



# Fact Sheet: Mobile Networks in NZ

## Understanding the safety aspects of a mobile network

With 2G, 3G, 4G and now 5G, New Zealanders have been asking how mobile signals are sent – and what are the technical details behind mobile connectivity. The health and safety of communities has always been – and continues to be – an absolute priority for us.

We closely monitor global research and will continue to deliver a world-leading network on a safety-first basis.

Decades of research, and thousands of scientific studies have been conducted globally on radio spectrum used by mobile networks, with experts finding no evidence that mobile phones pose a risk to human health.

## Let's start with the basics

### What are radio signals?

Mobile phones work by sending and receiving low power radio signals. All radio communications systems use electromagnetic fields (EMF) in the radio frequency (RF) part of the electromagnetic spectrum. This includes 2G, 3G, 4G and 5G – as well as AM/FM radio, Wi-Fi and television. Typical background EMF levels from radio communications systems are very low and well below safety guidelines and limits set by our government.

### Why do we need multiple mobile phone base stations?

Base stations need to be located reasonably close to mobile phone users to provide good quality reception. This means that if an area has more people using mobile phones, more base stations will be needed closer together.

## Understanding Electromagnetic Fields (EMF)

Electromagnetic fields (EMF) is also referred to as electromagnetic radiation (EMR) or electromagnetic energy (EME). Our bodies are regularly in contact with electromagnetic fields such as static electricity, magnetic fields, power frequencies from our electrical outlets and even include visible light, infrared, and the sun.

### Current use of electromagnetic fields

Devices such as TVs, radios, mobile and cordless phones and baby monitors need EMF to operate. EMF is also used by wireless technologies such as Wi-Fi and even operates the communication systems used by emergency services.

## How do ionising and non-ionising radiation differ?

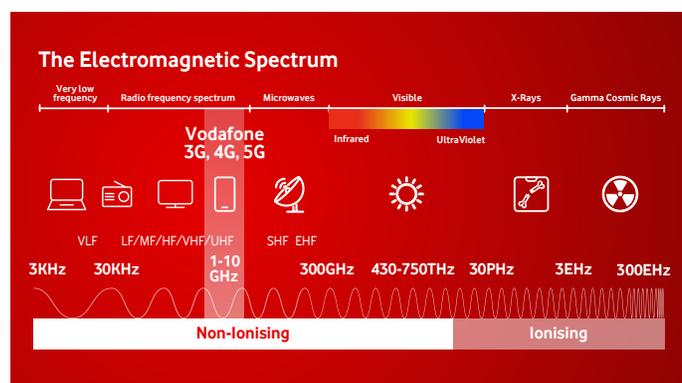
### Ionising radiation

Some electromagnetic waves carry such large quantities of energy that they can ionise particles of matter and consequently break down the chemical bonds between molecules. This type of radiation is potentially harmful to health, and is only used in a small number of specific applications: X-rays used for both diagnostic and therapeutic purposes (radiotherapy), gamma-rays (emitted by radioactive materials).

### Non-ionising radiation

On the other hand, electromagnetic fields which can't break down molecular bonds are called non-ionising radiation. Visible light is a type of non-ionising radiation, which we are exposed to daily from natural and artificial

sources such as the sun and indoor lighting. Below is where mobile phone signals sit on the Electromagnetic Spectrum:



## What are the current safety standards for NZ mobile base stations?



### **New Zealand Standard NZS 2772.1:1999 / National Environmental Standards for Telecommunication Facilities (NES) 2016**

The World Health Organisation (WHO) formally recognised the International Commission on Non-Ionising Radiation Protection (ICNIRP) to develop international EMF exposure guidelines. The ICNIRP guidelines are based on careful analysis of the scientific literature and are designed to offer protection for all ages, including children, against identified health effects of EMF with a large built-in safety margin.

The ICNIRP guidelines form the basis of the New Zealand radiofrequency field exposure standard NZS 2772.1:1999. The NES requires that all network operators comply with NZS 2772.1:1999, ensuring that the same standard applies across all local authorities.

### **Community Engagement Guidelines for Wireless Telecommunications Sites**

The Community Engagement Guidelines are an industry code of practice for the rollout of new wireless telecommunications sites in New Zealand, including mobile base stations.

These were created by members of the Telecommunications Carriers' Forum (TCF) in 2009, and updated in 2018, and are designed to help facilitate open and transparent engagement with communities at or near the location of new or upgraded wireless facilities. They aim to bridge the gap between what the Resource Management Act prescribes, and what communities and local councils expect, from wireless network operators when looking to upgrade or install new wireless facilities.

Vodafone New Zealand continues to be an active member of the TCF and follows these guidelines.

## Where can I find more information about mobile networks and EMF?

NZ Ministry of Health's information on EMF – [www.health.govt.nz/our-work/environmental-health/non-ionising-radiation](http://www.health.govt.nz/our-work/environmental-health/non-ionising-radiation)

NZ Ministry of Health's fact sheet on 5G and health – [health.govt.nz/your-health/healthy-living/environmental-health/radiation-environment/cellsites-and-5g](http://health.govt.nz/your-health/healthy-living/environmental-health/radiation-environment/cellsites-and-5g)

Chief Science Advisor to the Prime Minister, 5G information sheet – [www.pmcsa.ac.nz/our-projects/hot-topics/5g-in-aotearoa-new-zealand](http://www.pmcsa.ac.nz/our-projects/hot-topics/5g-in-aotearoa-new-zealand)

World Health Organisation's information on EMF – [www.who.int/peh-emf/en](http://www.who.int/peh-emf/en)

MBIE information on radio spectrum – [www.mbie.govt.nz/science-and-technology/it-communications-and-broadband/radio-spectrum/](http://www.mbie.govt.nz/science-and-technology/it-communications-and-broadband/radio-spectrum/)

Vodafone's international website on health – [www.vodafone.com/what-we-do/public-policy/mobiles-masts-and-health/health-the-science-and-evidence](http://www.vodafone.com/what-we-do/public-policy/mobiles-masts-and-health/health-the-science-and-evidence)

If you have a specific query about mobile networks, EMF and Vodafone's role, please contact:

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