

FACTS ABOUT SAFETY

Radiofrequency Fields

TV and radio transmitters

Cellphones

Cell sites

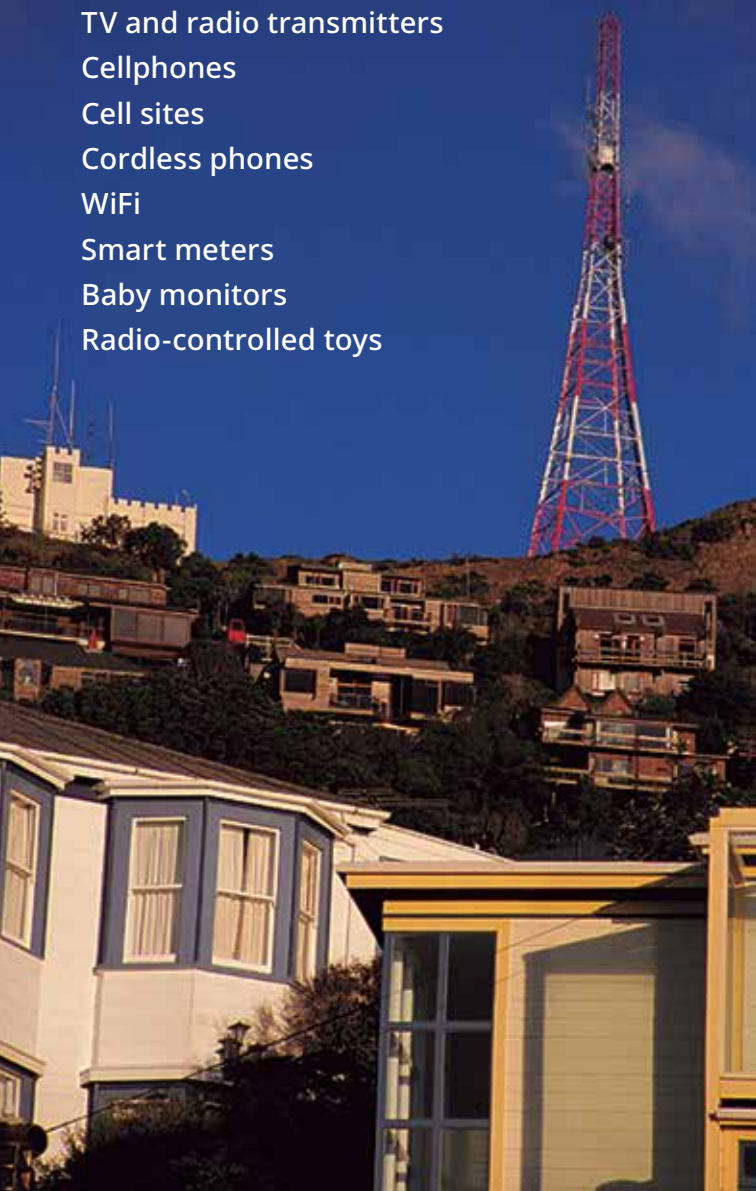
Cordless phones

WiFi

Smart meters

Baby monitors

Radio-controlled toys



In recent years the explosion of new technologies has made our lives easier, more exciting, and, in many ways, safer.

Many everyday items use radio and microwave signals to operate. That includes such things as cellphones, cordless phones, WiFi, radio-controlled toys, some baby monitors and microwave ovens.

However, there are some concerns about the possible harmful effects these new technologies may have. Examples include fear about the number of cellphone transmitter sites, and the use of WiFi in schools.

This leaflet tells you what researchers currently know about possible effects, what is being done in New Zealand to safeguard your health, and where you can go to get more information.



What are radiofrequency (RF) fields?

Radiofrequency (RF) fields, or radio waves, come from the towers and antennas that produce and transmit radio and telecommunication signals.

The RF fields make up the electromagnetic wave, or radiation, which is the radio signal. This is non-ionising radiation. It is quite different to the ionising radiation from X-ray machines and radioactive materials.

RF fields are also different from the low-frequency magnetic fields found around power lines and electrical appliances. Any possible health effects from electro-magnetic fields from these sources should not be confused with the effects of RF fields.

How are we exposed to them?

RF fields are all around us. Fields from natural sources are very weak.

In the home, RF field sources include microwave ovens, cordless phones, WiFi routers, baby monitors, and radio-controlled toys.

Outside the home, people who work in the broadcasting, transport, and communications industries can have higher exposure when they work close to RF transmitting antennas and radar systems.

Some industrial processes also use RF fields, such as dielectric heaters used for wood lamination and welding plastics.

What are the effects of exposure to RF fields?

A lot of research has been done over the past 60 years into the possible health effects of RF fields.

Above certain exposure levels, subtle changes in the behaviour of experimental animals have been observed. These are believed to be related to slight heating produced by RF fields. While a lot of research has looked for effects at lower levels, none have been established.

Analysis of studies of the health of people who have had long-term exposure to RF fields does not raise any cause for concern. No clear, consistent effects have shown up in studies of long-term exposure. The studies do show that if there are any risks, they must be very small.

What protections are there?

Many people are naturally concerned about RF exposure.



New Zealand has developed a Standard (NZS2772.1:1999) with limits to control levels of exposure to RF fields. This is based on international recommendations published by an organisation that is recognised for its independence and expertise by the WHO.

The New Zealand Standard is designed to protect both adults and children. Exposure limits have been set at least 50 times lower than the level where they might start to affect health.



As an example of what is considered a safe level of exposure, people who live near, or go past, cellphone sites and telecommunications antennas are typically exposed to less than one percent of the limit set by the New Zealand Standard. In very few cases, the levels may reach five or ten percent of the Standard.

The Standard also includes a requirement that, regardless of the recommended limits, exposure should be kept as low as possible.

Measurements in New Zealand and other countries show that exposure from household appliances is low.

Workplaces are required to develop health and safety plans to ensure that exposure is within acceptable limits.

Recent reviews by health bodies around the world have concluded that there is no clear evidence of ill health caused by exposure that complies with the limits.





How safe are cellphones and their transmitter sites?

Cellphones are a cheap and easy way to keep in touch while on the move. The demand for more phones and increased

services has created a need for more transmitter sites to provide good coverage and capacity.

The siting of radio transmitters, including cellphone sites, is governed by the Resource Management Act 1991. Regulations introduced in 2016 under the Resource Management Act (RMA) require that cell sites and other commercial transmitters must be planned and operated in accordance with the New Zealand RF field exposure Standard. The New Zealand Standard and the RMA regulations also cover 5G cell sites.

Cellphone site antennas are usually mounted well above the ground, either on a building or a mast.

They transmit a fan-shaped beam of RF waves roughly parallel to the ground. This means the RF levels at ground level are low and well within the international guidelines.

Where the sites are mounted on buildings, the beam is directed outward, so people inside are not highly exposed.

Although the number of cellphone sites is increasing, many of the new sites are designed to cover a small area. This means that they can operate at lower power.

Exposure to radio transmissions has been measured near many cell sites throughout New Zealand. The highest exposure is normally less than one hundredth of the maximum allowed in the Standard.

Cellphones are weak transmitters. The exposure Standard applies to exposure from phones (and other hand-held transmitters) as well as the base stations. Major telecommunication networks only allow phones that comply with the Standard to connect to their networks.

Some studies suggest there could be a link between talking on cellphones a lot and developing brain tumours, but the researchers said that this result could have happened because of biases in the way the studies were carried out.

For this reason, RF fields have been classed as a 'possible' cause of cancer by the International Agency for Research on Cancer. This does not mean that they definitely cause cancer, only that we can't rule it out.

Brain tumour rates haven't changed since cellphones were first used. Laboratory research does not suggest that radiofrequency radiation could affect cancer development.



User tips

If you are concerned about possible risks, there are some simple things you can do to reduce your exposure when using a cellphone:

- Limit the length of your calls.
- Use a speakerphone or hands-free kit.

Exposure from modern cellphones is typically 50–100 times lower than from older generation models.

Where to go for more information

If you would like more information about RF fields, or want to keep up to date with developments, you can check the Health New Zealand | Te Whatu Ora website [tewhatauora.govt.nz/health-services-and-programmes/environmental-health/non-ionising-radiation](https://www.tewhatauora.govt.nz/health-services-and-programmes/environmental-health/non-ionising-radiation).

The latest information from the WHO project can be found on their website at [who.int/health-topics/electromagnetic-fields](https://www.who.int/health-topics/electromagnetic-fields).