The ARPANSA Radiofrequency Radiation Exposure Standard

Introduction

On 7 May 2002, ARPANSA published the *Radiation Protection Standard - Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz*. The Standard sets limits for human exposure to RF fields in the frequency range 3 kHz to 300 GHz. The Standard also includes requirements for protection of the general public and the management of risk in occupational exposure, together with additional information on measurement and assessment of compliance.

The ARPANSA Standard is relevant to RF emissions from all devices that produce and radiate RF electromagnetic energy (EME) fields either deliberately or incidentally during their operation - this includes mobile phone handsets and base stations as well as radio and television transmitters and industrial sources.

The exposure limits in the Standard

The exposure limits to RF radiation are complex and depend upon the frequency of the RF radiation. In general the limits are defined by fundamental quantities called 'basic restrictions', which are designed to ensure that known adverse health effects do not arise from exposure to RF fields.

Direct assessment against the basic restrictions can be difficult, time consuming and costly. Consequently, reference levels, which are quantities that are relatively easy to measure directly are provided as a way of ensuring that the basic restrictions are not exceeded. Because these are conservatively derived from 'worst case' assumption, compliance with the reference levels ensures compliance with the basic restrictions

On what basis were the exposure limits in the Standard determined?

The exposure limits are based on a large body of up-to-date scientific research. While the International Commission on Non Ionising Radiation Protection (ICNIRP) 1998 exposure guidelines provided the initial basis for the Standard, further material including all relevant current literature was considered.

In brief, the limits in the Standard are designed to protect against all known adverse health effects and to prevent unwanted nuisance effects that may arise through any of the following mechanisms: a) electrical stimulation, b) heat stress; and c) auditory responses.

What are the exposure levels for mobile telephones and their associated base stations?

The ARPANSA Standard specifies exposure limits to RF EME at the frequencies used for mobile phone handsets that regulate the rate at which the user absorbs energy from the handset. The absorption of RF radiation energy is measured by the quantity 'specific absorption rate' (SAR) in units of Watts per kilogram (W/kg). It is defined as - the rate at which RF energy is absorbed per unit mass of a biological body. In the ARPANSA Standard the SAR limit for mobile phone handsets is 2 watts per kilogram of tissue (averaged over 10 grams). This resulting limit includes a significant safety factor, with the maximum temperature rise in the side of the head tissue being less than 0.1°C.

Measurements of RF EME around typical mobile phone base station sites accessible to the general public show that exposure levels are generally less than one percent of the exposure limits recommended by the Standard.

What about the possibility of adverse health effects at levels below the limits of the Standard?

Significant safety factors are incorporated into the exposure limits – that is, the limits are set well below the level at which all known adverse health effects occur. The health implications of biological effects below limits specified in the RF Standard are not known. Accordingly, there is no established data for bio-effects below the limits that could be used for setting the levels of basic restrictions. There is an extensive world wide research program into the possible health effects of low level RF exposure. ARPANSA will review the limits of the Standard if evidence does emerge of a causal link between low level RF exposure and adverse health effects in humans.

The Standard incorporates a "precautionary approach" which requires owners of RF sources to minimise unnecessary exposure of the public to RF fields. Australian regulators and codes of practice will decide how this statement is applied.

The ARPANSA Standard and other supplementary information including *An Explanatory Question & Answer Guide to the Standard* are available from the ARPANSA website at:

http://www.arpansa.gov.au