



## **What about broadcast towers – are there any health effects?**

### **What is a broadcast tower?**

Broadcast towers are used for transmitting a range of services including AM and FM radio and UHF, VHF and digital television. The tower will either act as an antenna itself or support one or more antennas on its structure, including microwave dishes.

### **What does a broadcast tower look like?**

There are two major types of broadcast towers around Australia.

The first type is used by radio stations at medium frequency (MF) (300 kHz to 3 MHz) amplitude modulated (AM). This tower is usually a relatively slim, tall structure of triangular cross-section that is supported by guy wires. The tower itself is the radiating antenna (see photo right). A variation of this arrangement is used at short-wave high frequency (HF) (3-30 MHz) broadcasting sites, where there are two or more guyed towers with the radiating wire antenna slung between them relatively close to the ground.



The second type is used for very-high frequency (VHF) (30-300 MHz) and ultra-high frequency (UHF) (300 MHz to 3 GHz) frequency modulation (FM) radio and television transmissions (including digital television). These towers may be either self-supporting structures with four main vertical members and consisting of a tapered structure of large cross-section at the bottom, or a triangular guyed slim structure similar to MF radio towers. At smaller stations, the tower may be a robust concrete pole. The tower is not the radiating element but a support for the transmitting antennas.

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## **What is required when siting a tower?**

Broadcast service providers have a number of requirements to fulfil when selecting a site for broadcast towers. Since broadcast towers transmit radio signals, which travel in straight lines, it is desirable to have a clear path between the transmitter and receiver to reduce interference. The higher the tower is sited, the greater the range at which the signal can be received. This is the principal reason why antennas are placed on hills, buildings and tall structures.

## **What are the exposure levels near broadcast towers?**

At ground level close to the base of MF AM antenna towers, the acceptable levels for exposure specified in the ARPANSA Radiation Protection Standard “*Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz*” may be exceeded for all but the very lowest power transmitters. For this reason, access to a tower where the radiofrequency (RF) electromagnetic energy (EME) exceeds the standard is to be controlled.

*For further information on the ARPANSA standard see fact sheet 4 ‘The Australian Radiofrequency Exposure Standard’.*

VHF/UHF radio and TV towers are placed on the highest point in an area so the transmitted signal has a clear path to receiving antennas. The transmitted antenna pattern is designed so that the radiating beam is projected away from the tower almost horizontally so that as much area as possible is covered. This minimises the signal strength at ground level near the tower. The higher level fields therefore occur at a height not accessible to the general public. Sample measurements of typical transmitter sites show that the signal levels on the ground near the towers are typically 1% or smaller than the general public exposure limits.

## **Are there any potential health effects?**

Broadcast towers produce weak RF EME exposure levels in the everyday environment. The weight of national and international scientific opinion is that there is no substantiated evidence that RF EME emissions associated with living near a broadcast tower poses a health risk.

To date, the only health effect that has been proven to exist as a result of exposure to RF EME relates to heating of part or all of the body. This is known as the thermal effect, and the ARPANSA Radiation Protection Standard “Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz”, which sets public and occupational limits of exposure to radiofrequency radiation, is designed to avoid adverse heating effects where people are exposed to RF EME.

*For further information on potential health effects see fact sheet 1 ‘Electromagnetic Energy and its Effects’.*

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**Fact sheets in the EME series are:**

Fact sheet 1: *Electromagnetic energy and its effects*

Fact sheet 2: *Government action on electromagnetic energy public health issues*

Fact sheet 3: *Australian research into EME*

Fact sheet 4: *The ARPANSA RF Exposure Standard*

Fact sheet 5: *About mobile phones*

Fact sheet 6: *About mobile phone networks*

Fact sheet 7: *What about using a mobile phone while driving*

Fact sheet 8: *Potential interference of mobile phones with pacemakers, hearing aids and other devices*

Fact sheet 9: *What about base stations and telecommunications towers - are there any health effects?*

Fact sheet 10: *What about broadcast towers - are there any health effects?*

Fact sheet 11: *Mobile phones and children*

For further information you can visit the ARPANSA web site at:

**<http://www.arpansa.gov.au>**

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