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ASA:

Ref: A17-388045/LT/ts

**Response by Electrosensitivity UK**

As required by July 5 2017.

Please see below.

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(Complaint about a poster seen at King's Cross Station in May 2017)

## Response by Electrosensitivity UK

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### 1. Introduction

As a charity which has long specialised in the scientific claims in this complex health area, we checked carefully that our advert was legal, decent, truthful and honest, and avoided any implications of it possibly being considered misleading or unsubstantiated. All the scientific professors and experts who have seen it and commented on it have applauded it as being just that - totally scientifically accurate without any possibility of a challenge at all. Clearly the complainants are not familiar with the latest research in this rapidly expanding and developing area of public health.

## 2. Rule 3.1 Misleading Advertising: invalid complaint

The wording of the advert was chosen deliberately to avoid being misleading in any way.

*"Worth the risk? It's your call. More and more research is starting to show potential health risks from mobile and cordless phones, WiFi and other electromagnetic fields."*

**(a) "Worth the risk? It's your call."**

- (i) This question and the following statement are clearly completely uncontentious. Either by themselves or with what follows they are not misleading in any possible reading by any member of the public. Together they simply suggest that the reader may wish to continue reading about the potential risk, or not.
- (ii) Everyone now knows that low-level exposure to electromagnetic radiation carries a risk. This is why all mobile phones come with warnings about keeping the phone a sufficient distance from the body to reduce the known risk. These instructions explain that if the user holds the mobile phone closer to the head than the prescribed distance, then the person using it is exceeding the risk that the UK and other governments deem acceptable and it could cause adverse effects on health and well-being.
- (iii) The UK government and the other organisations like the World Health Organisation (WHO) and International Commission on Non-Ionizing Radiation Protection (ICNIRP) have published numerous documents advising the public about the risks of electromagnetic exposure since the 1970s and 1980s. Their websites deal extensively with this issue. It is in no way misleading to refer to this known risk.
- (iv) The information in the advert explains this known risk in terms of giving further information about the ever-increasing number of peer-reviewed scientific studies showing the potential risk for a number of adverse health outcomes. The use of the question format gives a member of the public full control over how they react to the further information. This is not misleading.
- (v) The question about risk is reinforced later by the use of the phrase "potential risk". The wording is therefore absolutely truthful and honest in giving the member of the public their own choice by simply providing very basic information alluding to the current state of scientific research. To say there is no potential risk, or to say that there is no or reducing evidence, would be completely dishonest and untruthful. The use of the additional term "potential" deliberately reinforces the notion that the information provided is nuanced with appropriate caveats to cover every case and all members of the public would see it in this light.

**(b) "More and more research is starting to show potential health risks from mobile and cordless phones, WiFi and other electromagnetic fields."**

- (i) There are vast numbers of peer-reviewed studies confirming adverse health effects from low-level electromagnetic exposure. See below for some references to this enormous number of studies. Some experts reckon that there are now some 20,000 relevant peer-reviewed studies.
- (ii) The number of these studies is increasing rapidly and has been doing so steadily over the last 65 years or more, with many of the best studies now coming from China, Iran and Turkey which produced few studies until a few decades ago. There is no serious scientist who is up-to-date with this rapidly expanding area of health research who would have the slightest hesitation in accepting this statement as completely accurate and factual. To state otherwise would be untruthful and dishonest and thus blatantly misleading.
- (iii) All governments and regulators accept that this is the case. That is why many groups regularly update their safety guidelines, including the UK which last introduced new EM regulations under a year ago. They also update their advice to the public on how to reduce their exposure, and increasing numbers of countries have introduced bans on WiFi, mobiles and cordless phones in nurseries and schools in just the last few years.
- (iv) The list of 15 symptoms and health outcomes associated with low-level electromagnetic exposure are just a tiny proportion of perhaps 80 known symptoms and 30 conditions which could have been listed with the support of peer-reviewed studies. If anything, it could be objected that, by giving so few of the known risks, the advert is misleading the public into thinking that the potential risk from low-level electromagnetic exposure is relatively small, whereas in fact it covers a much larger number of outcomes. We decided, however, not to overwhelm the reader with too much information, but give sufficient so that the reader would understand some of the neurological and cancer outcomes now associated with low-level electromagnetic exposure in the peer-reviewed literature and then decide whether to research further.

**(c) Conclusion: The advert's wording is not misleading**

Our charity adopts evidence-based science and therefore deliberately chose the wording of the advert so that we could be absolutely certain that it would not, and could not, mislead any reader, however knowledgeable or not about this subject. We were pleased to receive so many positive comments on the wording and to know that we had hit the right tone without exaggerating or minimising the potential risk. We were especially pleased that involved scientists and health experts in this area agreed fully with the wording. To have removed mention of potential risk, the increasing number of research studies, or known and linked outcomes of adverse effects on health and well-being from low-level electromagnetic exposure would have made the advert misleading, dishonest and untruthful, as well as pointless.

### 3. Rule 3.7 Substantiation: invalid complaint

The other area of the alleged complaints is said to be that of Substantiation. If this is actually part of the complaints, it is absolutely extraordinary and suggests that the complainants are not experts in this area of adverse effects on health and well-being.

- (i) As explained above in paragraph 2 (b) (i), anyone with detailed knowledge of this area of health will know that there are many thousands of relevant peer-reviewed studies where often around 80% in any one area show adverse health effects. The number of these studies has been increasingly rapidly over the last few years and they have become much more detailed in their approach to molecular, genetic and epigenetic effects, protein expression, effects on VGCCs, lipids, melatonin, autonomic nervous effects, oxidative stress, DNA breaks, spin resonance etc., establishing both the known outcomes and, increasingly, their pathways and mechanisms, often as co-promoters or co-agents at particular windows of frequency and signal pattern.
- (ii) Although the ASA says it will not consider a study unless it is presented in full, I cannot conceive how I can provide thousands of complete studies or whether the ASA has time to read them within a few days. I have spent over ten years reading many of these studies but I do not know of anyone who claims to have read all of them yet.<sup>1</sup>
- (iii) It is clear that the complainants have not read such studies if they claim that the advert's very nuanced and tempered statements are not substantiated. A complaint of lack of substantiation cannot be validated against the careful wording of the advert, given the sheer volume of peer-reviewed evidence.
- (iv) I myself have some familiarity with this medical area, having written one of the few books on sensitivity to low-level electromagnetic exposure; it has over 1,800 references (1<sup>st</sup> ed. 2010, 2<sup>nd</sup> ed. 2013). Since then I have read many times that number of studies and collated a few of them in select lists (see attached documents), as well as publishing related papers.

### Conclusion: The advert's wording is fully substantiated

The sheer weight of evidence of thousands of peer-reviewed studies over the last 65 years provides full substantiation for the very limited wording of the advert. To claim that the advert's wording is unsubstantiated would be absurd scientifically and factually. Such an invalid complaint would, of necessity, be itself completely unsubstantiated and incapable of substantiation.

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<sup>1</sup> An excellent general introduction to the evidence are the [BioInitiative Reports](#) of 2007 and 2012, regarded by the majority of scientists as the best over-view of the subject.

For thousands of studies showing the same adverse effects but from over 45 years ago, see the US Naval Medical Research Inst.: ["Bibliography of Reported Biological Phenomena and Clinical Manifestations attributed to Microwave and Radio-Frequency Radiation"](#) (1971) (2,308 refs)

For studies with useful bibliographies covering new aspects of this area, such as protein expression, oxidative stress, genetic and epigenetic effects, and VGCCs etc, see: Rosch PJ (ed.) [Bioelectromagnetic and Subtle Energy Medicine](#) CRC Press (2nd ed., 2014), 672 pages.

See also many more bibliographies appended to the end of this response.

#### **4. World Health Organization: invalidated claim and invalid complaint**

The ASA's letter dated 26 June 2017 makes reference to the World Health Organization's Fact sheet N°193 "Electromagnetic fields and public health: mobile phones" (Reviewed October 2014).

This WHO sheet 193 is not relevant to the overwhelming evidence of adverse effects on health and well-being from low-level electromagnetic exposure, already referred to above, because it makes an invalidated claim. It is therefore irrelevant to the wording of the advert which remains entirely valid, and renders a complaint based on this WHO sheet 193 invalid.

- (a) This WHO sheet 193 lacks any peer-reviewed evidence about the adverse effects on health and well-being from low-level electromagnetic exposure, apart from the IARC's finding of 2011 that low-level electromagnetic exposure is a 2B human carcinogen, and the guidelines recommended by the ICNIRP and the IEEE, where the former admits to studies finding adverse outcomes like cancer from ELF which is one of the frequencies produced by many mobile phones.
- (b) Both of these guidelines by the ICNIRP and IEEE are based on the long invalidated hypothesis mistakenly proposed in the USA by Herman Schwan in 1953, that the only adverse health effect from low-level electromagnetic exposure is acute heating of 1 degree or above, measured as averaged over 6 minutes for a healthy adult male. This hypothesis is considered by the majority of scientists as absurd since the body can often increase its temperature by this amount and yet does not thereby generate the established neurological and cancer effects caused by low-level electromagnetic exposure. In contrast, the USSR in 1958 adopted biological safety limits based on established chronic and cumulative effects of low-level electromagnetic exposure, not on irrelevant heating ones like the WHO/ICNIRP.
- (c) This WHO sheet 193 is now entirely out of date. There have been many studies establishing and confirming that wireless radiation as from mobile phones is both a cancer promoter and a cause of cancer in long-term users. See studies below.
- (d) This WHO sheet 193 states (June 2017) that the "WHO will conduct a formal risk assessment of all studied health outcomes from radiofrequency fields exposure by 2016." This risk assessment, of course, has been delayed because it is now impossible for the WHO to produce an accurate scientific assessment without admitting the established adverse effects on health and well-being from mobile phones as a confirmed tumour promoter and as the cause of cancer in long-term users of mobile phones. In the draft stages of their risk assessment the WHO tried to omit reviewing the relevant studies, but they were caught out by the experts. The WHO is now in the dilemma of either following the science and admitting the established evidence of harm from wireless radiation, or producing another unsubstantiated claim which lacks scientific evidence.
- (e) This WHO sheet 193 claims, again without supporting evidence, "To date, no adverse health effects have been established as being caused by mobile phone use." This claim is invalid and based on inaccurate and unsubstantiated evidence.

The world's leading experts found increased risk of tumours from mobile phone use in 2002, long before this document of 12 years later. This and many supporting studies confirming the association was one of the major factors as to why WHO's IARC classified all radio and microwave frequencies as a 2B human carcinogen in 2011.

- (f) This WHO sheet's claim of "no adverse health effects" established is totally invalid. Even just the 20 convincing studies listed under the intolerance symptoms found by people using mobile phones, in the "Select Studies" attached, shows how invalid this claim is now. In addition there are the many studies now showing cancer and other adverse health outcomes from the use of mobile phones. Cancer from microwave radar exposure was established in the 1990s and some frequencies and modulations used by mobile phones have similarities with those used in radar.
- (g) According to people who classified wireless radiation as from mobile phones as a 2B human carcinogen in 2011 based on human studies, the evidence since 2011 has accumulated to such an extent, for instance by confirmation of tumour promotion in animal studies at both ELF and RF/microwave,<sup>2</sup> that this requires that the WHO/IARC classification of both ELF and RF/microwave is raised from class 2B to a minimum of class 2A probable human carcinogen rating.
- (h) Also since the human carcinogen classification of 2011, the \$25m National Toxicology Programme in the USA, the gold standard of all studies in the area of cancer and low-level electromagnetic exposure, confirmed that low-level electromagnetic exposure is a definite carcinogen. The NTP unusually released its findings early, in 2016, to ensure that governments and regulators could take action to protect their populations from what is now a confirmed carcinogen.
- (i) Moreover, further confirmation of mobile phones causing cancer and brain tumours has now been established in three separate centres, thus confirming the link without any doubt. This means that the evidence will now require all radio and microwave frequencies to be raised to not just a class 2A probable, as required by the animal studies confirming it as a tumour promoter, but now to a class 1 certain category. The leading world experts in this area concluded: "The nine Bradford Hill viewpoints on association or causation regarding RF radiation and glioma risk seem to be fulfilled in this review. Based on that we conclude that glioma is caused by RF radiation. Revision of current guidelines for exposure to RF radiation is needed."<sup>3</sup>
- (j) There is, therefore, more than enough evidence to support the advert's wording and show that the WHO sheet 193 is out of date and invalidated, and thus invalid as the basis for a complaint. Nevertheless it is not surprising that people apparently sympathetic to the wireless industry and like-minded governments complain to the ASA if there is any indication of this scientific evidence, since

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<sup>2</sup> Lerchl A et al: "Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans" *Biochem Biophys Res Commun.* (2015) [PMID: 25749340](#).

Sofftitti M et al: "Life-span exposure to sinusoidal-50 Hz magnetic field and acute low-dose  $\gamma$  radiation induce carcinogenic effects in Sprague-Dawley rats" *Int J Radiat Biol.* (2016) [PMID: 26894944](#).

<sup>3</sup> Carlberg M et al.: "Evaluation of Mobile Phone and Cordless Phone Use and Glioma Risk Using the Bradford Hill Viewpoints from 1965 on Association or Causation" *Biomed Res Int.* (2017) [PMID: 28401165](#).

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supporters of the wireless industry exert enormous pressure to ensure that this type of news is not reported in the mainstream media.

- (k) One reason why this WHO sheet 193 is fundamentally wrong and invalidated by current research is that it not peer-reviewed. The WHO sheet 193 could never be published in a reputable peer-reviewed journal with its inaccurate and invalidated claims. In contrast the dozens of peer-reviewed studies now showing that long-term exposure to mobile radiation can cause adverse effects on health and well-being, including brain tumours and cancer, mean that if the WHO chooses instead to present accurate evidence it will be required to admit the link.
- (l) In fact this WHO sheet 193 comes under the supervision of the WHO Team Leader for Radiation and the head of the WHO's EMF Project, Emilie van Deventer. She has refused to say who, other than herself, authorises such inaccurate claims. She, of course, is not the medical physician whom most people would expect to be in charge of this aspect of the WHO's health risk assessment, but a trained electronics engineer who has worked for the electronics industry. This means that all such anonymous statements on EMFs by the WHO are rendered worthless without peer-review and substantiated evidence.
- (m) Van Deventer was made head of the WHO's EMF Project to follow Repacholi, who has also worked for the wireless industry. The aim of the WHO's EMF Project, established in 1996, was to deal with the "EMF problem" of the many people who even then had been made ill by low-level man-made electromagnetic exposure. Although the aim was to contain EMF health "problem" and finish the Project by 2006, the vastly increasing evidence of harm has made this impossible, despite immensely strong wireless industry pressure to stop research altogether and pretend that some tens of thousands of peer-reviewed studies are all wrong. The WHO and WHO EMF Project's statements so far, such as sheet 193, and their failure to update them to provide accurate evidence of established harm, indicate that such sheets remain worthless for scientific purposes, as opposed to suiting those regulators and governments wishing to continue with high levels of wireless irradiation of the general population.
- (n) This major conflict of interest, exemplified by the WHO EMF Project, not only renders all the WHO's negative claims on health effects of wireless and electrical fields liable to challenge. It also means that they are regarded as worthless by the majority of independent scientists. Thus in 2015 the International EMF Scientist Appeal was launched directly to the general secretary of the United Nations, the parent body of the WHO, and to the director general of the WHO to sort out this appalling mess in the WHO and bring in some established science and health experts ([link](#)). It has now been signed by over 200 of the leading experts in this field.
- (o) Although it may seem incredible, the sole presentation which the WHO's van Deventer gave at the BioEM2017 conference in June 2017 was apparently advocating the use of mobile devices, not on their health risks, although that would appear to be her job remit. She also has links with the ICNIRP, a private group of like-minded members who cling to the invalidated minority viewpoint that still denies non-thermal effects, even though the vast majority of scientists

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now accept them, as the USSR has since 1958. Non-thermal effects are now used in many established therapeutic procedures common in UK hospitals.

- (p) The problem of conflict of interest or corruption is apparently a significant issue for the WHO in many areas. Even Dr Margaret Chan, recent WHO director general, admitted: "My budget [is] highly earmarked, so it is driven by what I call donor interests." Very high electromagnetic exposures have been maintained in some western countries, such as Australia, Canada, New Zealand, the UK and the USA, all belonging to The Technical Cooperation Programme of 1957. These same countries, along with third-parties, also form the Five Eyes secret intelligence service co-operation, dating from 1946 and secret until 2011. The WHO EMF Project leaders have so far come from Australia and Canada, although the country with the greatest research into electromagnetic health hazards is Russia.
- (q) These major conflicts of interest within the WHO are the subject of an important peer-reviewed study examining the conflicts of interests between the WHO and the private pro-industry group ICNIRP over EM harm: "WHO's in-house experts seem to be members of ICNIRP, although not exclusively. This may explain why only short term thermal effects from RF radiation are accepted as proofs of harm, and why non-thermal biological effects are ignored. In the draft of the Monograph [WHO's EMF risk assessment review due originally in 2014 but still unpublished] a large bulk of peer-reviewed scientific publications on non-thermal effects are dismissed, as also by ICNIRP. Most remarkable is that WHO has no intention to replace the Core Group of experts affiliated with ICNIRP. Thereby ICNIRP is given full access to and exclusive possibilities to influence the Monograph. In view of the huge economic interests built into the ICNIRP guidelines, and several of its expert members' ties to industry, no doubt this is a large conflict of interest that will seriously undermine not only the credibility of the Monograph on RF radiation but also the credibility of WHO as a protector of world health."<sup>4</sup> Therefore it is invalid to accept any claim, especially a clearly invalid one such as in WHO sheet 193, from the WHO as regards harm from EM exposure.
- (r) Of course, if the WHO were correct in claiming no health harm from the use of mobile phones, over 40% of countries would be wrong in that they have adopted safety levels recognising non-thermal health harm and below the WHO/ICNIRP's heating-only levels. They would also be wrong in their frequent and strong warnings to their citizens to reduce their exposure to mobile phone and similar radiation, and also in advocating the use of texting in place of speaking, or banning mobile phones and WiFi in nurseries and schools.
- (s) The UK also has such warnings, of which presumably the complainants are unaware, unless they are also complaining to the ASA about these too. Thus the UK government through the UK Chief Medical Officers actually gives instructions to its audience, as opposed to the advert's supply of information without instructions: "children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short." This

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<sup>4</sup> Hardell L: "World Health Organization, radiofrequency radiation and health – a hard nut to crack (Review)" *Int J Oncology*. (2017) [PMID: 28656257](https://pubmed.ncbi.nlm.nih.gov/28656257/).

government advice goes far beyond the information which advert supplies, where the advert's simple use of a question suggests that people can consider the evidence for themselves. The advert's wording is certainly not as strongly assertive about the potential risk of harm from EM exposure as the UK government's approach.

- (t) The WHO is not, of course, an independent agent free to follow the actual science when it comes to the safety of radiation. Since 1959 the WHO has been subordinate in all matters to do with radiation to the International Atomic Energy Agency (IAEA), established to endorse as far as possible the maximum use of ionising radiation. Thus none of the WHO's statements on radiation can be considered impartial or necessarily scientifically accurate. Likewise the UK government now uses COMARE, the Committee on Medical Aspects of Radiation in the Environment, the UK committee created in 1985 to deal with public concerns about the high level of cancer clusters discovered near radioactivity from nuclear power stations, for advising on non-ionising radiation too. In fact the previous government committee for non-ionising radiation, AGNIR, the Advisory Group on Non-Ionising Radiation, was founded in 1990 with the similar aim of quelling public disquiet over growing scientific evidence of harm, in this case over domestic electromagnetic exposure. It was at first chaired by Sir Richard Doll when aged 78-90, famous for linking cancer with smoking but then infamous for switching sides and supporting industries and government instead. He was a director with (Imperial) Cancer Research UK, which received generous donations from the wireless industry and typically denies harm from wireless radiation. Doll's successor as chair of AGNIR, Anthony Swerdlow, was also based at CRUK and stated, two months after WHO/IARC's declaration that mobile phone radiation was a 2B human carcinogen, that the "trend in the accumulating evidence" was increasingly against mobiles causing brain tumours, whereas within another four years the opposite was confirmed, that this radiation is indeed a tumour promoter.
- (u) The ASA has previously rejected specific WHO and other evidence on "the potential ill-effects of electromagnetic radiation" (24 December 2014) as likely to mislead because they were isolated extracts. The isolated WHO sheet 193 could do the same. It certainly has to be rejected as substantive evidence. The WHO sheet 193 is also misleading as regards the current state of the science.
- (v) Since 1990 the UK government has taken advice on health effects caused by low-level electromagnetic exposure from its AGNIR committee, the Advisory Group on Non-Ionising Radiation, and based its replies to MPs in the House of Commons and to members of the public, schools and employers on its AGNIR 2012 Report. This AGNIR 2012 Report was not peer-reviewed. It declared all low-level electromagnetic exposure safe in practical terms, including the public's exposure to mobile and cordless phones, masts, WiFi and wireless smart meters, even though in some areas about 80% of the studies referenced clearly showed harm. This AGNIR assessment was shown as invalid in a damning peer-reviewed critique published in late 2016, explaining in detail (i) the inaccuracies of the AGNIR

Report and (ii) the conflict of interests of members of AGNIR.<sup>5</sup> In the spring of 2017 the government decided to disband its heavily discredited AGNIR committee.

- (w) This means, however, that all the UK government's advice, which has long been based on the inaccurate AGNIR 2012 Report's claims, is now rendered unsafe. Thus the UK government and all those following this unsafe advice, such as schools, employers, wireless device manufacturers and network providers, could be liable for action by the thousands of people harmed by such inaccurate and conflicted advice.
- (x) It is not yet apparent whether those responsible for promulgating what has been shown to be inaccurate and therefore unsafe advice based on the government's AGNIR 2012 Report have yet been brought to account for the harm and deaths caused to those injured by their unsafe advice. The issue of liability and negligence appears to extend beyond the authors of the report to those who also decided to recommend that the UK government should accept this inaccurate AGNIR report.
- (y) In addition, the members and advisers who helped compile the discredited and invalidated AGNIR 2012 Report include people who are also part of WHO/ICNIRP and share the same invalidated minority viewpoint as WHO/ICNIRP. This therefore renders the whole unscientific approach of this small clique of people holding their minority viewpoint liable to the same action for negligence or more serious charges. Clearly a charity like Electrosensitivity UK and groups like the ASA, which all insist on truthful and accurate substantiated evidence, cannot use the inaccurate conclusions of the AGNIR 2012 Report and WHO/ICNIRP if they aim to uphold accurate, truthful and substantiated evidence.
- (z) The charity avoided in its advert referring to the AGNIR 2012 Report and the WHO sheet 193 since, as shown above, both are outdated and invalidated. In fact, at the time when the advert was finalised, in the spring of 2017, the UK government was still referring MPs and members of the public to this AGNIR 2012 Report, although they knew by then that it had been shown to be inaccurate and therefore unsafe.

### **Conclusion on WHO sheet 193 and AGNIR 2012 Report:**

**The advert is entirely substantiated scientifically and not at all affected by the invalidated WHO sheet 193 or the inaccurate and conflicted AGNIR 2012 Report**

Thus the advert is entirely substantiated as it stands. It would be rendered unscientific and invalid if it followed the inaccurate and conflicted claims of the UK

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<sup>5</sup> Starkey SJ: "Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation" *Rev Environ Health*. (2016) [PMID: 27902455](https://pubmed.ncbi.nlm.nih.gov/27902455/).

government's AGNIR 2012 Report and invalidated WHO/ICNIRP claims. If the advert were to follow AGNIR and WHO/ICNIRP and thus to state inaccuracies, the advert would be unsubstantiated and misleading and the charity would refuse to allow this to occur, since we are an evidence-based charity, just as the ASA is required to be an evidence-based adjudicator.

## 5. Earlier ASA rulings: invalid comparisons

### (a) Earlier ASA rulings: general

- (i) The ASA's letter dated 26 June 2017 makes reference to two earlier ASA rulings. These are irrelevant to our charity advert, both in terms of substance, since they both concerned claims by commercial companies for the efficiency of protective equipment and clothing, and date, since this area of health has changed substantially in the last few years.
- (ii) This change in science relating to public health is shown by the evidence provided to substantiate the EUROPAEM 2016 international safety guidelines,<sup>6</sup> which provide biological limits as opposed to the obsolete WHO/ICNIRP heating-only limits. In addition, Professor Belpomme, one of the leading research scientists in this area, has shown from his study of hundreds of subjects intolerant of low-level electromagnetic exposure, that this intolerance is a real physiological condition and can be diagnosed by objective medical markers.<sup>7</sup> Other centres have also shown the influence of particular genetic haplotypes in determining some cases of this sensitivity.<sup>8</sup> Evidence now suggests that 40% of adults are sensitive to, and affected by, low-level electromagnetic exposure or electrosmog.<sup>9</sup>
- (iii) In addition it became a requirement under UK legal regulations in 2016 that employers take action to protect employees at particular risk from electromagnetic exposure. This includes people such as pregnant women and those with active metallic implants in environments where there is Bluetooth, WiFi or mobile phone usage ("Electromagnetic fields at work: A guide to the Control of Electromagnet Fields at Work Regulations 2016", Health and Safety Executive, Table 7, page 21).<sup>10</sup>
- (iv) It is now unscientific and unsubstantiated, therefore, to claim that there are no adverse health effects caused by low-level electromagnetic exposure to

<sup>6</sup> Belyaev I et al.: "EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses" *Rev Environ Health* (2016) [PMID: 27454111](#); [pdf](#).

<sup>7</sup> Belpomme D et al: "Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder" *Rev Environ Health* (2015) [PMID: 26613326](#); [pdf](#).

<sup>8</sup> De Luca C et al: "[Metabolic and genetic screening of electromagnetic hypersensitivity subjects as a feasible tool for diagnostics and intervention](#)" *Mediators Inflamm.* (2014) [PHID: 24812443](#).

<sup>9</sup> Marshall TG et al.: "Electrosmog and autoimmune disease" *Immunol Res.* (2016) [PMID: 27412293](#).

<sup>10</sup> [Electromagnetic fields at work: A guide to the Control of Electromagnet Fields at Work Regulations 2016](#), Health and Safety Executive, 2016, Table 7, p.21.

members of the general population. Recent studies have shown clearly that many such cases exist at a physiological and not psychological level. This renders parts of the ASA rulings of 2014 irrelevant to the now validated statements of the advert of 2017.

*(b) Healthy House: adjudication of 24 December 2014.*

- (i) The adjudication has no relevance to subsequent complaints in that its dismissal of health hazards was for technical reasons, such as the defendant not producing evidence additional to the information already on its website by the date required.
- (ii) At that time the information supplied by the defendant on its website in 2014 included "extracts from WHO (World Health Organization) and European Parliamentary Assembly papers such as 'radiofrequency electromagnetic fields classified as possibly carcinogenic' and offered 'advice on reducing your exposure to electromagnetic fields'." The ASA, however, stated that such statements by the WHO and the EPA were not "evidence to demonstrate that electromagnetic radiation posed a risk to health", claiming that "many of the references to the potential ill-effects of electromagnetic radiation were extracts from official papers, we considered that isolated extracts of this kind, in the absence of other evidence or the wider context of the research in which they were set, were likely to mislead." This appears to deny the authority of the WHO and any supporting evidence on which its then claims were made, whereas now claimants are apparently relying on invalidated WHO claims (see above).

*(c) Wireless Armour Ltd, adjudication of 13 August 2014*

- (i) In this adjudication the ASA assessed the studies provided on the known harm to male fertility from low-level electromagnetic radiation. The defendant's advert stated that there were "many studies showing that using and carrying wireless devices, especially mobile phones, lowers the sperm count and motility (a measure of how well sperm moves and in what direction) in men." This assessment contained in the defendant's advert, however, was and is correct according to the majority of peer-reviewed studies, both in 2014 and now in 2017.
- (ii) The ASA, however, rejected this statement, which has since been confirmed to be correct, on the grounds that it should reject any papers in summary form because they did not provide sufficient details to allow the ASA "to ascertain whether they had been conducted robustly". The ASA then rejected the scientific evidence of the first paper supplied on the ground that male reproductive organs are separated from the source of radiation by "multiple tissue layers". The ASA rejected the second study, on animals, because the ASA did not think that there was "adequate evidence that the same impact would be experienced by humans". Finally, the ASA rejected the third study because of possible confounding factors, self-perception by the subjects, and uncertainty whether the phone's EM radiation caused harm to the sperm or whether it was because of a temperature increase in the testes (some

scientists, in fact, associate EM radiation with heating, especially of the testes). However, since 2014 it has been shown that 78% of robust studies show harm from EM radiation. Interestingly, the negative viewpoint adopted by the ASA in 2014 is similar to that of the now discredited non-peer-reviewed AGNIR 2012 Report. In contrast, a critique published in a peer-reviewed study showed: "78% of studies (18 out of 23) described significant adverse effects on sperm, male reproductive organs or changes in male testosterone concentrations. If the 22 references identified as omitted had also been included, this would have been 35 out of 45, 78%. Isolating small samples of evidence in chapters on cells, animals or humans may have made it easier to dismiss significant effects on male reproductive health. Inaccurately, in the overall and executive summaries, the evidence for adverse effects on male fertility disappeared: 'Despite many studies investigating effects on male fertility, there is no convincing evidence that low level exposure results in any adverse outcomes on testicular function' and for humans, in vivo, 'The limited available data on other non-cancer outcomes show no effects of RF field exposure'. The term 'convincing' is subjective and can erroneously imply that there is no evidence. The human data on male fertility did not show 'no effects of RF field exposure'." (Starkey SJ, 2016)

## **6. Invalid anonymity in specialised medical areas, especially for ASA adjudication**

- (a) Since the nature of the advert lies in a highly specialised area of medicine where the identity of the authoritative key players is well known by name, it is vital that the name of the expert making the ASA ruling is given if it challenges a specialised charity which arguably has access to more expertise in this area than any other group or persons in the UK. If the name is not given, the ruling lacks any credibility, authority or scientific integrity and becomes worthless.
- (b) Since the UK does not have any NHS centre of excellence in this health area and thus there are no researchers except psychologists investigating the different condition of Electrophobia, and the published list of health experts used by the ASA does not include any of the very few experts in health effects and bioelectromagnetics living in the UK, it is especially important that the ASA states the source of its viewpoint on these specialised health issues if it is to uphold a reputation for scientific integrity. Sadly, spokespersons for groups like Public Health England (formerly HPA, NRPB) have frequently revealed a lack of understanding in this area or a failure to keep abreast of the current scientific evidence, perhaps inevitably so if they are required by their government employer to follow the now discredited minority viewpoint of AGNIR 2012 Report and the invalidated viewpoints of WHO/ICNIRP, and thus deny the established non-thermal effects of low-level electromagnetic exposure.

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- (c) Sadly, as explained above, the ASA revealed inadequate scientific advice on adjudicating one part of each of the two previous rulings by the ASA, both in 2014, where the ASA's decision would not in one part in each case match that of a health expert in this field. Had the name of the adjudicator been given, it would then be possible for the public to assess this person's credentials as regards the ASA's findings and prevent bringing the ASA into the scientific disrepute which followed the publication of these adjudications. In scientific research and evaluation no study is published anonymously since the scientific credibility of study depends in part on the relevant expertise and credentials of the author.
- (d) If the adjudication is simply to be a vote by the ASA council who are not experts and are not themselves sensitive to, or intolerant of, low-level electromagnetic exposure, it is even more important that they find the right medical experts with up-to-date experience of diagnosing and treating conditions arising from such exposure. The charity Electrosensitivity UK can put them in touch with both the relevant health experts and with people adversely affected by low-level electromagnetic exposure.
- (e) It is also vital that the name and credentials of the persons making a complaint in such specialised medical matters is published from the start. If they have no expertise in this health area, it seems unlikely to be worth the effort of the ASA to conduct an inquiry. This appears to be the situation with the current complaint.
- (f) So long as the advert includes information as to who is sponsoring it, the general public can quickly form their own judgement of its scientific credibility.

## **7. Growing societal acceptance of intolerance to low-level electromagnetic exposure as a disability and functional impairment**

Within UK society as a whole there is a growing recognition of intolerance to low-level electromagnetic exposure as a genuine physical condition, and not just the different condition of psychological electrophobia. This growing acceptance can be found among judges, institutions and organisations. The advert does not address this aspect directly, of course, but, in presenting the issue of growing evidence for risks with potential health outcomes, seeks to reflect the growing difficulties which society as a whole is now facing. As many people are finding out to their surprise and to their cost, both those who have become intolerant to low-level electromagnetic exposure and those seeking to help them, when these potential societal risks are not appreciated early enough the difficulties can escalate, making them harder or even impossible to remedy in the long term.

- (a) Since 2013 a growing number of judicial tribunals in the UK have recognised physiological intolerance to low-level electromagnetic exposure in appeals against the Secretary of State for Work and Pensions for the allocation of Employment

and Support Allowance. In doing so they are recognising, as one potential risk of low-level electromagnetic exposure, the harsh consequences of the reality of functional impairment caused by low-level electromagnetic exposure. Internationally this is becoming well established. Since the year 2000, for instance, Sweden has required local authorities to make physical adaptations to help people who are intolerant to low-level electromagnetic exposure, while many European countries, like the UK, now award financial compensation, such as ESA, to a very few of those functionally impaired by this intolerance.<sup>11</sup>

- (b) These cases recognising functional impairment from intolerance to low-level electromagnetic exposure bring the DWP into line with the requirements of the Equality Act of 2010. This Act, like the United Nations Convention on the Rights of Persons with Disabilities of 2006, sees the environment as in need of remedy, not the person with the intolerance to an environmental toxin and that person's consequent functional impairment.
- (c) Similarly, a small but inevitably increasing number of schools, universities, hospitals and employers now accept the reality of physical intolerance to low-level electromagnetic exposure where it has become a significant problem for someone within their own organisation, such as a pupil, student, patient, employee, teacher, doctor or manager. All employers are bound by the Health & Safety at Work Act of 1974 which requires a duty of care towards employees and others on the premises, and this includes people physically intolerant of low-level electromagnetic exposure, where reasonable arrangements have to be made.
- (d) As mentioned above (section 5 (a) (iii)), since 2016 there are also now legal regulations in the UK requiring employees to protect persons at particular risk, such as those with active implants and pregnant women, as regards electromagnetic exposure.
- (e) A small but growing number of doctors and Occupational Health Advisers are becoming aware of the problem too. Some groups, like the Austrian Medical Association<sup>12</sup> in 2012, produce their own protocols and the Russian Health Department produced a draft standard at the Federal Medical Biophysical Centre, while most international research centres specialising in electromagnetic health effects have devised their own polyparametrical diagnosis. In many areas of the UK, however, there is still inadequate official information and training about the condition, despite International Classification of Diseases codes (ICD-10) being available for some aspects of the condition since the year 2000.<sup>13</sup> This is an area

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<sup>11</sup> Johansson O.: ["Electrohypersensitivity; State-of-the-Art of a Functional Impairment"](#) *El Biol & Med.* (2006) [PMID: 17178584](#).

Budzinski BI et al: "White zones", free from mobile phone coverage – unrealistic or required by law?" *Neue Zeitschrift für Verwaltungsrecht* (2015) [trans](#).

Gibson PR et al.: "Unmet health care needs for persons with environmental sensitivity" *J Multidiscip Healthc.* (2015) [PMID: 25670904](#).

Johansson O: "Electrohypersensitivity: a functional impairment due to an inaccessible environment" *Rev Environ Health* (2015) [PMID: 26613327](#); [pdf](#).

<sup>12</sup> Austrian Medical Association: "Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF related health problems and illnesses (EMF syndrome)" (2012) [pdf](#).

<sup>13</sup> Nordic Council of Ministers: "The Nordic Adaptation of Classification of Occupationally Related Disorders (Diseases and Symptoms) to ICD-10" (2000) [pdf](#); p.33 (ICD-10.R68.8), p.55.

where our charity seeks, when it can, to inform people of the latest scientific evidence.

### **8. Conclusion Overall: completely valid advert**

The advert was very carefully designed to be totally honest and truthful, based on the full current science, and to avoid being misleading or unsubstantiated in any way at all. I can find no grounds, not even the slightest, for the complaints. We do not promulgate the misleading and unsubstantiated claims of anyone relying on outdated or invalidated scientific viewpoints. We depend on, and promulgate, accurate and truthful evidence backed up by the best reliable scientific evidence and studies relating to adverse effects on health and well-being.

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**Studies attached and linked:**

Attached (1):

- Carlberg M et al.: "Evaluation of Mobile Phone and Cordless Phone Use and Glioma Risk Using the Bradford Hill Viewpoints from 1965 on Association or Causation" *Biomed Res Int.* (2017) [PMID: 28401165](#).

This is a definitive review by the world's top research team into the links between brain tumours and mobile phone use. It confirms that wireless radiation from mobile phones should be considered a cause of cancer and thus a WHO/IARC class 1 certain human carcinogen.

Attached (2):

- Belyaev I et al.: "EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses" *Rev Environ Health* (2016) [PMID: 27454111](#); [pdf](#).

This is a useful review of the current state of understanding of some of the harm from low-level electromagnetic exposure. It also includes the international biological guidelines for low-level electromagnetic exposure, which organisations like the European Parliament stated in 2009 should replace the obsolete 6-minute heating-only limits of AGNIR and WHO/ICNIRP.

Attached (3):

- Hardell L: "World Health Organization, radiofrequency radiation and health – a hard nut to crack (Review)" *Int J Oncology.* (2017) [PMID: 28656257](#).

This is a useful summary of some of the very serious problems of scientific corruption and conflicts of interest over low-level electromagnetic exposure involving the WHO/ICNIRP. Its implication is that the non-peer-reviewed claims by the WHO/ICNIRP on their websites are invalidated both by the conflicts of interest and by the failure to review the appropriate scientific studies.

Attached (4):

- Starkey SJ: "Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation" *Rev Environ Health.* (2016) [PMID: 27902455](#).

This is a damning critique of the inaccuracies in the UK government's AGNIR 2012 Report, on which the UK government has based its rationale for declaring the current high levels of radiation exposure as safe. It raises the issue of liability for promulgating unsafe advice which has led to harm for many people in the UK.

Attached (5):

- De Luca C et al: "[Metabolic and genetic screening of electromagnetic hypersensitivity subjects as a feasible tool for diagnostics and intervention](#)" *Mediators Inflamm.* (2014) [PMID: 24812443](#).

This article shows that people intolerant of low-level electromagnetic exposure are 9.7 times more likely to have a particular genetic profile, one also associated with higher cancer risk.

Attached (6):

- Belpomme D et al: "Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic

aspects of a unique pathological disorder" *Rev Environ Health* (2015) [PMID: 26613326](#); [pdf](#).

This is an important summary of the research at one of the leading research centres into intolerance to low-level electromagnetic exposure. It confirms, on the basis of many hundreds of persons examined, that this intolerance is definitely a physiological condition which can be diagnosed with objective physical markers. It can thus be distinguished from the different condition of psychological Electrophobia with which the AGNIR 2012 Report and WHO/ICNIRP still confuse it.

Attached (7):

- Pall ML: "Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression" *J Chem Neuroanat.* (2015) [PMID: 26300312](#).

A useful summary of some established effects of low-level electromagnetic exposure, based on Prof. Pall's seminal earlier review of 2013 (Pall ML: "Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects" *J Cell Mol Med.* (2013) [PMID: 23802593](#)) showing the role of voltage-gated calcium channels. The later study has been much cited as establishing one of the mechanisms of low-level electromagnetic effects, especially inflammatory factors such as oxidative stress which can lead to cancer. VGCCs have been seen as the molecular basis for electroreception in vertebrates (Bellono NW et al.: "Molecular basis of ancestral vertebrate electroreception" *Nature.* (2017) [PMID: 28264196](#)).

Attached (8):

- Yakymenko I et al: "Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation" *Electromagn Biol Med.* (2015) [PMID: 26151230](#).

This is becoming a seminal review of low-level electromagnetic effects via oxidative mechanisms. It concludes: "The analysis of modern data on biological effects of low-intensity RFR leads to a firm conclusion that this physical agent is a powerful oxidative stressor for living cell ... a broad biological potential of ROS and other free radicals, including both their mutagenic effects and their signaling regulatory potential, makes RFR a potentially hazardous factor for human health. We suggest minimizing the intensity and time of RFR exposures, and taking a precautionary approach towards wireless technologies in everyday human life."

Attached (9):

- Buchner K et al.: "Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields - A Long-term Study under Real-life Conditions" *Umwelt-Medizin-Gesellschaft* (2011) ([copy](#)).

This important and detailed study following the activation of a GSM mobile phone base station found that "the levels of the stress hormones adrenaline and noradrenaline increased significantly during the first six months; the levels of the precursor dopamine decreased substantially. The initial levels were not restored even after one and a half years. As an indicator of the dysregulated chronic imbalance of the stress system, the phenylethylamine (PEA) levels dropped significantly until the end of the study period. The effects showed a dose-response relationship and occurred well below current limits ... Chronic dysregulation of the catecholamine system has great relevance for health and is well known to damage human health in the long run." The study noted that "the increase in sleep problems, cephalgia, vertigo, concentration problems, and allergies could be clinically documented after the cell phone base station had been activated ...

Decreased PEA levels can be found in a large portion of ADD/ADHD patients ... . As part of the German Mobile Telecommunication Research Programme ... the data set regarding behavioral problems showed a significant increased risk for both adolescents (OR: 3.7, 95%-CI: 1.6-8.4) and also children (OR: 2.9, 95%-CI: 1.4-5.9) in the highest exposure group (Thomas S et al.: "Exposure to radio-frequency electromagnetic fields and behavioural problems in Bavarian children and adolescents" *Eur J Epidemiol.* (2010) [PMID: 19960235](#))."

Attached (10):

- Marshall TG et al.: "Electrosmog and autoimmune disease" *Immunol Res.* (2016) [PMID: 27412293](#).

This is a study with far-reaching implications, linking low-level electromagnetic exposure or 'electrosmog' to chronic inflammatory and auto-immune conditions. This suggests that some 40% of adults are sensitive to, and significantly affected by, low-level electromagnetic exposure.

Attached (11):

- McCarty DE et al.: "Electromagnetic hypersensitivity: evidence for a novel neurological syndrome" *Int J Neurosci.* (2011) [PMID: 21793784](#).

A classic study demonstrating acute conscious sensitivity to low-level electromagnetic exposure.

Attached (12):

- Johansson O et al: "Exacerbation of demyelinating syndrome after exposure to wireless modem with public hotspot" *Electromagn Biol Med.* (2016) [PMID: 27355805](#).

Demyelination from West Nile virus was here related to conscious intolerance of low-level electromagnetic exposure from wireless modems 11 years later.

Attached (13):

- Dieudonne M: "Does electromagnetic hypersensitivity originate from nocebo responses? Indications from a qualitative study" *Bioelectromagnetics* (2016) [PMID: 26369906](#).

This study of 40 EHS persons shows that most people experience intolerance symptoms before perceiving their origin, indicating that in most cases intolerance is physiological and not Electrophobia or a psychological 'Nocebo' conditioned effect. This refutes the invalid hypothesis often proposed by the series of studies in about 2005-10 at King's College London Institute of Psychiatry and Essex University. These were financed by the wireless industry and government but they failed to screen subjects before testing for whether and in what precise way they were intolerant of low-level electromagnetic exposure, and they then averaged the results. This hid the high positive scores of those who were intolerant and reacted consciously on a given occasion. The testers then claimed, invalidly it can now be seen, that, since they had been unable to find a link under these particular parameters, the condition must be a psychological Nocebo effect and not the physical condition it has been shown to be in more appropriate tests. In fact the Essex and King's tests did not ascertain whether the participants had appropriate prior conditioning, a necessary aspect of a Nocebo effect. The Dieudonne study shows that in most cases there is no prior conditioning and thus it cannot be a Nocebo effect, just as it cannot be Nocebo for children and animals who also lack prior conditioning.

Centres specialising in diagnosing people with the real physiological intolerance reckon that about 1% of those with this intolerance are also electrophobic.

[Link](#):

- Lamech F: "Self-Reporting of Symptom Development From Exposure to Radiofrequency Fields of Wireless Smart Meters in Victoria, Australia: A Case Series" *Altern Ther Health Med.* (2014) [PMID: 25478801](#).

A case series of 92 residents in Australia made ill by wireless smart meters.

Attached (14):

- Eger H et al.: "Specific Health Symptoms and Cell Phone Radiation in Selbitz, Bavaria, Germany - Evidence of a Dose-Response Relationship" *Umwelt Medizin Gesellschaft (2010)* [article in trans](#).

A detailed analysis of symptoms in the general population near a phone mast showing a dose-response relationship.

Attached (15):

- Crumpler S: "MCS and EHS: An Australian Perspective" *Ecopsychology.* (2017) [link](#).

This account covers the misdiagnosis and incarceration of a person with MCS and EHS.

Attached (16):

- Eberle S: "An Underworld Journey: Learning to Cope with Electromagnetic Hypersensitivity" *Ecopsychology.* (2017) [link](#).

This personal account by a psychologist presents the difficulties of living with an environmental intolerance.

[Link](#) to:

- [International EMF Scientist Appeal \(May 11, 2015\)](#)

This represents the majority viewpoint in this area. It is backed by over 200 of the world's leading experts in this field.

The following two studies confirm that both wireless/microwave radiation and ELF is a tumour promoter, and therefore it should be classified as at least a class 2A probable human carcinogen. See also Study Attached (1) for evidence that now requires wireless RF/microwave radiation to be classified as a class 1 certain human carcinogen.

- Lerchl A et al: "Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans" *Biochem Biophys Res Commun.* (2015) [PMID: 25749340](#).
- Sofftitti M et al: "Life-span exposure to sinusoidal-50 Hz magnetic field and acute low-dose  $\gamma$  radiation induce carcinogenic effects in Sprague-Dawley rats" *Int J Radiat Biol.* (2016) [PMID: 26894944](#).

[Link](#) to:

- Wyde M et al, "Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposure)" [bioRxiv](#). (2016).

This preliminary report from the NTP \$25m 'gold standard' study confirms that low-level electromagnetic radiation is a carcinogen. It was issued early to enable governments and regulators to make immediate changes to exposure guidelines and to warn the general public about the dangers. In cases where this has not happened, the issue of responsibility and liability for wilful negligence for failing to warn or safeguard the general public could be relevant.

### References, additional:

Some outcomes associated with low-level electromagnetic exposure and supporting first studies with dates:

- Alzheimer's disease (2009)<sup>14</sup>
- Amyotrophic lateral sclerosis (ALS) or Motor Neuron Disease (1986)<sup>15</sup>
- Blood-brain barrier leakage (1974)<sup>16</sup>
- Brain tumours, glioblastoma (1991)<sup>17</sup>
- Brain tumours, glioma etc. from mobiles (2009)<sup>18</sup>
- Depression, suicide (1979)<sup>19</sup>
- DNA damage (1995)<sup>20</sup>
- Electrosensitivity, EHS (1932, 1964)<sup>21</sup>
- Leukaemia, adult (1982)<sup>22</sup>
- Leukaemia, childhood (1979)<sup>23</sup>
- Leukaemia, acute myeloid (1982)<sup>24</sup>
- Microwave hearing, tinnitus (1962)<sup>25</sup>
- Tumour promotion (2009)<sup>26</sup>

<sup>14</sup> Huss A et al: "Residence near power lines and mortality from neurodegenerative diseases: longitudinal study of the Swiss population" *Am J Epidemiol.* (2009) [PMID: 18990717](#).

<sup>15</sup> Deapen DM et al.: "A case-control study of amyotrophic lateral sclerosis" *Am J Epidemiol.* (1986) [PMID: 3962963](#).

<sup>16</sup> Frey AH: "Differential biologic effects of pulsed and continuous electromagnetic fields and mechanisms of effect" *Ann N Y Acad Sci.* (1974) [PMID: 4613239](#).

<sup>17</sup> Törnqvist S et al.: "Incidence of leukaemia and brain tumours in some "electrical occupations"" *Br J Ind Med.* (1991) [PMID: 1911402](#).

<sup>18</sup> Hardell L et al: "Epidemiological evidence for an association between use of wireless phones and tumor diseases" *Pathophysiology* (2009) [PMID: 19268551](#).

<sup>19</sup> Reichmanis M et al: "Relation between suicide and the electromagnetic field of overhead power lines" *Physiol Chem Phys.* (1979) [PMID: 542502](#).

<sup>20</sup> Lai H et al.: "Acute low-intensity microwave exposure increases DNA single-strand breaks in rat brain cells" *Bioelectromagnetics.* (1995) [PMID: 7677797](#).

<sup>21</sup> Schliephake E: "Arbeitsgebiete auf dem Kurzwellengebiet" ["Fields of the Short-wave region"] *Dtsch Med Wochenschr.* (1932); Czerski P et al: "Przypadek 'choroby mikrofalowej'" [A case of 'Microwave Sickness'] *Medycyna Pracy* (1964), etc.

<sup>22</sup> Milham S Jr "Mortality from leukemia in workers exposed to electrical and magnetic fields" *N Engl J Med.* (1982) [PMID: 7088076](#); [abstract](#).

<sup>23</sup> Wertheimer N et al: "Electrical wiring configurations and childhood cancer" *Am J Epidemiol.* (1979) [PMID: 453167](#).

<sup>24</sup> Wright WE et al.: "Leukaemia in workers exposed to electrical and magnetic fields" *Lancet.* (1982) [PMID: 6128476](#).

<sup>25</sup> Frey AH: "Human auditory system response to modulated electromagnetic energy" *J Appl Physiol* (1962) [PMID: 13895081](#).

<sup>26</sup> Lerchl A et al: "Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans" *Biochem Biophys Res Commun.* (2015) [PMID: 25749340](#);  
Soffritti M et al: "Life-span exposure to sinusoidal-50 Hz magnetic field and acute low-dose  $\gamma$  radiation induce carcinogenic effects in Sprague-Dawley rats" *Int J Radiat Biol* (2016) [PMID: 26894944](#).

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## Bibliographies

To illustrate the vast and increasing number of peer-reviewed studies on adverse health effects from low-level electromagnetic exposure, the compilations of references given below are for just one key area, in this case for Electrosensitivity.

Attached (17):

- Bevington M: *Selected Studies on Electrosensitivity (ES) and Electromagnetic Hypersensitivity (EHS)*, 2017 (details of over 500 studies listed, categorized by sources of exposure, mechanisms and pathways, and areas of interest, etc.)
- (2016 edition [here](#))

Further resources and bibliographies listed in the above document:

- Bevington M: "Electromagnetic Sensitivity and Electromagnetic Hypersensitivity: A Summary" 2nd ed. (2013) ISBN: 9781872072210 (available from [ES-UK](#)) (112 pages; 1,800 refs).
- Bioinitiative Report (2012): [link](#)
- Dr Magda Havas: [Archive of 1960-70s US Navy medical researcher Dr ZR Glaser](#)
- Electrosensitivity.co: [Mechanisms and pathways](#) (over 300 studies at 6.2017)
- EMF Portal: [Studies](#) (23,100 refs; 5,600 summaries, as at 06.2016)
- EMF Safety: [Bibliographies](#)
- Emfwise.com: [Effects](#)
- Environmental Health Trust: [Bees, Butterflies And Wildlife: Research On Electromagnetic Fields And The Environment](#) (2017; over 70 studies)
- Oceania Radiofrequency Scientific Advisory Association (ORSAA): [database](#)
- Oscillatorium: [EMF and Birds](#) (2016)
- Philips A & J: [The Powerwatch Handbook](#) (2009)
- Powerwatch: [Electrical Hypersensitivity](#) (8 articles)
- Prove-It: [Studies](#) (1,168 refs)
- Rosch PJ (ed.) [Bioelectromagnetic and Subtle Energy Medicine](#) CRC Press (2nd ed., 2014), 672 pages.
- SSITA: Goldsworthy A: ["The Biological Effects of Weak Electromagnetic Fields"](#) (2012)
- Switch2safe: [Studies](#)
- US Naval Medical Research Inst.: ["Bibliography of Reported Biological Phenomena and Clinical Manifestations attributed to Microwave and Radio-Frequency Radiation"](#) (1971) (2,308 refs)
- WiFi in Schools.com: ["136 Studies Showing Health Effects from WiFi Radio Frequency Radiation"](#)
- WiFi in Schools.org.uk: [Studies](#)

Michael Bevington,  
July 4<sup>th</sup> 2017

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