

5G Inquiry Submission

I wish to raise concerns about the deployment and adoption of 5G infrastructure, devices and technology. Radio Frequency Electromagnetic Radiation (RF EMF) or non-ionising wireless radiation of which 5G is a part (along with 2G, 3G and 4G) has been shown to be harmful to people and the environment. With the ever-increasing adoption and use of this technology, including by toddlers and children, and the ubiquitous spread of cell towers that are ever encroaching into our streets and suburbs, a precautionary approach is warranted for its roll-out. While currently I have some control as to whether I expose myself and my family to wireless radiation, the deployment of 5G will drastically erode this choice. In order for 5G to successfully work there will be a requirement for small cell towers in our streets, flooding our homes and communities with wireless radiation 24 hours a day, 7 days a week. I and every Australian citizen should have the choice as to whether they want to be exposed to this already classified 2B carcinogen by the World Health Organisation's International Agency for Research on Cancer. To date this technology has not been proven to be safe and until it is a precautionary approach is warranted.

Along with a more precautionary approach to the deployment of 5G, an update of the current safety guidelines to take into account the biological effects of RF EMF is warranted to ensure safer adoption of this technology by the community. These safety guidelines should take into account the potential impact on young adults, children and babies and introduce more stringent requirements on the Telco's to provide safe infrastructure and devices so the adoption of this technology does not lead to detrimental effects further down the track. Furthermore, the use of safer alternatives such as the network of fibre optic cabling and other wired connections within the NBN should be encouraged and increased.

The Health Risk associated with RF EMF and 5G

According to the Environmental Health Trust¹:

Cumulative daily radiation exposure poses serious public health risks. (1)

The Environmental Health Trust go on to conclude:

Peer reviewed, published science indicates that exposures to wireless radiation can increase cancer risk and alter brain development and damage sperm. Most people are unaware that wireless technology was never tested for long term-safety, that children are more vulnerable and that the accumulated scientific evidence shows harm. (1)

Several large Insurance companies have highlighted RF EMF and 5G as having a HIGH risk and have opted not to insure for injury as a result of this technology (2) (3) (4). The Swiss Re Report on new and emerging risks (2) titled *Off the leash - 5G mobile networks* on page 29 while acknowledging the potential benefits of 5G technology also highlight that the biological effects of EMF in general and 5G in particular are still being researched but that potential health impairment claims may come with a long latency. They further state:

¹ The Environmental Health Trust is led by Dr Debra Davis, an award winning and internationally renowned scientist who was the founding director of the Board on Environmental Studies and Toxicology of the U.S. National Research Council, National Academy of Sciences.

To allow for a functional network ...more antennas will be needed, including acceptance of higher levels of electromagnetic radiation. (2)

Lloyd's of London describe:

The danger with EMF is that, like asbestos, the exposure insurers face is underestimated and could grow exponentially and be with us for many years. (5)

While AM Best, the only global credit rating company with a focus on the insurance industry, in their 2013 AM Best Briefing titled *Emerging Technologies Pose significant Risk with Possible Long-Tail Losses* state that:

The risks associated with long term use of cell phones, although much studied over the past 10 years, remains unclear. Dangers to the estimated 250,000 workers per year who come in close contact with cell phone antennas, however, are now more clearly established. Thermal effects of the cellular antennas, which act at close range essentially as open microwave ovens can include eye damage, sterility and cognitive impairments.....The continued exponential growth of cellular towers will significantly increase exposure to these workers and others coming into close contact with high-energy cell phone antenna radiation. (6)

In short the insurance companies do not want to insure for Electromagnetic radiation because it is simply far too risky.

The Austrian Accident Insurance Institute (AUVA) has undertaken several research reports from 2009 to 2016 (7) on the non-thermal impact of RF EMF and found that there are health effects and that precaution is required. Their findings are summarised as:

- RF EMF from cell phone radiation have an impact on the: Central Nervous System (brain), Immune System, Cognition and Protein Synthesis.
- The radiation-induced effects observed, were not always dosage-dependent as would be expected from thermal effects. Some cells showed an even stronger response with intermittent exposure. This would also support a biological effect mechanism.
- An important observation showed that, among the different cells, those that were metabolically active respond most strongly. This cell quality is most pronounced in the growing tissues of babies, children and youth. Consequently, it is these groups that would be more susceptible to the described effects.

The World Health Organisation's International Agency for Research on Cancer, after considering hundreds of scientific articles classified RF EMF, of which 5G is a part, as potentially carcinogenic to humans (Class 2B carcinogen) in 2011 (8). They have recently released new recommendations in April 2019 to reassess as a "high priority" the cancer risks of RF EMF in light of new research since their 2011 classification (9).

Safety of RF EMF and 5G and our current standards

According to Frank Clegg, the former President of Microsoft Canada:

I believe our current implementation of wireless technology is NOT safe. (10)

Scientists across the world are calling for a precautionary approach to RF EMF and 5G. In 2017 over 180 scientists and doctors issued a declaration calling for a moratorium on the increase in 5G cell antennas citing human health impacts and impacts on wildlife (11). Add

to this the 2015 International EMF Scientist Appeal with signatures from 225 scientists across 41 nations urging for the development greater protective policy, guidelines and safety education, particularly in terms of risk to children and fetal development (12).

EMF safety standards vary throughout countries and several have more stringent standards than Australia. These varying standards are roughly based on 3 different models of reasoning according to Kenneth R. Foster, Ph.D, a professor in the Department of Bioengineering at the University of Pennsylvania and are summarised below (13):

- 1) The Thermal Damage Model - which includes Australia, USA and many countries in Western Europe and does not consider biological damage from RF EMF only its thermal heating quality. He believes this model has the greatest risk as it ignores new research.
- 2) The Multiple Biological Effects Model - followed by Russia, China, and many Eastern European countries which have limits way below ours and take into account exposure of RF EMF over longer periods of time instead of the immediate thermal impacts that we set our limits on.
- 3) Precautionary Model - Italy, Switzerland, and Belgium have created exposure standards specifically intended to reduce the yet unknown risks of RF EMF.

Chris Wollaams the CEO of Integrated Oncology News sums it up in the following terms:

In a world where a drug cannot be launched without proof that it is safe, where the use of herbs and natural compounds available to all since early Egyptian times are now questioned, their safety subjected to the deepest scrutiny, where a new food cannot be launched without prior approval, the idea that we can introduce wifi and mobile phones without restrictions around a 5 year old is double-standards gone mad. (14)

The Problem with SAR Rating in phones that use RF EMF and 5G

We cannot look at the deployment of 5G without looking at the technology it will support. Safety guidelines for phones and tablets that use Rf EMF (and in the future 5G) was developed back in 1996 when mobile phone use was much less then it is today. The SAR (specific absorption rate) is based on the testing of a mannequin head called SAM (Specific anthropomorphic mannequin) who's dimensions represents only 3% of the population. SAM is modelled on a 6'2" (188 cm) male and is used to assess how much a human brain heats up when exposed to the maximum amount of radiation from a mobile phone held at least 5mm away from the head. This exposure is at the rate of 6 minutes a day.

Children's bodies and heads are smaller then the model tested and contain more water than adults which means they absorb 2 times more radiation with their bone marrow absorbing up to 10 times that of an adult (15). Considering that women, adolescents, children and even toddlers are now using mobile phones (and devices), often in a way contrary to those in the testing lab and for a lot longer each day, the relevance of this safety standard comes into question.

There is also an emerging body of evidence that goes beyond the heating effects of RF EMF, that is the effects measured by the SAR. This body of evidence shows that RF EMF (non-ionising wireless radiation) also has biological effects (along with heating) leading to impacts on human health. The US National Toxicology Program undertook a study to test whether RF EMF from cell phones cause cancer (15). The study exposed rats and mice to the equivalent RF EMF that a person would receive from talking ½ hour each day for 36 years. The study found that there was a higher rate of two types of brain cancer in the

exposed group than compared to the control group. The researchers ensured that the study removed the heating or thermal effects by making sure the rats body temperature never rose by more than 1 degree Celsius. There were also some other biological effects happening in this study beyond thermal effects yet our current safety standard continues to only take into account the thermal effects of exposure to RF EMF.

Reduction in Personal Choice

According to the Environmental Health Trust the radiation from small cells, that is those intended to be deployed as part of the 5G network, is not small (1). They go on to state that “radiation emitted from small cells is expected to typically travel from 10 feet to several hundred feet.” These small cells that will be part of the 5G deployment are set to be in the millions and will bring a greater level of RF EMF into our streets, parks and homes than ever before. While currently I have some control as to whether I expose myself and my family to wireless radiation, 5G will not afford me nor others this choice.

I have personally had my health impacted by RF EMF exposure. I have a history of insomnia, and more recently heart palpitations and dizziness. On encouragement from my doctor I sought out an EMF specialist to undertake an assessment of my home. We have for many years had ethernet connections throughout our house but discovered our modem was emitting wifi even though we had switched the wifi off. We subsequently contacted our service provider and had the wifi function disabled since the wifi button did not do so. My sleep has since improved and the other issues have disappeared. Personal choice around my exposure to RF EMF is of the utmost importance to me and those like me that are EMF sensitive.

Several studies including one published in 2015 found:

There is increasing evidence that the "microwave syndrome" or "electro-hypersensitivity" (EHS) is a real disease that is caused by exposure to EMFs, especially those in the microwave range. (16)

Research that surveyed 270 men and 260 women who lived at varying distances to Cell Towers found that those who lived closest experienced the most EHS type symptoms and that people should not live within 300 metres of cell antenna. They found:

... in relation with distance from base station and sex, show significant ($p < 0.05$) increase as compared to people living > 300 m or not exposed to base station, till 300 m for tiredness, 200 m for headache, sleep disturbance, discomfort, etc. 100 m for irritability, depression, loss of memory, dizziness, libido decrease, etc. Women significantly more often than men ($p < 0.05$) complained of headache, nausea, loss of appetite, sleep disturbance, depression, discomfort and visual perturbations. (17)

Emerging Health Impacts of RF EMF (wireless radiation) and 5G

While the scientific evidence is in no way conclusive, there is enough emerging evidence to throw doubt on the safety of the RF EMF technology that has become ubiquitous in our daily lives. While there are plenty of headlines that announce new studies that claim “no evidence of health risk” this is NOT the same as ‘safe’.

When looking at any Health impacts from RF EMF and therefore 5G we need to take a close look at who is providing the funding. As Martin Blank reports in his book *Overpowered*, the researcher Henry Lai has been tracking studies on the health effects of RF EMF since 1990. He found that around 30% are industry funded and 70% independent. Of the industry funded studies only 27% showed a biological health effect as a result of RF EMF exposure while the independent studies found an incidence of 68%. Lai goes on to explain that a lot of studies that are done now are done purely as PR tools for the industry (18).

The Oceania Radiofrequency Scientific Advisory Association² have constructed the world's largest categorised online database of peer-reviewed studies on RF EMF radiation and concluded:

A recent evaluation of 2266 studies (including in-vitro and in-vivo studies in human, animal, and plant experimental systems and population studies) found that most studies (n=1546, 68.2%) have demonstrated significant biological or health effects associated with exposure to anthropogenic electromagnetic fields. (19)

The authors of this paper undertook their own analysis on the data around RF EMF exposure and found:

... that 89% (216 of 242) of experimental studies that investigated oxidative stress endpoints showed significant effects. This weight of scientific evidence refutes the prominent claim that the deployment of wireless technologies poses no health risks at the currently permitted non-thermal radiofrequency exposure levels. (19)

Dr Martin Pall has recently undertaken a review (20) of the science around wireless radiation and in particular microwave frequencies which is the frequency range at which 5G operates and he found the data showed the following non-thermal health effects associated with RF EMF:

- Cellular DNA Damage
- Changes in testis structure, lowered sperm count/quality
- Neurological/neuropsychiatric effects
- Apoptosis/cell death
- Calcium overload
- Endocrine effects
- Oxidative stress, free radical damage

A 2018 review of the scientific literature around the thermal and non-thermal health effects of RF EMF by researchers of the European Cancer Environment Research Institute in Brussels and the Institute for Health and the Environment at the University at Albany found:

Exposure to low frequency and radiofrequency electromagnetic fields at low intensities poses a significant health hazard that has not been adequately addressed by national and international organizations such as the World Health Organization. There is strong evidence that excessive exposure to mobile phone-frequencies over long periods of time increases the risk of brain cancer both in humans and animals. The mechanism(s) responsible include induction of reactive

² The Oceania Radiofrequency Scientific Advisory Association is an independent scientific organisation made up of volunteering scientists.

oxygen species, gene expression alteration and DNA damage through both epigenetic and genetic processes. (21)

They went on to conclude:

Unfortunately standards set by most national and international bodies are not protective of human health. This is a particular concern in children, given the rapid expansion of use of wireless technologies, the greater susceptibility of the developing nervous system, the hyperconductivity of their brain tissue, the greater penetration of radiofrequency radiation relative to head size and their potential for a longer lifetime exposure.(21)

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