Dr Murray May, [redacted] **28 October, 2019**

Submission to the House of Representatives Standing Committee on Communication and the Arts: Inquiry into 5G in Australia

Dear Committee Members

I submit the following in relation to the committee's terms of reference addressing the deployment, adoption and application of 5G in Australia. I note there is no mention of public health in the terms of reference, even though this has been an issue of significant interest in the media.

My qualifications include a First class Honours Science degree in chemistry (University of Queensland) and a later career PhD in social ecology/environmental health (Western Sydney University, 2005). I worked for 23 years in the Australian Public Service in Canberra, primarily in the Health Department (environmental health, health education) and the Environment Department and associated agencies. From 2008 to 2016, I was a Visiting Fellow in the School of Physical, Environmental and Mathematical Sciences, UNSW Canberra. I have in recent years been involved with the issue of electromagnetic radiation and am a current active member of the Oceania Radiofrequency Scientific Advisory Association (https://www.orsaa.org/).

The deployment of 5G in Australia is problematic on multiple grounds. These are summarised below:

1. **There is now significant resistance worldwide and in Australia, both institutionally and at a community level, towards the installation of 5G technology.** These responses demonstrate a depth of thought and a critical approach, drawing on the existing and growing scientific evidence about harm from radiofrequency radiation.

For example, in Brussels Environment minister Céline Fremault earlier in 2019 stated that "I cannot welcome such technology if the radiation standards, which must protect the citizen, are not respected, 5G or not … The people of Brussels are not guinea pigs whose health I can sell at a profit. We cannot leave anything to doubt" ("Radiation concerns halt Brussels 5G development, for now," 2019).

Moratoriums have already been applied, for example, in various forms in parts of Switzerland, the Netherlands, Florence, Italy, Portland, Oregon, and San Francisco, California. The organisation, Americans for Responsible Technology (ART), co-ordinated a nationwide day of action to protest the deployment of 5G in the USA. A petition with signatures from 54,643 Germans asked the Parliament to stop a 5G auction on health grounds. There are currently over 60 Stop 5G groups across Australia, spanning national, State and Territory groups (https://www.wesaynoto5ginaustralia.com/local-groups).

2. **Deploying 5G without the scientific evidence that it is safe to do so is not only highly irresponsible but potentially very costly in financial terms.** Current topical examples of what happens in terms of financial cost from ill-considered government/industry mishandling and approval include the grounded Boeing 737 MAX which killed two

planeloads of people in October 2018 and March 2019, costing Boeing severely. A further example is the installation and subsequent required removal of flammable cladding from buildings in Australia at a cost of hundreds of millions of dollars, and more likely billions of dollars. PFAS chemical contamination across Australia is an additional example with huge financial ramifications.

Professor Dariusz Leszczynski (University of Helsinki, Finland) outlines in a September, 2019 presentation (included as an **appendix** to this submission) the confusion around 5G, in that it is being developed and deployed at the same time, and is a combination of old and new technologies. He also emphasises the paucity of research and serious limitations of biomedical research to date on millimetre waves, the higher frequency bands planned for use with 5G. Auctioning off this part of the spectrum is premature in such a state of ignorance.

Bodies such as ARPANSA and ICNIRP are looking for established evidence of harm before acting, which is not world's best practice for risk management. To establish harm is the point at which a potential risk materialises, which is far too late given the size of the population being exposed without formal consent. US Senator Richard Blumenthal (D-CT) raised concerns about scientific research on the safety of 5G technology with wireless industry representatives at a US Senate hearing, who conceded it had not been done. At the end of the exchange, Blumenthal concluded: "So there really is no research ongoing. We're kind of flying blind here, as far as health and safety is concerned" ("At Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Technology's Potential Health Risks," 2019).

Concerned and experienced scientists and medical doctors in fields from biophysics to oncology with respect to electromagnetic radiation (253 signatories at September 17, 2019) have therefore come together supporting the need for a precautionary approach via the 5G appeal. The appeal begins:

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

And in relation to higher frequencies:

"5G technology is effective only over short distance[s]. It is poorly transmitted through solid material. Many new antennas will be required and full-scale implementation will result in antennas every 10 to 12 houses in urban areas, **thus massively increasing mandatory exposure."** ("The 5G appeal," 2019).

To give just one example of the state of knowledge, or rather ignorance of possible harm, consider recent research by Israeli physicists whose work suggests that sweat ducts in the

skin could behave as antennas and thus respond to millimetre waves. They conclude as follows:

"While the promises of a glorious future, resplendent with semi-infinite data streaming, may be attractive, there is a price to pay for such luxury. We shall find our cities, workspace and homes awash with 5G base stations and we shall live though an unprecedented EM smog. The benefits to our society … cannot ignore possible health concerns, as yet unexplored. There is enough evidence to suggest that the combination of the helical sweat duct and wavelengths approaching the dimensions of skin layers could lead to non-thermal biological effects. Such fears should be investigated and these concerns should also effect the definition of standards for the application of 5G communications." (Betzalel, Ishaia, & Feldman, 2018).

3. The deployment of 5G in Australia rests on assumptions about the ARPANSA RF Standard. Bureaucrats and most politicians default to this position without apparently understanding the politics, research, and assumptions behind it.

Australia's regulation of RF radiation by ACMA is flawed, risking public health. ACMA uses the ARPANSA RF standard, but has actually dropped the limited precautionary aspects contained in the ARPANSA Standard. It is either naïve or reckless for politicians to continue with this approach.

The elements of and reasons for such a flawed position continuing are outlined below:

(a) The current ICNIRP safety guidelines are obsolete, being based on the outdated notion that only thermal effects are relevant, whereas there is now a large and growing scientific literature on non-thermal bio-effects showing adverse biological and health effects at radiation levels well below ICNIRP guidelines. ARPANSA similarly continues to ignore this scientific evidence. I am co-author of a recent letter to the editor in the journal *Bioelectromagnetics* in which the problems with the current thermally based standard are discussed (https://onlinelibrary.wiley.com/doi/abs/10.1002/bem.22225).

Such extensive scientific evidence is available for any politician or bureaucrat to access via the Oceania Radiofrequency Advisory Association database, the world's largest categorised database on radiofrequency electromagnetic radiation (www.orsaa.org). An overview of the latter database is provided by Leach, Weller and Redmayne (2018). Another review is the BioInitiative Report 2012 website updated to 2019 (https://bioinitiative.org/conclusions/). The extent of the paradigm gulf of thermal vis-à-vis non-thermal effects is now increasingly recognised in the medical literature, including a recent overview in *The Lancet* (Bandara & Carpenter, 2018).

(b) ACMA, ARPANSA, and ICNIRP (used by ARPANSA) have financial conflicts of interest, receiving funding from the wireless industry and working in partnership with it. For example, the well published long-term EMR researcher and oncologist Professor Lennart Hardell (2017) analyses in a paper attached as an **appendix** to this submission, how ICNIRP is an industry loyal NGO and has serious financial conflicts of interest. He discusses how the World Health Organization (WHO) EMF project was largely funded by telecom lobbying

organisations and how the chairman of ICNIRP acted like a representative for the telecom industry while responsible for the EMF health effects department at WHO.

This activity is at odds with the WHO's International Agency for Research on Cancer (IARC) which reviewed the scientific evidence related to cancer and classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B). Based upon the research published since 2011, the IARC has recently prioritized RFR to be reviewed again in the next five years. When considered with recent animal experimental evidence, the recent epidemiological studies strengthen and support the conclusion that RFR should be classed as carcinogenic to humans (IARC Group 1). The large (US $25 million) National Toxicology Program (NTP) study showed statistically significant increases in the incidence of brain and heart cancer in animals exposed to EMR below the ICNIRP guidelines followed by many countries.

(c) None of the themes above are particularly new, though the evidence base is now considerably larger. The earlier Australian Senate report provided a critique of and recommended against adopting ICNIRP guidelines to relax the Australian exposure standard (Senate Environment Communications Infomation Technology and the Arts References Committee, 2001). An earlier 1994 report by Dr Stan Barnett of CSIRO's Division of Radiophysics listed many well documented adverse bio-effects from exposure to RF at power levels well below the threshold for thermal effects.

As this evidence threatened industry interests, the trend in recent years has been for the Australian government to fund bodies such as the Australian Centre for Electromagnetic Bioeffects Research (ACEBR) staffed by people such as Prof. Rodney Croft, a psychologist by training. This skews research towards nocebo explanations of effects observed, rather than the biomedical approach as previously elaborated by Barnett. Handily for industry, it's much easier to locate problems in people's psyches than to address the biological data. Contradicting the nocebo thesis is the expanding literature showing the broad-ranging, scientifically demonstrated impacts of EMR pollution on animals and plants. One recent example is a study on insects, of great importance for the future economy, as it indicates a threat to honeybees from frequencies ranging from 2-120 GHz, encompassing those planned for use by 5G (Thielens et al., 2018).

(d) ARPANSA's website includes a disclaimer on its website which reads in part:

"Nothing contained in this site is intended to be used as medical advice and, in particular, it should not be used … as a substitute for your own health practitioner's professional advice. ARPANSA does not accept any liability for any injury, loss or damage incurred by use of or reliance on the information provided on this website."

How could it do otherwise? There is no way that research can keep up with the technology. Implementing 5G is therefore a human experiment on a wide scale, potentially opening Pandora's box. Unaddressed by ARPANSA's assurances are the total cumulative exposure across the spectrum from multiple sources and exposures for sensitive populations such as children. If there are synergistic effects from simultaneous exposures to multiple types of RFR, the overall risk of harm from RFR may increase substantially. There is a need to

address changes in carrier frequencies and the growing complexity of modulation technologies.

ARPANSA's assurances about no evidence of harm are thus not backed with any confidence, given the disclaimer above. Further, no one with medical qualifications is involved in ARPANSA's assessment of health risks, nor anyone with biomedical expertise. The academic training of panel members spans physical sciences, epidemiology and psychology.

The major insurance and reinsurance group Swiss Re is considerably more hard-headed with its evaluation, naming five risks with high potential impact on the industry in its 2019 SONAR report (Swiss Re, 2019). One of these is the spread of 5G technology, with concerns about potential negative health effects from electromagnetic fields likely to increase. In addition, hackers can exploit 5G speed and volume to acquire (or steal) data faster. This raises significant additional concerns about possible privacy and security breaches, as well as espionage e.g. the concerns raised about Huawei in Australia.

4. Careful technology assessment is required, taking into account the need for technologies and the costs involved. Just because we *can* do something doesn't necessarily mean we *should*. Prevention is better than cure.

Professor of Medicine at the University of California San Diego, Beatrice Golomb, reports that her research group alone has received hundreds of communications from people who have developed serious health problems from electromagnetic radiation, following introduction of new technologies. Golomb says most likely these are the tip of an iceberg of tens or perhaps hundreds of thousands of affected persons. As each new technology leading to further exposure to electromagnetic radiation is introduced – and particularly introduced in a fashion that prevents vulnerable individuals from avoiding it – a new group becomes sensitised to health effects. Her letter of 22 August, 2017 arguing against a Bill paving the way for 5G in California is attached as an **appendix**.

The speed of technological development doesn't mean we can abandon the important process of careful decisions about our common future. Just because we *can* do something doesn't necessarily mean we *should*. The internet of things means that one's home would end up being a major source of electrosmog.

Professor Golomb's call reflects that of many progressively oriented websites when she says:

"Let our focus be on safer, wired and well shielded technology – not more wireless."

The deployment of wireless has led to many unintended but serious consequences to date. These include significant distraction related road crashes from people texting and viewing smartphones while driving. The Federal Minister for Education recently announced $34.9 million in funding for the establishment of an Australian Research Council (ARC) Centre of Excellence for the Digital Child based at QUT. It will study issues such as excessive screen time and mental health issues in children, addiction, social media and gaming, online safety etc.

The ludicrous and widespread nature of technological invasion is underlined by the example of a new smart nappy that uses wireless sensors to alert parents when the baby's nappy needs changing. With this sort of thinking ever-present, a careful reconsideration of what is "smart" is urgently required.

Appendices

1. Professor Dariusz Leszczynski, University of Helsinki, Finland – presentation on "gaps in the knowledge" 15 September, 2019 Australia.

2. Professor Lennart Hardell – journal article (Hardell, L. (2017). World Health Organization, radiofrequency radiation and health - a hard nut to crack (Review). *International Journal of Oncology, 51*, 405-413.)

3. Professor Beatrice Golomb MD, PhD – Professor of Medicine, University of California, San Diego. Letter of 22 August, 2017 on the case against a Bill paving the way for the implementation of 5G.

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