

## About RF safety and health

### What is Radiofrequency Electromagnetic Energy (RF EME)?

RF EME is the radio waves generated by mobile phone transmission antennas.

EME is the energy stored in an electromagnetic field. Transmission antennas with a frequency from 3 kHz to 300 GHz transmit radio waves. Microwave transmissions are included in this radiofrequency band.

RF EME is a factor of everyday life. It is emitted by natural sources like the sun and the earth, and by man-made sources such as radio, television, mobile telephones and paging transmission antennas.

RF EME is also referred to as RF Radiation, EMR (electromagnetic radiation), RF Fields and EMF (electromagnetic fields).

### Can RF EME cause adverse health effects?

Yes, if a person is exposed above maximum recommended exposure levels.

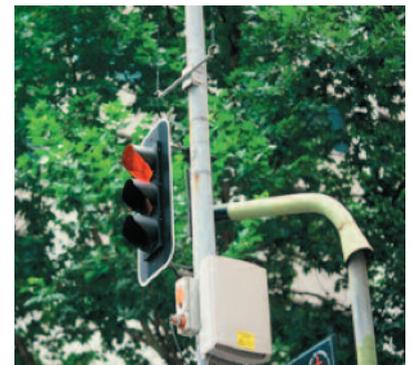
RF EME can heat objects in the same way that microwave ovens heat food although microwave ovens use much higher power in a confined space compared to mobile telecommunications transmitters.

Harmful heating of body tissue is a possibility where there is exposure to RF fields above maximum recommended exposure levels. Damage may result because the human body is unable to cope with excessive heat generated by very high RF exposures and can result in whole body heating, localised heating (in limbs, torso, head), surface heating of the body and auditory clicks. Also, shocks, similar to electric shocks, due to touching or receiving arcs from RF transmitters are also possible from over-exposure to RF radiation. These possible bioeffects are dependent on the frequency, duration or intensity of the exposure.

Heating is generally accepted as the main bioeffect although it is recognised that very high RF exposures, typically much higher than the exposure levels generated from mobile telecommunications transmitters, may lead to the formation of cataracts in the eyes.



*In-Building Antenna  
(Dimension 10cm x 5cm)*



*Microcell Mounted  
on Traffic Lights*

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In relation to adverse health effects the World Health Organisation has released a fact sheet (N0 304, May 2006) which says **“no adverse short or long-term health effects have been shown to occur”** and this includes cancer. This is for continuous exposures at or below the maximum safety limits.

Specifically in relation to any cancer risk associated with base stations and wireless technologies, the World Health Organisation says:

**“Over the past 15 years, studies examining a potential relationship between RF transmitters and cancer have been published. These studies have not provided evidence that RF exposure from the transmitters increases the risk of cancer. Likewise, long-term animal studies have not established an increased risk of cancer from exposure to RF fields, even at levels that are much higher than produced by base stations and wireless networks.”**

Sometimes suspected cancer clusters are reported in the media and the WHO advice is

**“Media or anecdotal reports of cancer clusters around mobile phone base stations have heightened public concern. It should be noted that geographically, cancers are unevenly distributed among any population. Given the widespread presence of base stations in the environment, it is expected that possible cancer clusters will occur near base stations merely by chance.**

**Moreover, the reported cancers in these clusters are often a collection of different types of cancer with no common characteristics and hence unlikely to have a common cause. Scientific evidence on the distribution of cancer in the population can be obtained through carefully planned and executed epidemiological studies.”**

### What RF exposure level is safe?

The Australian Radiation Protection and Nuclear Safety Agency (**ARPANSA**) have set the recommended maximum exposure levels for RF fields, being in the range of 3 kHz to 300 GHz.

The recommended RF exposure limits depend on whether the exposure is occupational (i.e. for persons classified as **‘RF Workers’**) or non-occupational (i.e. for the general public and persons who are not required to work within electromagnetic fields) (**General Public**).

For RF Workers, the basic exposure restriction for whole-body average Specific Absorption Rate (**SAR**) has been set at 0.4 W/kg averaged over a six minute period. Whole body average SAR is determined by dividing the total power absorbed in the body by the total mass of the body.

For the General Public, the basic exposure restriction for wholebody average SAR 0.08 W/Kg averaged over a six minute period.

The basic restrictions for RF Workers and the general public have included safety margins of 10-fold and 50-fold from the level of the first known adverse health effect (a 1 C rise in core body temperature).

### Where can I find more information?

**Australian Radiation Protection & Nuclear Safety Agency (ARPANSA)**

Phone (03) 9433 2211 or 1800 022 333

Web: [www.arpansa.gov.au](http://www.arpansa.gov.au)

**World Health Organisation**

EMF Project Home Page:

Web: [www.who.int/peh-emf/](http://www.who.int/peh-emf/)

