



**Australian Government**  
**Australian Radiation Protection  
and Nuclear Safety Agency**



# **Supplementary submission to the House of Representatives Standing Committee on Communications and the Arts inquiry into 5G in Australia**

## Independence and exclusion of evidence

The CEO of Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is an independent statutory authority, separate from any other government body. As a Health portfolio agency, ARPANSA acts autonomously and is independent of commercial interests across wider government or industry. Further, ARPANSA is not a proponent of mobile technology, and as a science based agency, our role is to convey the evidence.

Ultimately, ARPANSA rejects any views that our assessment is influenced by commercial interests, or that we operate in any way that compromises our mandated roles under *the Australian Radiation Protection and Nuclear Safety Act 1998* (ARPANS Act).

ARPANSA also rejects claims that we ignore certain scientific evidence, particularly with respect to evidence of non-thermal effects of exposure to radio waves. As we note in our main submission, and in our analysis of the 5G Appeal, there is considerable body of evidence that we base our assessment on the health impacts of radio waves and any assessment of studies undergoes a stringent process<sup>1</sup>.

## Reports and Appeals cited

### 5G Appeal

As mentioned in the main submission, the 5G Appeal was prepared in 2017 by some scientists and doctors around the world who are calling for the European Union to ‘halt the roll out of 5G due to serious potential health effects from this new technology’<sup>2</sup>. The 5G Appeal contains four main topics, which ARPANSA assesses below.

#### ***“5G leads to massive increase of mandatory exposure to wireless radiation”***

Exposure to radiofrequency (RF) fields reduces very rapidly with distance. So although we may be exposed to RF from various sources, it is close proximity to a particular source (e.g. when using a mobile phone) that will typically dominate the exposure. Measurement surveys have shown that exposure to RF radiation in the environment from various sources is very low and typically much lower than the allowable limit for safety in the ARPANSA RF Standard.

Introducing a new technology while retaining older systems may result in a small increase in overall environmental levels from mobile network infrastructure. However, as the older systems are replaced, this overall level will gradually reduce. In addition, while more antennas may be required to service areas where demand for the new service is high, users are closer to the mobile phone base station and therefore their devices can operate at a reduced power, reducing their exposure from their personal device<sup>3</sup>.

ARPANSA assesses that 5G will not lead to a “massive increase” of exposure to radio waves in the environment.

#### ***“Harmful effects of RF-EMF exposure are already proven”***

Although there have been studies reporting a range of biological effects at low RF levels, there has been no indication that such effects might constitute a human health hazard. Furthermore, no single study considered in isolation will provide a meaningful answer to the question of whether exposure to RF can cause or contribute to adverse health effects in people or in the environment. In order to make an

informed conclusion from all the research studies, it is important to weigh the science in its totality. Scientific evidence is deemed to be established when it is consistent and generally accepted by the broader scientific community. This usually follows an evaluation of the available data by expert scientific bodies using a health risk assessment approach. In a health risk assessment, all the available studies with either positive or negative effects, need to be evaluated and judged on their own merit, and then all together in a weight of evidence approach. It is important to determine how much a set of evidence changes the probability that exposure causes an outcome. Generally, studies must be replicated or be in agreement with similar studies. The evidence for an effect is further strengthened if the results from different types of studies (epidemiology and laboratory) point to the same conclusion.

As mentioned in main submission, health authorities around the world, including ARPANSA and the World Health Organization (WHO), have examined the scientific evidence for possible health effects from telecommunications sources. Current research indicates that there is no established evidence for health effects from the low level radio waves used in mobile telecommunications. This includes the upcoming roll-out of the 5G network.

The National Toxicology Program (NTP) animal study, which looked at whether exposure to RF causes any health effects in rats and mice. The NTP reported that there was varying evidence that exposure to high RF levels was associated with tumours of the heart, brain and adrenal glands of male rats. There was no clear evidence of any tumours in female rats, and male and female mice. The NTP also noted that these results cannot be directly applied to humans for two main reasons:

- The RF levels and durations of exposure in this study were greater than what people receive from mobile phones.
- The rats and mice were exposed to RF across their whole bodies, which is different from the more localized exposure that humans receive from mobile phones.

ARPANSA and the International Commission for Non-Ionizing Radiation Protection (ICNIRP) have published detailed analyses of the study<sup>4,5</sup>. ICNIRP, in its analysis, concluded that the NTP study does not provide a consistent, reliable and generalisable body of evidence that can be used as a basis for revising current human exposure guidelines to RF.

The epidemiological (population studies) evidence does not give clear or consistent results indicating mobile phone use causes disease in people. Some epidemiological studies have shown an association between heavy mobile and cordless phone use and brain cancer. Limitations of the methodology in these studies prevent conclusions of causality being drawn from these observations. Based largely on this limited evidence, the International Agency for Research on Cancer in 2011 classified RF fields as a Group 2B or possible carcinogen<sup>6</sup>. A study led by ARPANSA and published in the British Medical Journal Open in 2018 found no link between the use of mobile phones in Australia and the incidence of brain cancers. It showed that although mobile phone use has risen rapidly since 2003, there has been no increase in brain cancer since then.

ARPANSA's main submission discusses the issue of electromagnetic hypersensitivity (EHS). In summary, ARPANSA and the WHO advise that based on current scientific information, there is no established evidence that EHS is caused by RF at levels below exposure guidelines<sup>7,8</sup>. ARPANSA acknowledges that the health symptoms experienced by the affected individuals are real and can be a disabling problem, and advise those affected to seek medical advice from a qualified medical specialist.

ARPANSA's assesses that the total scientific body of evidence does not support the view that radio waves exposure to levels below the ICNIRP guidelines and the ARPANSA RF Standard will cause harm to individuals or the environment.

### ***“Precautions”***

In order to compensate for uncertainties in the scientific knowledge, large safety factors are incorporated into the exposure limits i.e. the limits are set well below the level at which all known adverse health effects occur<sup>9</sup>.

The Nuremberg Code is a set of research ethics applicable to experiments on humans<sup>10</sup>. The roll-out of 5G is not an experiment. There are experiments that are being conducted to investigate the effects of RF on human health. ARPANSA supports ethical research in human and ethical animal experiments.

ARPANSA assesses that the ICNIRP guidelines and the ARPANSA RF Standard already have sufficient precaution imbedded in their design.

### ***“Safety guidelines” protect industry — not health***

As was mentioned in the main ARPANSA submission, at the time the ARPANSA RF Standard was prepared, it was recognised that new scientific research may indicate that changes may need to be made to the limits or the implementation of the standard. Since then, the rationale for known health effects has remained the same. However, there have been advances in the measurement of radio wave absorption by the human body and ICNIRP is currently revising its guidelines. ARPANSA is planning to revise its RF Standard following the publication of the revised ICNIRP Guidelines. Changes are expected to refine the maximum exposure limits and are not expected to impact exposure from telecommunications (including 5G) which tend to be much lower than the maximum exposure limits.

ICNIRP provides scientific advice and guidance on the health and environmental effects of non-ionising radiation (NIR) to protect people and the environment from detrimental NIR exposure. ICNIRP is independent from commercial, national and vested interests. ICNIRP's members do not represent their country of origin nor their institute. They cannot hold a position of employment or have other interests that compromise their scientific independence. ICNIRP does not receive money from industry; its funding stems from subsidies granted by national and international public institutions.

ARPANSA assesses that the safety guidelines as produced by ICNIRP are entirely independent, and are a sound basis for any national government to base their standards on.

### **The BioInitiative Report**

The BioInitiative Report discusses the effects of electromagnetic fields (related to powerlines and wireless devices) and health<sup>11</sup>. The report is a collection of separate chapters written by individual authors that does not follow the health risk assessment approach performed by expert scientific bodies. The BioInitiative Report presents selected research results indicating the possibility of harmful effects beyond those considered established by the mainstream scientific community. Further, the policy recommendations made by the editors of the report do not necessarily follow from the overall body of scientific evidence on the subject. A detailed review of the BioInitiative Report was prepared by the Australian Centre for Radiofrequency Bioeffects Research, which concluded that the report ‘merely provides a set of views that are not consistent with the consensus of science, and it does not provide an analysis that is rigorous-enough to raise doubts about the scientific consensus’<sup>12</sup>. Internationally, detailed reviews on the

BioInitiative Report have been prepared by health authorities such as the Health Council of the Netherlands<sup>13</sup>, the German Federal Office for Radiation Protection and the French Agency for Environmental and Occupational Health Safety, all criticising the report for not being an objective and balanced reflection of the current state of scientific knowledge.

ARPANSA supports the assessment of these leading bodies that the BioInitiative Report is not an objective or balanced analysis of the scientific body of evidence.

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<sup>1</sup> How is scientific evidence assessed? <https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/how-is-scientific-evidence-assessed>

<sup>2</sup> The 5G Appeal <http://www.5gappeal.eu/the-5g-appeal/>

<sup>3</sup> Australian Centre for Electromagnetic Bioeffects Research, 5G Wireless Technology Fact Sheet [https://acebr.uow.edu.au/content/idcplg?IdcService=GET\\_FILE&dDocName=UOW254603&RevisionSelectionMethod=latestReleased](https://acebr.uow.edu.au/content/idcplg?IdcService=GET_FILE&dDocName=UOW254603&RevisionSelectionMethod=latestReleased)

<sup>4</sup> ARPANSA review of the National Toxicology Program animal study [https://www.arpansa.gov.au/sites/default/files/advise\\_from\\_arpansa\\_on\\_ntp\\_study.pdf](https://www.arpansa.gov.au/sites/default/files/advise_from_arpansa_on_ntp_study.pdf)

<sup>5</sup> International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP Note: Critical Evaluation of Two Radiofrequency Electromagnetic Field Animal Carcinogenicity Studies Published in 2018. Health Phys. 2019 Aug 27. <https://www.icnirp.org/cms/upload/publications/ICNIRPnote2019.pdf>

<sup>6</sup> International Agency for Research on Cancer (2013), Non-ionizing radiation, Part II: Radiofrequency electromagnetic fields. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, Lyon, France. <https://monographs.iarc.fr/wp-content/uploads/2018/06/mono102.pdf>

<sup>7</sup> ARPANSA factsheet on electromagnetic hypersensitivity <https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/electromagnetic-hypersensitivity>

<sup>8</sup> World Health Organization (WHO) fact sheet on Electromagnetic Hypersensitivity <http://www.who.int/peh-emf/publications/facts/fs296/en/>

<sup>9</sup> Australian Radiation Protection and Nuclear Safety Agency (2002), Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz Radiation Protection Series, 3. <https://www.arpansa.gov.au/regulation-and-licensing/regulatory-publications/radiation-protection-series/codes-and-standards/rps3>

<sup>10</sup> The Nuremberg Code <https://history.nih.gov/research/downloads/nuremberg.pdf>

<sup>11</sup> The BioInitiative report <https://bioinitiative.org/>

<sup>12</sup> Australian Centre for Radiofrequency Bioeffects Research (ACRBR). "ACRBR Position Statement on BioInitiative Report" <http://about.abc.net.au/wpcontent/uploads/2016/07/ACRBR-Bioinitiative-Report-18-DEc-2008.pdf>

<sup>13</sup> Health Council of the Netherlands Review <https://www.healthcouncil.nl/documents/advisory-reports/2008/09/02/bioinitiative>