AMTA

Australian Mobile Telecommunications Association

EME Update

Summer 2022

CONTENTS

Foreword

Welcome to the Summer 2022 Edition of AMTA's EME Update - a collection of news on all things EME in Australia and from around the world.

While the rollout of 5G is now well advanced and no longer a novelty for Australians and their communities, mobile communications and its rapid evolution to include new technologies such as mmWave services, continues to cause concerns for some members of the Australian public.

However, AMTA and its members remain confident in the safety of the mobile technologies they deploy and which are widely adopted by Australians to facilitate all aspects of their lives. Our confidence is founded on the science-based safety standards mandated in Australia and with which all mobile devices and infrastructure are required to comply.

In our last issue, AMTA welcomed the release of the new Australian RF safety standard, known as 'RPS S-1,' which incorporated an additional 20 years of scientific research and analysis to ensure Australian standards are up to date with the very latest for both existing and all future mobile network technologies.

As outlined in this issue of the AMTA EME Update, the Australian regulator, the Australian Communications and Media Authority (ACMA) has moved quickly to adopt the new standard into its regulatory regime for carriers and manufacturers.

In fact, Australia has been one of the first jurisdictions in the world to adopt these new regulations, based on the International Commission of Non-Ionising Radiation Protection (ICNIRP) guidelines, which were released in 2020.

AMTA worked closely with the ACMA in this process to ensure the new regulatory framework required technically correct compliance, as well as obligations which were practicable, efficient and effective for the industry to implement.

AMTA is currently assisting its members to review all their procedures and processes to ensure they meet the new regulatory requirements.

AMTA has also been busy pursuing the reforms it proposed in its States and Territories 5G Readiness Assessment Report released last year.

The reforms seek to make the regulatory framework which underpins the deployment of 5G to be as '5G ready' as possible, ensuring states and territories across Australia are best placed to take advantage of the 5G evolution. With active reviews underway in New South Wales and Victoria, approaches made at state level in Queensland and the Northern Territory, and even some work completed in Western Australia, AMTA is making good progress and looks forward to significant further developments in 2022.

In addition to the new regulations, in this edition of AMTA's EME Update, we also take a look at the recent and long-awaited publications of a large international study on the potential health effects of EME on children, the new EME research program being established in Australia, the international EME and health review process underway with the World Health Organisation and the contribution of the Australian authorities to this work.

We also take a further look at how jurisdictions around the world are moving to remove arbitrary constraints on deployment of 5G in recognition of the great benefits it offers for businesses, consumers and the economy.

We hope you enjoy this Summer 2022 edition of AMTA's EME Update. We welcome all your comments and feedback via contact@amta.org.au

Louise Hyland, AMTA CEO

No evidence of mobile phone tumour risk for young people

A large 14-country study - that included Australia - found *'no evidence of a causal association between wireless phone use and brain tumours'* among young people aged 10 to 24 years.

The MOBI-Kids study involved about 2,800 cases and controls from Australia, Austria, Canada, France, Germany, Greece, India, Israel, Italy, Japan, Korea, the Netherlands, New Zealand and Spain. The average age of participants was 16.5 years.

A press release from the Barcelona Institute for Global Health (ISGlobal), which coordinated MOBI-Kids, announced that the study showed:

'... no evidence of a causal association between brain tumours and use of mobile and cordless telephones and, in particular, exposure to radiofrequency (RF) and extremely-low-frequency (ELF) electromagnetic fields from these phones.'

Information about mobile and cordless phone usage was determined from interviews and reported mobile phone use was validated for about 25% of participants via billing records. A further MOBI-Kids validation study used an app that recorded phone usage for four weeks. This data was compared to recalled information six and 18 months later.

Importantly, more than a fifth of MOBI-Kids' participants were long-term users, and this is higher than the one in seven seen in the 2010 INTERPHONE study of adult mobile phone users.

The MOBI-Kids data indicated a possible protective effect, with reduced cancer risk for increasing mobile phone use, especially in the 15-19 year old age group. A commentary on the study by German authorities[i] explains that there is *'no reason to believe'* that a protective effect really exists.

More likely explanations, mentioned by the MOBI-Kids researchers, include relying on parents to estimate the usage of children and adolescents, and that sick people may have changed their phone usage before their cancer diagnosis.

While technical limitations of MOBI-Kids, such as relying on recall of past usage, mean that it is not possible to rule out a small risk, German authorities say the study *'... substantiates the current state of scientific knowledge that there is no reliable scientific evidence that radiation from mobile phones increases the risk of brain tumours.'*

[i] German Federal Office for Radiation Protection (BfS)

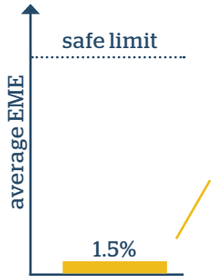
EME levels mostly unchanged with 5G

Measurements of EME levels by governments, universities and industry across the world show little change in typical public EME levels with the expansion of mobile networks and the addition of 5G.

Checking 5G in Australia

During 2021, the Australian Communications and Media Authority (ACMA) reported on an investigation of electromagnetic energy (EME) compliance for 5G base stations as part of the 2020-21 compliance priorities.

Measurements at 129 5G-enabled sites showed that average exposure was less than 1.5% of public EME limits. Operators were also found to be in compliance with regulatory requirements for EME exposure information and community consultation.

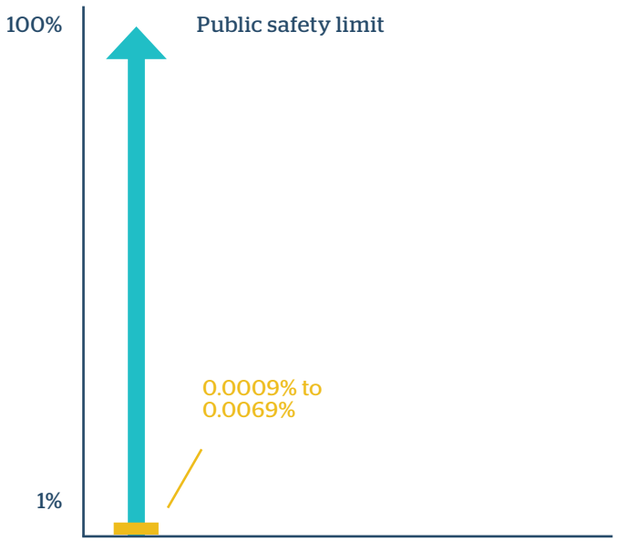


Average EME from Australian 5G enabled towers is less than 1.5% of the safe limit

Industry continues to share the results of 5G testing

Fifty measurements of 5G millimetre wave (mmWave) small cells operating at 26 GHz were conducted by Telstra at many different real-world settings in Queensland and Victoria. The 5G mmWave levels were *'very low, less than 1%'* of the public limit and similar to 3G, 4G and Wi-Fi.

Telstra also conducted EME testing of 5G low-band spectrum at 850 MHz in four towns on the Gold Coast. The testing showed very low average EME levels, which ranged from 0.0046 to 0.0069% of the public safety limit. These were similar to 3G levels that ranged from 0.0014 to 0.01% of the EME limit.



EME from 5G 850MHz sites we tested
Less than 1% of the public safety limit

EME levels mostly unchanged with 5G

EME levels similar after 5G launch in France

ANFR, the French spectrum agency, conducted measurements close to 1,500 mobile network sites identified for 5G and repeated the measurements after 5G was activated. The measurements included all the 5G frequencies used in France: 700 MHz, 2100 MHz (low-bands) and 3.5 GHz (mid-band). The results show that EME levels are comparable before and a few months after 5G roll out.

According to ANFR:

'For the low bands, the first results show that the public's exposure to waves remains stable despite their adaptation to 5G ... For the 3.5 GHz band, the first results show a very slight increase in exposure, with the additional contribution of this new band being estimated at 0.11 V/m, which is low compared to the regulatory limit of 61 V/m for this band.'

France uses the same regulatory limit values for EME as Australia.

In addition, ANFR conducted measurements at 370 5G sites while downloading a 1 gigabyte file. These results suggest that in the long-term, overall exposure could increase by 4% from the current low level in areas where 3.5 GHz is deployed. ANFR also points out that this new band increases the capacity of mobile networks by 50%.

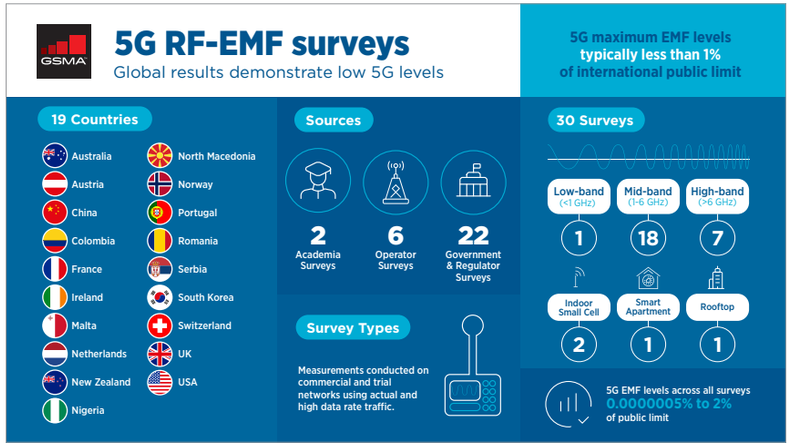
Global survey of 5G EME levels

The global mobile industry association, the GSMA, published an interactive map that summarises the results of 5G EME measurement surveys from 19 countries (including Australia). The surveys covered all 5G frequency bands and the typical maximum 5G EME level was less than 1% of the international public limits.

Long-term monitoring of EME levels in Sweden

Almost 300,000 environmental RF-EMF measurements collected from 2012 to 2021 by the Swedish Radiation Safety Authority show that *'levels are usually well below the reference value in both urban and rural areas, although there are exceptions.'*

Average exposures are 1,000 times below the limits with a *'slight upward trend.'* Tests were conducted over 1,733 km in 34 municipalities using a car equipped with measurement equipment.



ACMA amends regulations to adopt updated EME safety standard

In November 2021, the Australian Communications and Media Authority (ACMA) released amended regulatory instruments governing compliance of carrier and user equipment with the new Australian EME standard (RPS S-1).

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) RPS S-1

RPS S-1 was adopted in 2021 and is based on the updated international EME guidelines. It covers EME transmitters operating between 100 kHz and 300 GHz and supersedes RPS-3.

The amended ACMA regulations apply to public exposures and include a 12-month transition period that will end in November 2022. So, there is no immediate regulatory requirement to change existing procedures for transmitters.

There are a number of new reference level limits and compliance assessment options in the updated EME rules that AMTA is exploring in discussion with Standards Australia and Australian regulatory authorities.

It has been confirmed that the existing approach of determining EME compliance based on the peak level is conservative and can continue to be used. Work is underway to define the technical requirements for averaging that could be used when the peak method is overly conservative in a given application.

Safe Work Practice and RF Worker Safety

The ACMA rules only apply to EME compliance for the general public. Compliance with safe work practices and occupational exposure limits is regulated separately by the state and federal workplace safety agencies. Further regulatory amendments are expected from those bodies in the coming year.

ARPANSA calls for 5G research proposals

ARPANSA issued the first call for 5G EME health research proposals under its EME Program Action Plan 2020-2024. Funding is available for major research projects with a value of $30,000 - $300,000 and small/seed research projects (<$30,000). Applications will be assessed by ARPANSA and external EME experts. The results of the first round of applications are yet to be released.

ARPANSA is contributing directly to EME research and is currently working on a systematic map of the scientific evidence related to human-made EME exposure effects on animals and plants in the environment. The map will also identify knowledge gaps, recommend future research needs and inform environmental and radiation protection authorities.

Australia contributes to WHO protection framework

Australian scientists also contributed to the development of a WHO framework for non-ionising radiation protection framework that will enable countries to harmonise approaches to protection.

Brussels changes EME limits to enable 5G

The government of the Brussels Capital Region of Belgium has moved to implement the recommendation of a citizen consultative committee that the EME limit be increased to support the deployment of 5G in the city.

Rudi Vervoort, the minister-president for the Brussels Capital Region, said:

'With this decision in principle, it is the end of a long procrastination in a strategic dossier for the economic and technical future of the Brussels Region, as well as for its international image.'

Brussels has one of the most restrictive EME limits in Europe at 6 V/m for mobile networks, about 50 times stricter than international guidelines. This is linked to call saturation at 4G sites and currently prevents the deployment of 5G in the city. In the course of 2021, a consultative committee involving 45 citizens and 15 members of the Brussels parliament was tasked with making recommendations towards allowing 5G. One of the 43 recommendations was the adoption of an outdoor EME limit of 14.5 V/m.

The 14.5 V/m limit came from a 2018 report by the Belgian telecommunications regulator, which concluded that 14.5 V/m was the minimum needed to deploy 5G in the city but that adoption of international EME limits would *'guarantee the capacity and quality of mobile networks, and this will also ensure the user experience for end customers.'*

The draft regulation with the updated EME limit was published in October 2021 and will be subject to consultation with bodies representing environmental, social and economic interests before an updated draft is submitted to the parliament for approval.

The Belgium industry has repeatedly called for limits to be brought in line with the international EME guidelines, arguing that *'such a revision seems realistic while allowing the precautionary principle to be observed.'*

History of changes

The EME limits in Brussels have been modified several times since a restrictive 3 V/m limit was put in place in 2009. This negatively impacted mobile services in the city and blocked 4G deployment. After a drawn out process, including a legal challenge by community groups opposed to the change, in 2016 the limit was increased to 6 V/m, with each operator not allowed to exceed 33% of the limit.

In 2018, the Belgian telecommunications regulator (BIPT) warned that the Brussels EME limit would *'very seriously hinder the arrival of new services, such as 4.5G or 5G.'* Most reports estimate that 5G will contribute four to six billion euro ($6.3 to $9.5 billion) per annum to the Belgian economy by 2030.

Base station health surveys cause unjustified alarm

The Spanish EME expert group CCARS (Comité Científico Asesor en Radiofrecuencias y Salud) is critical of some studies investigating claimed health effects among people living near base stations warning that *'survey-based studies, and especially those that use non-validated questionnaires, have serious methodological limitations.'*

CCARS is concerned that:

'... some of the studies published on this topic tend to be of very low methodological quality, do not allow valid conclusions to be drawn, provoke a high risk perception, and generate fears and unjustified alarm. They are observational works based on household surveys in populations sensitized against the installation of antennas.'

In a 43-page report, the CCARS group provides both general guidance on how to analyse such studies and critical comments on a Spanish study that relied on self-reported health surveys completed by residents concerned about living near base station antennas.

CCARS points out that the neighbours' prior beliefs about EME risks mean that those surveyed will have a predisposition (bias) to confirm those risks, and this is *'a serious limitation of the validity of the study.'*

In addition, many of the symptoms mentioned in the survey responses are difficult to quantify (such as tiredness), common in the general populations (for example, headaches) or may be due to other factors (such as family circumstances). These are known as confounding factors and should be considered in any analysis.

Studies that assess health variables and EME exposure at a point in time are termed cross-sectional and do not permit establishing a cause and effect relationship. For example, it can't be known if the health complaints existed before the antennas were turned on.

The CCARS report concludes:

'Carrying out observational studies on indirect exposure to telephone antennas, without meeting systematic criteria that guarantee their methodological quality, generates an unjustified alarm for unknown purposes.'

COVID-19 misinformation

In a similar way, maps have been circulated on social media claiming to show a link between the 5G rollout and COVID-19. Irish researchers point out that conspiracy theorists are likely to see patterns in data that confirm their existing beliefs.

In reality, the researchers say that population density is predictive of both demand for mobile connectivity and levels of illness, so similar distributions would be expected to arise independently.

WHO initiates EME reviews

The World Health Organization (WHO) has commissioned a series of systematic reviews that will contribute to an updated health risk assessment for radiofrequency EME.

A systematic review is based on a clearly formulated research question and uses predefined methods to collect and analyse relevant scientific literature. The methods (or protocol) is published in advance to aid transparency.

Priority topics for WHO review

To prioritise the health outcomes that would be subject to systematic reviews the WHO International EMF project surveyed 300 EME experts. The experts rated the outcomes based on evidence from scientific studies, possible public health impact and public concern.

This led to the ten priority topics summarised in the table, of which nine protocols (four involve Australian scientists) are now published in a special issue of the journal Environment International. The tenth, will look at heating, which is the only established health mechanism for radiofrequency EME hazards.

Call for EME Task Group experts

In late 2021, the WHO began assembling the Task Group that will draw conclusions on the effects of EME exposure on health based on the systematic reviews and other reports. Individuals with a significant conflict of interest are not able to participate in the process.

The work is being undertaken through online and/or physical meetings, with completion estimated by December 2022.

The output will be published as a monograph in the WHO Environmental Health Criteria (EHC) series.

Review topic (study types)	Countries contributing
Cancer (animals)	Australia, Canada, Germany, Spain, Switzerland, USA
Cancer (epidemiology)	Australia, Germany, Italy, New Zealand, Sweden, Switzerland, UAE
Cognitive effects (human)	Austria and Germany
Cognitive effects (epidemiology)	Australia and Sweden
Self-reported symptoms (epidemiology)	Iran, Nigeria, Sweden, Switzerland, UK, USA
Self-reported symptoms (human)	Iran, Nigeria, Norway, Switzerland, UK, USA
Oxidative stress (animal, cell)	Austria, Germany, Italy, the Netherlands, UK, USA
Reproduction (animal, cell)	Australia, Canada, China, Italy, the Netherlands, UK
Reproduction (epidemiology)	Sweden, UK
Heat (human)	Protocol not yet published

Cancer data continues to show no link to mobile phones

Analysis of data from several countries for two decades of cancer trends continues to show no link to mobile phone use.

South Korean brain cancer study

Researchers examined data for brain cancer incidence from 1999 to 2017 relative to the number of cell phone subscribers. Overall they found *'no evidence of an increase in brain cancer incidence associated with the increasing number of mobile phone subscribers in Korea.'*

The study, which involved 29,721 patients, also looked at different generations of mobile technology, noting that 2G phones have been in use for more than 20 years. There was no evidence of technology related links.

Cancer time trends in England

Frank de Vocht, Professor in Epidemiology and Public Health at the Bristol Medical School, analysed time trends for brain, parotid gland and thyroid cancer in England between 1996 and 2017.

The parotid and thyroid glands are in the jaw and neck respectively, close to a mobile phone when making calls.

Professor de Vocht reported that:

'updated incidence trends of cancers of the brain and parotid gland in England continue to provide little evidence that exposure to RF radiation from mobile phones is an important risk factor; if it is one at all.'

The new paper is an update to a previous analysis by de Vocht that looked at data for England up to 2007. Ten more years of data showed *'little evidence of an impact of mobile phone use,'* however, de Vocht sees value in continuing to monitor cancer trends.

A recent US study of tumour rates for two other head cancers, benign meningiomas and vestibular schwannomas (also called acoustic neuromas), concluded that *'stable rates argue against an association with mobile phone use.'*

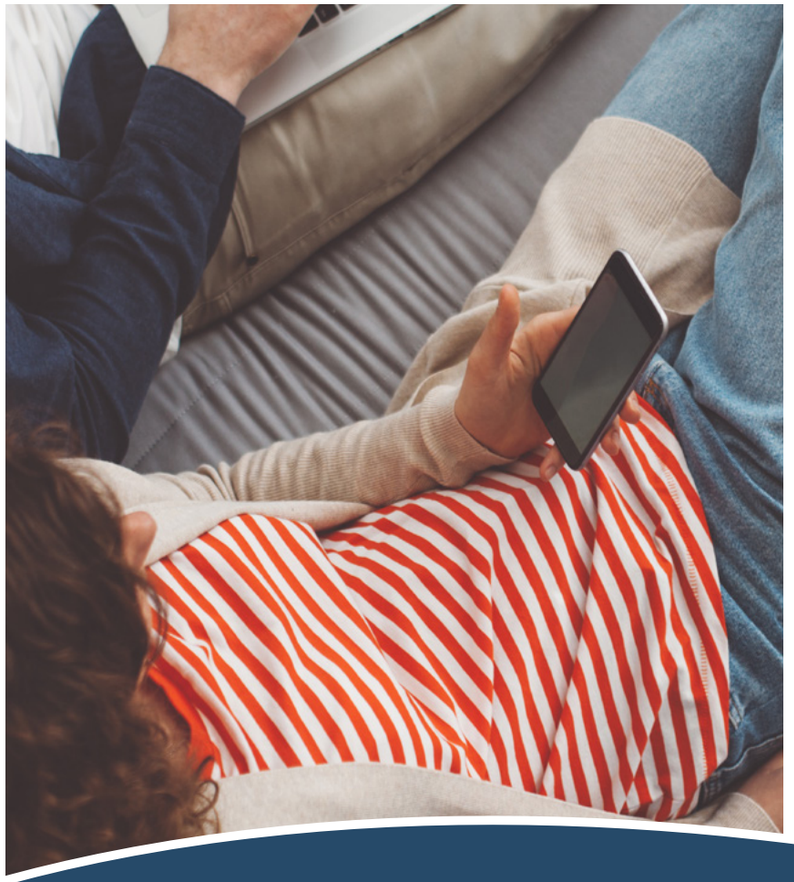
In 2021 an Australian study found no link between mobile phone use and salivary gland cancers.

Mobile phone risk is 'at least overestimated'

The International Agency for Research on Cancer (IARC) was asked by German authorities to look at brain cancer incidence trends in the Nordic countries in order to assess the magnitude of possible cell phone risks. The Nordic countries were among the first to make widespread use of mobile phones.

The complete analysis is not yet published but a summary in the IARC Biennial Report 2020-2021 explains that actual brain cancer incidence rates are not compatible with estimates from studies claiming increased risk. IARC says that the analysis shows that *'if there is a risk, it is very small'* and previous studies have *'at least overestimated'* the possible risk.

‘Little evidence’ of Wi-Fi health risk



Researchers from Swiss and Iranian universities reviewed studies involving exposure to Wi-Fi signals and found *‘little evidence that WiFi exposure is a health risk in the everyday environment.’* They noted that everyday exposure levels are typically considerably lower than international guideline values – the same values used in Australia.

The reviewers say that Wi-Fi contributes little to total EME exposure in our everyday environment, which makes it *‘challenging’* to study long-term effects specifically focusing on Wi-Fi signals.

The review was commissioned by the Swiss Federal Office of Public Health and the researchers examined epidemiological, animal and cell studies published between January 1997 and August 2020.

The authors say that many of the studies did not meet quality criteria, further noting that various reviews have found that higher quality studies were less likely to report biological effects.

Wi-Fi measurements in Australian schools

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has measured EME exposure from Wi-Fi and other sources across 23 schools in Victoria and New South Wales. The typical Wi-Fi levels inside classrooms was 0.0002% of the Australian safety standard and similar to levels reported in international studies.

On the basis of current scientific information, ARPANSA sees no reason why Wi-Fi should not continue to be used in schools and in other places.

Smart home devices

Swinburne University of Technology, Total Radiation Solutions and Telstra measured the EME levels from a range of wireless enabled devices designed for use in a smart home for lighting, security/monitoring, kitchen and entertainment applications.

Most of the devices used either Wi-Fi or Bluetooth and transmitted less than 1% of the time. The EME levels were nearly all less than 0.01% of the Australian public limits. The results were presented at the AMTA EME Symposium 2021 and a report is in preparation.

No 5G aircraft interference issue in Australia

Authorities have reassured travellers that despite concerns reported by US media, no instances of 5G interference with aircraft systems have been observed in Australia.

The Civil Aviation Safety Authority (CASA) explains that the US concerns relate to possible interference to radio altimeters - devices that measure an aircraft's clearance height over terrain.

Globally, radio altimeters operate in 4.2-4.4 GHz range, which is close to the 5G frequency range in the US. However, in Australia, 5G spectrum currently goes from 3.4 to 3.7 GHz and stops *'well below the radio altimeter frequencies.'* This same spectrum has been used for 4G since 2016.

In the past two years of 5G operation, CASA and the Australian Transport Safety Bureau (ATSB) have seen no reports of 5G related radio altimeter incidents.

In the US, the spectrum allocated for 5G is in the adjacent 3.7-3.98 GHz range and the aviation industry is concerned about the potential for interference to altimeters that could affect safety during low visibility landings.

The launch of US 5G services in this frequency range (known as C-band) was delayed by the need for the Federal Aviation Administration (FAA) to evaluate the potential impacts. As of 3 February, 87 airports were affected and the FAA had cleared 20 altimeters used by approximately 90% of the U.S. commercial fleet.

The US cellular industry has responded to the concerns by delaying the widespread rollout of 5G in the C-band and implementing 'C-band radio exclusion zones' around 50 US airports for six months, until 5 July.

Other countries do not have the same concerns as the US due to larger frequency separations (similar to Australia) between the 5G and altimeter bands and, in some cases, restrictions on the height or power of 5G antennas near to airports.

The GSMA points out that 60 countries have *'live 5G deployments in 3.5 GHz with no instances of interference between 5G and altimeters to date.'*

EME news from around the world

European Parliament 5G health report

The European Parliament Panel for the Future of Science and Technology (STOA) published a report on the health impact of 5G. The report concludes that frequencies below 6 GHz are *'probably carcinogenic … clearly affect male fertility and possibly female fertility,' whereas 'no adequate studies were performed on non-thermal effects of the higher frequencies.'*

The report was criticised by the Dutch Kennisplatform Elektromagnetische Velden en Gezondheid (Knowledge Platform on Electromagnetic Fields and Health), which said that there are *'question marks'* over the STOA report because study quality was not assessed and *'some of the studies concern exposure above the exposure limits.'*

The Knowledge Platform is financed by the Dutch government. It is a partnership of scientific and regulatory bodies from the Netherlands.

Separately, the European Commission Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) is reviewing the updated international EME guidelines in preparation for their adoption in Europe.

Swiss government rejects 5G moratorium

The Swiss government officially rejected calls by three French speaking cantons (administrative areas) for a moratorium on 5G mmWaves.

During 2020, three French speaking cantons, Geneva, Jura, and Neuchâtel had lodged Swiss Parliamentary initiatives seeking to block future use of mmWaves. However, the government concluded that a 5G mmWave moratorium *'would have serious consequences not only for science and innovation, but ultimately also for society.'* Instead, there will be more information for cantons and the public.

The Swiss government also clarified the legal basis for EME evaluation of 5G active antennas, including the use of correction factors, emphasising that the level of protection remains unchanged.

Court asks FCC for better explanation of unchanged EME limits

In a two-to-one ruling, the United States Court of Appeals for the District of Colombia ordered the Federal Communications Commission (FCC) *'to provide a reasoned explanation for its determination that its guidelines adequately protect against harmful effects of exposure to radiofrequency radiation unrelated to cancer.'*

The August 2021 decision did not criticise the guidelines themselves or the science that supports them. The judicial majority makes clear that *'we take no position in the scientific debate regarding health and environmental effects of RF radiation.'*

In essence, the judgment says that the FCC had provided *'an adequate explanation for its determination that exposure to RF radiation at levels below the Commission's current limits does not cause cancer,'* but the FCC had not adequately addressed submissions claiming other harmful impacts of EME on health and the environment.

The case was brought by activist groups who challenged the process used by the FCC to confirm existing EME limits in 2019. It is not known when the FCC will respond.

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