

ELECTROMAGNETIC FIELDS

As the number of electrical devices and appliances we rely on everyday increases, we respect some customers have questions about their potential exposure to electromagnetic fields (EMF).

EMF are present everywhere in our environment due to both natural and manmade sources. We recognise our powerlines and other assets like transformers, substations and smart meters emit EMF.

The presence of EMF and whether it impacts on our health is one of the most extensively researched areas of science. In fact, the World Health Organisation¹ reports that over the past 30 years, approximately 25,000 articles have been published about the effects.



This factsheet is intended to provide information on how we plan to ensure EMF emitted by our infrastructure is compliant with all guidelines. If you want to find out more, then please refer to the sources and services listed on the final page.

Part of modern life

People have always been exposed to natural sources of EMF. The source we recognise most is the sun which sends out waves that create electric and magnetic fields (EMFs) or radiation.

Electric fields are created by differences in voltage: the higher the voltage, the stronger the resultant field. A good example of this in nature is the build-up in electric charges we feel in the air before a thunderstorm. What we call 'static-electricity' is a form of EMF.

Magnetic fields are created when electric current flows: the greater the current, the stronger the magnetic field. In nature, the most well-known magnetic field is the type that causes a compass needle to orient to north or south.

Everyone is exposed to a mix of electric and magnetic fields at home, in communities and at workplaces.

Importantly though, these fields reduce in intensity with distance. The further you are from the source, the lower the intensity of the field.

In a modern society, there are two types of EMF that we can be exposed to.

1. Low-frequency: Appliances like microwave ovens, mobile phones, and distribution level powerlines send out this form of low-level EMF.
2. High-frequency: This is sent out in the form of ultraviolet rays from the sun and X-rays from medical imaging machines.

It is not disputed that EMFs above certain high levels can trigger health effects. However, other than exposure to the sun, which comes with its own health warnings, it is very unlikely that you'll be exposed to high-frequency EMFs in your everyday life.

It is still good to be aware EMFs exist and if you choose, to reduce your exposure to them.

EMF sources in the community

Some examples of EMF sources in communities are:

- Electric trains and tram cars and the overhead lines that power them
- Security systems in shops and buildings such as key card access controls or anti-theft systems
- Television and radio signals relayed via a network of antennas
- Mobile phones which receive signals from a network of base stations
- Radars used for navigation, weather forecasting or other functions.

Electricity transmission and distribution lines are also a source of EMF. These powerlines move electricity over long distances. Transmission towers carry electricity at high voltage. Distribution lines like those found in the CitiPower and Powercor networks, move the electricity at far lower voltages that emit low-frequency fields.

EMF sources at home

The walls to your home help reduce the electric fields from outside the house.

But there are still a variety of magnetic fields found near various appliances in your home. You'll find low-frequency fields sourced from:

- Kitchen appliances like refrigerators, toasters, microwaves and food processors
- Technologies like Wi-Fi routers and computers
- Living room stereos and televisions
- Laundry appliances like washing machines and irons
- Bathroom appliances like hair dryers and electric shavers.

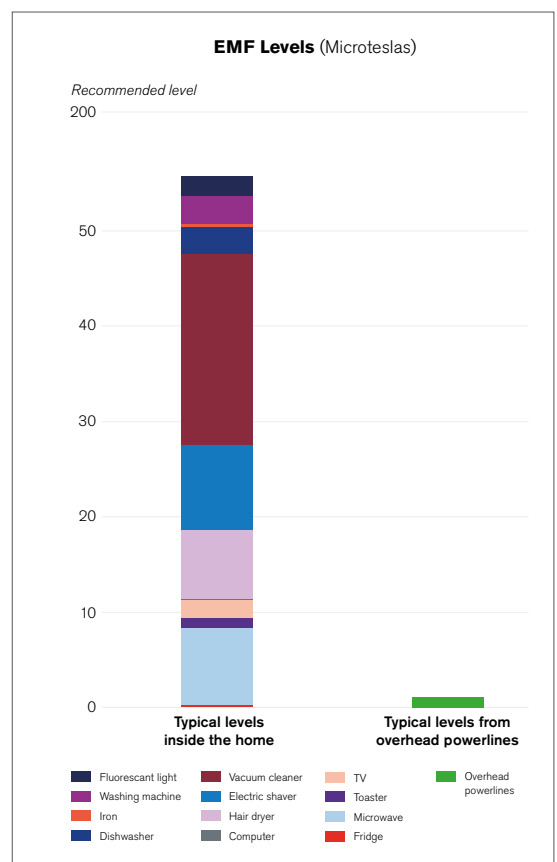
Comparing EMF levels

To help illustrate the relative low levels of EMF inside your home with our assets outside, please see the table below.

This information provided by the World Health Organisation shows EMF levels in a typical home compared with external fields generated by our overhead powerlines and the smart meter to your home's energy supply.

We've also compared it to the guidelines for safe level exposure to magnetic fields set by the International Commission on Non-Ionising Radiation Protection (ICNIRP) in 2010 and adopted by the Australian authority, ARPANSA. These standards have resulted from scientific research over many decades to establish safe levels for exposure to EMF inside homes.

Source: World Health Organisation: <https://www.who.int/news-room/q-a-detail/radiation-electromagnetic-fields>



Safety in design

Our role in the energy supply chain is to take power produced by electricity generation and transported by transmission lines, reduce the voltage, and then distribute the electricity to our connection point on your home or business. Our role ends at your electricity meter.

WHO reports that in respect to distribution network infrastructure, *“current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields.”*

In any event, we choose to construct our network in a way that reduces the potential for community members to be exposed to the low levels of EMF they create.

Using a Safety in Design process, we build engineering control measures into the design process to identify and avoid the potential for EMF to be emitted. For example:

- Placing equipment up poles, well away from community members
- Ensuring boundary fences around our zone substations are well away from transformers and other equipment that might emit EMF
- Using sheet metal screens specifically designed to form a shield against EMF
- Establishing exclusion zones around our equipment and where appropriate, posting signs advising of safe distances based on the low-frequency fields emitted.

These strategies are used in planning all forms of infrastructure such as overhead powerlines, substations of all sizes and community level batteries on our network.

Smart meter safety

Between 2009 and 2013 we installed more than a million smart meters in homes and businesses across the CitiPower and Powercor networks. Around 97% of our customers have smart meters and we continue to install them for all new connections.

In the more than ten years since, we've found smart meters are safe, accurate and helpful for us in planning to meet power demand. Customers have found they can count on their electricity bills being for exactly what they use, not an estimate or average.

However, we appreciate some customers have questions about EMF generated by this advanced technology. Smart meters measure electricity usage and communicate this information back to networks using short bursts of radio waves or low-level radiofrequency (RF). This is a type of EMF.

The RF emissions from smart meters are regulated by the Australian Communications and Media Authority. They require wireless devices like smart meters to comply with safety

standards set by the Australian Government authority, ARPANSA.

ARPANSA³ reports that the RF exposure from smart meters is very low and well below the safety standards because of the combined effect of:

- Relatively low power used by the smart meter transmitters
- Their location on the outside of buildings
- The very short time they spend transmitting.

Health authorities around the world, including ARPANSA and WHO, have examined the scientific evidence regarding possible health effects from smart meters. Comprehensive information on this subject is available on the ARPANSA website (www.arpansa.gov.au).

In summary, this information concludes that:

“There is no established scientific evidence that the low-level RF EME exposure from smart meters causes any health effects including symptoms of ill health communicated by some people.”

For further advice

EMF Detector for Hire

If you want to find out more about your exposure to EMF, then ARPANSA offers four types of meters you can hire.

These include hand-held magnetic field meters for measuring EMF from electrical appliances and sources inside and outside the home.

Please note they do not offer meters to measure radiofrequency that you find with wireless devices including smart meters. ARPANSA advises that this is a complex measurement and recommends you consult a NATA accredited consultant. The National Association of Testing Authorities (NATA) provides a network of best practice industry experts.

To find out more go to: www.arpansa.gov.au/our-services/equipment-hire

References

There are three main sources of information we have referred to in this factsheet:

1. World Health Organisation: go to Radiation: Electromagnetic fields (www.who.int) for a detailed Q&A on EMF
2. An online source of health tips and wellness advice medically reviewed by doctors, Healthline, "Should you be worried about EMF exposure?", March 2019: www.healthline.com/health/emf
3. Australian Radiation Protection and Nuclear Safety Agency (ARPANSA): go to www.arpansa.gov.au and search for Smart Meters and Health.
4. World Health Organisation: <https://www.who.int/news-room/q-a-detail/radiation-electromagnetic-fields>

Other sources we reviewed in preparing this material and which you may find of interest are:

- International Commission on Non-Ionizing Radiation Protection: www.icnirp.org
- Better Health website offered by the Victorian Government: www.betterhealth.vic.gov.au
- Energy Networks Australia Guidebook on EMF: www.energynetworks.com.au/electric-and-magnetic-fields