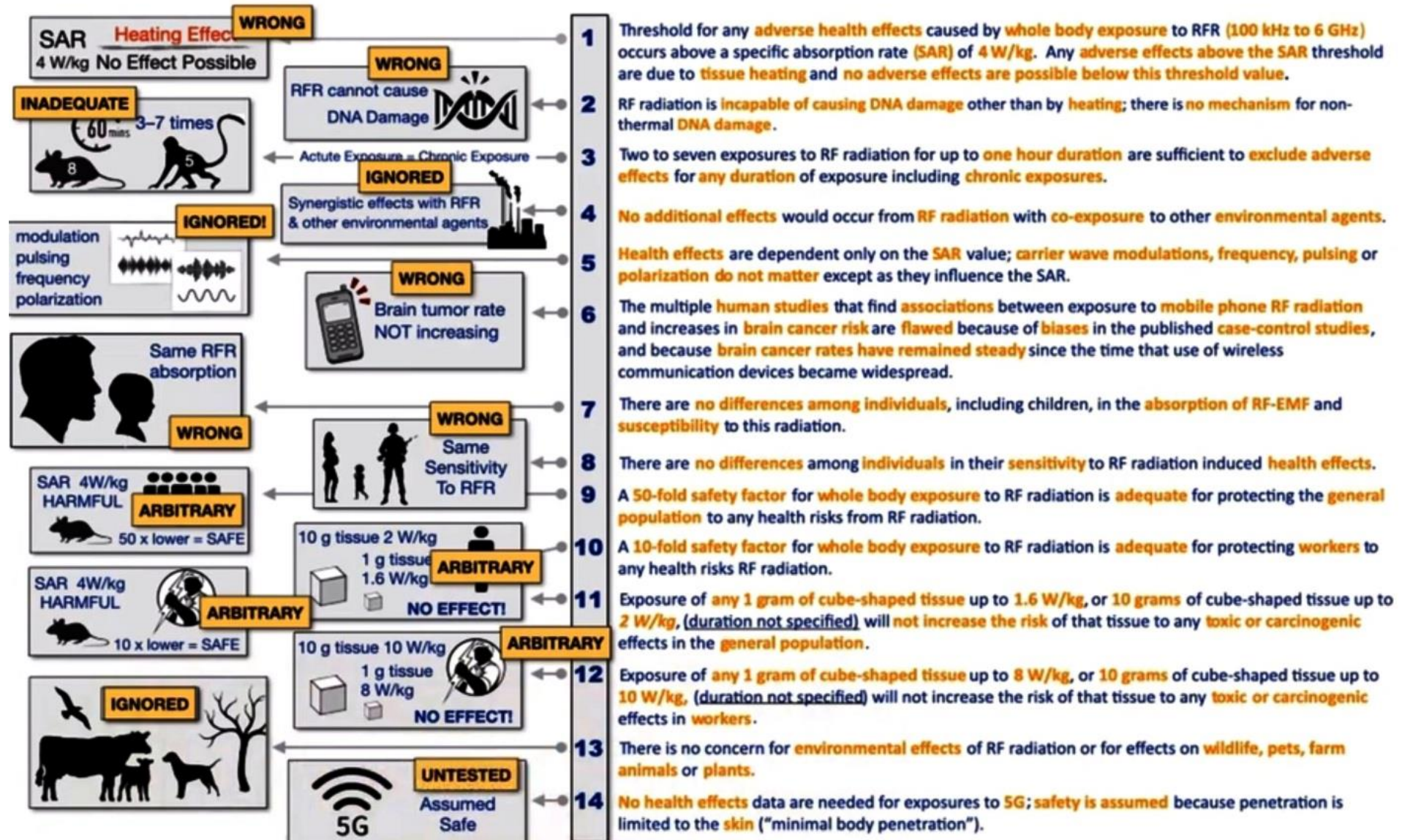
<http://www.ncbi.nlm.nih.gov/pubmed/21999884>

Further on, we will see the graphic summaries of the prestigious multidisciplinary group of scientists **ICBE – EMF (International Commission on the Biological Effects of Electromagnetic Fields)**. As declared on their [website](#)^{cccxxiv}, quite similarly to ICNIRP's declared mission, their “*primary purpose is to make recommendations, based on the best peer-reviewed scientific research publications, that include, and go beyond establishing numerical exposure guidelines. We are dedicated to ensuring the protection of humans and other species from the harmful effects of non-ionizing radiation (up to including 300 GHz).*”

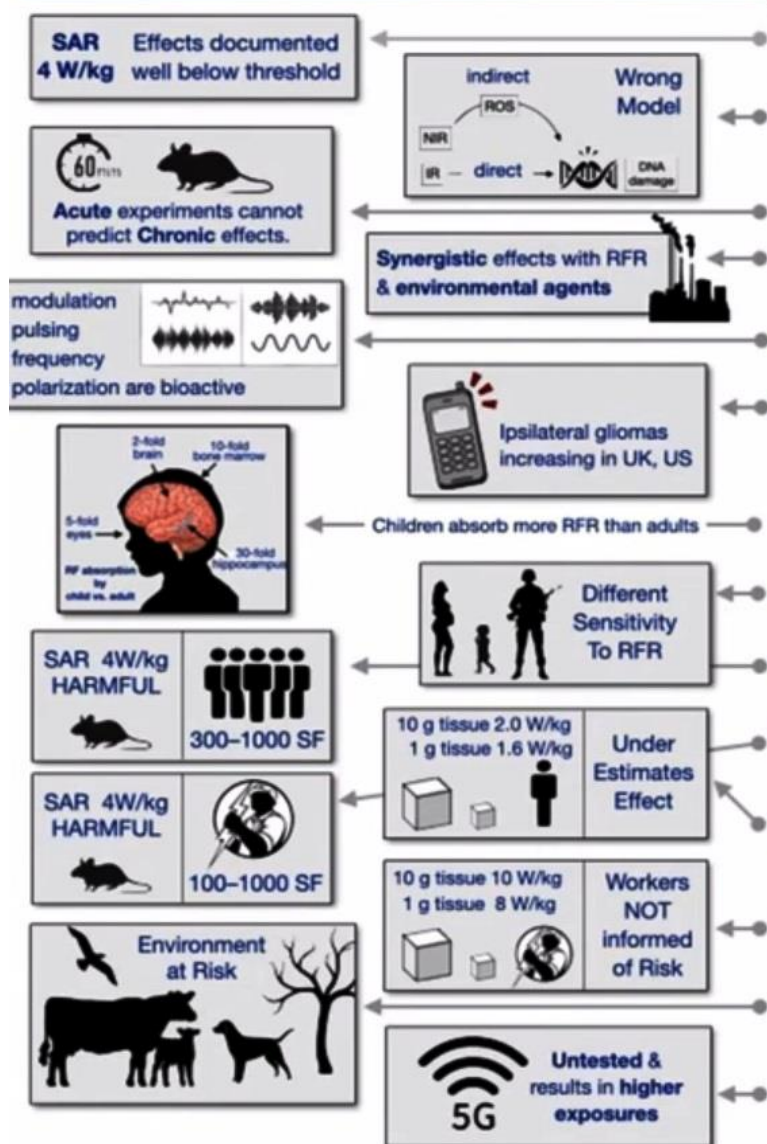
The following charts are taken from the ICBE-EMF slideshow based video:

SCIENTIFIC EVIDENCE: FCC + ICNIRP + WHO exposure limit determinations for RFR (SAR) are incorrect^{cccxxv}

flawed 14 Assumptions (RFR Limits) made by



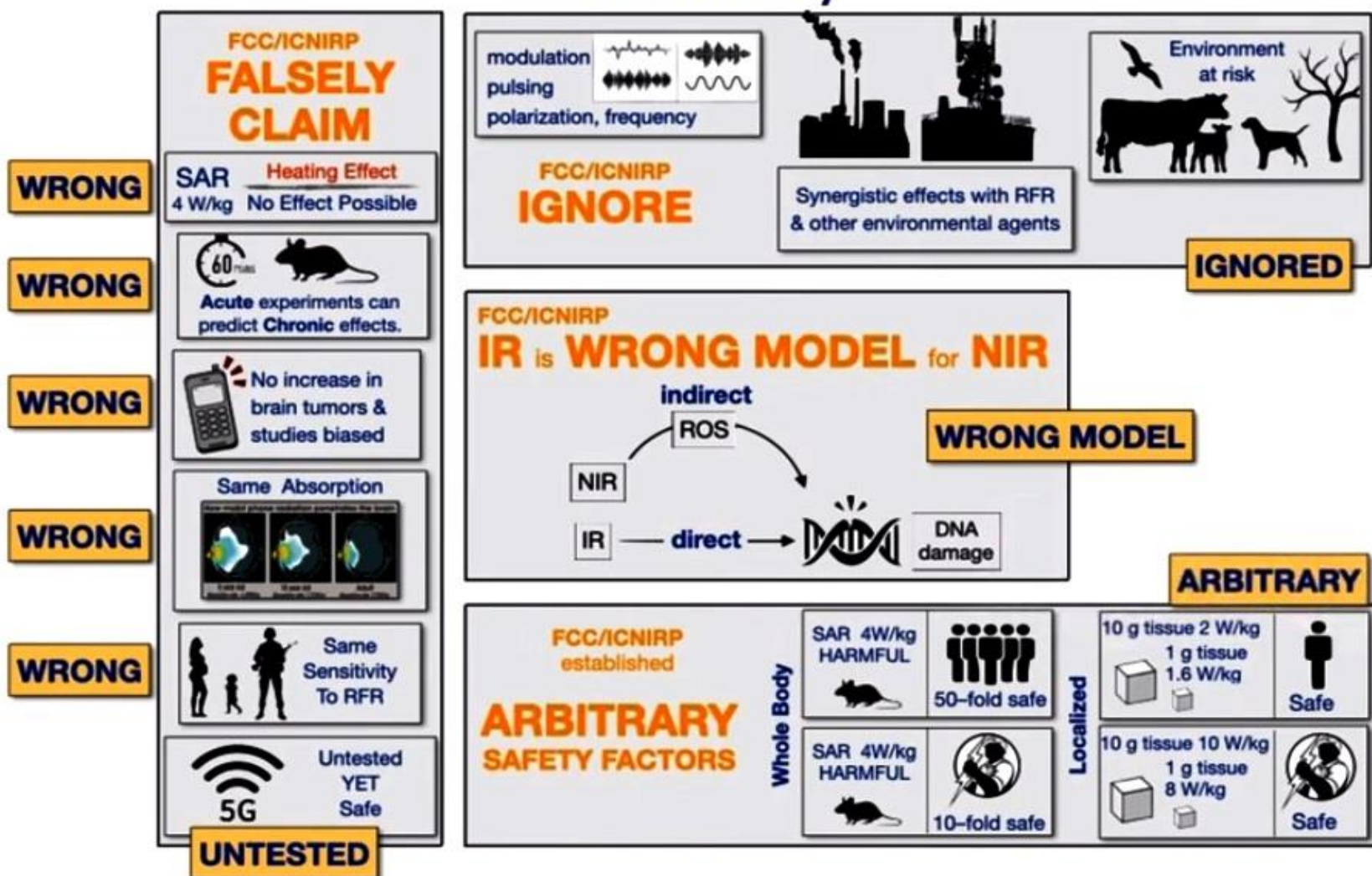
ICBE-EMF's challenges FCC's & ICNIRP's 14 flawed assumptions regarding Radiofrequency Radiation Exposure Limits.



- 1** 4 W/kg is NOT an adequate limit to prevent harm since adverse health effects have been documented at levels well below this thermal limit.
- 2** Ionizing radiation (IR) is the wrong model for non-ionizing radiation (NIR) bioeffects since IR has a direct effect while NIR has an indirect effect on DNA.
- 3** FCC/ICNIRP limits do NOT protect against chronic exposure since they did not test chronic exposure with long-term studies.
- 4** FCC/ICNIRP ignore interactions with environmental agents despite studies showing synergistic effects with various carcinogens, mutagens, and inflammatory agents.
- 5** FCC/ICNIRP ignore wave characteristics by focusing exclusively on SAR despite these being bioactive.
- 6** Statement that brain tumors are NOT increasing is false because glioblastoma incidence is increasing in UK & US since 1990s, which agrees with case-control experiments showing greatest risk is for ipsilateral tumors in the cerebellum & frontal/temporal zones.
- 7** FCC/ICNIRP ignore differences in RF absorption despite the fact that children absorb more RF radiation than adults since they have a thinner skull, a smaller head, more conductive brain tissue & are still growing & developing.
- 8** FCC/ICNIRP ignore individual sensitivities despite the fact that children, pregnant women & those with EHS are more vulnerable to most environmental pollutants including RFR.
- 9** 50-fold safety factor for whole body exposure to RF radiation is inadequate to protect the public. A more appropriate safety factor based on toxicology should be between 300 & 1000-fold.
- 10** 10-fold safety factor for whole body exposure to RF radiation is inadequate to protect workers who have not been informed of the real health risks since FCC/ICNIRP believe there are no health effects below their thermal limit.
- 11** The larger the tissue (1 g vs. 10 g) and the higher the frequency the less reliable the SAR for localized effects. Tissue size is too large for documenting effects at the cellular level and SAR is an inappropriate metric above 6 GHz.
- 12** Item 11 applies to the general population and item 12 applies to workers. Workers are NOT informed of health risk.
- 13** FCC/ICNIRP ignore environmental effects of RF radiation in contrast to numerous studies documenting EMF interference with orientation, migration, food finding, mating, nest & den building in animals. Plants are also adversely affected by RFR.
- 14** 5G small cells are likely to increase RFR exposure since many more antennas will be closer to human populations & since 5G consists of microwaves used in 3G & 4G (which are known to be harmful) and mmwaves (which have not been tested for safety).

ICBE-EMF's challenges FCC's & ICNIRP's 14 flawed assumptions regarding Radiofrequency Radiation Exposure Limits.

Summary



ANNEX C – CRITICISM OF THE AGNIR REPORT

According to dr. Sarah Starkey's research, the advisory bodies such as Public Health England, ICNIRP and the now disbanded group AGNIR - Advisory Group on Non-ionising Radiation (AGNIR) provided inaccurate misleading advice offering guidelines that are invalid. In Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation^{ccccxvi}

Dr. Sarah Starkey observes that there are strong conflict of interests shared by Public Health England, AGNIR and ICNIRP (*"At the time of writing the report, the chairman of AGNIR was also chair of the ICNIRP standing committee on epidemiology. Currently, six members of AGNIR and three members of PHE or its parent organisation, the Department of Health (DH), are or have been part of ICNIRP "*), *the scientific accuracy of the AGNIR report suffers due to three main facts: "(a) Studies were omitted, included in other sections but without any conclusions, or conclusions left out; (b) evidence was dismissed and ignored in conclusions; (c) there were incorrect statements."* Let's point to the fact that the ignored or dismissed studies refer to extremely important aspects such as causation of oxidative stress, fertility and neurocognitive issues etc,

ANNEX D - CRITICISM OF SCENIHR REPORT

TWO DOCUMENTS RELATING TO THE 2015 EUROPEAN COMMISSION'S 'SCIENTIFIC COMMITTEE ON EMERGING AND NEWLY IDENTIFIED HEALTH RISKS' (SCENIHR) REPORT

1. '5G: GREAT RISK FOR EU, U.S. AND INTERNATIONAL HEALTH!'

Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF). Exposures and the Mechanism that Causes Them^{ccccxvii}, written by **Martin L. Pall, Professor Emeritus** of Biochemistry and Basic Medical Sciences, Washington State University. BA degree in Physics, Phi Beta Kappa, with honours, Johns Hopkins University; PhD in Biochemistry & Genetics, Caltech. This is an excerpt from the report:

'The document that follows was, in its original form, sent to many of the authorities of the European Union, in conjunction with other documents sent to the same people by a group of European scientists.

... *There is a vast literature, both in the review literature and in the primary literature studies, that disagrees strongly with the SCENIHR (European Commission, Scientific Committee on Emerging and Newly Identified Health Risks) positions and are completely ignored by SCENIHR. In a few cases, such 45 studies are cited and very briefly discussed by SCENIHR but then they have no impact on the assessments that SCENIHR makes in the SCENIHR 2015 document [73]. The situation here is similar to an organization that has two sets of books, the fake books that are used in public and then a genuine set of books that includes all of the data that are too inconvenient to be included in the fake set of books.'* ... 'What is clear is that

SCENIHR is wittingly or unwittingly serving as a propagandist for the industry and in that process, SCENIHR has no difficulty in putting forth seven devious ,individually important falsehoods.'

*... 'Summary: We know that there is a massive literature, providing a high level of scientific certainty, for each of **eight pathophysiological effects caused by non-thermal microwave frequency EMF exposures**....*

- 1. **Attack our nervous systems including our brains** leading to widespread neurological/neuropsychiatric effects and possibly many other effects. This nervous system attack is of great concern.*
- 2. **Attack our endocrine (that is hormonal) systems.** In this context, the main things that make us functionally different from single celled creatures are our nervous system and our endocrine systems – even a simple planaria worm needs both of these. Thus the consequences of the disruption of these two regulatory systems is immense, such that it is a travesty to ignore these findings.*
- 3. **Produce oxidative stress and free radical damage**, which have central roles in essentially all chronic diseases.*
- 4. **Attack the DNA of our cells**, producing single strand and double strand breaks in cellular DNA and oxidized bases in our cellular DNA. These in turn produce cancer and also mutations in germ line cells which produce mutations in future generations.*
- 5. **Produce elevated levels of apoptosis (programmed cell death)**, events especially important in causing both neurodegenerative diseases and infertility.*
- 6. **Lower male and female fertility**, lower sex hormones, lower libido and increased levels of spontaneous abortion and, as already stated, attack the DNA in sperm cells.*
- 7. **Produce excessive intracellular calcium** [Ca²⁺]_i and excessive calcium signalling.*
- 8. **Attack the cells of our bodies to cause cancer**. Such attacks are thought to act via 15 different mechanisms during cancer causation.*

*There is also a substantial literature showing that EMFs also cause other effects including **life threatening cardiac effects** (Chapter 3). In addition substantial evidence suggests **EMF causation of very early onset dementias, including Alzheimer's, digital and other types of dementias** (Chapter 3); and there is evidence that **EMF exposures in utero and shortly after birth can cause ADHD and autism** (Chapter 5).*

'The European Commission has done nothing to protect European citizens from the very serious health hazards and the U.S. FDA, EPA and National Cancer In

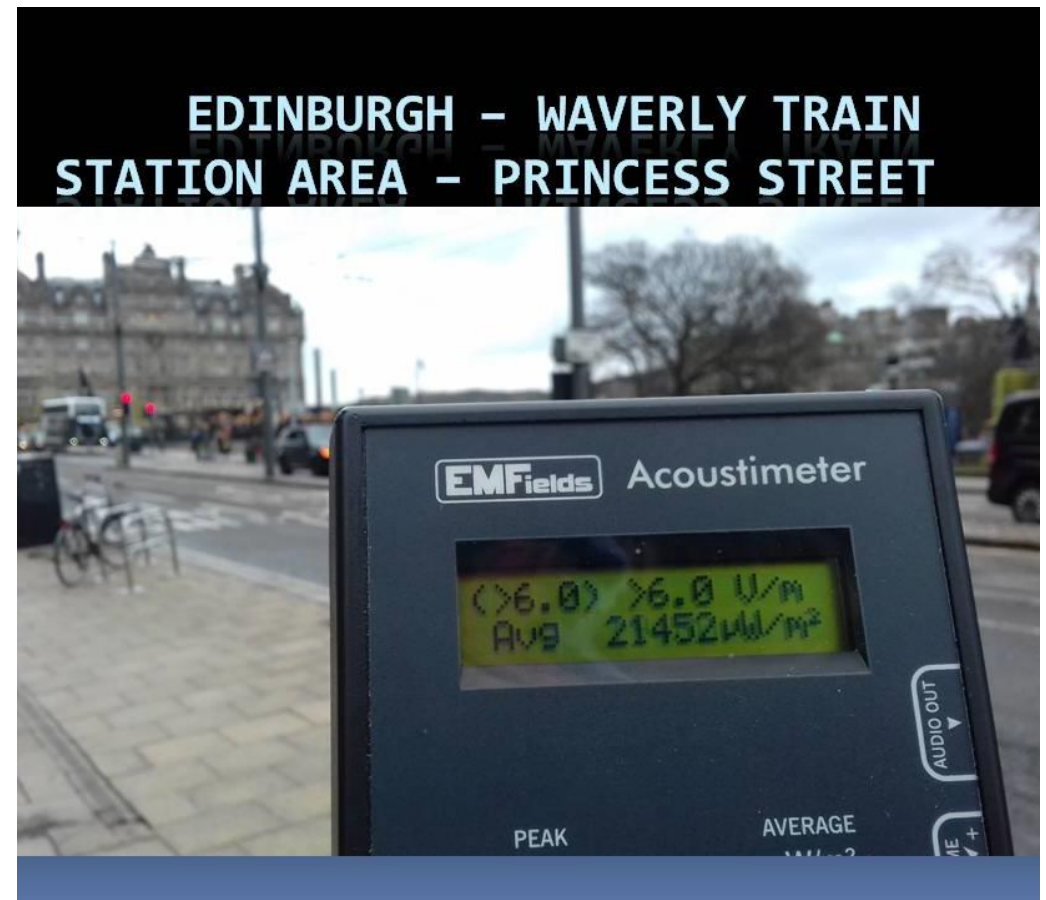
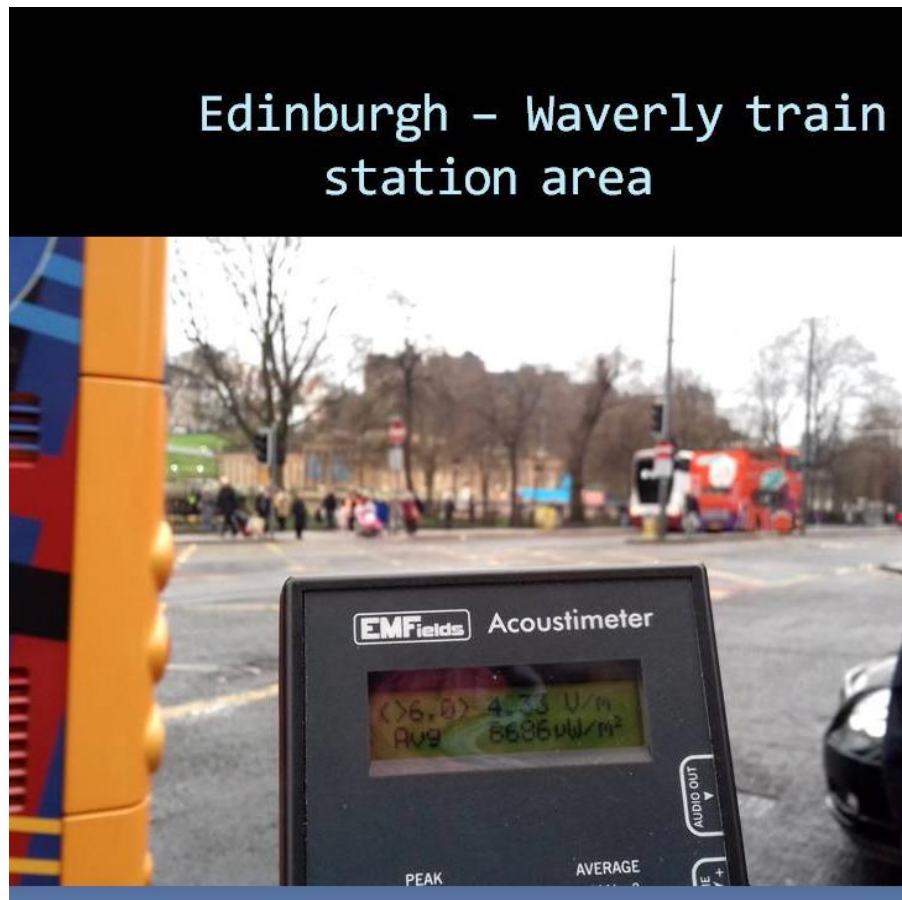
stitute have done nothing to protect U.S. citizens. The U.S. FCC has been worse than that, acting in wanton disregard for our health.'

2. 'COMPLAINT TO THE EUROPEAN COMMISSION concerning the 2015 SCENIHR opinion on potential health effects of exposure to electromagnetic fields'^{cccxxviii}, created by The International Electromagnetic Fields Alliance, IEMFA :

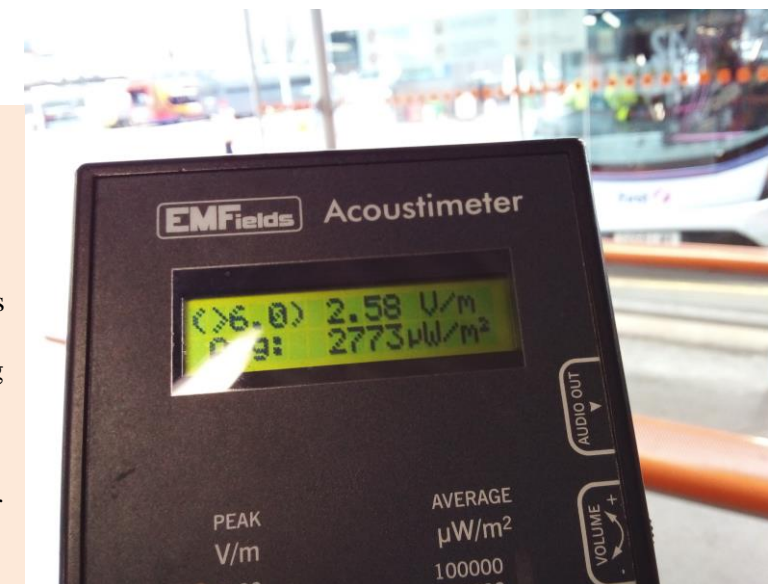
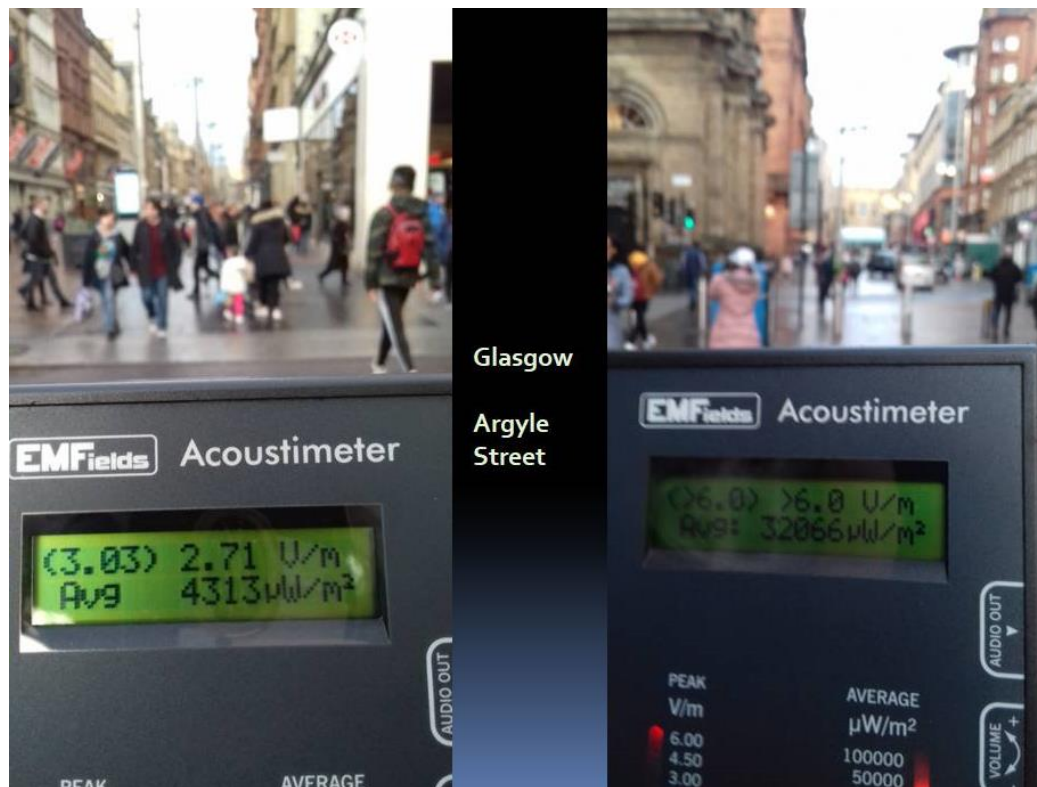
'The European Commission has once again failed in setting up an expert group on the health effects of exposure to electromagnetic fields that meets its own principles of "of excellence, independence and impartiality, and transparency" (COMMISSION DECISION of 5 August 2008).

The experts behind the report blatantly fail in their main mission: to identify "potential health risks". There is evidence that clearly, convincingly and increasingly establishes that there are many potential negative health effects and health hazards: brain tumours, cancer, neurodegenerative diseases, damage on fetuses and stress related diseases ... The SCENIHR report ignores the scientific evidence of health risks from levels of exposure to electromagnetic fields that practically everybody is increasingly exposed to, including small children, in most countries in Europe today.'

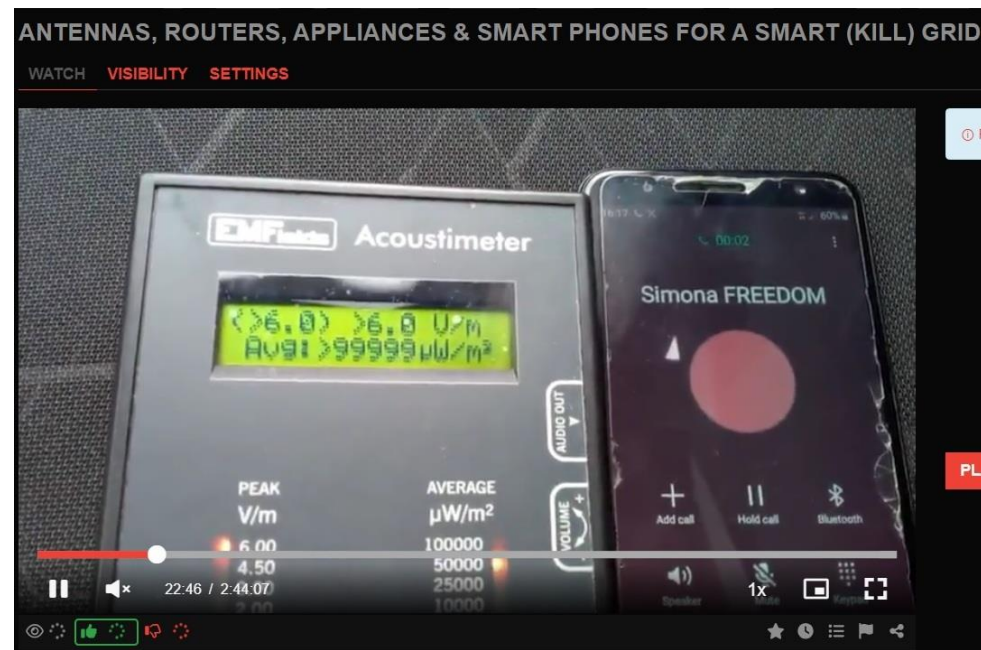
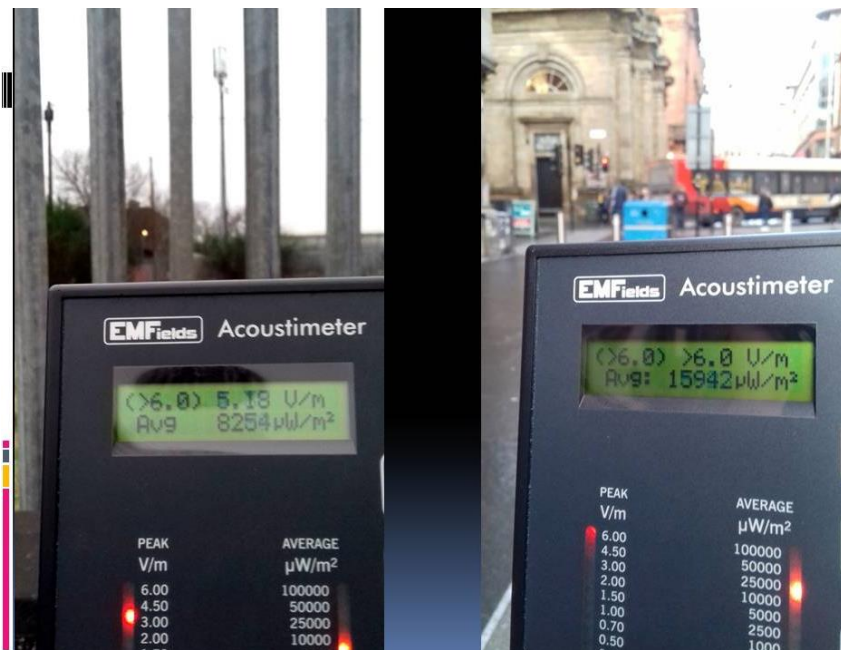
Annex E – Measurements of RF radiation power in Scotland



Measurements with an Acoustimeter in **Edinburgh** city centre in 2022 showed incredibly high levels of RF radiation, up to **more than 20,000 uW/m²** in one of the most circulated area, near the Waverly train station (Princess Street). No cell tower was visible at the street level, so it appears that most of it could be due to the **small cells infrastructure** – these can be placed on light poles, buildings, on various pieces of street furniture, including those associated with the bus stops. As a reference, in **Glasgow**, Sauchiehall Street, where a **mast antenna** was placed on the roof of the building about 50 m away from the street, the radiation recorded in the zone with direct exposure was similar – over 20,000 uW/m².



In Argyle Street (left picture) – intersection with Buchanan Street – probably the most circulated area in **Glasgow**, measurements indicated between thousands and more than **32,000 $\mu\text{W}/\text{m}^2$** . Also in Jamaica Street, near Lidl we encountered stunning levels of more than **20,000 $\mu\text{W}/\text{m}^2$** . However, there are places in Glasgow where there is **almost no RF radiation on the street**, though just 20 meters away at a crossroad, one can get an exposure of more than **10,000 $\mu\text{W}/\text{m}^2$** (as seen in the upper right picture). It all depends on where the tower cells or small cells or other reflective devices or surfaces are located and if there are buildings that block their emissions or not. Another very irradiated area in Glasgow is in front of the Royal Infirmary where a 4G tower cell facing the hospital and five 4G-5G masts on top of Destiny Church Glasgow are blasting the hospital, the residential flats around and the people waiting at the bus stops in this area. We have recorded more than **10,000 $\mu\text{W}/\text{m}^2$** in various points, including at the bus stops. In the central Buchanan bus station which is exposed to several cell towers, the people waiting for their buses can be exposed to thousands of $\mu\text{W}/\text{m}^2$ (we measured more than **10,000 $\mu\text{W}/\text{m}^2$**). In the very busy **Hamilton** train and bus stations, we got again, up to more than **20,000 $\mu\text{W}/\text{m}^2$** .



In the image on the left, one can observe that the recordings we got from a mast situated 70-80 meters away from us in Glasgow, respectively around **8,000 uW/m²**, are however half of the ones recorded in Argyle Street, which were given **only by direct exposure to small cells** (but they can be just a quarter, as seen in the pictures before pointing at **32,000 uW/m²** in the same place). A lot of **street furniture and lamp post architecture** (see in Sauchiehall Street) **comprises small cells** that are not at all easily identifiable by people passing by as they have various shapes and are integrated in the general design of these structures, so only testing with an EMF meter can make people aware of their exposures (which can also vary a lot in the same spot) and what zones they should generally avoid. In our experience, the **areas of retail parks, shopping centres, stadiums and other outdoors places for sport, areas of medical centres, hospitals or care homes, train and bus stations** are often significantly RF irradiated, and not only in the biggest cities, but also in most of the towns today. In **Cumbernauld town centre**, for example, we have seen places with **10,000 uW/m² up to more than 20,000 uW/m²**!

Some of our more significant recordings can be found in a couple of videos on [bitchute.com](https://www.bitchute.com) that refer to this topic in the context of the actual knowledge on the RF harmful effects on living beings:

- **THE EXTREME DANGERS OF NON-IONISED / WIRELESS RADIATION (EDINBURGH, GLASGOW, CUMBERNAULD RECORDINGS (2022))** <https://www.bitchute.com/video/xfDPsr2s0w6k/>

- **ANTENNAS, ROUTERS, APPLIANCES & SMART PHONES FOR A SMART (KILL) GRID (2023)** <https://www.bitchute.com/video/bewlhjf0syu0/>

In the second video we have some recordings outside on various locations in cities and towns of Scotland, but also indoors, coming from **wifi, microwave ovens and, particularly from mobile phones** from which we got the highest levels of radiation in comparison to all other sources – **up to +100,000 uW/m²** (2 mobile phones, one during a simple appeal, not connected to the Internet – see the picture on the right - and the other when connect on the Internet and browsing popular pages such as Amazon or Ebay). The radiation from **microwave ovens that went up to more than 50,000 uW/m²** (despite the fact that they are considered to be Faraday cages, completely blocking the microwaves; they operate **at 2.45 GHz** - the same frequency as the classic wifi routers; only the power output being much stronger and having a thermal effect) and **the radiation from the mobile phones reaching the upper limit of our Acoustimeter**, were the **most shocking results we ever obtained by now**. Please consider also that there is a multiplication effect due to higher frequencies and that the Acoustimeter we used cannot perceive the 20-40GHz range that the 5G small cells are meant to emit – therefore surely, **the radiating power in areas with 5G small cells is much higher than we can detect with such a device.**

ANNEX F – THE BIOINITIATIVE REPORT 2012 (conclusions)

BioInitiative 2012
A Rationale for Biologically-based Exposure Standards
for Low-Intensity Electromagnetic Radiation

Report Updated 2014 -2022

You are here: Home / Conclusions

Search ...

BIOINITIATIVE 2012 – CONCLUSIONS Table 1-1

Overall, these 1800 or so new studies report abnormal gene transcription (Section 5); genotoxicity and single-and double-strand DNA damage (Section 6); stress proteins because of the fractal RF-antenna like nature of DNA (Section 7); chromatin condensation and loss of DNA repair capacity in human stem cells (Sections 6 and 15); reduction in free-radical scavengers – particularly melatonin (Sections 5, 9, 13, 14, 15, 16 and 17); neurotoxicity in humans and animals (Section 9), carcinogenicity in humans (Sections 11, 12, 13, 14, 15, 16 and 17); serious impacts on human and animal sperm morphology and function (Section 18); effects on offspring behavior (Section 18, 19 and 20); and effects on brain and cranial bone development in the offspring of animals that are exposed to cell phone radiation during pregnancy (Sections 5 and 18). This is only a snapshot of the evidence presented in the BioInitiative 2012 updated report.

BIOEFFECTS ARE CLEARLY ESTABLISHED

Bioeffects are clearly established and occur at very low levels of exposure to electromagnetic fields and radiofrequency radiation. Bioeffects can occur in the first few minutes at levels associated with cell and

The continued rollout of wireless technologies and devices puts global public health at risk from unrestricted wireless commerce unless new, and far lower exposure limits and strong precautionary warnings for their use are implemented.

EMF AND RFR ARE PREVENTABLE TOXIC EXPOSURES

We have the knowledge and means to save global populations from multi-generational adverse health consequences by reducing both ELF and RFR exposures. Proactive and immediate measures to reduce unnecessary EMF exposures will lower disease burden and rates of premature death.

DEFINING A NEW 'EFFECT LEVEL' FOR RFR

1000 uW/m2

On a precautionary public health basis, a reduction from the BioInitiative 2007 recommendation of 0.1 uW/cm2 (or one-tenth of a microwatt per square centimeter) for cumulative outdoor RFR down to something three orders of magnitude lower (in the low nanowatt per square centimeter range) is justified.

A scientific benchmark of 0.003 uW/cm2 or three nanowatts per centimeter squared for 'lowest observed effect level' for RFR is based on mobile phone base station-level studies. Applying a ten-fold reduction to compensate for the lack of long-term exposure (to provide a safety buffer for chronic exposure, if needed) or for children as a sensitive subpopulation yields a 300 to 600 picowatts per square centimeter precautionary action level. This equates to a 0.3 nanowatts to 0.6 nanowatts per square centimeter as a reasonable, precautionary action level for chronic exposure to pulsed RFR. These levels may need to change in the future, as new and better studies are completed. We leave room for future studies that may lower or raise today's observed 'effects levels' and should be prepared to accept new information as a guide for new precautionary actions.

3 - 6 uW/m2

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So the updated guidelines of the most influential independent group of scientists from Bioinitiative indicate as **threshold of safety for RF radiation 3 to 6 uW/swm**. Let's also remind that there are practically **no studies dealing with real life situations** in which **a multitude of frequencies and powers reach the human beings and other living organisms simultaneously**, and also very little about the synergistic potentiating between this toxic factor and the multitude other toxic factors, mainly biological and chemical toxins, that people are currently exposed to in the modern world. Below, you can see two of **the charts of the Bioinitiative Report** – the numbers need to be multiplied by 10,000 in order to find out the equivalent in uW/m2 that we have referred to in our measurements with the Acoustimeter. For ex., **2 uW/cm2 means 20,000 uW/m2 – indicating below double strand DNA damage in rats' brain cells**.

Power Density (Microwatts/centimeter ² - uW/cm ²)	X 10,000 for uW/m²	Reference
0.01 - 0.05 uW/cm ²	Adults (18-91 yrs) with short-term exposure to GSM cell phone radiation reported headache, neurological problems, sleep and concentration problems.	Hutter, 2006
0.005 - 0.04 uW/cm ²	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated)	Thomas, 2008
0.015 - 0.21 uW/cm ²	Adults exposed to short-term GSM 900 radiation reported changes in mental state (e.g., calmness) but limitations of study on language descriptors prevented refined word choices (stupified, zoned-out)	Augner, 2009
0.05 - 0.1 uW/cm ²	RFR linked to adverse neurological, cardio symptoms and cancer risk	Khurana, 2010
0.05 - 0.1 uW/cm ²	RFR related to headache, concentration and sleeping problems, fatigue	Kundi, 2009
0.07 - 0.1 uW/cm ²	Sperm head abnormalities in mice exposed for 6-months to base station level RF/MW. Sperm head abnormalities occurred in 39% to 46% exposed mice (only 2% in controls) abnormalities was also found to be dose dependent. The implications of the pin-head and banana-shaped sperm head. The occurrence of sperm head observed increase occurrence of sperm head abnormalities on the reproductive health of humans living in close proximity to GSM base stations were discussed."	Otitolaju, 2010
0.38 uW/cm ²	RFR affected calcium metabolism in heart cells	Schwartz, 1990
0.8 - 10 uW/cm ²	RFR caused emotional behavior changes, free-radical damage by super-weak MWs	Akoev, 2002
0.13 uW/cm ²	RFR from 3G cell towers decreased cognition, well-being	Zwamborn, 2003
0.16 uW/cm ²	Motor function, memory and attention of school children affected (Latvia)	Kolodynski, 1996
0.168 - 1.053 uW/cm ²	Irreversible infertility in mice after 5 generations of exposure to RFR from an 'antenna park'	Magras & Zenos, 1997
0.2 - 8 uW/cm ²	RFR caused a two-fold increase in leukemia in children	Hocking, 1996
0.2 - 8 uW/cm ²	RFR decreased survival in children with leukemia	Hocking, 2000
0.21 - 1.28 uW/cm ²	Adolescents and adults exposed only 45 min to UMTS cell phone radiation reported increases in headaches.	Riddervold, 2008

Power Density (Microwatts/centimeter ² - uW/cm ²)	X 10,000 for uW/m²	Reference
0.5 uW/cm ²	Significant degeneration of seminiferous epithelium in mice at 2.45 GHz, 30-40 min.	Saunders, 1981
0.5 - 1.0 uW/cm ²	Wi-Fi level laptop exposure for 4-hr resulted in decrease in sperm viability, DNA fragmentation with sperm samples placed in petri dishes under a laptop connected via WI-FI to the internet.	Avendano, 2012
1.0 uW/cm ²	RFR induced pathological leakage of the blood-brain barrier	Persson, 1997
1.0 uW/cm ²	RFR caused significant effect on immune function in mice	Fesenko, 1999
1.0 uW/cm ²	RFR affected function of the immune system	Novoselova, 1999
1.0 uW/cm ²	Short-term (50 min) exposure in electrosensitive patients, caused loss of well-being after GSM and especially UMTS cell phone radiation exposure	Eltiti, 2007
1.3 - 5.7 uW/cm ²	RFR associated with a doubling of leukemia in adults	Dolk, 1997
1.25 uW/cm ²	RFR exposure affected kidney development in rats (in-utero exposure)	Pyrpasopoulou, 2004
1.5 uW/cm ²	RFR reduced memory function in rats	Nittby, 2007
2 uW/cm ²	RFR induced double-strand DNA damage in rat brain cells	Kesari, 2008
2.5 uW/cm ²	RFR affected calcium concentrations in heart muscle cells	Wolke, 1996
2 - 4 uW/cm ²	Altered cell membranes; acetylcholine-induced ion channel disruption	D'Inzeo, 1988
4 uW/cm ²	RFR caused changes in hippocampus (brain memory and learning)	Tattersall, 2001
4 - 15 uW/cm ²	Memory impairment, slowed motor skills and retarded learning in children	Chiang, 1989
5 uW/cm ²	RFR caused drop in NK lymphocytes (immune function decreased)	Boscolo, 2001
5.25 uW/cm ²	20 minutes of RFR at cell tower frequencies induced cell stress response	Kwee, 2001
5 - 10 uW/cm ²	RFR caused impaired nervous system activity	Dumansky, 1974
6 uW/cm ²	RFR induced DNA damage in cells	Phillips, 1998

ANNEX G – EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses

Precautionary guidance values

In areas where people spend extended periods of time (>4 h per day), minimize exposure to VLF electric fields to levels as low as possible or below the precautionary guidance values specified below.

Table 6: Precautionary guidance values for VLF electric fields.

VLF electric field	Daytime exposure	Nighttime exposure	Sensitive populations
Arithmetic mean (AVG)	0.1 V/m ¹⁾	0.01 V/m ¹⁾	0.003 V/m ²⁾

Based on: ¹⁾The current density induced in the human body increases with increasing frequency in an approximately linear relationship (266). Therefore, the guidance value of the electric field in the VLF frequency range should be lower than the one of the 50/60 Hz electric field, e.g. for 10 V/m/100 = 0.1 V/m. For the rationale of 10 V/m and 1 V/m, see section ELF electric fields. ²⁾Precautionary approach by a factor of 3 (field strength). See also TCO Development (265).

Note: As seen above, for 2G to 4G, EuropaEM Guideline indicates a threshold of safety of 1uW/m² for sensitive people, as for WiFi less than 1uW/m² for night exposure and 0.1 uW/m² for sensitive people – which drives the general threshold of safety to 0.1 – 1 uW/m² which is even lower than that of the Bioinitiative Group Guidelines (of 3-6uW/m²)

Table 3: Precautionary guidance values for radio-frequency radiation.

RF source Max Peak/ Peak Hold	Daytime exposure	Nighttime exposure	Sensitive populations ¹⁾
Radio broadcast (FM)	10,000 µW/m ²	1000 µW/m ²	100 µW/m ²
TETRA	1000 µW/m ²	100 µW/m ²	10 µW/m ²
DVBT	1000 µW/m ²	100 µW/m ²	10 µW/m ²
GSM (2G)	100 µW/m ²	10 µW/m ²	1 µW/m ²
900/1800 MHz			
DECT (cordless phone)	100 µW/m ²	10 µW/m ²	1 µW/m ²
UMTS (3G)	100 µW/m ²	10 µW/m ²	1 µW/m ²
LTE (4G)	100 µW/m ²	10 µW/m ²	1 µW/m ²
GPRS (2.5G) with	10 µW/m ²	1 µW/m ²	0.1 µW/m ²
PTCCH* (8.33 Hz pulsing)			
DAB+ (10.4 Hz pulsing)	10 µW/m ²	1 µW/m ²	0.1 µW/m ²
Wi-Fi 2.4/5.6 GHz	10 µW/m ²	1 µW/m ²	0.1 µW/m ²
(10 Hz pulsing)			

*PTCCH, packet timing advance control channel.

Based on: BioInitiative (9, 10); Kundi and Hutter (260); Leitfaden Senderbau (221); PACE (42); Seletun Statement (40). ¹⁾Precautionary approach by a factor of 3 (field strength)= a factor of 10 (power density). See also IARC 2013 (24) and Margaritis et al. (267).

Annex H - Other examples of peer-reviewed studies on RF radiation on rats

*“An experiment on mice in Greece, it was already shown in 1997 that mice become **completely infertile within 3 generations** with permanent irradiation of **only 1/30 of the German limit values** (Magras and Xenos 1997). In a study by the US National Toxicology Program (NTP), 360 rats were irradiated with mobile phone frequencies for life (Wyde et al. 2018). At the Ramazzini Institute (Falcioni et al. 2018), more than 2000 rats were irradiated for 2 years each. Here, too, the limit values were adhered to, thus creating situations to which we humans are also exposed. In both studies, there was **clear evidence of an increase in malignant tumours in the group of irradiated animals.**” (*Animals and plants under radiation stress*^{ccccxxix}, 2021)*

- **Mutagenic response of 2.45 GHz radiation exposure on rat brain.**^{ccccxxx} (2h/day for 35 days, 0.34 mW/cm(2))

Kesari KK, Behari J, Kumar S. *Int J Radiat Biol.* 2010 Apr;86(4):334-43. doi: 10.3109/09553000903564059. PMID: 20353343

*The study concludes that the **chronic exposure to these radiations may cause significant damage to brain, which may be an indication of possible tumour promotion*** (Behari and Paulraj 2007).

- **900-MHz microwave radiation promotes oxidation in rat brain**^{ccccxxxi}. (2h/day for 45 dys; SAR 0.9W/kg)

Kesari KK, Kumar S, Behari J. *Electromagn Biol Med.* 2011 Dec;30(4):219-34. doi: 10.3109/15368378.2011.587930. PMID: 22047460

*The study concludes that a reduction or an increase in antioxidative enzyme activities, protein kinase C, melatonin, caspase 3, and creatine kinase are related to **overproduction of reactive oxygen species (ROS) in animals under mobile phone radiation exposure**. Our findings on these biomarkers are clear indications of possible health implications.*

- **Fifty-gigahertz microwave exposure effect of radiations on rat brain.**^{ccccxxii} (50 GHz, 2h/day for 45 days, SAR 8.0 x 10⁽⁻⁴⁾ W/kg)

Kesari KK, Behari J. *Appl Biochem Biotechnol.* 2009 Jul;158(1):126-39. doi: 10.1007/s12010-008-8469-8. Epub 2008 Dec 17. PMID: 19089649

*“We conclude that these **radiations can have a significant effect on the whole brain.**”*

- **Radiofrequency radiation emitted from Wi-Fi (2.4 GHz) causes impaired insulin secretion and increased oxidative stress in rat pancreatic islets**^{ccccxxiii} Ali Masoumi¹, Narges Karbalaei^{1,2}, S M J Mortazavi³, Mohammad Shabani⁴

*“These data showed that **EMR of Wi-Fi leads to hyperglycemia, increased oxidative stress, and impaired insulin secretion in the rat pancreatic islets.**”*

- **Microwave exposure affecting reproductive system in male rats.**^{ccccxxiv} (50 GHz, 2h/day for 45 days, SAR 8.0 x 10⁽⁻⁴⁾ W/kg)

Kesari KK, Behari J. *Appl Biochem Biotechnol.* 2010 Sep;162(2):416-28. doi: 10.1007/s12010-009-8722-9. Epub 2009 Sep 19. PMID: 19768389

*We conclude that **these radiations may have a significant effect on reproductive system of male rats, which may be an indication of male infertility.***

- 2.45 GHz microwave irradiation-induced oxidative stress affects implantation or pregnancy in mice, *Mus musculus*.^{ccccxv} (2h/day for 45 days, 0.033549 mW/cm(2))

Shahin S, Singh VP, Shukla RK, Dhawan A, Gangwar RK, Singh SP, Chaturvedi CM. *Appl Biochem Biotechnol*. 2013 Mar;169(5):1727-51. doi: 10.1007/s12010-012-0079-9. Epub 2013 Jan 22. PMID: 23334843

Our findings led us to conclude that a low level of MW irradiation-induced oxidative stress not only suppresses implantation, but it may also lead to deformity of the embryo in case pregnancy continues. We also suggest that MW radiation-induced oxidative stress by increasing ROS production in the body may lead to DNA strand breakage in the brain cells and implantation failure/resorption or abnormal pregnancy in mice.

REFERENCES:

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- ⁱ <https://www.es-uk.info/>
- ⁱⁱ <http://www.ehs-mcs.org/en/>
- ⁱⁱⁱ <https://www.5gspaceappeal.org/the-appeal>
- ^{iv} <https://www.saferemr.com/2019/07/international-scientist-appeal-on.html>
- ^v <https://ehtrust.org/science/medical-doctors-consensus-statements-recommendations-cell-phoneswireless/>
- ^{vi} <https://questions-statements.parliament.uk/written-questions/detail/2018-10-08/176372>
- ^{vii} https://www.ofcom.org.uk/_data/assets/pdf_file/0025/214459/guidance-emf-compliance-enforcement.pdf
- ^{viii} <https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf>
- ^{ix} <https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf>
- ^x <https://www.icnirp.org/>
- ^{xi} https://assets.publishing.service.gov.uk/media/5a7e0ebded915d74e6223d46/RCE-20_Health_Effects_RF_Electromagnetic_fields.pdf
- ^{xii} <https://www.gov.uk/government/publications/radiofrequency-electromagnetic-fields-health-effects/health-protection-agency-response-to-the-2012-agnir-report-on-the-health-effects-from-radiofrequency-electromagnetic-fields>
- ^{xiii} <http://www.mthr.org.uk/>
- ^{xiv} www.iegmp.org.uk
- ^{xv} <https://www.gov.uk/government/publications/mobile-phone-base-stations-radio-waves-and-health/mobile-phone-base-stations-radio-waves-and-health>
- ^{xvi} <https://webarchive.nationalarchives.gov.uk/ukgwa/20100712173700/http://www.iegmp.org.uk/evidence/clarke.htm>
- ^{xvii} <https://webarchive.nationalarchives.gov.uk/ukgwa/20100104215452/http://www.iegmp.org.uk/report/text.htm>
- ^{xviii} Article 191 defines the Precautionary Principle as follows: “According to the European Commission **the precautionary principle may be invoked when a phenomenon, product or process may have a dangerous effect, identified by a scientific and objective evaluation**, if this evaluation does not allow the risk to be **determined with sufficient certainty**. Recourse to the principle belongs in the general framework of risk analysis (which, besides risk evaluation, includes risk management and risk communication), and more particularly in the context of risk management which corresponds to the decision-making phase. The Commission stresses that the precautionary principle may only be invoked in the event of a potential risk and that it can never justify arbitrary decisions. **The precautionary principle may only be invoked when the three preliminary conditions are met: identification of potentially adverse effects; evaluation of the scientific data available; the extent of scientific uncertainty.**”
- ^{xix} https://webarchive.nationalarchives.gov.uk/ukgwa/20100104215459mp_/http://www.iegmp.org.uk/documents/iegmp_5.pdf
- ^{xx} <https://www.gov.uk/government/publications/radio-waves-reducing-exposure/radio-waves-reducing-exposure-from-mobile-phones>
- ^{xxi} <https://webarchive.nationalarchives.gov.uk/ukgwa/20140713082604/http://www.hpa.org.uk/Publications/Radiation/NPRBArchive/DocumentsOfTheNRPB/Absd1502/>
- ^{xxii} <https://ehjournal.biomedcentral.com/counter/pdf/10.1186/1476-069X-10-14.pdf>
- ^{xxiii} <https://academic.oup.com/ije/article/48/1/25/5132994>
- ^{xxiv} <https://www.ofcom.org.uk/home>
- ^{xxv} <https://www.hse.gov.uk/radiation/nonionising/emf.htm>
- ^{xxvi} https://www.legislation.gov.uk/uksi/2016/588/pdfs/uksi_20160588_en.pdf

-
- xxvii https://www.hse.gov.uk/foi/internalops/sims/cactus/5_01_50.htm
- xxviii <https://www.hse.gov.uk/radiation/nonionising/faqs.htm>
- xxix <http://www.mthr.org.uk/>
- xxx <https://www.gov.uk/government/publications/smart-meters-radio-waves-and-health/smart-meters-radio-waves-and-health>
- xxxi <https://assets.publishing.service.gov.uk/media/5a7d7d25e5274a6b89a50622/HpaRpd010.pdf>
- xxxii https://health.ec.europa.eu/scientific-committees_en
- xxxiii https://ec.europa.eu/health/scientific_committees/emerging/docs/scenihr_o_041.pdf
- xxxiv This study has been written by Dr Fiorella Belpoggi, BSc, PhD, International Academy of Toxicologic Pathology Fellow (IATPF), Ramazzini Institute, Bologna (Italy), at the request of the Panel for the Future of Science and Technology (STOA) and managed by the Scientific Foresight Unit, within the Directorate-General for Parliamentary Research Services (EPRS) of the Secretariat of the European Parliament. The scoping review search was performed by Dr Daria Sgargi, PhD, Master in Biostatistics, and Dr Andrea Vornoli, PhD in Cancer Research, Ramazzini Institute, Bologna
- xxxv <https://ehtrust.org/wp-content/uploads/2015/12/Schools-and-Wireless-Briefing-October-2015.pdf>
- xxxvi <https://magdahavas.com/from-zorys-archive/pick-of-the-week-25-review-of-international-microwave-exposure-guidelines-from-1957-to-1968/>
- xxxvii <https://cellphonetaskforce.org/governments-and-organizations-that-ban-or-warn-against-wireless-technology/>
- xxxviii <https://ehtrust.org/wp-content/uploads/International-Policy-Precautionary-Actions-on-Wireless-Radiation.pdf>
- xxxix <https://ehtrust.org/science/medical-doctors-consensus-statements-recommendations-cell-phoneswireless/>
- xl <https://safetechinternational.org/wp-content/uploads/2023/09/EECCsubmission12-9-2023-info-version.pdf>
- xli <https://www.gofundme.com/f/admin-fees-for-litigants-in-person>
- xlii <https://aches.international/wp-content/uploads/2024/03/Letter-to-Chief-Constable-Thames-Valley-Police.pdf>
- xliii <https://aches.international/uk-projects-against-mobile-masts/>
- xliv <https://www.youtube.com/watch?v=nqyNw4qv4uc>
- xlvi <https://www.youtube.com/watch?v=0JHmexC1bYw>
- xlvi <https://connected-communities.ca/>
- xlvi <https://lifi.co/lifi-vs-wifi/#:~:text=The%20terms%20WiFi%20and%20LiFi,waves%20whereas%20LiFi%20uses%20light.>
- xlvi <https://www.swisscom.ch/en/about/news/2023/11/29-connect.html>
- xlvi <http://www.parentsfor safetechnology.org/corporations-are-100--aware-of-wireless-harm.html>
- l <http://emfsafetynetwork.org/wireless-devices-potential-cancer-risk-says-world-health-organization/>
- li <https://www.sciencedirect.com/science/article/pii/S0013935118303475>
- lii <https://www.emf-portal.org/en>
- liii <https://sites.google.com/site/understandingemfs/the-science>
- liv <https://olgasheean.com/wp-content/uploads/2017/02/WHO-setting-the-standard-for-a-wireless-world-of-harm.pdf>
- lv <http://www.greenmedinfo.com/disease/electromagnetic-radiation>
- lvi <https://www.orsaa.org/>
- lvii https://a037613.fmphost.com/fmi/webd/Research_Review_V4

-
- lviii <https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/Oceania%20Radiofrequency%20Scientific%20Advisory%20to%20.pdf?ver=1714671928635>
- lix <https://scientists4wiredtech.com/wp-content/uploads/2018/07/1993-Adey-Biological-Effects-of-Electromagnetic-Fields.pdf>
- lx <https://www.sciencedirect.com/science/article/pii/S0013935118300355>
- lxi https://europaem.eu/attachments/article/131/2018-04_EU-EMF2018-5US.pdf
- lxii <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9189734/>
- lxiii <https://scientists4wiredtech.com/martin-pall-primer/>
- lxiv <https://betweenrockandhardplace.wordpress.com/2019/03/25/influential-australia/>
- lxv <https://www.sophiahi.com/>
- lxvi <https://zachbushmd.com/>
- lxvii <https://www.theshiftclinic.com/specialist/dr-jay-davidson/>
- lxviii <https://drleecowden.com/dr-cowden-bio/>
- lxix <https://drpompa.com>
- lxx <https://phiremedical.org/team/phire-medical-doctors/>
- lxxi <https://europaem.eu/en/library/articles>
- lxxii <https://www.aaemonline.org/electromagnetic-and-radiofrequency-fields-effect-on-human-health/>
- lxxiii <https://www.aaemonline.org/wp-content/uploads/2020/12/emfpositionstatement.pdf>
- lxxiv <https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/British-Doctors-Letter-March-2014.pdf?ver=1710463790685>
- lxxv <http://wifiinschools.org.uk/resources/safeschools2012.pdf>
- lxxvi <https://rense.com//general96/trower.html>
- lxxvii <https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/2015-06-22-WFNS-Factsheet-Dr.%20Zac%20Cox%20-%20Interv.pdf?ver=1714671928772>
- lxxviii <https://www.radiationresearch.org/wp-content/uploads/2019/04/On-the-Clear-Evidence-of-the-Risks-to-Children-from-Smartphone-and-WiFi-Radio-Frequency-Radiation-Final-20201.pdf>
- lxxix <https://zoryglaser.com/>
- lxxx <https://ntp.niehs.nih.gov/whatwestudy/topics/cellphones/index.html>
- lxxxi <https://scientists4wiredtech.com/ntp-rf-mw-radiation-study-update>
- lxxxii <https://www.ncbi.nlm.nih.gov/pubmed/29530389>
- lxxxiii https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/LARGEST_UNETHICAL_MEDICAL_EXPERIMENT_FINAL.pdf?ver=1714671928772
- lxxxiv www.powerwatch.org.uk
- lxxxv <https://drive.google.com/file/d/19CbWmdGTnnW1iZ9pxlxq1ssAdY13Eur3/view>
- lxxxvi <https://www.powerwatch.org.uk/health/childhood-cancer-non-ionising-ch4-hq.pdf>
- lxxxvii <https://www.powerwatch.org.uk/health/braintumours.asp>

-
- lxxxviii <https://www.powerwatch.org.uk/health/sensitivity.asp>
- lxxxix https://www.powerwatch.org.uk/science/reasons_us.pdf
- xc <https://betweenrockandhardplace.wordpress.com/2021/05/04/guest-blog-from-professor-denis-l-henshaw-on-the-myth-where-emfs-too-low-energy-to-break-chemical-bonds-is-automatically-equalled-to-no-meaningful-effects-possible/>
- xc i <https://www.sciencedirect.com/science/article/abs/pii/S0013935118302561?via%3Dihub>
- xc ii <https://www.theguardian.com/technology/2024/apr/19/quarter-of-uks-three--and-four-year-olds-own-a-smartphone-data-shows>
- xc iii <https://www.northlanarkshire.gov.uk/news/new-5g-facility-brings-limitless-potential>
- xc iv <https://stateofthenation2012.com/?p=121005>
- xc v <https://ehtrust.org/wp-content/uploads/2015/12/Schools-and-Wireless-Briefing-October-2015.pdf>
- xc vi <https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/American-Academy-of-Pediatrics-Supports-Child-.pdf?ver=1714671928772>
- xc vii <http://www.nhs.uk/Conditions/Mobile-phone-safety/Pages/Risks.aspx>
- xc viii <https://www.radiationresearch.org/wp-content/uploads/2020/04/Complaint-against-First-News-There-is-no-5G-Conspiracy-Eileen-OConnor-RRT-27-4-20.pdf>
- xc ix <https://phiremedical.org/>
- c <https://ehtrust.org/>
- ci <https://www.youtube.com/watch?v=sNFdZVeXw7M&pp=ygVORHJueVyaWNhIE1hbGxlcnkQmx5dGhlIC0gRWxlY3Ryb21hZ25ldGljIFJhZGlhdGlvbWwgSGVhbHRoIGFuZCBDaGlsZHIJbiAyMDE0>
- c ii <https://www.youtube.com/watch?v=9yFmQYZZKIA&pp=ygUVZGV2cmEgZGF2aWVzIGNoaWxkcmVu>
- c iii <https://phiremedical.org/2020-nir-consensus-statement-press-release/>
- c iv <http://www.independent.co.uk/environment/green-living/eu-watchdog-calls-for-urgent-action-on-wifi-radiation-402539.html>
- c v <http://www.parentsfor safetechnology.org/school.html>
- c vi <https://ehtrust.org/wifi-in-schools-tool-kit/>
- c vii <https://lenasfabulousfrequencies.com/grassroots>
- c viii <https://ehtrust.org/wireless-radiation-health-risks-and-safe-technology-in-schools-letters-to-state-education-authorities-and-universities/>
- c ix <https://ehtrust.org/letter-scientific-evidence-to-support-restrictions-on-cell-towers-on-or-near-school-property/>
- cx http://www.wi-cancer.info/antenna_fix1.aspx
- cx i <https://www.youtube.com/watch?v=Lw03FexMATs>
- cx ii <https://www.theepochtimes.com/epochtv/professor-says-a-human-can-be-killed-with-emf-radiation-found-at-home-dr-paul-heroux-5594131>
- cx iii <https://www.youtube.com/watch?v=iebggbBHAqo>
- cx iv <http://emfsafetynetwork.org/wp-content/uploads/2018/05/Letter-to-Seb-Verizon-5G.pdf>
- cx v <https://ehtrust.org/cell-towers-everything-you-need-to-know/>
- cx vi <https://ehtrust.org/health-effects-of-cell-phones-and-wireless-radiation-published-credible-science/>
- cx vii <http://www.parentsfor safetechnology.org/cell-towers.html>
- cx viii https://www.healthandenvironment.org/uploads/docs/EMFcallmore_recent_cell_tower_papers.pdf ; <https://faso.org.ar/imagenes/cipracem/3.1c.pdf>
- cx ix <https://lawandcrime.com/administrative-law/scientists-sue-fcc-for-dismissing-claims-that-cell-phone-radiation-causes-cancer/>

cxx <https://ehtrust.org/in-historic-decision-federal-court-finds-fcc-failed-to-explain-why-it-ignored-scientific-evidence-showing-harm-from-wireless-radiation/>

cxxi <https://dgtalearth.com/why-is-5g-banned-in-some-countries-2024/>

cxix <https://www.durham.ac.uk/research/current/thought-leadership/how-chinese-companies-are-challenging-national-security-decisions-that-could-delay-5g-network-rollout/>

cxixiii <https://tecknexus.com/5g-network/5g-magazine-5g-tower-small-cells-das-edition/>

cxixiv <https://mastdata.com/>

cxixv <https://www.nperf.com/en/map/GB/-/-/signal/?ll=20&lg=0&zoom=3>

cxixvi <https://www.signalchecker.co.uk/>

cxixvii <https://planning.org.uk/coverage>

cxixviii <https://ehtrust.org/?s=lawsuit>

cxixix <https://www.crowdjustice.com/case/5g-judicial-review-2020/>

cxixxx <https://actionagainst5g.org/legal-case/>

cxixxi <https://actionagainst5g.org/case-updates/judgment-received/>

cxixxii <https://www.telecoms.com/operator-ecosystem/uk-telcos-face-3-3bn-loyalty-penalty-lawsuit>

cxixxiii <http://www.bioinitiative.org>

cxixxiv <http://www.bioinitiative.org/report/wp-content/uploads/pdfs/BioInitiativeReport-RF-Color-Charts.pdf>

cxixxv <https://bioinitiative.org/conclusions/>

cxixxvi <https://www.degruyter.com/document/doi/10.1515/reveh-2016-0011/html?lang=en>

cxixxvii <https://iaacn.org/wp-content/uploads/2021/10/EMF-Sleep-Standards-by-the-Building-Biology-Institute.pdf>

cxixxviii [https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/Electrosensitivity%20UK%20to%20ICNIRP%20\(2018\).docx?ver=1714671928635](https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/Electrosensitivity%20UK%20to%20ICNIRP%20(2018).docx?ver=1714671928635)

cxixxix <https://actionagainst5g.org/case-updates/application-to-the-european-court-of-human-rights/>

cxli <https://www.theguardian.com/technology/2018/jul/14/mobile-phones-cancer-inconvenient-truths>

cxlii <https://www.telegraph.co.uk/science/2018/05/17/electromagnetic-radiation-power-lines-phone-masts-poses-credible/>

cxliii <https://einarflydal.files.wordpress.com/2018/03/eklipse-buglife-conferencematerial-january2018.pdf>

cxliiii <https://pubmed.ncbi.nlm.nih.gov/34047144/>

cxliiv <https://www.saferemr.com/2018/05/EMF-wildlife.html>

cxliv <https://ehtrust.org/science/bees-butterflies-wildlife-research-electromagnetic-fields-environment/>

cxlvi <https://ehtrust.org/5g-and-small-cell-environmental-effects-birds-bees-trees-and-climate/>

cxlvii <https://cellphonetaskforce.org/birds-on-texel-island-2/>

cxlviii <https://arthurfirstenberg.substack.com/p/kiwibirds>

cxlix <https://cellphonetaskforce.org/wp-content/uploads/2021/11/Mt-Nardi-Wildlife-Report-to-UNESCO-FINAL-2017.pdf>

cli <https://cellphonetaskforce.org/dogs-cats-birds-and-maui/>

cli <https://www.youtube.com/watch?v=C5ABHcenkIo>

-
- clii <https://www.naturalscience.org/news/2021/02/animals-and-plants-under-radiation-stress/>
- cliii <https://mdsafetech.org/ntp-study-2016/>
- cliv <https://scientists4wiredtech.com/what-are-4g-5g/the-insect-apocalypse-is-here/>
- clv <https://www.facebook.com/theinsectinspector/>
- clvi <https://www.youtube.com/watch?v=aHhUch5GgtY>
- clvii <https://www.nature.com/articles/s41598-018-22271-3>
- clviii <https://cdn.buglife.org.uk/2021/06/Buglife-Strategy-2021-30-Final.pdf>
- clix <https://www.youtube.com/watch?v=imtwqDHG11A>
- clx <https://edition.cnn.com/2010/WORLD/europe/06/30/bee.decline.mobile.phones/index.html>
- clxi https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations
- clxii <https://academic.oup.com/mutage/article/31/2/187/2622776>
- clxiii <https://onlinelibrary.wiley.com/doi/abs/10.1002/BEM.21890>
- clxiv <https://www.youtube.com/watch?v=TUYbUc6YC5w>
- clxv <https://www.youtube.com/watch?v=Vw5UhjRsvP8>
- clxvi <https://www.youtube.com/shorts/ivIq4EdQ87c>
- clxvii <https://www.youtube.com/watch?v=bSEte28dIsk>
- clxviii <https://link.springer.com/article/10.1007/s12275-017-7208-7>
- clxix https://europaem.eu/attachments/article/131/2018-04_EU-EMF2018-5US.pdf
- clxx Consider also the big contribution to the destruction of trees and vegetation of pesticides, particularly Roundup that has been sprayed intensively in agriculture and in communities in the US and UK, most particularly in Scotland.
- clxxi <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2023.1058454/full#supplementary-material>
- clxxii <https://www.sciencedirect.com/science/article/abs/pii/S037842742030028X>
- clxxiii [European Union: 5G Deployment, State of Play in Europe, USA and Asia, In-Depth Analysis requested by the ITRE committee](https://www.ehtrust.org/science/co-carcinogenic-synergistic-effects-emfs/)
- clxxiv <https://www.ehtrust.org/science/co-carcinogenic-synergistic-effects-emfs/>
- clxxv <https://www.sciencedirect.com/science/article/abs/pii/S0048969720362100?via%3Dihub#>
- clxxvi [http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045\(11\)70147-4/fulltext?_eventId=login](http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(11)70147-4/fulltext?_eventId=login)
- clxxvii <http://monographs.iarc.fr/ENG/Monographs/vol102/>
- clxxviii <http://www.sciencedirect.com/science/article/pii/S0006291X15003988>
- clxxix <http://informahealthcare.com/doi/abs/10.3109/09553001003734501>
- clxxx <https://web.archive.org/web/20150314205433/http://m.jacobs-university.de/2015/03/higher-tumor-rates-through-exposure-to-electromagnetic-fields/>
- clxxxi <https://ehtrust.org/scientific-research-on-5g-and-health/>
- clxxxii http://www.wi-cancer.info/home_the_overview2.aspx

clxxxiii . “Although individual variability was observed, **effects of RF from mobile phones strongly depended on the carrier frequency/frequency channel (74–77). Regardless of the cell type (human lymphocytes, fibroblasts, or stem cells), the effects at the 905 MHz/ GSM channel 74 on DNA repair foci and chromatin were consistently lower as compared to the effects at the 915 MHz/GSM channel 124. The data also indicated stronger effects of exposure to RF from UMTS mobile phone radiation at the frequency of 1947.4 MHz**”.

Ref: 74. Markovà E, Hillert L, Malmgren L, Persson BR, Belyaev IY. **Microwaves from GSM Mobile Telephones Affect 53BP1 and gammaH2AX Foci in Human Lymphocytes from Hypersensitive and Healthy Persons.** Environ Health Perspect 2005;113(9):1172–7;

75. Belyaev IY, Markovà E, Hillert L, Malmgren LO, Persson BR. **Microwaves from UMTS/GSM mobile phones induce long-lasting inhibition of 53BP1/g-H2AX DNA repair foci in human lymphocytes.** Bioelectromagnetics 2009;30(2):129–41.;

76. Sarimov R, Malmgren LO, Markova E, Persson BR, Belyaev IY. **Nonthermal GSM microwaves affect chromatin conformation in human lymphocytes similar to heat shock.** IEEE Trans Plasma Sci 2004;32(4):1600–8.;

77. Markovà E, Malmgren LOG, Belyae IY. **Microwaves from mobile phones inhibit 53BP1 focus formation in human stem cells more strongly than in differentiated cells: possible mechanistic link to cancer risk.** Environ Health Perspect 2010;118(3):394–9.

clxxxiv <https://www.youtube.com/watch?v=XLCi4UH6eKo&t=91shttps://youtu.be/XLCi4UH6eKo?t=1m31s>

clxxxv https://europaem.eu/attachments/article/131/2018-04_EU-EMF2018-5US.pdf

clxxxvi <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9189734/>

clxxxvii <https://pubmed.ncbi.nlm.nih.gov/34043892/>

clxxxviii <https://www.youtube.com/watch?v=VuVtGldYXK4>

clxxxix <https://www.sciencedirect.com/science/article/abs/pii/S0013935118300331>

exc <https://www.tandfonline.com/doi/full/10.3109/09553002.2011.538130>

exci <https://magdahavas.com/from-zorys-archive/pick-of-the-week-25-review-of-international-microwave-exposure-guidelines-from-1957-to-1968/>

excii <https://drive.google.com/file/d/1mX1fSrTzvWlxJBOC0Q8POLD0XhBQSpDv/view>

exciii <https://magdahavas.com/5g-and-mm-waves/a-review-translated-from-the-russian-and-ukrainian-research-on-millimetre-waves-similar-to-5g-published-in-2001/>

exciv <https://magdahavas.com/wp-content/uploads/2018/02/RFR-Russian-Ukrainian-1.pdf>

exciv <https://www.sciencedirect.com/science/article/pii/S1631070513000480> / <https://goo.gl/gbBKHL>

excvi <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2023.1058454/full#supplementary-material>

excvi <https://www.saferemr.com/2017/08/5g-wireless-technology-millimeter-wave.html>

excvi <https://www.linkedin.com/pulse/we-have-reason-believe-5g-safe-joel-moskowitz/>

excix https://www.researchgate.net/publication/375003884_5G_Safety_State_of_the_art_from_scientific_reviews_and_their_findings

cc <https://www.sciencedirect.com/science/article/pii/S241464472300091X>

cci https://www.researchgate.net/publication/342085409_Serious_Safety_Concerns_about_5G_Wireless_Deployment_in_Australia_and_New_Zealand

ccii <https://pubmed.ncbi.nlm.nih.gov/9771583/>

cciii https://en.wikipedia.org/wiki/Active_Denial_System#:~:text=The%20system%20is%20operated%20and,a%20power%20of%2030%20kilowatts.

cciv <https://s3.amazonaws.com/media.electrosmogrx.com/dr-pall-5g-hazard-letter.pdf> (chap. 3, 4)

ccv <https://www.saferemr.com/2017/08/5g-wireless-technology-millimeter-wave.html>

ccvi <https://s3.amazonaws.com/media.electrosmogrx.com/dr-pall-5g-hazard-letter.pdf>

ccvii [https://europaem.eu/attachments/article/120/2017-08 EU 5G Appeal 10 August 2017.pdf](https://europaem.eu/attachments/article/120/2017-08_EU_5G_Appeal_10_August_2017.pdf) , <https://www.5gappeal.eu/>

ccviii www.emfscientist.org

ccix http://www.isde.org/5G_appeal.pdf

ccx <https://www.5spaceappeal.org/the-appeal>

ccxi <https://www.frontiersin.org/articles/10.3389/frcmn.2021.673534/full>

ccxii [https://www.researchgate.net/publication/342085409 Serious Safety Concerns about 5G Wireless Deployment in Australia and New Zealand](https://www.researchgate.net/publication/342085409_Serious_Safety_Concerns_about_5G_Wireless_Deployment_in_Australia_and_New_Zealand)

ccxiii <https://scientists4wiredtech.com/what-are-4g-5g/5g-wavelengths-from-blankets-to-bullets/>

ccxiv <https://ehtrust.org/international-actions-to-halt-and-delay-5g/>

ccxv <https://ehtrust.org/usa-city-ordinances-to-limit-5g-and-control-wireless-facilities-small-cells-in-rights-of-ways-2/>

ccxvi <https://ehtrust.org/legal-liability-and-financial-risks-of-5g-wireless-and-cell-towers/>

ccxvii <https://ehtrust.org/liability-and-risk-from-5g-and-cell-towers/>

ccxviii <https://tecknexus.com/5g-network/5g-magazine-5g-tower-small-cells-das-edition/5g-cells-what-are-macro-cells-small-cells-and-das/>

ccxix as there were some errors; generally, these numbers may anyway differ in a certain measure from presentation to presentation

ccxx <https://www.essentracomponents.com/en-gb/news/industries/telecoms-data/a-guide-to-5g-small-cells-and-macrocells>

ccxxi **Let's consider that the output of a microwave oven (at 2.45 GHz) is 800 W and we can have a certain degree of exposure to dozens of such towers that cover our area.**

ccxxii <https://futurenetworks.ieee.org/topics/massive-mimo>

ccxxiii <https://www.ibwave.com/storage/app/media/pdf/white-papers/EMF-radiation-in-mobile-wireless-networks-pt1.pdf>

ccxxiv <https://earthhavenlearning.ca/photos/custom/5G-TheFinalAssault%20by%20Jeremy%20Naydler.pdf>

ccxxv <https://techmonitor.ai/leadership/digital-transformation/what-is-massive-mimo>

ccxxvi <https://scientists4wiredtech.com/2017/04/palo-alto-4g-small-cells/>

ccxxvii <https://www.youtube.com/watch?v=XLCi4UH6eKo&t=91s>

ccxxviii <https://www.mercola.com/>

ccxxix <https://expose-news.com/2024/04/14/ten-new-studies-detail-health-risks-of-5g-analysis-by-dr-joseph-mercola/>

ccxxx <https://www.amazon.com/EMF-Phones-Hidden-Protect-Yourself-ebook/dp/B081Y3SVT1/>

ccxxxi <https://www.emf-portal.org/en/article/overview/millimeter-waves/medical-biological#level-2>

ccxxxii <https://pubmed.ncbi.nlm.nih.gov/32772819/>

ccxxxiii <https://link.springer.com/article/10.1007/s10762-018-0497-z#:~:text=Pigmented%20rabbit%20eyes%20were%20exposed,cornea%20thickness%20and%20reduced%20transparency.>

ccxxxiv <https://www.emf-portal.org/en/article/17429>

ccxxxv <https://www.emf-portal.org/en/article/19297>

ccxxxvi <https://www.emf-portal.org/en/article/18567>

-
- cclxiv <https://wsimag.com/science-and-technology/64080-green-5g-or-red-alert>
- cclxv <https://www.greenpeace.org/static/planet4-eastasia-stateless/2021/05/a5886d59-china-5g-and-data-center-carbon-emissions-outlook-2035-english.pdf>
- cclxvi <https://www.france24.com/en/europe/20201220-deploying-5g-will-lead-to-spike-in-co2-emissions-french-climate-council-warns>
- cclxvii <https://www.clientearth.org/media/wbglw3r3/clientearth-accountability-emergency.pdf>
- cclxviii <https://strandconsult.dk/telecom-operators-want-to-be-green-some-have-the-real-deal-in-renewable-energy-others-like-vodafone-greenwash/>
- cclxix <https://www.youtube.com/watch?v=hq6lkqqjR2Y&t=83s>
- cclxx <https://www.60ghz-wireless.com/>
- cclxxi <https://www.sciencedirect.com/science/article/abs/pii/S002240739290127P> <https://zenodo.org/records/1276023#.XpR0RFMzZTZ>
- cclxxii **Millimeter-wave pulsed heating in vitro: cell mortality and heat shock response:**
<https://www.semanticscholar.org/paper/Millimeter-wave-pulsed-heating-in-vitro%3A-cell-and-Orlacchio-Page/b8ef83322f40042af080162b90e1c56125d5d4ad>
- cclxxiii <https://www.nature.com/articles/s41598-019-45662-6.pdf>
- cclxxiv https://en.wikipedia.org/wiki/Corona_discharge
- cclxxv <https://www.trainorlawfirm.com/the-top-5-deadly-gases-in-the-oil-and-gas-industry/>
- cclxxvi <http://emfsafetynetwork.org/smart-meters/smart-meter-health-complaints/>
- cclxxvii <http://emfsafetynetwork.org/smart-meters/smart-meter-fires-and-explosions/>
- cclxxviii <https://www.takebackyourpower.net/1000s-of-smart-meter-fires-new-whistleblower-court-evidence-video/>
- cclxxix <https://www.aspentimes.com/opinion/guest-commentary-is-5g-a-potential-fire-hazard/>
- cclxxx <https://www.tycorun.com/pages/best-lithium-ion-battery-for-telecom-industry-towers-backup-systems>
- cclxxxi <https://www.youtube.com/watch?v=yIH9ED0j5dQ>
- cclxxxii <https://www.youtube.com/watch?v=XBpcyJeHmww>
- cclxxxiii <https://www.youtube.com/watch?v=G5-gdx3lleU>
- cclxxxiv <https://magdahavas.com/electrosmog-exposure/mobile-phones-electrosmog-exposure/live-blood-cells-and-electrosmog/>
- cclxxxv https://www.youtube.com/watch?v=0WL_ar6Tgbs or <https://www.bitchute.com/video/4LAtc0PoxWhI/>
- cclxxxvi <https://www.drrobertyoung.com/post/the-effects-of-electromagnetic-frequencies-emf-on-the-human-blood-and-biological-terrain>
- cclxxxvii <https://www.youtube.com/watch?v=9U3qjLYJHdI&t=87s>
- cclxxxviii https://www.youtube.com/watch?v=pwLZT_YY7KU&pp=ygUTYnVncyBleHBvc2VkIHRvIGVtZg%3D%3D
- cclxxxix <https://www.youtube.com/watch?v=FV7fzbfJT4Y>
- ccxc <https://www.youtube.com/watch?v=RLBu-o5DYZU>
- ccxci <https://www.youtube.com/watch?v=1HPiP-H9Cc>
- ccxcii <https://www.youtube.com/watch?v=PaQLm0Etpxo>
- ccxciii <https://www.mdpi.com/2079-9292/12/1/64>
- ccxciv <https://unitefortruth.online/led-lights>
- ccxcv <https://ieeexplore.ieee.org/search/searchresult.jsp?newsearch=true&queryText=6G>

ccxcvi <https://www.youtube.com/watch?v=YAtQFkEg5-w>

ccxcvii <https://www.oledcomm.net/blog/future-of-lifi-technology-2024/#:~:text=Being%20an%20alternative%20to%20WiFi,take%20over%20the%20communication%20market.>

ccxcviii <https://pubmed.ncbi.nlm.nih.gov/29212756/>

ccxcix <https://mmrjournal.biomedcentral.com/articles/10.1186/s40779-014-0026-x>

ccc <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8483303/>

ccci <https://www.sciencedaily.com/releases/2020/06/200605182334.htm>

cccii <https://link.springer.com/article/10.1007/s10762-011-9794-5#Sec5>

ccciiii <https://incompliancemag.com/dangerous-side-effects-of-terahertz-radiation-discovered-by-korean-researchers/>

ccciv <https://pubmed.ncbi.nlm.nih.gov/20174451/#:~:text=Based%20on%20our%20results%20we,gene%20expression%20and%20DNA%20replication.>

cccvi <https://www.besjournal.com/article/doi/10.3967/bes2019.094>

cccvi <https://www.technologyreview.com/2009/10/30/208491/how-terahertz-waves-tear-apart-dna/>

cccvi <https://physicsworld.com/a/intense-terahertz-pulses-cause-dna-damage-and-repair/#:~:text=Short%20yet%20powerful%20bursts%20of,cells%20to%20repair%20this%20damage.>

cccvi https://www.optica.org/about/newsroom/news_releases/2013/intense_terahertz_pulses_cause_dna_damage_but_also_induce_dna_repair/#:~:text=New%20research%20performed%20on%20lab,help%20the%20body%20fight%20cancer.

cccix <https://www.intechopen.com/chapters/86911>

cccix <https://opg.optica.org/boe/fulltext.cfm?uri=boe-2-9-2679&id=222111>

cccxi <https://mmrjournal.biomedcentral.com/articles/10.1186/s40779-021-00321-8>

cccxi <https://www.barkerbrettell.co.uk/are-smartphones-about-to-get-smarter-with-terahertz-spectroscopy-technology-it-certainly-looks-that-way/>

cccxi <https://pubmed.ncbi.nlm.nih.gov/18666810/>

cccxi <https://pubmed.ncbi.nlm.nih.gov/37180041/#:~:text=Introduction%3A%20Terahertz%20waves%20lie%20within,affect%20the%20structure%20of%20neurons.>

cccxi As seen, it also presents a long list of summaries of relevant research, associated with the level of RF exposure, showing the impact on organisms (animals or humans) and draws corresponding conclusions and standards – as we mention also in this paper

cccxi <https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/ICNIRP%20GUIDELINES%202020.pdf?ver=1714671928635>

cccxi https://www.icnirp.org/cms/upload/consultation_upload/ICNIRP_RF_Guidelines_PCD_Appendix_A_2018_07_11.pdf

cccxi <https://neilcherry.nz/blog/>

cccxi https://neilcherry.nz/wp-content/uploads/2021/05/90_m4_EMR_ICNIRP_critique_09-02.pdf

cccxi <https://www.emfcall.org/the-emf-call/>

cccxi [https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/Electrosensitivity%20UK%20to%20ICNIRP%20\(2018\).docx?ver=1714671928635](https://img1.wsimg.com/blobby/go/71801b8c-fda3-43cc-86e2-e2e50ff2f191/downloads/Electrosensitivity%20UK%20to%20ICNIRP%20(2018).docx?ver=1714671928635)

cccxi <https://www.sciencedirect.com/science/article/abs/pii/S0928468014000649?via%3Dihub>

cccxi <https://ehtrust.org/wp-content/uploads/2015/12/ahonen.guidelines.debate.last50years.pdf>

cccxi <https://icbe-emf.org/>

-
- cccxxv <https://www.youtube.com/watch?v=9MicoRBN510>
- cccxxvi <https://www.degruyter.com/document/doi/10.1515/reveh-2016-0060/html?lang=en>
- cccxxvii <https://europaem.eu/ attachments/article/130/2018- 04 EU-EMF2018-5US.pdf>
- cccxxviii <http://www.iemfa.org/ wp-content/pdf/Complaint-to- the-European-Commission- SCENIHR-2015-08-31.pdf>
- cccxxix <https://www.naturalscience.org/news/2021/02/animals-and-plants-under-radiation-stress/>
- cccxxx <https://pubmed.ncbi.nlm.nih.gov/20353343/>
- cccxxxi <https://pubmed.ncbi.nlm.nih.gov/22047460/>
- cccxxxii <https://pubmed.ncbi.nlm.nih.gov/19089649/>
- cccxxxiii <https://pubmed.ncbi.nlm.nih.gov/29913098/>
- cccxxxiv <https://pubmed.ncbi.nlm.nih.gov/19768389/>
- cccxxxv <https://pubmed.ncbi.nlm.nih.gov/23334843/>