What is 5G?

AMTA
Australian Mobile Telecommunications Association

5G is the 5th generation of mobile networks, a significant evolution of today's 4G networks.

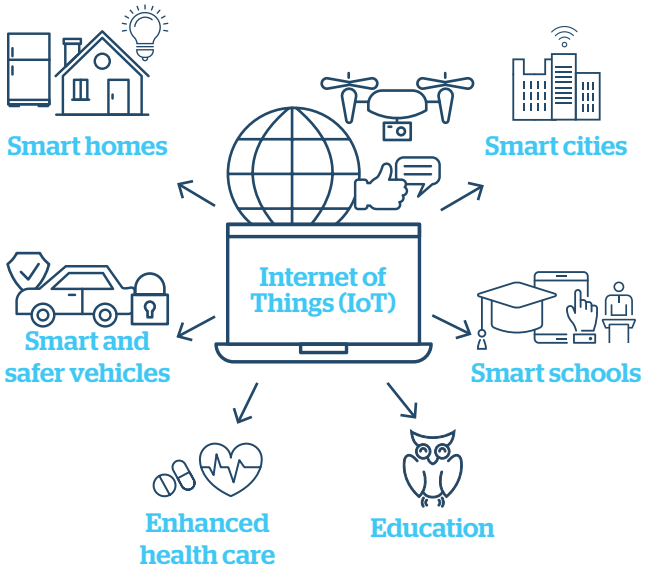
5G is designed to meet the very large growth in data and connectivity of today's modern society, the internet of things with billions of connected devices, and tomorrow's innovations.

5G will initially operate in conjunction with existing 4G networks before evolving to fully standalone networks. The rollout of 5G will help meet Australians' growing demand for more data, with the Australian Communications and Media Authority (ACMA) reporting that the volume of data downloaded on mobiles has increased by 41% from June 2017 to June 2018, and this is set to continue.

What will 5G enable?

5G will enable enhanced mobile broadband, instantaneous connectivity to billions of devices, the Internet of Things (IoT) and a truly connected world.

For communities, 5G will enable real-time connection of billions of devices to provide a safer and more efficient place to live by enabling things like:



For businesses and industry, 5G and IoT will provide a wealth of data allowing them to gain insights into their operations like never before.

Business will increasingly operate and make key decisions driven by data (e.g. parcel tracking), and innovate in different application areas including agriculture, smart farms and manufacturing. All of these will pave the way for cost savings, better customer experience and long-term growth.

5G enabled mobile technology

IS SET TO DELIVER A

$65 billion bigger Australian economy

BY 2023

Mobile Nation 2019 – the 5G Future report by Deloitte Access Economics and AMTA

What is 5G?

What will be the first applications for 5G?

5G-enabled products such as wireless broadband, mobile devices and IoT will be the first applications using 5G.

What will 5G devices offer?

The prime benefits of 5G devices will be significantly faster speeds in data access, downloading and streaming content. In addition, 5G devices will have increased computing power and make use of faster connectivity, meaning that the devices will enjoy virtually instantaneous connections to the network, as well as greater connectivity when on the move. 5G will enable applications such as remote monitoring, automation of production, medical monitoring and even remote surgery.

How does 5G work?

5G will deliver faster speeds, better response times and greater capacity. 5G networks are designed to work in conjunction with 4G networks using a range of macro cells, small cells and dedicated in-building systems.

Small cells will be a feature of 5G networks and will evolve to include the use of millimetre wave (mmWave) frequencies.

Small cells are mini base stations designed for very localised coverage typically from 10 metres to a few hundred metres providing in-fill for the larger macro network. Small cells will be essential for the 5G networks.

5G devices will have increased computing power and make use of faster connectivity, meaning that the devices will enjoy virtually instantaneous connections to the network, as well as greater connectivity when on the move.

5G and EME Safety

Are there safety limits for 5G?

Yes. Comprehensive international guidelines exist governing exposure to radio waves including the frequencies proposed for 5G. The limits have been established by independent scientific organisations, such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and include substantial margins of safety to protect all people including children and the elderly at all times.

These guidelines have been widely adopted in standards around the world, including in Australia by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and are endorsed by the World Health Organization (WHO).

WHAT DO THE EXPERTS SAY ABOUT 5G AND HEALTH?

In relation to radio frequency exposures and wireless technology and health, including frequencies used for 5G, the World Health Organization (WHO) states:

"Despite extensive research, to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health."

In relation to 5G frequencies, Dr Sarah Loughran, Director of the Australian Centre for Electromagnetic Bioeffects Research at the University of Wollongong states:

"The higher frequencies [of 5G] actually means that the energy doesn't penetrate as deeply into the body than previous fourth generation and other generation technologies have."

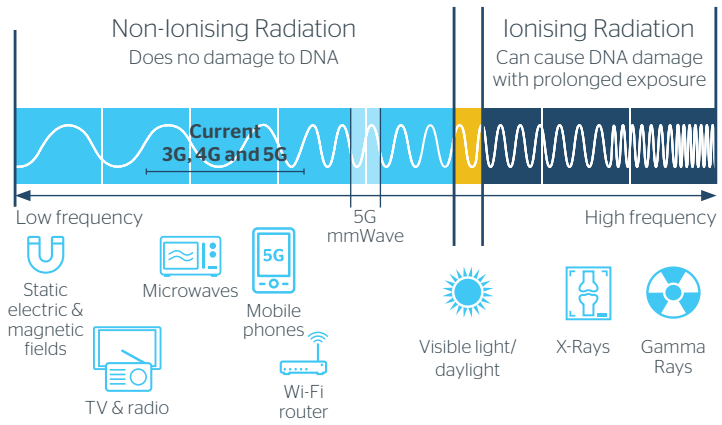
In relation to 5G and health, ARPANSA states:

"There are no established health effects from the radio waves that the 5G network uses."

What research into health effects has been done on 5G?

The electromagnetic frequencies used for 5G are part of the radio frequency spectrum which has been extensively researched in terms of health impacts for decades.

Where 5G fits in the electromagnetic spectrum



5G operates at a higher frequency than previous 4G networks so it can carry more data but can't travel as far. This means it will have less impact on the human body than any previous network.

Over 50 years of scientific research has already been conducted into the possible health effects of the radio signals used for mobile phones, base stations and other wireless services including frequencies planned for 5G and mmWave exposures.

ARPANSA states:

"This network currently runs on radio waves similar to those used in the current 4G network, and in the future will use radio waves with higher frequencies. It is important to note that higher frequencies does not mean higher or more intense exposure. Higher frequency radio waves are already used in security screening units at airports, police radar guns to check speed, remote sensors and in medicine and these uses have been thoroughly tested and found to have no negative impacts on human health."

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5G and EME Safety

Testing on Australian 5G networks with commercial devices in real-world settings shows levels similar to 3G, 4G and Wi-Fi, and in many cases around 1,000 times below the safety limits.

Does 5G mean higher power and higher exposure levels?

No – 5G networks are designed to be more efficient and will use less power than current networks for similar services.

The Australian Centre for Electromagnetic Bioeffects Research (ACEBR) states:

"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."

Dr Sarah Loughran, Director of the Australian Centre for Electromagnetic Bioeffects Research at the University of Wollongong, states:

"Based on the improvements in technology, the level of exposure is expected to be lower [with 5G] than what it has been in previous technologies."

How will 5G be regulated?

All base stations including 5G equipment and devices, must comply with standards set by ARPANSA.

Where can I get more information on 5G?

Australian Communications and Media Authority (ACMA)
1300 850 115
https://www.acma.gov.au/theACMA/a-guide-to-small-cells

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)
(03) 9433 2211
www.arpansa.gov.au

EMF Explained web site
www.emfexplained.info

Mobile Nation 2019 - the 5G future report
https://amta.org.au/new-mobile-nation-report-the-5g-future/

Mobile Carriers Forum
http://amta.org.au/mcf

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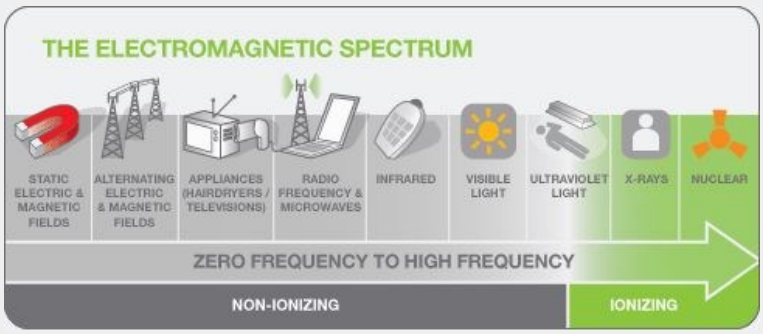
EMF Explained Series

WHAT IS EMF? - L1

EMF is short for electromagnetic fields or sometimes known as electromagnetic radiation (EMR) or electromagnetic energy (EME). Electromagnetic fields are present everywhere in our environment – the earth, sun and ionosphere are all natural sources of EMF.

Electric and magnetic fields are part of the spectrum of electromagnetic energy which extends from static electric and magnetic fields, mains power frequencies (50/60Hz) through radiofrequency, infrared, and visible light to X-rays.



Electromagnetic Spectrum - This diagram shows the electromagnetic spectrum, ionising and non-ionising sections, and typical sources of electromagnetic fields.

Electromagnetic fields are also created whenever an electrical appliance is connected to the mains supply, including many in daily use such as refrigerators, hairdryers and computers.

Many electrical appliances don't just create EM fields – they rely on them to work. Television and radio, mobile and cordless phones, remote control handsets, baby monitors and the communication systems used by emergency services all communicate using Radio Frequency EM fields. So do wireless technologies such as WiFi, which is increasingly used by computer networks, to connect to the internet.

Note: The EMF Explained Series is specifically focused on the radio frequency part of the electromagnetic spectrum for mobile and wireless services.

More information...

Developed by AMTA, GSMA and MMF

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Australian Government

THE SCIENCE OF SAFE CONNECTION

Telecommunications infrastructure near your home

Telecommunications infrastructure: keeping you safe and connected

For most of us, digital connectivity and communications technologies are part of everyday life.

Our experience through the pandemic means access to quality and reliable telecommunications services are more important than ever, keeping us connected with family and friends, and enabling many of us to learn and work from home.

While our fixed line internet services stood up well in the pandemic, it has been just as important for telecommunications companies (Telcos) to expand and improve their mobile networks to support our increasing need for digital connectivity.

Continuing to improve our digital connectivity

Telcos often need to install new equipment or infrastructure in our communities to provide effective coverage and capacity where and when we need it.

It is understandable some people are concerned about the electromagnetic energy (EME) emitted by telecommunications infrastructure, particularly when it is installed nearby in our local communities.

The Australian Government strictly regulates EME emissions to protect the health and safety of all members of the public, while allowing the community to benefit from modern telecommunications.

How we keep communities safe

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is an independent government agency that provides advice to the Government on radiation protection. ARPANSA updated its Standard for Limiting Exposure to Radiofrequency Fields – 100 kHz to 300 GHz (the Standard), based on the most up-to-date Australian and international peer-reviewed research into EME.

The Standard protects people of all ages and health status against all known adverse health effects from exposure to EME by specifying strict safety limits for exposure levels with which telecommunications services must comply, including 5G.

The Australian Communications and Media Authority (ACMA) sets and actively monitors rules for telecommunications companies to follow based on ARPANSA's Standard so EME is kept at safe levels. In Australia, all telecommunications infrastructure and equipment must comply with these rules and a series of sanctions can be imposed if these rules aren't followed.

Monitoring EME emissions

The ACMA is monitoring EME emissions from a selected sample of representative sites across Australia, and have compared their results against both the ARPANSA safety limit and carriers' predicted EME assessments. ACMA's measurements have to-date found all sites tested are well below the safety limit specified in the Standard and significantly lower than the carriers' predicted levels. ACMA's findings are available at www.acma.gov.au.

With these measures in place ensuring EME exposure from telecommunications infrastructure is below the safety limits, there is no advantage requiring transmitters to be located any particular distance from residential areas.

So, if there is telecommunications infrastructure near you, not only will you have access to more reliable connectivity but you can be reassured the technology making that connection possible is researched, regulated and safe.

For more information visit
www.eme.gov.au

What key information do I need to know?

Telcos expand and improve their mobile networks to support our increasing need for digital connectivity. They often need to install new equipment or deploy new infrastructure in our communities.

It is understandable some people are concerned about the electromagnetic energy (EME) emitted by telecommunications infrastructure, but the Australian Government strictly regulates EME emissions to protect the health and safety of all members of the public.

There are measures in place to ensure that EME exposures from telecommunications infrastructure are below the safety limits.