

A dozen reasons to object to a 5G mast in Sea Rd, Bexhill on Sea

("RR/2022/2442/TN")

David Gee. Nov 8th 2022

Introduction

The subject of electro-magnetic fields and 5G has been swirling round with debate and opinion and is causing concern. Lobbies and commercial interests are eager to brief the media with their reassurances, and given the role of social media, it is not easy to know which sources to trust. I have been working in the field of health hazards all my professional life and continue to follow the progress which scientists are making in analysing whether 5G is likely to cause harm. It is extraordinary, given that virtually no health studies have been carried out on 5G, that the telecoms companies are keen to roll it out all over the country. This is an important time to take a cool look at the situation and ask questions. Particularly for decision-makers.

The main points for councillors to be aware of are:

1. Local authorities' planning remit for telecoms masts can include health considerations;
2. Planning context: the proposed mast is close to a conservation area and a primary school;
3. There are health damage liability issues for telecoms companies and local authorities;
4. Expect some reductions in property values;
5. The standard setting body ICNIRP guidance is out of date and unreliable on EMF health risks and "safe" exposure limits;
6. Increased EMF exposures to the public are expected from 5G masts;
7. Increased evidence of health effects from living near masts;
8. Children are particularly vulnerable to EMF radiations;

9. Increasing evidence of cancer and reproductive effects from 2-4 G exposures; no health studies on 5G – we are “flying blind”¹
10. The significant privacy and security risks from 5G;
11. Increased evidence of harmful effects on wildlife; and
12. The increased energy consumption from 5G and telecommunications: each 5G mast requires approximately 3 times more power than a 4G mast. Many more 5G masts will be required for the 5G rollout.

The evidence in this paper will throw some light on the state of the science now.

Personal and scientific context: learning from history.

I am retired and live in Bexhill-on-Sea. I have an intellectual and professional interest in the possible harms from EMF/RF. I am the instigator and author of three “early warnings” about EMF/RF and possible head tumour risks (in 2007², 2009 and 2011), which were published by the European Environment Agency (EEA) when I was serving there as Senior Adviser, Science, Policy and Emerging Issues. I have published four other publications indicating the likelihood of future head cancer risks from EMF/RF from mobile phones: a chapter in the BioInitiative Report, 2007³; an article in Pathophysiology 2009, “*Late Lessons from Early Warnings: Towards realism and precaution with EMF?*”⁴; the EEA evidence provided to the Council of Europe in 2011, which apparently influenced their 2011 report⁵ and which called for greater protection from EMF; and, with Hardell and Mild, a chapter on the risks from mobile phones in the EEA 2013 report “*Late Lessons from Early warnings: science, precaution and Innovation*”⁶ I have also written *5G: from Insight to Foresight?* as evidence⁷ to the inquiry of the UK Parliamentary Select Committee on Digital, Culture, Media & Sport into

¹ Senator Blumenthal, see <https://www.youtube.com/watch?v=7L9-pfirnlY>

² “*Appropriate, precautionary and proportionate actions taken now to avoid plausible and potentially serious threats to health from EMF are likely to be seen as prudent and wise from future perspectives*” Prof. Jacquie McGlade, Executive Director, EEA, September 2007.

³ see updated BioInitiative Report 2012, 2014, 2017, <https://bioinitiative.org/>

⁴ <https://doi.org/10.1016/j.pathophys.2009.01.004>

⁵ Council of Europe, 2011, *The potential dangers of electromagnetic fields and their effect on the environment*, <https://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-en.asp?fileid=17994> .

⁶ <https://www.eea.europa.eu/publications/late-lessons-2>

⁷ *5G: from Insight to Foresight?*, D Gee, evidence to Inquiry of the UK Parliamentary Select Committee on Digital, Culture, Media & Sport into “Broadband and the Road to 5G”, June 2020.

“Broadband and the Road to 5G”, 2020. My views are greatly informed by the 35 case studies of other technological, chemical, radiological, and ecosystems hazards reviewed in both volumes of *Late Lessons from Early warnings (EEA, 2001 and 2013)* for which I was the creator, joint editor, author and co-author of several chapters, working in partnership with the over 80 scientific authors and EEA colleagues.⁸

What does history tell us?

As the two EEA reports show, when we analyse the histories of key health or environmental hazards such as asbestos, smoking, lead in petrol, BSE, X rays, acid rain, antibiotics as animal growth promoters, PCBs, CFCs, climate change etc, we find that despite early concerns about the harm they might do, it took years and often decades before action was taken. The gradual strengthening of scientific evidence finally resulted in effective preventive measures, after “possible”, then “probable”, then “convincing” evidence of harm was confirmed. As a consequence, many people were harmed. There were high and long term costs of avoidable, and often irreversible harms, to people, the environment, the technology companies, their insurers, the health/environment services of societies, and taxpayers.

One cause of such long delays is provided by Gilbert S G in his book review of *Doubt Is Their Product: How Industry’s Assault on Science Threatens Your Health*⁹

*“The very nature of scientific exploration is to ask and answer the next question. But rather than accepting the process of scientific discovery, business interests press to have every tiny bit of uncertainty explored before any policy decision can be made, demanding proof rather than precaution—in fact, they even manufacture uncertainty. As a result, decisions are not made; policy is not advanced; problems are not addressed.”*¹⁰

From insights to foresight: similarities between 5G and other known hazardous agents.

Insights from the histories of previous technologies can help justify the use of prudent foresight with current technologies, such as 5G, so as to minimise harm whilst preserving

⁸https://www.eea.europa.eu/publications/environmental_issue_report_2001_22/Issue_Report_No_22.pdf/vi
[ew](#)

⁹ David Michaels, New York: Oxford University Press, 2008. Updated in 2020 as *The Triumph of Doubt: Dark Money and the Science of Deception*.

¹⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2685872/>

benefits and stimulating innovation. As George Santayana observed: “Those who cannot remember the past are condemned to repeat it.”

I am struck by how the history of EMF is playing out in very similar ways to these other hazards that I and the EEA have studied in the two “*Late Lessons from Early Warnings*” reports.

These similarities include issues such as: much initial marketing hype¹¹ about the claimed benefits of the emerging technology; and a failure to systematically and independently scrutinise and justify the claimed pros and cons of the new technology.

Both of these similarities apply to EMF and 5G, along with another 10 similarities, such as the harassment of the early warning scientists: all of these similarities are cited in my evidence to the UK Parliament ¹².

Many of the scientists who produced the first early warnings of their researched hazards suffered from intellectual and personal harassment, much in the same way as the public health doctor in Ibsen’s timeless play, *An enemy of the people*. He and his family were eventually hunted out of their town for inconveniently discovering that the local water supply was polluted: this observation threatened key economic interests in the town. Several EMF scientists have suffered a similar fate¹³.

A Dozen Objections to the 5G Mast on Sea Rd

My objections to the Sea Rd, Bexhill Telecoms mast cover a number of issues that may be unfamiliar to a Planning Committee. However, these broader issues are relevant to society’s local and national interests and to their decisions on both 5G and on the competing

¹¹ On the marketing hype of 5G, see the 2019 EU Parliament report for the Committee on Industry, Research & Energy, *5G Deployment, State of Play in Europe, USA and Asia*, written by telecommunications industry experts Colin Blackman and Simon Forge which noted that “marketing hype is widespread”. [https://www.europarl.europa.eu/RegData/etudes/IDAN/2019/631060/IPOL_IDA\(2019\)631060_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/IDAN/2019/631060/IPOL_IDA(2019)631060_EN.pdf). And China News, Oct 10,2020, “Chinese 5G Not Living Up to Its Hype”.

¹² See also my slides for the EMF workshop on RFR at the Collegium Ramazzini, Oct 27th 2022: “*From the 'magic mineral' to the 'Internet of Things': similarities and differences between the histories of asbestos and RFR/EMF*” which lists 12 striking similarities and 17 significant differences between asbestos and the radiofrequencies radiations from electro-magnetic fields. It concludes by observing that the historical trajectory of RFR/EMF is, so far, not dissimilar to that of asbestos, from the first plausible early warning about asbestos disease in 1898, to 1982, when the Yorkshire TV documentary, *Alice: A Fight for Life*” helped to provoke more effective prevention; regulations; lower exposure limits; and bans on asbestos. **Currently there are some 5,000 new asbestos cancer deaths in the UK emerging from the long latency of such cancers.** See Notes on this from D Gee at geedavid90@gmail.com.

technologies such as wired systems, photonics, and visible light communications (fibre optics) which are now superior in many technical respects and without the radiations. All these issues affect the public and our elected representatives, at local, regional, and national levels, who are gradually getting involved in these critical societal debates about appropriate, beneficial, and safe telecommunications.

1. Local Authority Planning Remit for Telecoms masts can include health considerations¹⁴.

UK planning policy combines the National Planning Policy Framework (NPPF), the Public Health England (PHE, now called the Health Security Agency) guidance, and compliance with planning procedures and planning law. This is consolidated through EU Telecommunications Directives (2014 and 2018; now incorporated into UK law) for making '*general authorisations*' as local planning authorities (LPAs) when determining applications for planning permission for radio mast siting, at Local, District, or County level, as appropriate. OFCOM cannot provide those '*general authorisations*' through its spectrum management obligations for Telecoms licensing, nor is the siting of new radio mast usually granted as permitted development, so the spectrum management authorisation for new radio masts extends to where the radio mast are granted as permitted development, through the '*prior approval*' system.

This places the public health obligations created by EEC Article 45.2(h) subject to the jurisdiction of local authorities as competent authorities under Retained EU law, as clarified by Government statement in Parliament, June 22, 2021:

"The European Electronic Communications Code Directive updated the EU telecommunications regulatory framework, and was transposed into UK law via the Electronic Communications And Wireless Telegraphy (Amendment) (European Electronic

¹⁴ I am grateful to Nicholas Martin and Karen Churchill for the information in this section.

Communications Code And EU Exit) Regulations 2020. Whilst the Directive gave member states flexibility to assign certain functions to competent authorities, as under prior EU and domestic law, Ofcom is retained as the designated telecoms national regulatory authority in the UK. Local planning authorities were not made competent authorities through EU Directive 2014/61/EC, as the government was already content that the functions in question relating to planned civil works were already in place. The transposition of the EECC would have no effect on the status of local planning authorities where they are considered competent authorities under EU Directive 2014/61/EC”.

UK planning policy, as stated in paragraph four of PHE Guidance on 'Mobile phone base stations; radio waves' (2021 version) and reinforced on behalf of PHE by the DLA Piper Solicitors (2019), makes it clear that public exposure to radiofrequency radiations (RFR) is regulated by local authorities through its 'planning policy' which would include policy on procedural and legal compliance by local authorities.

The legal obligation placed on local planning authorities to consider all relevant material planning considerations arising from radio mast siting as competent authorities means that the public health consequences of any new mast proposal have to be determined through an evidence-based decision.

The incompatibility and acceptability of the proposed use of land or buildings for radio mast siting has to be properly weighed-up in relation to the use made of adjacent land and buildings, taking properly into account the human health and environmental impacts of the proposed radio mast.

Frome Town Council, in Somerset, has recently turned down, with legal backing, a 5G mast on health grounds. The Frome Planning Board recognised that they were not in possession of enough evidence concerning the safety of 5G:

-"the refusal is carried. We have closed the loop. That is now a legal decision'.

Meeting minutes - "RESOLVED - refused contrary to Officer Recommendation due to concerns on the impact to public health for all ages and lack of backed up evidence of the impact to health'. (Excerpt from the meeting transcript, Frome Town Council)¹⁵

LPA based expertise, in interpreting the implications of relevant scientific knowledge on the potential incompatibility of communications technologies on public health grounds, requires interpretation by a person with competency if they are to comply with EEC Recital 110.

Recital 110 stresses the *'need to ensure that citizens are not exposed to electromagnetic fields at a level harmful to public health ...'*

The status of the **National Planning Policy Framework (NPPF)** has been determined in a string of decisive legal judgments as **guidance only and at best, a material planning consideration.**

To be 'material', considerations have to be applicable 'in situ' and evidenced as such. Elements of the NPPF may be 'material', subject to an 'in situ' evaluation of their actual relevance.

LPA's do seem obliged to address an 'incompatible or unacceptable use' as a material planning consideration by treating the applicant's risk appraisal and the required ICNIRP certificate (NPPF paragraph 117(c)), as evidence of the compatibility of the siting of the proposed radio mast with other uses of land and buildings within the proposed vicinity of its siting.

There does not appear to be an ICNIRP certificate with this mast application?

Argument and evidence raised by members of the public, on public health or environmental grounds, would need to be taken into account as proof of the incompatibility of the siting of the radio mast in relation to the use currently made of the land or buildings within the vicinity.

¹⁵ However, the record of their refusal on health grounds is not on the Frome Planning portal as the Telecoms Co withdrew their proposal after the refusal decision. This has apparently muddied the legal water somewhat and could well lead to a legal challenge.

Adverse health effects from involuntary exposure to radio-frequency radiation, if raised by members of the public as objections to the proposed siting of the radio mast, may provide more significant evidence of incompatible use than the evidence of compatibility provided by the applicant.

The LPA would determine the material planning consideration on a balance of acceptability, and after considering the likely reliability of evidence cited as demonstrating safety of the EMF exposures. LPAs would be wise to not rely solely on EMF safety reassurances provided by the International Commission on Non ionising Radiation Protection (ICNIRP), which is a private body some of whose members have strong ties to the Telecommunications industry¹⁶. ICNIRP also seems to be suffering from what the UN Climate Change scientific body, IPCC, warned its lead scientific authors about in 2010 ie the tendency towards intellectual “*group think*” that needs to be checked.

The unreliability of ICNIRP’s EMF evidence evaluation, and of their associated recommended EMF exposure limits, has been noted by Courts in the USA, Italy and Holland, and by academics: see below in Section 4.

There are still some legal issues surrounding the current competence of LPAs and some questions on the impact of EU Telecommunication Directives on the status of local authorities as competent authorities. These are the subject of jurisdictional clarity being currently developed by the DLUH&C, with the involvement of the DDCMS and the HSA.

2 Planning Context: Proposed mast is close to both a Conservation Area and to Primary School

The proposed 5G mast for the middle of Sea Rd on top of a block of flats is adjacent to sheltered accommodation for the elderly and is close to both a Conservation Area and to a Primary School, which is some 200 metres away.

¹⁶ See “*Self-referencing authorships behind the ICNIRP 2020 radiation protection guidelines*”. A study by Nordhagen and Fydale, 2022; and “*The International Commission on Non-Ionizing Radiation Protection: Conflicts of interest , corporate capture and the push for 5G*”. MEPs Klaus Buchner and Michèle Rivasi <https://klaus-buchner.eu/wp-content/uploads/2020/06/ICNIRP-report-FINAL-19-JUNE-2020.pdf>

The school does not appear to have been consulted?

“Conservation Areas are defined as areas of special architectural or historic interest the character of which it is desirable to preserve or enhance”. (RDC Website)

RDCs current planning policies require that any new development *“respects, and where appropriate, enhances the...character of the Conservation Area....(to) ensure that the main features of the area are conserved and that new development contributes positively to the special character of the area”.*

The proposed phone mast is near enough to the Conservation Area to provide another example of previous *“thoughtless alterations”* and *“erosions of character”* which have occurred before in the Conservation Area and which have been noted by RDC.

The proposed mast is likely to be *“visually discordant, unsympathetic, and of intrusive scale and design that would result in excessive clutter”* in the street scene roofline. The associated equipment would also result in an *“imposing and overbearing impact on the amenity of nearby residents”* as has been noted by RDC in adjacent areas.

These have been the legitimate grounds for refusing planning permission for phone masts eg in Hastings, and elsewhere.

For example, in SW London, Wandsworth Council Planning chief, Cllr Guy Humphries, said: *“We wholeheartedly agreed with local residents that this was absolutely the wrong location for such a tall phone mast. It would have towered over neighbouring homes and been an unsightly and unwelcome addition to the street scene.”*

In addition the nearby Primary school adjacent to Sea Rd is likely to be affected by the RFR exposures as it is within the safety zone of 500 metres recommended by some authorities.

(See Ref 23)

Planning bodies need to give due consideration to the health implications of Telecomms masts for children in nearby schools. Failure to do so could provide grounds for legal challenge.

For example, Brighton and Hove Council recently (Nov 2021) conceded a Judicial Review, and paid costs, having failed to properly follow planning law when considering a planning application for a telecoms mast near a school. *“The Council failed to address the health*

impacts of this particular proposal and to obtain adequate evidence of the assessment of the proximity to the school and the amended proposal” ¹⁷

3. Health Damage Liability issues for Telecoms Companies and LAs.

Insurance cover for damages from electro-magnetic fields is generally not provided to telecoms companies, nor to landowners with masts on their lands, so they will directly bear the costs of future liability claims for health and/or property damage- unless this comes to be underwritten by Governments, as they do for damage liability claims from nuclear power.

In 2011 Businessinsurance.com reported that *“most insurance plans do not cover EMF and they have electromagnetic field exclusions”* ¹⁸. And in 2011 Lloyds of London justified its refusal to cover EMF liabilities by referring to mounting evidence of possible harm and to their bitter lessons with asbestos.

In 2019 Swiss Re (a major global re-insurance company) in its report on *“New Emerging Risk Insights”*, concluded that 5G mobile networks are *“an off the leash high impact emerging risk that **will affect property and casualty claims**”* and that *“concerns regarding potential negative health impacts from EMF are only likely to increase -**an uptick in liability claims could be a potential long-term consequence**”*.

In 2020 the UK Central Association of Agricultural Valuers (CAAV) urged landowners:

*“to request information on **radiation exclusion zones** from operators of telecoms masts located on their land.....when applying for planning permission for a larger mast, **operators are only required to confirm the mast will comply with ICNIRP guidelines and do not have to disclose the exclusion boundaries; meaning that neither the owner nor the planning authority is able to assess the effect of the mast on buildings, land or other activities**”*.

The “safe” exclusion zones around 3—5 G masts are determined by complex calculations involving traffic density, antenna features, power levels, distances, etc. The resulting

¹⁷ <https://rfinfo.co.uk/fishersgate-mast-in-brighton-quashed-at-judicial-review/>

¹⁸ *The next asbestos: five emerging risks that could shift the liability landscape*
<https://www.businessinsurance.com/article/99999999/wp05/110519977/the-next-asbestos-five-emerging-risks-that-could-shift-the-liability-landscape>

distance from the antenna beyond which the RF signal will fall below specified “safe” exposure limits is called the “**compliance distance**”.¹⁹

In general it appears as though the exclusion zones around 5G masts will need to be larger than for 3-4G masts. “*ICNIRP (exposure) limit compliance is not an issue for normal installations – although [a] larger exclusion zone [is required] than for 3G/4G*”, one Eriksson expert Törnevik concludes²⁰.

Where RFR exposure limits are significantly below IEEE or ICNIRP exposure limits the exclusion zone, and compliance distance would need to be much greater. “*A hundred-fold reduction in limits below ICNIRP would mean a tenfold increase in the exclusion distance. A carrier could reduce the number of transmitting elements in a MIMO array, which would reduce peak “worse-than-worst case” exposures but this also reduce the capacity of the station, perhaps to uneconomic levels*”.²¹

As there is generally no insurance cover on EMF (which includes the Extra Low Frequency (ELF) radiations from power lines and from mobile communications, and the RFR from mobile phones and masts) the telecoms companies are obliged to warn shareholders of possible future EMF liability claims.

¹⁹ Foster K et al *5G Communications Systems and Radiofrequency Exposure Limits*, 2019, IEEE Future Networks Tech Focus.

²⁰ C. Törnevik, “*Impact of EMF limits on 5G network roll-out*,” in *ITU Workshop on 5G*, 2017.

TU-T K.Sup14, “*The impact of RF-EMF exposure limits stricter than the ICNIRP or IEEE guidelines on 4G and 5G mobile network deployment*,” 2018.

B. Thors, A. Furuksar, D. Colombi, and C. Tornevik, “*Time-averaged realistic maximum power levels for the assessment of radio frequency exposure for 5G radio base stations using Massive MIMO*,” *IEEE Access*, 2017.

D. Colombi, B. Thors, and C. Törnevik, “*Implications of EMF exposure limits on output power levels for 5G devices above 6 GHz*,” *IEEE Antennas Wirel. Propag. Lett.*, vol. 14, pp. 1247–1249, 2015.

²¹ See Ref 19, Foster.

Vodafone US, for example, noted in its 2018 Annual report that EMF is a "High Principal Risk" with potential liabilities for the company. Although they thought the risk as "unlikely" they noted that *"Electromagnetic signals emitted by mobile devices and base stations may be found to pose health risks, with potential impacts including: changes to national legislation, a reduction in mobile phone usage, or litigation"*.

Precedents are already being set for damages compensation from EMF eg :

a) to farmers for harm to their cattle from the ELF radiations from overhead power lines²²

b) to workers for head tumours from over exposures to RFR from mobile phones where occupational health benefits have been awarded in Italy²³; and

c) Possibly to brain cancer victims of RFR who are suing Motorola in the US courts²⁴: this is likely to result in their victory at the first court, judging by the quality and weight of expert reports for the victims eg from Chris Portier ex Director of Toxicological Research at the US National Toxicology Programme. A victory for the victims will most likely be appealed by the telecoms industry, which will delay the final outcome for several more years.

Defending such litigation concerning damage to property and/or health by relying on meeting the recommendations of ICNIRP (or those of Public Health England-now called the Health Security Agency) is not likely to succeed, given that **both bodies explicitly say that their guidance does not provide liability cover.**

ICNIRP: *"We do not assume any responsibility for any damage, including direct or indirect loss suffered by users or third parties in connection with the use of our website and/or the*

²² Claims for harm to cattle from the ELF from overhead Power lines have already been won by farmers in France. See <https://www.lefigaro.fr/conjoncture/tres-haute-tension-rte-condamne-a-verser-plus-de-450-000-euros-a-des-eleveurs-20220603> The court of Coutances (Manche) sentenced the company Réseau de transport d'électricité (RTE), a subsidiary of EDF, to pay just over 460,000 euros to a dairy farm in the Manche, thus recognizing RTE's liability, attributing half of the damage to the passage of the Cotentin-Maine very high voltage (EHV) line near the farm.

²³ See the relevant judgements in Italian court cases where workers have been awarded occupational health benefits for head tumours that were "probably" caused by long term exposures to RFR from mobile phones. Eg The Appeal Court of Turin. <https://levaudsansantennes.ch/2020/01/16/the-court-of-appeal-of-turin-confirms-the-link-between-a-head-tumour-and-mobile-phone-use/>.

²⁴ A major lawsuit, originally filed in 2001 by individuals who claim their brain cancer were caused by their cell phones usage, was heard in the D.C. Superior Court before [Judge Alfred S. Irving](#). The hearings for this multi-plaintiff case were held from September 12 to September 30, 2022 (Murray v. Motorola; case no. 2001 CA 008479 B).

information it contains, including for the use or the interpretation of any technical data, recommendations, or specifications available on our website". (ICNIRP Legal Terms, 2022)²⁵.

Public Health England also issued similar legal advice via their solicitors DLA Piper who have stated:

"The Guidance [on PHE website] is not maintained and revised by PHE for the explicit purpose of any other body undertaking any other statutory function. If in any other context regard is had to the Guidance, that is entirely a matter for the discretion of the relevant body and it must determine what weight to place on the Guidance given the clear indication as to the sources from which the advice and recommendations in the Guidance are derived.

Equally, that body must determine what other evidence from your clients or other members of the public or interested parties to consider in making any decision."

"If it be alleged that a public body now or in the future acted unlawfully in placing reliance on the guidance, that cannot retrospectively taint the guidance with illegality". (8 August 2019).

A German court has recently clarified in a lawsuit that property owners who rent space for base stations and mobile towers assume responsibility for health consequences of the activity. Although the radiation is lower than the relevant reference values from the authorities, this does not mean that the property owner is not responsible for negative health consequences.

The case, decided in the District Court in Munster, Germany, concerned a municipality that wanted to terminate a rental agreement with a mobile phone operator regarding the location of base stations. The ruling clarified that property owners who rent space for mobile masts or base stations are responsible together with the telecom operators for any damage that the business may cause.

Attorney Krahn-Zembol, **who represented the municipality** said *"the Federal Court (in Germany) has repeatedly stated that producers or operators cannot liberate themselves by*

²⁵ <https://www.icnirp.org/en/legal-notice.html>

referring to the official limit values if they know or should have known of additional harmful effects”²⁶

The UK, the US and other Courts are likely to use similar reasoning when faced with liability claims for health damages based on the current scientific evidence on the health and environmental hazards of EMF.

This evidence has steadily strengthened since the three “early warnings” on EMF and head tumours, issued by the European Environment Agency in 2007, 2009 and 2011; and the evaluation of the then evidence by the WHO International Agency for Research on Cancer from EMF-RFR in 2011 which concluded that it was a “possible” carcinogen on the basis essentially of just two epidemiological studies. Since then the evidence on head cancers has, unfortunately, strengthened considerably. (See below **Section 9**)

4. Reduction in Property Values.

5G is already having a negative impact on house prices in some countries, such as the USA. Realtor magazine reports on a US survey which has found that *“an overwhelming 94 percent of home buyers and renters surveyed by the National Institute for Science, Law & Public Policy (NISLAPP) say they are less interested and would pay less for a property located near a cell tower or antenna. Of the 1,000 survey respondents, 79 percent said that under no circumstances would they ever purchase or rent a property within a few blocks of a cell tower or antennas, and almost 90 percent said they were concerned about the increasing number of cell towers and antennas in their residential neighbourhood”*.

Many local news outlets in the UK are reporting on the negative impact of 5G on house prices. This includes Manchester Evening News, Bolton News and This Local London.

In Manchester, Councillor Paul Heslop has said *“Of immediate concern is the proximity to residences...At 20 metres in height, the proposed mast is twice the height of the surrounding properties and literally hundreds of properties are situated within a couple of hundred metres of the proposed mast.”*

²⁶ Swedish Radiation Protection Foundation, July 6th 2022.

The topic of purchasing a house near a mast is also being discussed on social media. To take just one example, a member of Mumsnet is concerned about the lack of the testing of 5G for safety, with one resident saying "*I don't want to be a tech-company and government guinea pig.*"²⁷

5. The unreliability of ICNIRP guidance on EMF health risks and its "safe" exposure limits

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) is often cited as an authority on EMF. However, their credibility and impartiality has been seriously questioned by independent EMF scientists and by courts of law in Italy, Holland, Germany and the USA. A letter of July 2002 from the US Environmental Protection Agency to the President of the EMR network stated that ***"the FCCs current exposure guidelines (which were based on ICNIRP guidelines) do not apply to chronic (long term) non-thermal exposure situations. They are considered protective of effects arising from a thermal mechanism, but NOT from all possible (biological) mechanisms. Therefore, the generalization by many that the (FCC/ICNIRP) guidelines protect human beings from harm by any or all mechanisms is not justified."***

This view has strengthened considerably over the last 20 years since that warning from the US EPA: the evidence for short and long term harmful effects of RFR via non thermal biological mechanisms is now compelling to most independent EMF experts.

The UK Court of Appeal, in May 2022, has given permission for legal action against the UK Government for, in the case of EMF from 2-5G:

1. The failure to provide adequate or effective information to the public about the risks and how, if it be possible, it might be possible for individuals to avoid or minimise the risks;

²⁷ <https://ehtrust.org/cell-phone-towers-lower-property-values-documentation-research/>
<https://magazine.realtor/daily-news/2014/07/25/cell-towers-antennas-problematic-for-buyers>
<https://www.mumsnet.com/Talk/property/3734531-Would-you-buy-a-house-directly-opposite-a-5G-mast>

2. (a) The failure to provide adequate and sufficient reasons for not establishing a process to investigate and establish the adverse health effects and risks of adverse health effects from 5G technology and/or for discounting the risks presented by the evidence available; and/or (b) failure to meet the requirements of transparency and openness required of a public body.

These grounds advance a breach of the Human Rights Act 1998 by omissions and failings in violation of the positive obligations to protect human life, health and dignity, required to be met by Articles 2, 3 and/or 8 of the European Convention on Human Rights.

The case will now be sent back to the Administrative Court and we await the directions as to the full hearing in due course.

<https://actionagainst5g.org/blog/news/>

This effectively questions the Government's and PHE's (now the Health Security Agency) uncritical reliance on ICNIRP guidance instead of ensuring an independent and comprehensive evaluation of all of the relevant scientific evidence on RFR, much of which ICNIRP dismisses, or downplays.

A similar legal challenge to the administrative competence of the relevant US regulatory body for EMF, the FCC, was successful in August 2021 when the United States Court of Appeals for the District of Columbia Circuit ruled (in the case of Environmental Health Trust et al. v. the FCC) that the December 2019 decision by the Federal Communications Commission (FCC) to retain its ICNIRP based 1996 safety limits for human exposure to wireless radiation was *“arbitrary and capricious.”*

The court held that the FCC failed to respond to *“record evidence that exposure to RF radiation at levels below the Commission's current limits may cause negative health effects unrelated to cancer.”* Further, the FCC demonstrated *“a complete failure to respond to comments concerning environmental harm caused by RF radiation.”* The court found the FCC

ignored numerous organizations, scientists and medical doctors who called on them to update EMF exposure limits and not to rely solely on ICNIRP Guidance.²⁸

The Court found that the FCC particularly failed to address these issues:

- the impacts of **long term** wireless exposure
- the impacts to **children**,
- the testimony of **people injured by wireless radiation**,
- the impacts on **wildlife and the environment**
- the impacts on the **developing brain and reproduction**.

The UK Administrative courts may well take a similar view.

Other Courts have also dismissed ICNIRP guidance as scientifically unreliable. In 2020 the Court of Appeal of Turin confirmed in Romeo v. INAIL (Italian Social Security agency) that the worker's acoustic neuroma (benign tumour of the head) was caused by the use of his mobile phone. The Court called into question the reliability of ICNIRP's guidance and exposure limit recommendations, recognising:

“that telephone industry-funded scientists, or members of the ICNIRP, are less reliable than independent scientists. “Much of the scientific literature that excludes carcinogenicity from RF exposure, or at least argues that research to the contrary cannot be considered conclusive... is in a position of conflict of interest, which is not always asserted. See, in particular...the Applicant’s defence (not contested by the other party) that **the authors of the studies indicated by INAIL, who are mentioned by name, are members of ICNIRP and/or SCENIHR, which have received, directly or indirectly, funding from industry”.**

“It is considered that less weight should be given to studies published by authors who have not declared the existence of conflicts of interest. In this case, conflict of interest situations may arise in relation to the assessment of the effect of radio frequencies on health, for example, where the author of the study advised the telephone industry or received funding

²⁸ <https://ehtrust.org/in-historic-decision-federal-court-finds-fcc-failed-to-explain-why-it-ignored-scientific-evidence-showing-harm-from-wireless-radiation/>

for studies from the telephone industry, or if the author himself is a member of the ICNIRP.”

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The Court’s decision was based on the strength of evidence used in civil cases of liability for health damage ie “*more likely than not*”. This is in contrast to the “*beyond all reasonable doubt*” strength of evidence used in criminal court cases.

Some experts want to wait for “*convincing*” evidence of harm before public health protection is justified. However, many others, including most EMF informed public health doctors and scientists; the European Environment Agency; the Council of Europe,; the EU Parliament; and the EU Court of Justice, recognise that waiting for “*convincing*” evidence of harm in humans from hazards like EMF would be too late if harm is to be avoided³⁰.

For example, taking effective *precautionary* action to avoid the *plausible or possible hazards* of smoking in the 1950s would have saved much harm, health treatment costs, and productivity losses from smoking. Waiting for the 1990s, or later, to *prevent* the then *known* risks of smoking (established “*beyond doubt*” by 1964), ensured very large health damage and costs to smokers, their families, taxpayers, tobacco companies, and their insurers.

One reason for this delay was the ability of the tobacco industry to influence some scientists to create doubt about the emerging evidence of cancer from tobacco. (See Ref 9)

The EU organisations above justify earlier action on, for example, “*reasonable grounds for concern*” using the **precautionary principle** which has long been used in UK and European law to justify timely prevention. (See “*More or less Precaution?*” chapter by David Gee in “*Late Lessons from Early Warnings*”, vol 2, EEA, 2013).³¹

²⁹ <https://levaudsansantennes.ch/2020/01/16/the-court-of-appeal-of-turin-confirms-the-link-between-a-head-tumour-and-mobile-phone-use/>

³⁰ See slides by D Gee on “*2-5G exposures and “convincing” evidence of harm*”, Sept 2022; and “*Key generic arguments against timely prevention of harm from hazardous agents as currently used in the debate on electro-magnetic fields of radiofrequency radiations (EMF/RFR): with some responses*” D Gee, Oct 2022: both available from the author.

³¹ https://www.eea.europa.eu/publications/environmental_issue_report_2001_22/Issue_Report_No_22.pdf/vi and <https://www.eea.europa.eu/publications/late-lessons-2>

Since the Turin case, the evidence concerning strong influence of the telecoms industry, via their sympathetic experts on the “unreliable” ICNIRP, and via employees in regulatory agencies, has increased:

- the District Court of Gelderland in The Netherlands ruled in 2020 that the ICNIRP exposure limits are unprotective. It concluded *that “In the opinion of the court, considering all arguments, with reference to scientific literature, it cannot be ruled out that there are increased health risks even at a field strength lower than 1 V/m.”* ICNIRP generally recommends 61V/m as a “safe” exposure limit for the public.³²
- *“Self-referencing authorships behind the ICNIRP 2020 radiation protection guidelines”*. Nordhagen and Fydale, 2022:
“Our analysis shows that ICNIRP 2020 itself, and in practice all its referenced supporting literature stem from a network of co-authors with just 17 researchers at its core, most of them affiliated with ICNIRP and/or the IEEE, and some of them being ICNIRP 2020 authors themselves. Moreover, literature reviews presented by ICNIRP 2020 as being from independent committees, are in fact products of this same informal network of collaborating authors, all committees having ICNIRP 2020 authors as members.
This shows that the ICNIRP 2020 Guidelines fail to meet fundamental scientific quality requirements and are therefore not suited as the basis on which to set RF EMF exposure limits for the protection of human health.
With its thermal-only view, ICNIRP contrasts with the majority of research findings, and would therefore need a particularly solid scientific foundation. Our analysis demonstrates the contrary to be the case. Hence, the ICNIRP 2020 Guidelines cannot offer a basis for good governance”.

³² <https://rfinfo.co.uk/breakthrough-in-case-law-on-radiation-risks/>

- a report MEPs reporting to the European Parliament; *“The International Commission on Non-Ionizing Radiation Protection: Conflicts of interest , corporate capture and the push for 5G”*. Klaus Buchner and Michèle Rivasi³³
- from other research reports; eg the Swiss EMF expert group BERENIS which also disagrees with parts of ICNIRP 2021³⁴
- a report from Harvard University, Centre for Ethics, on the US FCC :*“Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates”*³⁵

In October 2022 **The International Commission on Biological Effects of Electromagnetic Fields** was launched to promote better health and environmental protection from EMF. Its first scientific paper analysed 14 key scientific assumptions that underpin ICNIRP’s evidence evaluation and recommended exposure limits, finding them all to be invalid.³⁶

Planning Committees that ignore the above scientific and legal evidence which questions the reliability of the ICNIRP Guidelines to protect the public are likely to become embroiled in subsequent political and legal disputes. And insurance cover for local authorities involved in such such legal affairs is unlikely to be available.

6 EMF exposures to the public will generally increase from 5G masts

Adaptive 5G antennas could lead to less radiation overall than conventional 3 and 4G antennas because they would radiate in a more targeted manner. However:

- An adaptive 5G antenna can radiate several beams simultaneously at full and varying power, which is what it is designed for: it is called a MIMO antenna, ie Multiple Input/Multiple Output. Multiple beams enable adaptive antennas to transmit more data.

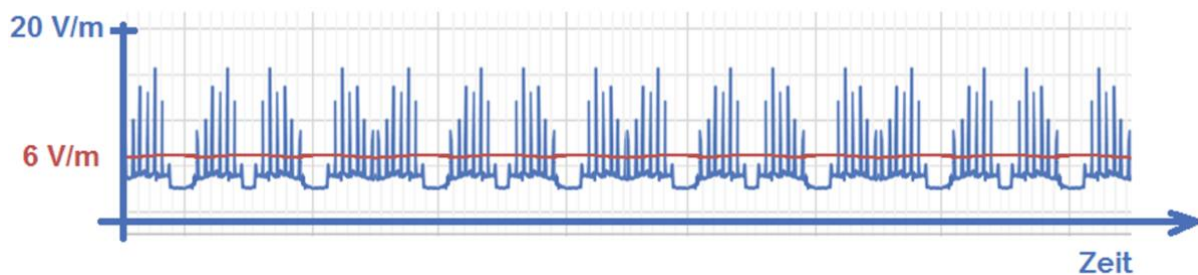
³³ <https://klaus-buchner.eu/wp-content/uploads/2020/06/ICNIRP-report-FINAL-19-JUNE-2020.pdf>

³⁴ <https://betweenrockandhardplace.wordpress.com/2021/01/26/berneis-disagrees-with-icnirp/>

³⁵ https://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf;

³⁶ Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G”. ICBE-EMF <https://ehjournal.biomedcentral.com/articles/10.1186/s12940-022-00900-9>

- RFR exposures to 5G adaptive antennas will be in addition to the radiations to the public from existing previous antennas and frequencies from 3/4G masts (which 5G systems will rely on for several more years) and from other RFR emitting devices, such as phones, routers, smart meters, and microwave ovens.
- The adaptive antenna has a much smaller range because of the high frequencies it uses. Rain, trees, buildings etc can block these higher frequency 5G radiations which is why there need to be many more 5G masts positioned close to the public users.
- To compensate for this reduced ability to reach its customers, the 5G masts have to radiate much more strongly via a more focused radiation beam: **beamforming is one of the innovative features of 5G that has not been independently studied for its health and environmental effects.**
- The 5G radiation output also **pulses with peak radiation emissions being much higher than average emissions.** With adaptive antennas, continuous peaks of up to 18 V/m are possible. The constant and quickly changing radiation exposure is also stressful for the body. We can compare this with our everyday experience: constant fluctuations in air pressure can cause headaches; temperature fluctuations can strain the heart etc.



An illustration of the Peak, pulsed, and average exposures expected from 5G masts. **In Italy, 6 V/m is a public exposure limit.**³⁷

³⁷ Source: <https://levaudsansantennes.ch/2021/12/22/switzerland-federal-council-relaxes-limit-up-to-ten-times-transmission-power-for-5g/>

See also recent studies on 5G exposures³⁸. A French preliminary study of 5G exposures concluded that: ***“Initial results suggest an eventual increase of about 20 % in overall exposure”***³⁹.

There is almost a complete lack of research into the health and environmental effects of 5G radiations: this elicited the observation by US Senator Blumenthal that “we are flying blind with 5G” after being told by Telecommunications CEOs that they knew of no research into the health impacts of 5G.(See Ref 1)

7. Increasing evidence of health effects from living near masts.

In densely populated areas like Sea Rd, Bexhill, the radiation from the proposed masts will expose many children and other vulnerable groups such as pregnant women, the immunocompromised, and the elderly to RFR radiations.

An example of the gradually strengthening evidence on health effects from RF emanating from nearby masts is the 2022 review of the 38 higher quality research studies on people living near phone masts in urban areas in 20 countries.

This concluded that over 74% of the studies showed *“three types of effects by base station antennas on the health of people: radiofrequency sickness (ie electro hypersensitivity eg*

³⁸ *“Measurements of radiofrequency electromagnetic fields, including 5G, in the city of Columbia, SC, USA”* Tarmo Koppel, & Lennart Hardell, 2022 <https://doi.org/10.3892/wasj.2022.157> . And Hardell et al 2022: *“Microwave radiation from base stations on rooftops gave medical symptoms consistent with the microwave syndrome”*. This shows that 5G causes typical symptoms of microwave syndrome as well as a massive increase in microwave radiation. It confirms that radiation well below levels allowed by the authorities’ causes ill health. https://ehtrust.org/study-5g-causes-microwave-syndrome/?fbclid=IwAR1V72jYMc6LtNO1CXsBkvmmaivmnK30yUDsLquJ7O5TjZHx1c_7Hd9O0L4g. Lopez et al found a statistically significant increase in headaches and headache intensity, nightmares, dizziness, motor instability, tachycardia, and insomnia. They also found the cancer rate to be 5.6% which is 10 times higher than the total Spanish population. <https://pubmed.ncbi.nlm.nih.gov/33434609/> See also *“Radiofrequency electromagnetic field exposure in everyday microenvironments in Europe: A systematic literature review”*, Sagar et al 2018. <https://pubmed.ncbi.nlm.nih.gov/28766560/> . *“Public exposure to radiofrequency electromagnetic fields in everyday microenvironments: An updated systematic review for Europe”*. Lalilian et al 2019. . <https://pubmed.ncbi.nlm.nih.gov/31202043/>

³⁹ *“Study of the 5G contribution to exposure of the general public to electromagnetic waves”*. Dec 2021. ANFR France. <https://www.anfr.fr/fileadmin/mediatheque/documents/expacement/20211214-exposition-5G-EN.pdf>

headaches, dizziness, memory loss, other neurological effects etc); cancer; and changes in biochemical parameters".⁴⁰

The main reasons why all research studies do not show the same health effects from RF are because of different study designs and methods and because of the very large number of biological, physical, and technological variables involved in all human studies of RFR.

RFR is much more complex than smoking, or asbestos, yet it still took many decades of strengthening research on those simpler hazards before evidence became "*convincing*", and decades more before strong public health measures were taken by governments. By that time a "pipeline" of lethal legacies of cancers were in the making which was impossible to shut off. For example, there are now over **2500 new asbestos cancers (mesotheliomas)** a year in the UK (and about 2500 cases of **new asbestos induced lung cancer** a year) even though asbestos was essentially banned for new uses in 1985 (blue and brown asbestos), and in 1999 (white asbestos).

Long term cancer hazards can only be avoided if exposures to the possible, or probable, carcinogen are reduced well before there is "convincing evidence" of harm.

Studies of childhood leukaemia from living under electric power lines, and of neurological effects in children living near phone masts, as in the review above, indicate that in order to both protect vulnerable populations and to reduce future liability risks for phone companies, landlords, and local authorities, several scientists and organisations recommend an **exclusion zone for telecommunications of 500 metres around schools, hospitals, nurseries, playgroups, care homes etc.**⁴¹

⁴⁰ Balmori, A. Evidence for a health risk by RF on humans living around mobile phone base stations: From radiofrequency sickness to cancer. *Environmental Research* (2022), doi: 10.1016/j.envres.2022.113851. <https://www.sciencedirect.com/science/article/abs/pii/S0013935122011781>

⁴¹ See the "*State of New Hampshire Commission on the Health effects of Evolving 5G Technology*", 2020, (Appendix K, p103) https://www.researchgate.net/publication/346006178_Final_Report_of_the_Commission_to_Study_The_Environmental_and_Health_Effects_of_Evolving_5G_Technology.

8 Children are particularly at risk from RFR⁴²

Studies show children's brains can absorb up to 10 times more non-ionising radiation than adults. This is one reason why the American Academy of Paediatrics (AAP) has long been asking the US Regulatory authorities to reassess EMF radiation standards specific to children⁴³.

(The AAP advice on how to reduce RFR exposures to children and others is reproduced in the **Appendix** to this report).

In 2011 The Council of Europe report on "*The Potential Dangers of EMF*"⁴⁴ recommended:

"concerning the protection of children:

8.3.1. *develop within different ministries (education, environment and health)*

targeted information campaigns aimed at teachers, parents and children to alert them to the specific risks of early, ill-considered and prolonged use of mobiles and other devices emitting microwaves;

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

Ronald Melnick, Senior Toxicologist (retired) and former leader of the US National Toxicology Program's health effects and animal cancer studies of cell phone radio frequency radiation, has stated:

And "*Limiting liability with positioning to minimize negative health effects of cellular phone towers*", J.M Pearce Environmental Research 181 (2020) 108845.

<https://www.sciencedirect.com/science/article/abs/pii/S0013935119306425>

⁴² Butler T, 2019, "*On the clear evidence of the risks to children from non-ionising radio Frequency Radiation: the case of the Digital Technologies in the Home, Classroom, and Society*", University College Cork, p 6. <https://www.radiationresearch.org/articles/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/>

⁴³ <https://www.icrp.org/publication.asp?id=icrp%20publication%2060>

⁴⁴ <https://pace.coe.int/en/files/17994>

“ I find it appalling that mobile phone emission standards do not adjust for children when it is well established that the absorption of radiofrequency radiation by the brain is greater in children than in adults; the developing brain is highly susceptible to tissue damaging agents; and the use of wireless devices is being actively marketed to children.

At a minimum, regulatory agencies need to make strong recommendations for consumers to take precautionary measures and avoid close contact with their mobile phones.”⁴⁵

The exposure limits recommended by the voluntary and private association, the International Commission on Non-Ionising Radiation Protection (ICNIRP) do not give special protection for children and foetuses.

This is in contrast to the lower exposure limits for this vulnerable group (under 18 and foetuses) for exposures to ionising radiations eg from X Rays.

These lower exposure limits for ionising radiation have long been recommended by the more independent International Commission on Radiological Protection (ICRP)⁴⁶.

ICNIRP’s exposure limits are based essentially on just short term heating (thermal) effects from the high energy intensities of some EMFs. They therefore provide very little protection against the non-thermal effects of RF of lower energy intensities that are well

⁴⁵ International EMF Scientists Appeal for greater health protection. <https://www.ordinemedicitn.org/wp-content/uploads/2019/12/Summary-International-EMF-Scientist-Appeal.pdf>

⁴⁶ Morgan et al 2014, “Why children absorb more microwave radiation than adults: The consequences” 2014. Sangun et al “The Effects of Electromagnetic Field on the Endocrine System in Children and Adolescents”. 2015. And see ICRP reports no 60 and 103 on exposure limits for ionising radiations. The exposure limit for young workers exposed to ionising radiations is 10% (5% in Germany) of an adult. There are also lower exposure limits for pregnant workers: 1mSv during the pregnancy. In addition, “as there is no *dose* value below which it is possible to rule out a health risk due to ionising radiation, a certain – albeit minor – risk also exists below the limit values which increases with increasing *dose*. Therefore, any radiation exposure, even at levels below the specified limit values, should be firstly “justified”; then avoided if possible by design/control at source (“optimised”) and, failing this, kept “as low as is reasonably achievable”: the “ALARA” principle). In practice, these three basic principles of health protection from ionising radiations, which stem from 1948, means that in “the vast majority of cases radiation exposure is far below the legally specified limit values”. https://www.bfs.de/EN/topics/ion/radiation-protection/limit-values/limit-values_node.html

below the ICNIRP recommended exposure limits and for which there are thousands of scientific papers pointing to health effects and harm to people, wildlife, and ecosystems.

These low level effects are largely explained by the **emerging “cell signalling” paradigm** which is now complementing that of the traditional thermal tissue heating paradigm which ICNIRP relies upon⁴⁷.

Paradigm competition is part of the scientific process: but it is usual fraught with heated debate, perhaps best captured by these two quotes:

“All truth (a paradigm shift) passes through four stages. First, it is ignored. Second, it is ridiculed. Third, it is violently opposed. Forth, it is accepted as being self-evident”. Arthur Schopenhauer. And:

“A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.” Max Plank, Nobel prize winning physicist⁴⁸.

9 Health Impact of 2-5G: Cancer and Reproductive/Developmental effects

⁴⁷ The ICNIRP guidelines for limiting unacceptable RF exposures are essentially based on the **thermal tissue heating paradigm**: ie they are “based on short term, immediate health effects, such as stimulation of peripheral nerves.....and elevated tissue temperatures”. (ICNIRP Guidelines for limiting exposures to time-varying electric, magnetic and electromagnetic fields(up to 300GHz)", Health Physics, 1998, Vol 74, No. 494-522, p496.). However, the contrasting, strongly emerging, and complementary paradigm used by most informed EMF experts is the **“cell signaling “paradigm** (with several competing, complementary, and plausible mechanisms of biological action) which helps to explain biological effects that are sometimes harmful and which occur at RFR exposure levels that are much lower than those needed to raise tissue temperatures. See also Havas M, 2017: “Ionizing radiation (IR) has enough energy to break chemical bonds and is known to cause cancer. However, because nonionizing radiation (NIR) lacks this energy, it was assumed that these lower frequencies cannot be carcinogenic. This concept is based on a flawed assumption. NIR can and does cause cancer not by increasing the production of free radicals but by interfering with the repair mechanisms that neutralize free-radicals. While the mechanisms differ, the consequences of both NIR and IR are the same—oxidative stress resulting in cellular damage including cancer”. Carcinogenic Effects of non-Ionising Radiation: a paradigm shift”, JSM, Environmental Science & Ecology, 5(2), 1045.

<https://www.jscimedcentral.com/EnvironmentalScience/environmentalscience-5-1045.pdf>

⁴⁸ See also Kuhn, T. University of Chicago Press, 1962, “The Structure of Scientific Revolutions” in which “the discovery of “anomalies” during revolutions in science leads to new **paradigms**. New paradigms then ask new questions of old data, move beyond the mere “puzzle-solving” of the previous paradigm, change the rules of the game and the “map” directing new research”.

https://en.wikipedia.org/wiki/The_Structure_of_Scientific_Revolutions#:~:text

There is much, and sometimes conflicting, scientific literature on the carcinogenic and reproductive/developmental effects of EMF on humans which cannot be reviewed here⁴⁹. However, a recent and comprehensive review of this evidence has been produced for the Research services of the European Parliament, STOA. The report *“aims to take stock of our present understanding of health effects (cancer & reproductive/developmental effects only) of 5G”*.⁵⁰

Summary extracts from the STOA report are provided below.

“5G, along with 3G and 4G for which there is much evidence on health damage, and with which it will operate in parallel for several years, may....pose threats to human health.

The upcoming deployment of 5G mobile networks will allow for significantly faster mobile broadband speeds and increasingly extensive mobile data usage. Technical innovations include a different transmission system (MIMO: use of multiple-input and multiple-output antennas), directional signal transmission or reception (beamforming), and the use of other higher frequency ranges.

At the same time, a change is expected in the exposure to electromagnetic fields (EMF) of humans and the environment. In addition to those used to date, the 5G pioneer bands identified at EU level have frequencies of 700 MHz, 3.6 GHz (3.4 to 3.8 GHz) and 26 GHz (24.25 to 27.5 GHz).

The first two frequencies (FR1) are similar to those used for 2G to 4G technologies and have been investigated in both epidemiological and experimental studies over many years for different (biological) end points (including carcinogenicity and reproductive/developmental effects), while the higher 5G pioneer bands 26 GHz (FR2) and higher frequencies have not been adequately studied for the same end points.

⁴⁹ See ICNIRP 2020; and Schutz, 2006; Hardell 2015; Hardell 2015a; Hardell 2017; Philips 2018; Interphone 2010; Coureau 2014; Belpomme 2018, NTP 2019, Ramazzini Institute, 2019, and other refs in the STOA report.

⁵⁰ The STOA report was written by Dr Fiorella Belpoggi, a Fellow of the International Academy of Toxicologic Pathology (IATPF) and of the Ramazzini Institute, Bologna, Italy, at the request of the Panel for the Future of Science and Technology (STOA). It was managed by the Scientific Foresight Unit within the Directorate-General for Parliamentary Research Services (EPRS) of the Secretariat of the European Parliament. July, 2021.
[https://www.europarl.europa.eu/RegData/etudes/STUD/2021/690012/EPRS_STU\(2021\)690012_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/690012/EPRS_STU(2021)690012_EN.pdf)

The International Agency for Research on Cancer (IARC) classified radiofrequency (RF) EMF as 'possibly carcinogenic to humans' (Group 2B, 2011)⁵¹ and recently recommended RF exposure for a re-evaluation, 'with high priority' (IARC, 2019)⁵².

(DG note. This IARC re-evaluation of the cancer evidence of EMF/RF is likely to be completed in 2024 and given the strengthened human, animal, and mechanistic evidence since 2011 it is very likely to classify RFR as a “probable “ carcinogen, and possibly as a “confirmed carcinogen”).

“Since 2011 a great number of (cancer) studies have been performed, both epidemiological and experimental. The present review addresses the current knowledge regarding both carcinogenic and reproductive/developmental hazards of RF as exploited by 5G.

There are various in vivo experimental and epidemiological studies on RF at a lower frequency range (450 to 6000 MHz), which also includes the frequencies used in previous generations' broadband cellular networks, but very few (and inadequate) on the higher frequency range (24 to 100 GHz, centimetre/MMW).

The review shows:

1) 5G lower frequencies (700 and 3 600 MHz):

a) limited evidence of carcinogenicity in epidemiological (human) studies;

b) sufficient evidence of carcinogenicity in experimental (animal) bioassays;

⁵¹ IARC 2011, Non ionising radiation **Part 2: radiofrequency electromagnetic fields** Vol 102, <https://monographs.iarc.who.int/wp-content/uploads/2018/06/mono102.pdf>. **Part 1**, published in 2002, was on the Extremely Low Frequencies (ELF), arising mainly from overhead electric power transmission lines, which classified **ELF** as a “possible” carcinogen because of evidence linking childhood leukaemia with living near (c 400 metres) to such power lines. Non-ionizing Radiation, Part 1: Static and Extremely Low-frequency (ELF) Electric and Magnetic Fields. <https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Non-ionizing-Radiation-Part-1-Static-And-Extremely-Low-frequency-ELF-Electric-And-Magnetic-Fields-2002>

This is relevant to 5G as ELF is also non ionising radiation; and it often contaminates the RF from telecommunications. See email from Prof Denis Henshaw (Emeritus Professor of Human Radiation Effects, Atmospheric Chemistry Group, School of Chemistry University of Bristol) on radical pair mechanisms and the Zeeman Effect, June 28th, 2022, available from D Gee; and “Cell phone radio waves have insufficient energy to damage DNA and cause serious illness - an enduring fallacy”, April 16 2020, available from DG or Denis Henshaw.

⁵² IARC 2019 “Report of the Advisory Group to Recommend Priorities for the IARC Monographs during 2020–2024”, https://monographs.iarc.who.int/wp-content/uploads/2019/10/IARCMonographs-AGReport-Priorities_2020-2024.pdf

c) sufficient evidence of reproductive/developmental adverse effects in humans;

d) sufficient evidence of reproductive/ developmental adverse effects in experimental animals;

2) 5G higher frequencies (24.25-27.5 GHz): the systematic review found no adequate studies either in humans or in experimental animals.

Conclusions of the STOA report:

- 1) 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, foetuses and newborns;*
- 3) FR2 (24 to 100 GHz): no adequate studies⁵³ were performed on non-thermal effects of the higher frequencies”.*

STOA: Recommended Policy Options for RF:

“The safety level currently allowed in Europe is 61 V/m (ICNIRP, 2020a). The lowest dose at which those effects have been experimentally observed for far field (ie from masts) exposure is 50 V/m.

In light of this result, one policy option might be to revise residential and public exposure maxima throughout Europe. Levels could be reduced by at least 10 times, i.e. to around 6 V/m, which is an exposure level at which no cancer effects in experimental animals have been observed. 6 V/m seems also to be the precautionary limit where no adverse effects on fertility are concerned”.

This proposed exposure limit would be similar to the lower exposure limits applied in Paris, Brussels, Italy, and Switzerland, and nearer the lower exposure limits used for years in much of former Eastern Europe, Russia and China, which are based on their early research on

⁵³ *“So we are flying blind with 5G”* concluded US Senator Blumenthal after having been told by the Telecoms industry that they had not carried out any research into the potential for harm from the novel technical features of 5G. <https://www.youtube.com/watch?v=7L9-pfirnlY>

radar and subsequent research on other EMFs that demonstrated non thermal biological effects.

A recent (Sept 2022) article from a most eminent expert on EMFs, Prof Frank Barnes⁵⁴ notes that:

*“It is well established that **biological systems respond to exposure to weak EM fields at energy levels well below the current safety guidelines which result in modification of their functionality without significant changes in temperature**”...**Experimental results showing both increases and decreases in cancer growth rates and concentration of reactive oxygen species**” from exposures to both RF and ELF fields...“**Feedback and repair processes often mitigate potential health effects**”....*

.. “We hypothesis that EM effects vary from person to person and are a function of exposure conditions in conjunction with other stresses...”.

*“Forcing a solution that eliminates all wireless communications is not a reasonable approach. **Allowing the telecommunications industry and users to ignore the potential harm indicated by some of the experiments showing the effects of weak field exposures is equally unsatisfactory given the data that are currently available.***

There are many other reliable scientific papers on the health effects of EMF other than cancer and reproductive problems: these include the **serious electro hypersensitivity (EHS) suffered by about 3-10 % of the population**⁵⁵.

10. “Privacy and security aspects of 5G technology”

⁵⁴ Barnes F, Freeman, E.R, “Some thoughts on the possible health effects of electric and magnetic fields and exposure guidelines”, Frontiers in Public Health, Sept 2022. Barnes is a Distinguished Professor Emeritus, Department of Electrical, Computer and Energy Engineering, CB 425 University of Colorado and eminent in the field of EMF. <https://www.frontiersin.org/articles/10.3389/fpubh.2022.994758/full>

⁵⁵ See Physicians’ Health Initiative for Radiation and Environment (**PHIRE**) 2020 “Consensus Statement of UK and International Medical and Scientific Experts and Practitioners on Health Effects of Non-Ionising Radiation (NIR)”, <https://phiremedical.org/> by Dr Erica Mallory –Blyth et al, **now signed by 3500+ medical doctors**. See also “The Medical Perspective on Environmental Sensitivities”, M E Sears, for the Canadian Human Rights Commission, 2007. https://www.chrc-ccdp.gc.ca/sites/default/files/envsensitivity_en.pdf And see reports on the “Havana effect” from microwave radiations of US Embassies in “An Assessment of Illness in U.S. Government Employees and Their Families at Overseas Embassies “US National Academy of Sciences, Dec 2020. <https://www.ncbi.nlm.nih.gov/books/NBK566407/> . This concluded that, “among the mechanisms the study committee considered, the most plausible one to explain the accounts, especially in individuals with distinct early symptoms, appears to be **directed, pulsed microwave energy**”.

One key and unresolved cost of 5G acknowledged by some in the industry⁵⁶ is the increased security risk which is *“much more complicated to manage...the challenge is amplified by vertical 5G use-cases such as connected cars and health care”....***“5Gs shared infrastructure has the potential for mass failure across multiple networks”**.

They were mindful of an earlier report on the security and privacy aspects of 5G:

“Our analysis of the extracted 5G protocol model covering 6 key control-layer protocols spanning across two layers of the 5G protocol stack with 5GReasoner has identified 11 design weaknesses resulting in attacks having both security and privacy implications.

Our analysis also discovered 5 previous design weaknesses that 5G inherits from 4G, and can be exploited to violate its security and privacy guarantees”⁵⁷.

In 2022 the European Parliamentary Research Service Scientific Foresight Unit (STOA), produced a study⁵⁸ for the European Parliament on *“Privacy and security aspects of 5G technology”* which stated that:

“5G will connect 'everything' by using new approaches and other disruptive technologies (such as AI, robotics and Internet of Things).

This combination will result in an exponential growth of the threat surface, posing new risks, challenges and also presenting opportunities for privacy and security.

*The impact assessment carried out in this paper has **identified six privacy and six security concerns related to 5G technology.** In addition, two ethics concerns have also been identified.eg **Lack of citizen awareness on the impacts of 5G on ethical aspects”**.*

The study suggested providing democratic access to information about 5G and the promotion of critical thinking about data security practices in the 5G ecosystem.

⁵⁶ Raconteur.net, promotion on 5G, distributed by The Times, 19 Feb, 2020. p12/13. Quoting telecoms experts Kate O’ Flaherty & Alex Farrant. <https://www.raconteur.net/sponsored/get-ready-for-the-5g-revolution>.

⁵⁷ “G Reasoner: A Property-Directed Security and Privacy Analysis Framework for 5G Cellular Network Protocol”. Syed Rafiul Hussain et al University of Purdue. <https://www.cs.purdue.edu/news/articles/2019/5g-reasoner.html>

⁵⁸ [https://www.europarl.europa.eu/thinktank/en/document/EPRS_STU\(2022\)697205](https://www.europarl.europa.eu/thinktank/en/document/EPRS_STU(2022)697205)

There is also **increasing military interest** in the potential of 5G for enhanced surveillance and crowd control⁵⁹

11. Effects of EMF/RF on Wildlife.

These environmental effects of EMF/RF which are not considered by ICNIRP, or accounted for in their exposure guidelines, have recently been comprehensively, and critically, reviewed by Levitt, Lai, and Mannville,⁶⁰.

An extract from their 3 Part review Abstract is reproduced below.

*“Ambient levels of nonionizing electromagnetic fields (EMF) have risen sharply in the last five decades to become a **ubiquitous, continuous, biologically active environmental pollutant**, even in rural and remote areas. Many 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***

⁵⁹ J Lin “Directed-Energy Weapons Research Becomes Official” , IEEE Microwave magazine, April,2022. Lin noted that: “the U.S. Navy awarded a research contract titled, “**Remote Personnel Incapacitation System**” through its small business innovative research program. The goal of the project was to design and **build a prototype nonlethal weapon based on the microwave auditory effect**. The transient personnel incapacitation system is dubbed **MEDUSA (for Mob Excess Deterrent Using Silent Audio)**. The weapon relies on a combination of **pulse parameters and pulse power to raise the auditory sensation to the “discomfort” level to deter personnel from entering a protected perimeter**”.

⁶⁰ “Effects of non-ionizing electromagnetic fields on flora and fauna, **Part 1**. Rising ambient EMF levels in the environment” **B Blake Levitt**¹, **Henry C Lai**, **Albert M Manville**. Rev Environ Health, 2021 May 27;37(1):81-122. doi: 10.1515/reveh-2021-0026. Print 2022 Mar 28. <https://pubmed.ncbi.nlm.nih.gov/34047144/>
[Study Part 1 Reviews on Environmental Health 05/27/2021](#)
[Study Part 2 Reviews on Environmental Health 05/27/2021](#)
[Study Part 3 Reviews on Environmental Health 05/27/2021](#)

orientation and migration, food finding, reproduction, mating, nest and den building, territorial maintenance and defence, 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.

Part 2 of this 3-part series includes four online supplement tables of effects seen in animals from both ELF and RFR at vanishingly low intensities.

*Taken as a whole, this indicates enough information to raise concerns about ambient exposures to nonionizing radiation at ecosystem levels. **Wildlife loss is often unseen and undocumented until tipping points are reached. It is time to recognize ambient EMF as a novel form of pollution and develop rules at regulatory agencies that designate air as ‘habitat’ so EMF can be regulated like other pollutants.***

Long-term chronic low-level EMF exposure standards, which do not now exist, should be set accordingly for wildlife, and environmental laws should be strictly enforced — a subject explored in Part 3”.

The synergistic effects mentioned above include, for example, the combined effects of two stressors, pesticides and EMF fields, which have been shown to be worse than either stressor alone in experiments with bees⁶¹. Lupi et al concluded:

“Results showed that bee health conditions were the worst in the multi-stress site with only one colony alive out of the four ones present at the beginning. In this site, a complex picture of adverse effects was observed, such as disease appearance (American foulbrood), higher mortality in the under baskets (common to pesticide-stress site), behavioural alterations (queen changes, excess of

⁶¹ Lupi et al “Combined Effects of Pesticides and Electromagnetic-Fields on Honeybees: Multi-Stress Exposure”, 2021. <https://www.mdpi.com/2075-4450/12/8/716/htm>

honey storage) and biochemical anomalies (higher ALP activity at the end of the season). The overall results clearly indicate that the multi-stress conditions were able to induce biochemical, physiological and behavioural alterations which severely threatened bee colony survival”.

12. Increased Energy Consumption from expanding Telecommunications systems.

Energy consumption from Telecommunications is one of the fastest growing sectors with further increases expected from 5G systems, with **forecasts of a tripling of energy consumption by 2030.**⁶². Each 5G mast requires approximately 3 times more power than a 4G mast...and many more 5G masts will be required for the 5G rollout. With 5G’s greatly increased traffic, electricity usage from telecoms could create up to 23% of global greenhouse gas emissions by 2030.

“The digital transition as it is currently implemented participates to global warming more than it helps preventing it. The need for action is therefore urgent..the carbon footprint of the global digital system and its energy consumption rises by 9% a year”⁶³.

“A lurking threat behind the promise of 5G delivering up to 1000 times as much data as today’s networks is that 5G could also consume 1000 times as much energy”.⁶⁴

How does this fit with Bexhill-on-Sea, Rother (or any other) Council’s carbon neutral goals and Climate Action Plans?

⁶² “Telecoms to Triple Electricity Consumption, Boosting Growth of Distributed Energy Generation”, **FEBRUARY 9, 2021, JENNIFER NASTU IN ENERGY & ENVIRONMENT LEADER.** [HTTPS://WWW.ENVIRONMENTALLEADER.COM/2021/02/TELECOMS-TO-TRIPLE-ELECTRICITY-CONSUMPTION-BOOSTING-GROWTH-OF-DISTRIBUTED-ENERGY-GENERATION/](https://www.environmentalleader.com/2021/02/telecoms-to-triple-electricity-consumption-boosting-growth-of-distributed-energy-generation/).

⁶³ Jean-Marc Jancovici, Member of the French High Climate Council, President The Shift Project. See “Implementing Digital Sufficiency”: *“In this report, The Shift Project provides the tools to assess the energy suitability of connected technologies, in order to help organisations adopt greater environmental considerations in their information systems and take back control over their digital practices. Without such thoughtful considerations, our policies and strategies for digital expansion would be pointless; the digital transition, although pervasive, would then fail to be part of the solution to the current physical and societal challenges”.* https://theshiftproject.org/wp-content/uploads/2021/07/TSP_DigitalSufficiency2020_Summary_corrige.pdf

⁶⁴ IEEE Spectrum. “5G’s Waveform is a Battery Vampire”. <https://spectrum.ieee.org/5gs-waveform-is-a-battery-vampire>

Conclusion.

The dozen reasons above for objecting to a 5G mast, such as that proposed for Sea Road, Bexhill-on-Sea, are more than sufficient grounds for refusing planning permission. Any significant deficiencies in Internet coverage for Bexhill citizens and businesses can be adequately addressed, in both urban and rural areas, by 3-4 G provision, a/o by superior technologies, such as wired systems, photonics, and visible light communications (fibre optics). These systems are faster, more secure, and more energy efficient⁶⁵.

Meanwhile, the **Appendix** below provides some **simple steps that all can take to reduce their current exposures to the radiofrequency radiations from telecommunications devices**.

David Gee, Aug; updated Nov 8th, & Nov 23, 2022.

Visiting Fellow, Centre for Pollution Research and Policy, Brunel University, London.
Fellow, Collegium Ramazzini. Advisor to the International Commission on Biological Effects of EMF. geedavid90@gmail.com.

Appendix Cell phone safety tips from:

A) the American Academy of Pediatrics: how to reduce exposure.

B) The Environmental Health Trust, USA, Step by safe – safe technology at home.

C) What policy makers could be asking the telecoms firms

- A) *“They’re not toys. They have radiation that is emitted from them and the more we can keep it off the body and use (the phone) in other ways, it will be safer,”* said Jennifer A. Lowry, Chair of the American Academy of Pediatrics (AAP) Council on Environmental Health Executive Committee in *“AAP responds to study showing link*

⁶⁵ Timothy Schloechle, “Reinventing Wires: the future of landlines and Networks”, Nat Inst for Science, Law & Public Policy, 2018. Cited in *“Climate Change, 5G & the Internet of Things”*, Environmental Health Trust, USA. <https://ehtrust.org/>

between cell phone radiation, tumors in rats” 2016. The AAP produces the following advice on how to reduce exposures to RFR from mobile phones:

- Use text messaging when possible, and use cell phones in speaker mode or with the use of hands-free kits.
- When talking on the cell phone, try holding it an inch or more away from your head.
- Make only short or essential calls on cell phones.
- Avoid carrying your phone against the body like in a pocket, sock, or bra. Cell phone manufacturers can't guarantee that the amount of radiation you're absorbing will be at a safe level.
- Do not talk on the phone or text while **driving**. This increases the risk of automobile crashes.
- Exercise caution when using a phone or texting while walking or performing other activities. “Distracted walking” injuries are also on the rise.
- If you plan to watch a movie on your device, download it first, then switch to airplane mode while you watch in order to avoid unnecessary radiation exposure.
- Keep an eye on your signal strength (i.e. how many bars you have). The weaker your cell signal, the harder your phone has to work and the more radiation it gives off. It's better to wait until you have a stronger signal before using your device.
- Avoid making calls in cars, elevators, trains, and buses. The cell phone works harder to get a signal through metal, so the power level increases.
- Remember that cell phones are not toys or teething items.

<https://www.healthychildren.org/English/safety-prevention/all-around/Pages/Cell-Phone-Radiation-Childrens-Health.aspx>

B) “STEP BY STEP: SAFE TECHNOLOGY AT HOME”

ENVIRONMENTAL HEALTH TRUST, USA. OCT 2022.



Distance is Important

One basic, very important concept is “Distance Is Your Friend.” The amount of wireless radiation absorbed into people decreases very rapidly when you increase the distance from wireless devices.

Decrease your exposure by increasing your distance from wireless emitting sources. For example, always keep cell phones and wireless laptops away from your body.

Identify Sources in Your Home

Take a look around your home. How many wireless things do you have? Become aware of the various emitting sources in your surroundings first so you can address each one step by step.

Keeping a distance from devices is just the first step in reducing your risk. The next step is identifying safer ways to get the connections you need but without the wireless radiation. Here is a list of things that emit wireless commonly found in homes: computers, smart speakers, Wi-Fi router, gaming consoles, cordless phones, cordless mouse, cell phones, and wireless security systems.

Get to Know Airplane Mode

“Airplane mode”, also known as “flight mode,” is a setting on your wireless device that stops the microwave radiation emissions. It turns antennas to OFF. Learning how to use airplane mode is one of our most important tips. On some devices airplane mode only turns cellular antennas, so you also need to check and turn off other antennas that could be on such as Wi-Fi or Bluetooth.

- On every computer, laptop, tablet, or WTD, there is a function key that turns OFF the Wi-Fi transmitter. There is also a function key that turns OFF the Bluetooth transmissions.
- Whenever you hand a child a technology device such as cell phone, tablet, or laptop, please set the Airplane mode to ON, and Wi-Fi to OFF, and Bluetooth to OFF.

Devices should be used on a table and *never on a lap*.

Get a Corded Landline.

Home cordless phones emit radiation like cell phones. Most cordless phone base stations constantly emit high levels of microwave radiation regardless of whether or not any connected handset is in use. Corded landlines have no wireless radiation emissions. So every home should have a corded landline (with a curly cord to the handset) if possible. Then you can forward cell phones to your home line while you are at home. Prefer the landline corded phone for most voice conversations.

If you cannot get a copper landline you can use a Voice over Internet Protocol system or purchase a telephone line connection from your Internet provider.

Reduce Your Cell Phone Radiation Exposure

First, try to minimize your overall cell phone use to decrease the time you are exposed. For adults who must use a mobile phone:

- Use speaker phone or a plug-in earpiece to keep the phone away from your brain and body, and when you are **not** using the phone be sure to power off or set the phone on Airplane/Flight mode and the Wi-Fi to OFF and the Bluetooth to OFF.
- Prefer texting instead of voice calls and hold the phone out, away from your body when you press “send,” and do not rest your phone against your abdomen as you text.
- Do not carry a powered ON cell phone in your pocket or bra.

- Turn automatic updates off. Reduce active Apps. Cell phones emit radiation constantly, even when you are not actively using them. Even if you turn wireless antennas off, they are still emitting magnetic fields so power them 100% off before you carry them near your body.
- Children should not use mobile phones except for emergencies.

Note: The safest way to use a cell phone is to turn it off and use a corded landline.

Environmental Health Trust has a detailed step by step on reducing cell phone radiation [here](#).

[Turn It Off When Not In Use](#) We want to be clear that turning things “off when not in use” still results in significant wireless exposure. EHT recommends you swap out wireless devices with safe wired connections. However, for many people, they feel overwhelmed or are unable to do this immediately. That is why turning things *off when not in use* is often the first step people take. Then we highly recommend you move to the next step which is swapping out wireless devices with safe corded connections.

Wireless enabled devices are always transmitting radiation even when you are not surfing the internet or using the device to talk or message. The only way to stop these emissions is to set the wireless antennas to OFF.

Why? Wi-Fi devices continuously check in with their main network (cell tower or Wi-Fi router) to be sure a connection exists. This radiation activity is called a digital handshake. For example, a Wi-Fi router emits a beacon signal at regular intervals to signal the available network (whether or not any person or machine is using the network). Similarly, a Wi-Fi enabled tablet or other personal use devices will also signal at regular intervals hunting for a network (whether or not a person is using that connection). Those signals are all radiation emissions.

- You can easily decrease your family’s firsthand and secondhand radiation exposure by turning off wireless networks and devices whenever you are not actively using them, such as at night while you sleep.
- Unplugging wireless devices (and their related gear)—for example, gaming, entertainment, and computer systems—when not in use also saves significant energy and makes all-around good sense.

Note: Turning Wi-Fi off when not in use *only eliminates* wireless exposures while the WiFi is OFF. However, you will still be exposed when the Wi-Fi is ON. Therefore, be aware you are still getting significant exposure when the Wi-Fi is ON.

Prefer Corded Technology Connections

For home phones (landline), internet, printer, speakers, and entertainment gear, connect by cord or cable with all wireless features off.

- Wi-Fi Internet Connections at Home: As an easy first step, power off the Wi-Fi router at bedtime. Then ask your internet provider how to connect with plug-in cords and turn off the antennae feature of the modem or router. Many companies allow you to manage the wireless settings online and you can simply turn it off via the internet. Sometimes a swap to a non-wireless modem is necessary.
- Wire Up Game Stations and Controllers: Choose gaming devices that have the option to connect the hand controllers with a cord.
- Hardwire Accessories (Printer, Keyboard, Mouse, Speakers, etc.): Wi-Fi printers, your cordless mouse, and your virtual assistant speaker are a hidden source of constant Wi-Fi emissions, just like a Wi-Fi router or cordless phone base.
- Remember: If a user or tracking device is wireless, it has wireless radiation emissions.

Power Off Wireless Devices When Driving

Power off cell phones and wireless connectivity in vehicles. Mobile devices distract drivers even if hands-free. Cell phones and streaming tablets and laptops also emit higher power radiation during travel because the metal surroundings create radiation hotspots inside the driver and passenger areas of your vehicle.

- Use an old fashioned GPS without wireless.
- Plan ahead so that you do not need to use any cell phones or wirelessly enabled devices in the car.
- Going on a road trip and your children want to watch movies? Before you leave, download the movies onto the device so that during the trip wireless access is not necessary.
- Call your car manufacturer to learn how to turn the wireless antennas (Bluetooth or Wi-Fi) to OFF in the car.

Protect Children and Pregnant Women

Rethink how you use cell phones when you are near children. Children's skulls are thinner than adults' and their brains are still developing. Hence, radiation from cell phones

penetrates more deeply into their brains and is likely to cause more damage. For example, do not use a cell phone while an infant is on your lap, and do not carry your cell phone in your baby carrier. Keep a transmitting cell phone or wireless device away from a child's brain and body.

Safeguard Your Sleep

Pew Research reported that 75% of children sleep every night with their cell phone beneath their pillow. Wireless radiation and blue light impacts sleep. So be sure to power off all screens and electronics *well before bedtime*.

- Need an alarm on your phone? You can set the phone to Airplane/Flight Mode ON and the Wi-Fi and Bluetooth to OFF and still use the alarm feature.
- Many newer TVs, gaming systems, and computers plugged into electricity or on battery power will have radiation emissions even if in power off mode, so it is best to remove them from the bedroom or completely disconnect them from their power source.
- Be sure to charge cell phones and tech devices outside the bedroom, because charger gear generates other types of electromagnetic fields that are also linked to health issues. Locate screens in family areas—not in bedrooms.

Decrease Overall Time of Wireless Use and Exposure

The longer you connect wirelessly, the more radiation you absorb into your body. So keep your wireless phone calls and Wi-Fi use short—whenever possible. We all need internet access and good long phone calls, so be sure you have a landline corded phone and wired home computer to use for safe internet connections.

No wireless radiation is emitted from ethernet cables. Be sure all the accessories for your tech are corded *not wireless*. Minimize your time spent in Wi-Fi hotspots. Minimize time overall on wireless devices and teach your friends about this issue so you (and they) can be less exposed when you hang out with them.

Read the Fine Print: Keep Devices Off Your Lap

All device manufacturers advise that each wireless device should be at some distance away from human bodies and brains. Cell phone instructions state that the device is radiation tested at a distance from your body- sometimes around half an inch. Printers, computers,

and wireless routers instruct that the distance between the device and a human body must be at least 20 cm (that's about 8 inches).

- Keeping these devices closer than the manufacturer's designated distance can result in a violation of the federal government's official radiation exposure limit. Learn more about fine print instructions for cell phones and tech devices [here](#).
- Before a phone, tablet, MP3 player, etc. is placed into a pocket or bra or tucked into clothing, power the phone to OFF. If you set Airplane mode to ON and Wi-Fi to OFF and Bluetooth to OFF you will stop the wireless radiation. However, you will not stop the ELF-EMF/magnetic fields so always power phones off before placing them against your body. Always also use those settings to turn off wireless before devices are near a pregnant abdomen.

Keeping these distances will not protect you from biological effects because research has found impacts at levels well below federal safety limits. However, keeping devices off your body will reduce your overall exposure.

[Replace Your Smartmeter with an Analogue Electric Meter](#)

Ensure you and your neighbors' utility meters are analog, not digital, and not wireless. Companies are replacing electric, water, and gas utility meters with digital "smart" meters that emit radiation. The pulses of radiation from smart meters are not safe. Industry states it is a "low" amount of radiation exposure. In reality, the pulses of radiation can be very high- even though they just last a millisecond- but they pulse continuously thousands of times a day. Learn more about "smart" meters [here](#).

[Decrease the Power of the Signal](#)

Educate yourself on the situations where your cell phone or wireless device has higher wireless radiation emissions so you can eliminate and reduce your use in these situations. For example, your device will emit more radiation when you are traveling in a moving car, bus, or train, when you are streaming audio or video or downloading large files and in areas of low reception, and when several applications are open or running in the background on your device.

- Do not stream video inside vehicles. Passengers can use electronics with pre-loaded movies and applications (instead of streaming).

- Prefer to video chat when you are at a computer with a corded internet connection.
- If you want to listen to music or watch a video, first download the files (preferably by using a corded connection) onto your device (instead of streaming) so that you can watch and listen without continuous RF.
- Prefer to use social media (with photos and video) when you have a corded internet connection rather than on a cell phone.
- Turn the phone and device off or on airplane mode in low reception areas.
- Prefer texting over voice in low reception areas.

There is more to learn about when devices go to high power and emit radiation. Environmental Health Trust has more details for you on this issue [here](#).

[Reduce Magnetic Fields](#)

Scientists have also long investigated another type of electromagnetic radiation called magnetic fields. Magnetic fields are found where-ever electricity flows, from electronics to appliances to powerlines. Replicated [research](#) has linked ELF-EMF to childhood leukemia, [miscarriage](#), [ADHD](#), [obesity](#), and [asthma](#). Some quick tips on reducing exposure include:

- Do not charge phones and devices by your bedside or working space.
- Use a battery-powered alarm clock
- Use laptops and tablets on a table- not lap.
- Unplug heating blankets and waterbed heaters before getting into bed.
- Do not stare into the microwave watching food cook.
- Sleep away from all electronics, utility meters, and large appliances.
- Take magnetic field measurements, especially if you live near a powerline.

EHT has a webpage dedicated to educating you on more ways to reduce your exposure to magnetic and electric fields.

[Meaningful Policy Change is Critical to Full Protection](#)

Yes-wireless radiation is everywhere and yes, we can reduce our exposure with personal changes like these above but the reality is that we are exposed every day to more and more radiation from cell antennas that we cannot control. We need meaningful policy change to assure everyone can take these steps.

Some people cannot afford to hardwire their house and some people do not even have access to ethernet connections because they live in an apartment with wireless access only. We ask that you get involved in the movement for safe technology today. Now with 5G and 4G densification, industry is pushing for hundreds and thousands of new antenna installations near our homes. We cannot reduce this exposure with personal changes. We need meaningful long-lasting policy change. This means talking to your elected officials. This means organizing awareness and action in your community. Learn more here.

[A Few Rather Important Things to Add](#)

Laptops: Use a grounded 3 prong plug for the power supply. Yes, you may have to buy this separate when you buy your laptop. (MACs come with a two-prong adapter as well as a two-prong).

Lighting: Opt-out of fluorescents. They emit harmful blue light, create electromagnetic interference and they have mercury in them. Some halogens can create electromagnetic interference. Incandescent bulbs seem to be the safest from an electromagnetic perspective, however, they are not energy efficient.

Did you know that years ago when incandescents first came on the market, incandescents had the ability to last for far longer- but the companies created what was called the "[light bulb cartel](#)" to ensure bulbs had a shorter life span and the companies could sell more bulbs. Contact your elected representative and tell them you want power saving bulbs that are safe for our health.

<https://ehtrust.org/educate-yourself/ten-steps-to-safe-tech/>

Appendix C

Some questions the committee could ask:

1. *How much independent research has been done to establish the safety of 5G on human health?*

2. *How much have telecommunication companies spent on research to investigate and anticipate the possible hazards to human health of 3G, 4G and 5G compared to the amount spent on its development and promotion?*
3. *Is the “hype and excitement” of 5G dulling the critical faculties of policymakers/regulators?*
4. *If costs and benefits are not unfolding as predicted with the relatively simple roll out of smart meters, might that not also be the case for the much more complex 5G roll out?*
5. *Is the rush to roll out 5G likely to also produce cost escalations and defects; and would the more careful and less rushed roll out recommended by the EU paper (ref 4) be more appropriate?*
6. *Have the claimed benefits of 4 G (£75b by 2020⁶⁶) and of 5G (£175b by 2030⁶⁷); the costs of achieving these; and their distribution across interest groups, been independently scrutinised, using, inter alia, appropriate methods such as the risk-analysis approach (cf static CBA) adopted by the influential Stern/HM Treasury report on climate change⁶⁸ ?*
7. *Is 5G now crowding out the innovations in Wired⁶⁹; photonics; and Visible light Communications?*
8. *Would the promotion of a diversity of technological and social means for meeting current connectivity and data capacity needs be more resilient to inevitable “surprises”, help minimise oligopolies, and stimulate innovation ?*

⁶⁶ Capital Economics, 2013, see International Business Times, (July 2, 2014)

<https://www.ibtimes.co.uk/everything-everywhere-4g-network-t-mobile-orange-344384>

⁶⁷ HM Treasury report, UK Strategy and plan for 5G & Digitalisation - Driving economic growth and productivity”, (2017) p.28

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/597421/07.03.17_5G_strategy_-_for_publication.pdf

⁶⁸ Stern, Nicholas. 2007. The Economics of Climate Change: The Stern Review. Cambridge, UK: Cambridge University Press

⁶⁹ “The great telecommunications revolution of the 1990s was based on a notion of fibre-to-the-home (FTTH), an infrastructure that guaranteed everyone – whether in a big city or the rural heartland – equal access to the world-wide-web. It was introduced in 1999. In 2008, NASA conceives 5G wireless technology and the telecom industry quickly commercialized it, seeing it as an easier to implement and a cheaper option than FTTH”. Rosen D 2020 “The Great 5G Hype” <https://www.counterpunch.org/2020/03/20/the-great-5g-hype/>

9. *How can policymakers ensure that there is a broad and independent representation of relevant scientific disciplines on the risk assessment and exposure limit setting committees on which they rely?*
10. *In order to help overcome scientific and policy “silos” could there be a joint investigation/workshop by the CDMS, Health, and Environmental Audit Committees on the potential harm from EMF where independent scientists from the two main schools of thought (thermal v cell signalling paradigms) could present their evidence?*
11. *What would be the appropriate strength of evidence to justify a moratorium on 5G, given the strengthening evidence of harm from 2-3g and the near absence of research into possible harms from 4 and 5G?*
12. *Could such a moratorium serve to stimulate innovations in alternative ways of meeting data and connectivity needs?*
13. *How will policymakers avoid the latency lacunae in the case of mobile phones, and their 3, 4, and 5G systems, where rapid technical change will present this challenge very strongly?*
14. *Why are these early and late warnings about hazards from EMF/RF not apparently being taken seriously by industry⁷⁰ and regulatory authorities? Is history repeating itself through the failure to apply the precautionary principle to protect EMF?*
15. *Why does the insurance industry not provide cover for health and wildlife damage from mobile phones and related networks?*
16. *Why can governments not protect future taxpayers by using anticipatory insurance bonds/funds, or similar measures, as in other sectors with plausible long-term hazards, such as oil, mining and banking?*
17. *When would it be timely to apply the precautionary principle to RF and 5G, given that many personal exposure reduction measures can be simple and relatively inexpensive?*
18. *Would a temporary moratorium on the roll out of 5G be appropriate, pending the production of relevant research into its possible effects and the adoption of exposure limits that are protective of long term cumulative effects, especially in children and other sensitive groups?*

⁷⁰ Le Menestrel & Rode, “Why did business not react with precaution to early warnings?”, ch 25 in EEA, 2013.