

Working safely around Radiofrequency (RF) Transmitters

Exposure to excessive levels of radiofrequency (RF) emissions may affect your health

This Mobile Carriers Forum (MCF) Fact sheet series is designed to inform all who are required to work on sites located near operating radiofrequency transmitting antennas (RF Site). This includes:

- Mobile Phone Carrier personnel and contractors working on RF Sites as part of Carrier operations; and
- Workers involved in activities such as roof maintenance, window cleaning, facade maintenance and delivery of plant where access to the roof is required and there are Mobile Phone Carrier transmitters in close proximity.



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MCF Fact Sheets



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.



Microcell Mounted on Traffic Lights



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

About RF safety and health

In relation to adverse health effects the World Health Organisation has released a fact sheet (NO 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).

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 whole-body average SAR is 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 (nominally a 1°C rise in core body temperature).

Where can I find more Information?

Australian Radiation Protection & Nuclear Safety Agency (ARPANSA)

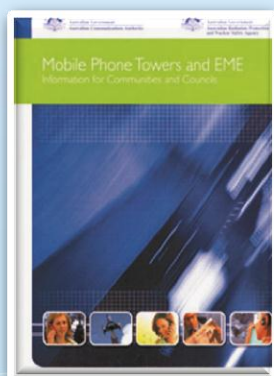
Phone (03) 9433 2211 or 1800 022 333

Web: www.arpansa.gov.au

World Health Organisation

EMF Project Home Page:

Web: www.who.int/peh-emf/



About RF Transmitters and who are RF Workers

Where would I find RF Transmitters?

Wherever 2-way radio, paging systems, mobile phone, AM/FM and TV broadcast equipment is located.

The antennas utilised by this equipment may take various forms. To reduce any negative visual impact of a site, some of this equipment may sometimes even be concealed.

For this reason, personnel accessing commercial rooftops, lattice towers, monopoles, or other areas of transmission sites should consult with the site or building owner to find out if there is any RF transmitting equipment on site before entering the site.

Am I an RF Worker?

If you are exposed to RF EME under controlled conditions as an intrinsic part of your work activities then you may be considered an RF Worker.

Numerous Mobile Phone Carrier personnel and contractors who undertake maintenance, servicing or modification of Base Station Transmitting sites particularly on the antenna systems would be classified as RF Workers. Base station equipment huts or rooms generally do not have any restricted areas or EME levels approaching the general public safety limits. Maintenance personnel that only work in equipment huts in most cases would not be classified as RF Workers but would still be trained in radio maintenance safety.

RF Workers require appropriate RF training. Also a "pre-placement health assessment" should be undertaken for those RF Workers with bio-medical implants and/or hearing aids. Pregnant women are encouraged to always wear RF monitors and should not enter areas with RF exposure levels above General Public limits.

Mobile Phone Carrier personnel and contractors working on sites as part of Carrier operations should contact their Team Leader or the OH&S Manager for additional information.

What if I am not an RF Worker?

Those individuals who would not be considered as an RF Worker do not require special RF training. However, they should contact the building owner/manager to determine if they will be working near any RF transmission equipment and, if so, obtain information about safe working procedures.



I need to access a roof/structure as part of my work duties near Mobile Phone Carrier RF Transmitters

How does the Mobile Phone Carrier Industry control RF exposure?

Mobile Phone Carriers utilise various methods to minimise or control exposure to sources of RF EME. These controls include:

RF ASSESSMENT & DESIGN

Sites are designed and transmission equipment positioned with a view to ensure full RF EME compliance and to minimize unnecessary RF exposure.

ENGINEERING

Securing, barricading or other means of restricting access to the site or to areas where RF exposures exceed the maximum recommended limits.

SIGNAGE

Positioning of signage on perimeter fencing/doors, the base of structures or other suitable positions to indicate the presence of RF hazards and safe areas.

TRAINING

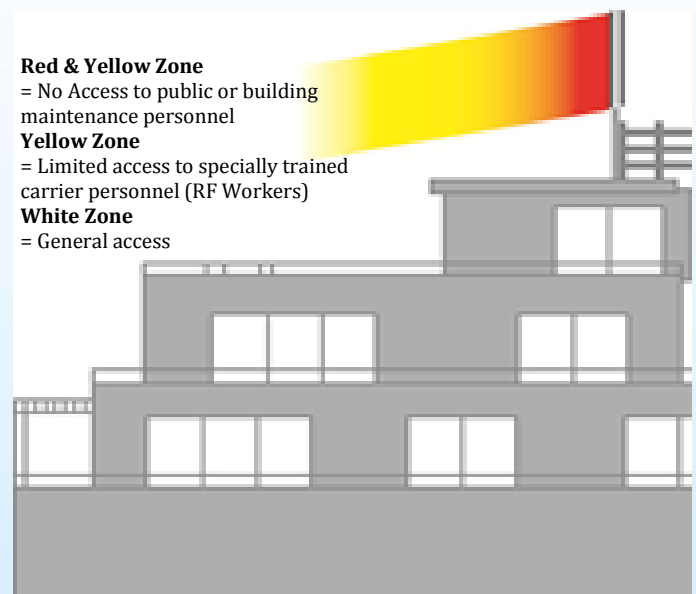
Training persons who perform work on RF equipment. This may include general induction, RF awareness, and Working at Heights

SITE MANAGEMENT BOOK

Production of a Radiocommunications Site Management Book (RCSMB) which provides important RF safety information for anyone who has to work near mobile phone base station transmitters.

How to read the RF Hazard drawings

Plan and elevation view RF Hazard drawings display horizontal and vertical cross-sections of the emission patterns from transmitting antenna.



Red & Yellow Zone

= No Access to public or building maintenance personnel

Yellow Zone

= Limited access to specially trained carrier personnel (RF Workers)

White Zone

= General access

Important - General Public and Maintenance Personnel and staff associated with the building/property do not enter red or yellow zones.



The RCSMB contains site contact details, information on RF Hazard drawings, site access control, equipment installed at the site and Safe Working Procedures.

I need to access a roof/structure as part of my work duties near Mobile Phone Carrier RF Transmitters

Where do you get the RCSMB?

A copy of the RCSMB is given to the property owner/manager. All the MCF Member Mobile Phone Carriers load the completed RCSMBs onto a central database called the National Site Archive. Property owner/managers can directly access the RCSMB for their site through the NSA website: www.rfnsa.com.au

If you cannot locate the RCSMB from the property owner/manager there is a 24 hour Mobile Phone Carrier contact number that should also be displayed at the entry point to the rooftop or base station. This number is the Mobile Phone Carrier Network Operations Centre. See the Table below, for specific details for each Carrier.

What if I have to work in an RF Hazard Zone?

Prior to undertaking work on/around operational equipment, the RF hazard areas need to be identified for the site (that is red and yellow areas). Section 5, Safe Work Procedure of the RCSMB should be read and followed.

In areas where high emissions are indicated, the transmitting equipment should be switched OFF and isolated. In many instances only "powering down" is required.

You must contact the Mobile Carrier Network Operations Centre to co-ordinate either "switch OFF and isolation" or "powering down". Wherever "powering down" is utilised, correct procedures for isolation must be followed. The Mobile Phone Carrier contact will clearly explain required procedures.

Where MORE THAN ONE Carrier is identified at a site, it is IMPORTANT to call EACH Carrier Network Operations Centre so that any other necessary switch OFF or "powering down" procedures are IMPLEMENTED and PROPERLY COORDINATED. Personal monitoring devices (e.g. RADMAN) are recommended for use on these sites.

Please note that Mobile Phone Carrier Base Station transmitters have power supplies independent of the mains power to the building.

What if there are RF transmitters other than Mobile Phone Carriers' on the roof?

The facility manager should have the safety information for all radio operators at the site. The RCSMB should show all RF transmitters operating on the site, including other mobile phone carriers and other operators such as paging, emergency services, taxis etc. Site contact details for other operators are shown in the RCSMB.

Personal monitoring devices (e.g. RADMAN) are recommended for use on co-located sites, or where numerous sources of RF radiation (i.e. paging systems, two-way radio etc) are identified. Calibration and correct use of this equipment is essential.

Telstra
Global Operations Centre
(Telstra GOC)
0418 707 000

Optus
Network Surveillance & Control Group (Optus
NSAC)
1800 505 777

Vodafone
Fault Management Centre/ Network Operations
Centre
(Vodafone FMT-NOC)
1800 683 683

Where can I find more information?

Carrier Network Operations Centres (see phone contacts opposite)

**Australian Radiation
Protection & Nuclear
Safety Agency (ARPANSA)**
1800 022 333
Web: www.arpansa.gov.au

Worksafe Victoria
Worksafe Advisory Service
Phone: (03) 9641 1444 or
Phone (03) 9433 2211 or tollfree 1800
136 089
Web: www.worksafe.vic.gov.au

I am an RF Worker and I need site access as part of Mobile Phone Carrier operations

RF Workers entering a Mobile Phone BTS (Base Station Transmitting) Site

Mobile Phone Carrier personnel and contractors working on sites as part of Carrier operations should adopt the following precautionary measures to minimise any risk of RF overexposure.

1. Check with your Team Leader/Manager that you are appropriately trained.
2. If you are working alone or in a remote area, ensure check-in procedures are followed.
3. Contact relevant Carrier Network Operation Centre (see Table below)
4. Consult any RF signage and RF Site Management Book (RCSMB). If it is the first time on site and/or required by the site access procedure, organise to meet a representative of the property owner who is familiar with the equipment on the building or structure.
5. Attempt to identify all potential sources of RF emissions and only access the site via dedicated walkways and safe areas.
6. Where "Shutdown" has been requested, confirm shutdown (with all identified Carriers) prior to commencing work.
7. Use a personal RF Monitor to check safety conditions and confirm power down
8. Ensure appropriate RF monitoring equipment is serviceable, available and used correctly.

Telstra
Global Operations Centre
(Telstra GOC)
0418 707 000

Optus
Network Surveillance & Control Group (Optus NSAC)
1800 505 777

Vodafone
Fault Management Centre/ Network Operations Centre
(Vodafone FMT-NOC)
1800 683 683

Additional precautions when other RF transmitters are on site

On numerous sites, the specific Mobile Phone Carrier equipment that you are working on is co-located with the equipment of other telecommunications carriers. In some cases, other equipment may also be operating at the site, for example, emergency services, TV and radio broadcasting, paging systems etc.

Prior to access to these sites, the Project Supervisor (Team Leader/ Manager) must take all reasonable steps to determine the type, location and exclusion zones of ALL transmission equipment on site.

While accessing/working: Monitoring equipment should be used by personnel to ensure that accidental exposure does not occur.

The Mobile Phone Carriers want to know of any unsafe situations

The Mobile Phone Carriers are committed to ensure safety and compliance on all of their BTS sites. If ANY UNSAFE SITUATION is noticed, please immediately REPORT it to the relevant Network Operations Centre using the numbers provided in the above Table.

Where can I find more information?

Carrier Network Operations Centres (see phone contacts opposite)

Australian Radiation Protection & Nuclear Safety Agency (ARPANSA)
1800 022 333
Web: www.arpansa.gov.au

Worksafe Victoria
Worksafe Advisory Service
Phone: (03) 9641 1444 or
Phone (03) 9433 2211 or tollfree 1800 136 089
Web: www.worksafe.vic.gov.au

What if I believe I have been over-exposed to RF EME?

The safety of all is of paramount importance to the Mobile Phone Carrier Industry. Immediate notification is essential if you believe you may have been over-exposed to RF or you feel unsure about the status of your exposure.

Mobile Phone Carrier staff and their contractors should:

- IMMEDIATELY notify their Team Leader or Manager and fill in an incident report form.

General Workers (**e.g. roof & lift maintenance, window cleaners**) should:

- IMMEDIATELY inform their own company Supervisor or Manager;

AND

- IMMEDIATELY contact the relevant Carrier' specialist EME Manager (or contact the Carrier's Network Operations Centre).

Telstra

Geoff Bail, EME Operations Manager 1300 368 387
Network Operations Centre 0418 707 000
ememanagement@team.telstra.com

Vodafone

Taras Saczko, EME Operations Manager 0414 207 002 or 02 9415 7002

Network Operations Centre 1800 683 683

EMEmanagement.au@vodafone.com

Optus

The EME Manager, Team Leader or Manager will confirm the status of the RF EME sources in the area and other relevant information, including:

- Power output of transmitters
- Frequencies of transmitters
- Location of Worker from emission sources(s)
- Duration of exposure
- Status of Worker (RF Worker or Non-RF Worker)

If it becomes clear on initial investigation that no over-exposure has occurred, then no further action is required.

If a "suspected over-exposure" (i.e. RF exposure levels in excess of prescribed ARPANSA Occupational Exposure Limits for RF Workers or ARPANSA General Public Exposure Limits for non-RF Workers), then a full incident investigation will be conducted by the Carrier EME Manager, Team Leader or Manager. Suspected overexposures require referral to a physician with knowledge of RF for health assessment including psychological and physical symptoms and accurate records kept.

This investigation report will be submitted to the Carrier and relevant company OH&S Managers.

Where can I find out more information?

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)

- Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz, (Radiation Protection Series No. 3)

Phone: (03) 9433 2211 or 1800 022 333

Web: www.arpansa.gov.au/Publications/codes/rps3.cfm

Worksafe Victoria

- WorkSafe Alert - Radiofrequency (RF) radiation
- Dangers of exposure

Worksafe Advisory Service

Phone: (03) 9641 1444 or tollfree 1800 136 089

Web: www.worksafe.vic.gov.au