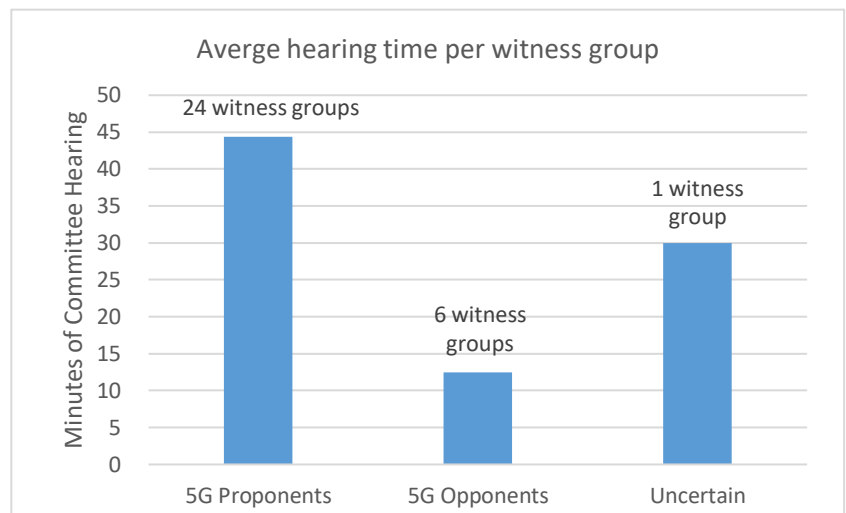


ORSAA follow up documents to the 5G Parliamentary Hearing

ORSAA thanks the committee for a chance to follow up following the Melbourne hearing. However, with this also comes our regret that we have not had adequate time to effectively communicate with the committee. Being positioned within in a 45minute slot along with two other witnesses meant that we did not get enough time to answer your questions adequately nor to hold an interactive discussion with you regarding very important matters that you would not be aware of due to industry

influences in the mainstream conversations. Members of ORSAA who presented at the hearing feel that this process has not been democratic in view of the huge imbalance in airtime. As the adjacent figure shows, the proponents of 5G were given much more time to speak across the six hearings. On average, each witness group that was a proponent for 5G had ~45 minutes in person with the committee, while each witness group opposing 5G as currently planned had 12.5 minutes. Therefore, ORSAA is providing this follow-up material in the hope that you will read it and think deeply about what is presented here.



Which experts to believe: The problem for the committee is that the small number of recognised and funded experts have many industry ties (clear conflicts of interest), yet they are also the prominent voices in most mainstream media. On the other hand, ORSAA is asserting there are many other independent expert voices speaking about harmful effects, who are rarely heard; e.g., the International EMF Scientist Appeal: www.emfscientist.org This may be confusing for the committee. To assist, we offer two helpful tool sets below that can be used to scrutinise the presented evidence. These tools are accessible to any thinking person, scientist or not, as follows.

A. A set of principles which can help to determine whether scientific evidence is solid

- **Converging evidence:** many studies from different fields all point to the same conclusions. The amount of converging evidence regarding health effects of RF-EMR is large.
- **Consensus by experts:** several recognised experts speaking from within their own field of expertise agree on the conclusions. This is true for the number of expert voices cautioning against 5G e.g. see the 5G space appeal signed by scientists and doctors from around the world <https://www.5gspaceappeal.org/the-appeal>
- **Science denialism** occurs when the focus is on small gaps or small amounts of evidence contradict a conclusion instead of considering the strength resulting from convergence. All scientific studies are imperfect. We claim that denialism is rife when it comes to the research into the health effects of wireless radiation.
- **Industry funded studies are unlikely to be trustworthy** e.g. in the early 1990s, Lai and Singh found breaks in the DNA of cultured cells and brain cells of live rats due to exposure to radiation (at levels considered to be safe). A full-scale effort to discredit the experiments ensued, and the head of the Wireless Technology Research asked the university to fire Lai and Singh. In a leaked internal Motorola memo executives claimed success in “War-Gaming” the Lai-Singh experiments (see attached and the following links)

<https://www.rfsafe.com/wp-content/uploads/2014/06/cell-phone-radiation-war-gaming-memo.pdf>

<https://www.seattlemag.com/article/uw-scientist-henry-lai-makes-waves-cell-phone-industry>

- **Null results are vacuous.** Any study needs to obtain non-null results to add meaningfully to the literature. Therefore, industry-funded studies that have turned up null results prove nothing.
- **Balanced debate required:** When there is uncertainty, a balanced debate needs perspectives from both sides. The problem is that the WHO EMF expert panel is top heavy with ICNIRP members who are industry linked. These ‘experts’ are not qualified in biophysics, and they hold a one-sided position that supports their own interests. They conveniently and repeatedly claim that only thermal effects matter, and dismiss the mountain of non-thermal bio-effects evidence that has been piling up since the 1970s. e.g. see World Academy of Sciences Journal online article: <https://www.spandidos-publications.com/10.3892/wasj.2019.28>
- **Modern science versus Newtonian physics:** The science of the invisible (e.g. electron transfer) is vastly different from the science of the visible (e.g. machines). Without any understanding of complex biology, telecommunications engineers are creating infrastructure and signalling systems that are disrupting the basic processes on which life exists. The ARPANSA and ICNIRP assurances of safety are feebly based on Newtonian physics. They sound plausible to the lay person but they are of no relevance to what is actually occurring.

B. The science provides a significant weight of evidence.

We appreciate that it is difficult for the committee to trust ORSAA, as we are a new and less well-known entity. Instead, we ask you to trust the evidence that we put before you, using your own understanding of logic and critical thinking to discern the truth.

1. Thermal effects of 5G

The committee asked ORSAA to provide the Neufeld and Kuster paper (Neufeld & Kuster, 2018 see attached and summary below). Note that Prof. Kuster was the main RF technical consultant hired by the US National Toxicology Project for their \$30 million cancer study .

Summary

The recent study: The Neufeld & Kuster study modelled a worst-case scenario for 5G exposure as an extended pulse train, in which previous pulses create a background temperature increase in skin temperature via diffusion. The freshly arriving 5G pulses then superimpose rapid, localized heating. Such a 5G pulse train was modelled mathematically (see adjacent Figure 1 from Neufeld & Kuster showing the temperature spikes).

The authors used objective criteria for deriving safety limits (based on [MRI] exposure safety guidelines).

Results: The temperature oscillations become very large, resulting in thermal spikes. The temperatures of these spikes may result in permanent tissue damage. These spikes occurred within the limits allowed by ICNIRP guidelines, which is unacceptable for regulatory purposes.

Comments: A criticism by Foster (from ICNIRP) was made in the same journal saying that Neufeld & Kuster’s results are overestimates, that the new IEEE standard C95.1-2019 (IEEE 2019) provides limits, and that pulse trains causing high temperature spikes are unlikely to happen with real world technologies, so there is no need to worry. Neufeld & Kuster responded by saying that the overestimation in their results is small, and that the new guidelines only apply to signals over 30GHz. Furthermore Neufeld & Kuster clarify that ‘unlikely to happen’ is not good enough; instead, 5G signals need full formal regulations in order to ensure that industry complies with safety. These

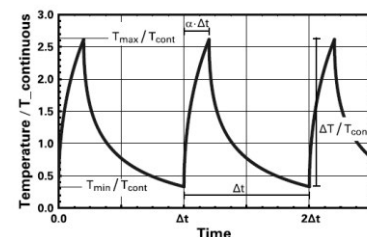


Fig. 1. Transient temperature oscillations resulting from a pulse train, computed for $\Delta t = \tau_1$ and $\alpha = 20\%$ at an intensity resulting in a temperature increase of 1 K at continuous exposure. T_{min} : minimum temperature; T_{max} : maximum temperature; T_{cont} : temperature at continuous exposure.

regulations do not yet exist under 30GHz. The current Australian spectrum being auctioned for 5G is in the 26-27GHz frequency range, which is not regulated by the new IEEE standard.

2. Planetary effects of 3G 4G and 5G

The committee asked ORSAA to provide the Bandara and Carpenter paper (Bandara & Carpenter, 2018 see attached)

Radiofrequency electromagnetic radiation causes DNA damage ... similar to near-UV radiation, which was also long thought to be harmless.

[https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(18\)30221-3/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30221-3/fulltext)

3. Neurodevelopmental effects from exposure to EMR

The committee asked about evidence of neurodevelopmental effects in children who have been affected by EMR exposures. There are some very important human studies e.g. the following papers (attached):

A Danish study on ~13,000 children linked maternal mobile phone use, both prenatal and postnatal, to emotional and hyperactivity problems in children around the age of school entry: the more the mothers used mobile phones during pregnancy, the more problematic the children's behaviour (Divan, Kheifets, Obel, & Olsen, 2008)

To follow up on this finding, a Yale study exposed pregnant mice to mobile phone radiation and studied the offspring. The young mice looked fine on the outside but their brains had abnormal structural and functional changes and they displayed behaviours similar to ADHD children (Aldad, Gan, Gao, & Taylor, 2012).

More recently, Spanish academics found that young boys who live near RF transmitters showed reduced verbal expression/comprehension and had higher scores for total problems, obsessive-compulsive and post-traumatic stress disorders than controls without such residential exposure (Calvente et al., 2016).

Behavioural pathology: smartphone addiction has recently been directly related to EMR signals. This is not just due to phone use (content) which only results in phone addiction, but due to the signal itself. The results show fMRI brain changes. See <https://www.ncbi.nlm.nih.gov/pubmed/32062336>

In addition, the ORSAA database has 20 more papers showing neurodevelopmental effects of EMRs/mobile phones (MP) on children and adolescents. Over 100,000 children and adolescents from Australia, New Zealand and countries all over the world have been included in these studies. See www.orsaa.org, and summaries below. (Note: paper ID refers to the unique identifier in the ORSAA database).

Paper ID	N	Results
112 Zheng	781 children	The association between fatigue and MP usage remained statistically significant.
120 Chiu	2042 11-15 years old	MP use was associated with a significantly increased adjusted odds ratio (AOR) for headaches and migraine
249 Divan	28 745 children	Exposure to cell phones prenatally, and to a lesser degree postnatally, was associated with more behavioural difficulties, with further control for an extended set of potential confounders, the associations remained.
775 Krause		Electromagnetic fields emitted by mobile phones have effects on brain oscillatory responses in children in the approximately 4 - 8 Hz and approximately 15 Hz EEG frequencies during cognitive processing.

776 Kolodynski	Skrunda is a pulse radar radio station	Children living in front of the Skrunda station had less developed memory and attention. Their reaction time was slower and their neuromuscular apparatus endurance (tapping test) was decreased.
2740 Lu	461 mother and child pairs	The mean infant birth weight was lower in the excessive use (mother) group than in the ordinary use group, and the frequency of infant emergency transport was significantly higher in the excessive use group than in the ordinary use group.
3503 Grigoriev		Chronic exposure to electromagnetic radiation from a mobile phone may negatively affect the central nervous system of the child: 1. The reaction time to sound and light stimuli is increased; 2. There is an increase in the number of violations of phonemic perception and the number of missed signals when a sound stimulus is presented; 3. Indicators of arbitrary attention and semantic memory deteriorate; 4. There are increased parameters of fatigue and decreased parameters of working memory capacity
461	1,498 children and 1,524 adolescents	An association between exposure (dosimeter) and conduct problems for adolescents (3.7; 1.6-8.4) and children Exposure to RF fields in the highest quartile was associated to overall behavioural problems for adolescents but not for children.
109 Schoeni	439 adolescents	A change in memory performance over one year was negatively associated with cumulative duration of wireless phone use and more strongly with RF-EMF dose. This may indicate that RF-EMF exposure affects memory performance.
127 Redmayne		The number and duration of cellphone and cordless phone calls were associated with increased risk of headaches. Using a wired cellphone headset was associated with tinnitus while wireless headsets were associated with headache, feeling down/depressed and waking in the night. Several cordless phone frequencies bands were related to tinnitus, feeling down/depressed and sleepiness at school, while the last of these was also related to modulation.
174 Abramson (The MoRPhEUS study)	317 grade 7 children from 20 schools around Melbourne	The accuracy of working memory was poorer, reaction time for a simple learning task shorter, associative learning response time shorter and accuracy poorer in children reporting more mobile phone voice calls. There were no significant relationships between exposure and signal detection, movement monitoring or estimation. The completion time for Stroop word naming tasks was longer for those reporting more mobile phone voice calls.
396 Munezawa	94,777 adolescents	Mobile phone use for calling and for sending text messages after lights out was associated with sleep disturbances (short sleep duration, subjective poor sleep quality, excessive daytime sleepiness, and insomnia symptoms) independent of covariates and independent of each other.
764 Ikeda	2,785 high school students	Overall associations between hours of mobile phone use and total scores were significant for "Depressed mood", "Tension and excitement" and "Fatigue".
861 Leung	41 adolescents 42 adults and 20 elderly	The accuracy for the N-back task [working memory test] in the adolescents was significant worse in the 3G exposed group than in the sham exposed group. Delayed ERD/ERS responses of the alpha wave power were found in both 3G and 2G conditions compared to the sham condition (independent of age group).
1128 Kim	715 adolescents	Higher prevalence rates for ocular symptoms were observed in groups with greater exposure to smartphones.
2344 Roser	412 adolescents	Problematic mobile phone use was associated with impaired psychological well-being, impaired parent and school relationships and more behavioural problems.
2345 Schoeni	439 adolescents	Being awakened during the night by mobile phone was associated with an increase in health symptom reports such as tiredness, rapid exhaustibility, headache and physical ill-being.
2812 Geronikolou		The hypothalamic-pituitary-adrenal (HPA) axis response to cellular phone after mental stress in children and adolescents follows a different pattern in frequent users than in occasional users that seems to be influenced by the baseline thyroid hormone levels.
3163 Foerster	669	Decreased figural memory scores in association with an interquartile range (IQR) increase in estimated cumulative RF-EMF brain dose scores.

4. Health effects

Dr. Paul Heroux, Professor of Toxicology and Health Effects of Electromagnetism at McGill University Faculty of Medicine summarised 1,724 peer-reviewed studies showing radio-frequency bioeffects produced by non-ionizing radiation.¹ Effects include: altered enzyme activity, biochemical changes, oxidative stress, pathological cell changes, neuro-behavioural effects, DNA damage, altered gene expression, brain activity changes, and death of cells. It is well established that in the long-run, these adverse biological effects will lead to chronic diseases. It is these conditions that now comprise the major health burden in Australia rather than acute illness.

Similarly, the ORSAA database classifies the bio and health effects into meaningful categories. See Figure 2 adjacent and attached files described below.

Figure 2: Total number of papers in the ORSAA database showing biological effects in each effect category. Many papers have multiple statistically significant biological effects, each of which is included in the summary totals.

Find Search Summary Totals					
Peer Reviewed Studies Showing Biological Effects			Number of records used : 1485 of 2653		
Auditory Dysfunction / Hearing loss / Tinnitus	32	Apoptosis (Programmed Cell Death)	96	Brain Tumours	44
Blood Brain Barrier Permeability Changes	15	Breast Cancer	13	Cellular Stress	61
Brain Development / Neuro Degeneration	39	Biochemical Changes	331	EEG changes / Brain Waves	93
Neuro Behavioural Effect / Cognitive Effects	171	Cell Irregularities/ Damage/ Morphological Changes	187	Effects on Mitochondria	35
Calcium Influx / Efflux	24	Fatigue	41	Altered Enzyme Activity / Protein Levels / Protein Damage	418
Circadian Rhythm Disruption	11	Altered Gene Expression	144	Headaches/Migraines	57
DNA Damage / Mutagenic / Genotoxic	154	Altered Glucose Level / Glucose Metabolism	21	Inflammation	23
Endocrine / Hormone Effects	66	Cardiovascular/Vascular Effects	70	Hepatic Effects (Liver)	25
Miscarriage / Spontaneous Abortion / Foetus Resorption	7	Immune System Effects	70	Impaired / Reduced Healing/ Bone Density Changes	3
Memory Impairment	65	Oxidative Stress / ROS/ Free Radicals	346	Speech Impairment	4
Sperm /Testicular Effects	83	Sleep Effects	58	Haematological Effects	54
Tumour Promotion	35	Neurotransmitter Effects	30	Synergistic/Combinative Effects	62
Thyroid Effects	14	Visual Disturbances/ Ocular Effects	40	Autism	8
Leukemia	14	Parotid Gland Malignancy	4	Neoplasia/ Hyperplasia (Abnormal Tissue Growth)	3
Depression	23	Induced Adaptive Response	55	Dizziness / Vertigo / Vestibular Effects	23

Continue

ARPANSA's inadequacies as revealed by the ORSAA database: see attached files in folders.

- **ORSAA database ARPS conference papers** folder including a letter to the editor exchange between ARPANSA and ORSAA in the Radiation Protection in Australasia journal.

¹ The studies reviewed by Heroux were contained in the New Hampshire Commission interim report <http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports.html>

- **A Novel database containing** folder containing *A novel database of bio-effects from non-ionizing radiation* (Leach, Weller, & Redmayne, 2018) plus a subsequent letter to the editor from a German rival database called emportal and our rebuttal.
<https://www.ncbi.nlm.nih.gov/pubmed/29874195>

5. Evidence on Mobile phones See attached folder Mobile phone epidemiological studies. Mr Victor Leach told the committee he would provide the follow-up information on mobile phone studies. The papers reveal a clear pattern i.e. greater exposure → greater damage. The committee chair and deputy need to study the science as they are misinformed. Comments on blanket safety cannot be given as the Italian courts are now showing.

6. Mass worry as stated by the WHO

The committee asked about whether the WHO commentary on mass worry was pointing to a psychological phenomenon. There are two groups of people who are currently being accused of being 'worried' or 'concerned' about 5G, in order to explain their objections to the 5G upgrades. The first is the group of people who are suffering from Electro Hyper Sensitivity (EHS), who feel painful and debilitating effects from the current exposures to EMRs from phones, devices, modems and towers. These people are very worried that they will not be able to cope physically with the 5G signals, and that they will no longer be able to participate in civil society. (Their current participation is already very low as they are unable to control their exposures to 3G and 4G signals in public places). The second group are those who are worried about health effects based on their knowledge of the science. Instead of their concerns being taken seriously, these objectors are being grouped as overly anxious. In response to this conjecture, we bring the following to your attention. Doctors are not claiming that anxiety is the issue in EHS. For a doctor to diagnose anxiety as the cause of any condition, all other factors need to be first ruled out. This has not been done in the case of EHS. In fact, there are large groups of doctors and medical researchers who have made substantial inputs into this issue (see attached):

- **The Austrian Medical Association's Guidelines** for the diagnosis and treatment of EMF related health problems and illnesses (EMF syndrome) to government. See also the attached letter by Professor Beatrice Golomb, MD, PhD with comment on EHS from an accomplished medical doctor and researcher.
- **Blood and saliva tests for diagnosing EHS have been established** (Belpomme, Campagnac, & Irigaray, 2015 see attached)
- **Brain changes in EHS sufferers have been observed using fMRI** (Heuser & Heuser, 2017)
- **Adverse health effects of exposure to RF radiation is classified in the ICD-10 (W90)** and therefore they are accepted as real. EHS is recognised in Sweden and Canada as a functional impairment.
- A new FDA report (<https://www.fda.gov/media/135043/download>) conducted epidemiological reviews on 69 papers, handpicked² to show no harm. Even then, in their conclusions they state:

the need for shifting the focus from the general population with undetectable overall risk to a very small subset of people who might be inherently predisposed to the risk for tumorigenesis and who therefore might be more susceptible to putative risk modification by the intense RF-EMF exposure.

Current estimates put this group anywhere between 1 to 13% of the general population and growing. See <https://www.ncbi.nlm.nih.gov/pubmed/26372109>)

- **The 2002 ICNIRP statements** on NIR acknowledged that Different groups may differ in their ability to tolerate a particular NIR exposure such as children, the elderly, and some

² The ORSAA database contains 292 epidemiology papers that have not been hand picked

chronically ill people, and therefore separate guideline levels may be needed.
(<https://www.icnirp.org/cms/upload/publications/ICNIRPphilosophy.pdf>)

These results and expert opinions provide converging evidence that EHS is a real physiological condition, and not a psychosomatic complaint due to anxiety. Thousands of people around the world are claiming to have become EHS. True scientists would go looking for the cause, thereby pushing the boundaries of understanding regarding human sensory and learning mechanisms. Instead we have industry-linked scientists using their positions to shut down the research or to conduct trivial experiments. For example, the research in Australia at ACEBR has focused on proving that people describing electromagnetic sensitivities are suffering from psychosomatic affects. Their published paper on this topic was based on an unacceptable sample size of three participants. Not one serious study has been conducted in Australia investigating the effects of radiation on biological tissue, DNA, oxidative stress markers or even skin cells where 5G is said to have its sole effects. Not even on rats. This Australian group has advised the WHO (which has taken up the mantra of mass anxiety due to media coverage) and is also highly influential in ICNIRP. Thus, the global telecommunications rollout has its claims of no harm built on a foundation of lame science and conflicts of interest.

Please see the diagram at the end of this document showing how the telecommunications industry, researchers and the government advisory bodies comprise the same people and create a circular chain of advising one another of no harm. There is no independent voice or authority amongst them which is not directly or indirectly influenced by industry. See (Hardell, 2017) attached and "Influential Australia" <https://betweensrockandhardplace.wordpress.com/2019/03/25/influential-australia/>

Industry has been using the same hype and the same tactics on governments since the 1990s, promising faster services, wonderful technologies, and improved health and education yet not delivering (Kushnick, 2015, The Book of Broken Promises). We implore this committee not to act as a puppet in the service of the telecommunications industry, and instead, to do its own independent research and thinking.

The future: The fall-out from the 5G rollout may make the PFAS and asbestos cover-ups both look like a walk in the park. Our children and grandchildren may suffer greatly, while our planet will heave. Who knows if it will survive man-made electromagnetic fields 1,000,000,000,000,000 times greater than natural systems (Bandara & Carpenter, 2018). There is an alternative, safer future with a sophisticated and human internet based on wired connections (Schoechle, 2018) which must be seriously considered.

- Aldad, T. S., Gan, G., Gao, X.-B., & Taylor, H. S. (2012). Fetal radiofrequency radiation exposure from 800-1900 mhz-rated cellular telephones affects neurodevelopment and behavior in mice. *Scientific reports*, 2, 312.
- Bandara, P., & Carpenter, D. O. (2018). Planetary electromagnetic pollution: it is time to assess its impact. *The Lancet Planetary Health*, 2(12), e512-e514.
- Belpomme, D., Campagnac, C., & Irigaray, P. (2015). Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder. *Reviews on environmental health*, 30(4), 251-271.
- Calvente, I., Pérez-Lobato, R., Núñez, M. I., Ramos, R., Guxens, M., Villalba, J., . . . Fernández, M. F. (2016). Does exposure to environmental radiofrequency electromagnetic fields cause cognitive and behavioral effects in 10-year-old boys? *Bioelectromagnetics*, 37(1), 25-36.
- Divan, H. A., Kheifets, L., Obel, C., & Olsen, J. (2008). Prenatal and postnatal exposure to cell phone use and behavioral problems in children. *Epidemiology*, 523-529.
- Hardell, L. (2017). World Health Organization, radiofrequency radiation and health-a hard nut to crack. *International journal of oncology*, 51(2), 405-413.
- Heuser, G., & Heuser, S. A. (2017). Functional brain MRI in patients complaining of electrohypersensitivity after long term exposure to electromagnetic fields. *Reviews on environmental health*, 32(3), 291-299.
- Kushnick, B. (2015). *The Book of Broken Promises: \$400 Billion Broadband Scandal & Free the Net*: New Networks Institute.
- Leach, V., Weller, S., & Redmayne, M. (2018). A novel database of bio-effects from non-ionizing radiation. *Reviews on environmental health*, 33(3), 273-280.
- Neufeld, E., & Kuster, N. (2018). Systematic derivation of safety limits for time-varying 5G radiofrequency exposure based on analytical models and thermal dose. *Health physics*, 115(6), 705-711.
- Schoechle, T. (2018). *Re-Inventing Wires: The Future of Landlines and Networks*.