

# Leaflet 35

## Radio Frequency Radiations

### CONTENTS

#### Paragraph

- 1 Scope
- Definitions
- 3 Occupational exposure
- 4 Public exposure
- 5 Basic restriction
- 6 Reference level
- 7 Statutory requirements
- 9 MOD mandatory guidance
- 10 Single service instructions and guidance
- Duties
- 11 Commanding Officer and Head of Establishment (CO/HoE)
- 12 Radiation Safety Officer (RSO)
- 13 Focal point authorities for radiofrequency radiation
- 14 Hazards
- 15 Assessment of risk
- 16 Reference levels
- 17 Control of public exposure
- 18 Contact currents
- 19 Hazard areas
- 22 Permit to work system
- 23 Medical Implants
- 24 Accidental exposure to RF radiation
- 25 Provisions for the protection of the public
- 27 Provisions for liaison with contractors
- 28 Associated documents

#### Table

- 1 Single service contact details
- 2 Legal and MOD mandatory requirements

#### Annex

- A Reference levels for exposures to EMFs up to 300 GHz
- B Special considerations for radio equipment including mobile communications masts
- C Other standards and issues – UK, European and International exposure guidelines

### Scope

1 Radiofrequency (RF) radiation is electromagnetic radiation, fields and waves in the frequency range 0-300 GHz. RF radiation is also referred to in guidance and standards as electromagnetic fields (EMF).

2 This Leaflet details the requirements for the keeping, using and disposal of equipment emitting radiofrequency radiations, or equipment containing components which emit radiofrequency radiations. Such equipments include: radar (including countermeasures transmitters), communications apparatus, microwave links, magnetrons, klystrons, diathermy apparatus, RF induction and dielectric heating, RF welding, microwave ovens etc. This list is not exhaustive.

## Definitions

### Occupational Exposure

3 Occupational exposure means any exposure to EMF that occurs in the course of a person's employment.<sup>1</sup>

### Public Exposure

4 Any exposure that is not occupational exposure. This includes:

- Anyone outside the site boundary who is not at work;
- Visitors to a site who are not at work, e.g. those attending a display or exhibition.

### Basic Restriction

5 A limit of exposure below which acute exposure will not cause adverse health effects. This is often given as a biological or dosimetric quantity that is difficult to measure directly.

### Reference Level

6 A quantity e.g. an electric or magnetic field level that can be measured directly and below which exposure should be below the basic restriction. These levels have been derived from the basic restrictions using various assumptions, e.g. plane wave and far field exposure, as an aid to the assessment of exposure.

## Statutory Requirements

7 There is at present no statutory UK legislation specifically concerning exposure to radiofrequency radiation. However, a European Directive is being agreed laying down minimum health and safety requirements regarding exposure of workers and members of the public arising from electromagnetic fields. This Directive will be transposed into statutory legislation by March 2015.

8 The general provisions of the Health & Safety at Work etc Act 1974, and the Management of Health and Safety at Work Regulations 1999, do apply. The Health & Safety Executive (HSE) considers compliance with these regulations is achieved if advice given by the Public Health England Radiological Protection Division (PHE/RPD) (formerly Health Protection Agency) is adhered to. This advice considers exposure of workers and the general public and is consistent with the European Council recommendations. A summary of the Legal and MOD mandatory requirements can be found in Annex D Table 4.

---

<sup>1</sup> A job does not have to be defined as working with EMF to fall into the category of occupational exposure.

## MoD Mandatory Guidance

9 Exposure to EMF can produce both acute and chronic effects. Acute effects manifest themselves after exposure over a period of hours or less. Some chronic effects are known, and these generally occur only if exposure is above the permitted levels. However, low level chronic effects have been postulated, e.g. that exposure may lead to cancer. There has been much debate about this but there is, as yet, no conclusive proof. A further distinction is made between “direct effects” that are the result of the interaction of EMF with the body and “indirect effects” hazards such as currents induced in conducting objects which can give rise to a shock or burn, that arise from other objects exposed to EMF.

More information can be sought from either:

E3RADHAZpol  
Defence E3 Authority  
DCSA DCTO, Blumlein Building  
Blandford Camp, BLANDFORD  
Dorset, DT11 8RH  
PSTN 01 258 485 458  
Mil 94 371 5458 BLN

Dstl Environmental Sciences Dept  
c/o Institute of Naval Medicine  
Crescent Road  
Alverstoke  
GOSPORT  
Hampshire  
PO12 2DL  
PSTN 023 9276 8130  
Mil 9380 68130 PY

## Single Service Instructions and Guidance

10 The following single service publications also detail guidance:

- 10.1 Royal Navy - BR2924 Radiohazards in the Naval Service (Vols. 1 and 2).
- 10.2 Royal Air Force – CESO (RAF) Branch Guidance Ref. 01/07.
- 10.3 Army - AESP 02000-A-092-013 Chapter 4

## Duties

### Commanding Officer/Head of Establishment (CO/HoE)

11 The CO/HoE has a duty to the Secretary of State, and a personal responsibility, to protect the environment and secure the health, safety and welfare of their staff at work. The CO/HoE is also required to protect persons not in MOD employment (e.g. members of the public) against risks to their health and safety arising from the MOD work activities. This includes radiation safety. The CO/HoE's authority (but not responsibility) for radiation safety management arrangements may be delegated to appropriate personnel such as a Radiation Safety Officer (RSO).

### Radiation Safety Officer (RSO)

12 Radiation Safety Officers are to ensure that they are familiar with the specific radiation hazards at the establishments or vessels for which they are responsible, and that adequate radiation protection arrangements are made to minimise the radiation hazards.

## Focal Point Authorities for Radiofrequency Radiation

13 The single service focal point authorities are listed at Table 1.

Table 1 Single service contact details

Service	Address	Telephone
Royal Navy	FWEO SS Navy Command MP2.4 Leach Building Whale Island Portsmouth Hampshire PO1 3NH	PSTN 023 9272 5794 Mil 93832 5794 PY
Army	CESO (Army) IDL420, Ramillies Bldg, Marlborough Lines, Monxton Road Andover Hants SP11 8HJ	01 260 2218 Mil 94 391 2218
Royal Air Force	CESO (RAF) CHQ RAF High Wycombe Walters Ash HIGH WYCOMBE Buckinghamshire HP14 4UE	PSTN 01 494 495 481 Mil 95 221 5481
Other/Civilian	Dstl Environmental Sciences Department c/o Institute of Naval Medicine Crescent Road Alverstoke GOSPORT Hampshire PO12 2DL	PSTN 023 92 76 8130 Mil 9380 68130PY

## Hazards

14 The perceptible biological effects of exposure to RF radiation are mainly thermal and acute in nature. These effects may take the form of warming of the body either through resonance effects or induced currents. The effects may be mild, such as prickling of the hairs and small static shocks, increasing in severity to large static shocks, through to deep thermal burns which may be caused by grasping transmitting antennas. Effects similar to tinnitus have been experienced by some exposed personnel. RF radiation may, in some cases, cause interference with personal medical devices such as pacemakers and hearing aids. It should be noted however that biological damage may be caused by exposure to RF radiation which is below the threshold of detection.

## Assessment of Risk

15 Emissions from equipments and installations are to be assessed or measured locally by a competent person. If the assessment indicates that exposures exceed either the occupational or the public reference levels (whichever is appropriate) given in Annex B, the CO/HoE is to report the results to the focal point authority for radiation safety of EMF. The focal point authority for radiation safety is to arrange for a risk assessment for the equipment or installation to determine any risk to the workforce or members of the public who may be exposed to the emissions.

## Reference Levels

16 Reference levels for direct measurement of non-ionising radiation are detailed at Annex A. Exposures at or below these levels are to be reduced so far as is reasonably practicable, but are otherwise tolerable and do not require further investigation. Exposures above reference levels may still conform to PHE/RPD guidance, but must be referred to the focal point authority for radiation safety listed at Table 1.

## Control of Public Exposure

17 In general, the public should be excluded from areas where exposure exceeds the reference levels for public exposure – see also Para 26. However, this may not be practicable in every case, e.g. site visitors and people transiting areas of public access that, for good reason, happen to be above the reference level. In these cases, the risk assessment will have to determine whether the exposure may be “significant” in the terms of JSP 375 Leaflet 39 (Health and Safety Risk Assessment); and the EU recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz).

## Contact Currents

18 Personnel may suffer electric shock or burn from contact with sufficiently large conducting ungrounded objects, such as vehicles or mobile structures (cherry-pickers etc) at electric field strengths below the reference levels in Annex A. If there are working areas adjacent to emitters of RF, in which it is established that large ungrounded objects are present on a regular basis, it will be necessary to ensure that measured contact currents with such objects do not exceed those given in Annex A Table 3. Any requirement to measure contact currents as part of a local assessment is to be referred to the focal point authority for radiation safety who will make arrangements for the measurements to be taken. If the local assessment shows that there is no risk from this hazard, it will not be necessary to measure contact currents on large ungrounded objects.

## Hazard Areas

19 A hazard area is that area within which the exposure to EMF can exceed the reference levels for occupational exposure given in Annex A.

### Marking of Hazard Areas

20 The boundary of a hazard area is to be marked using signs and barriers, as appropriate. It may be necessary to prevent unauthorised entry. All signs and RF hazard warning notices should be in accordance with the Health and Safety (Safety Signs and Signals) Regulations 1996. A notice giving the name and telephone number of the competent person responsible for the area is to be displayed with the RF hazard warning notice.

### Responsibilities in relation to Hazard Areas

21 General responsibilities in relation to EMF hazard areas are as follows:

- The person in charge of an installation is to ensure, before activating the installation, that no unauthorised persons are present;
- Personnel are not to enter the area without the authority of the person in charge of the installation;
- A competent person is to be appointed, for equipments or installations having an associated hazard area. This competent person is to co-ordinate all safety measures relating to the area;
- The competent person is to produce local orders for the areas for which he is responsible and ensure that they are readily available to and understood by all personnel;
- Personnel authorised to enter and work within an area are to be instructed as to the hazards that they may be exposed to, and are to be trained in safe techniques to be used. Otherwise, access to the area is to be controlled by a "permit to work" system as described in Para 22.

## Permit to Work System

22 When a permit to work system is used, the permit is to give the name(s) of the person(s) who have to enter the area and state the following:

- Whether the installation is radiating;
- Conditions for entry and working in area;
- If the installation is radiating
  - the approximate radiated power;
  - the arrangements for preventing an increase in radiated power; and
  - the arrangements for preventing overexposure, e.g. time averaging exposure
- If the installation is not radiating, the arrangements for maintaining that condition;

- Date and time of entry into the area and when work may start;
- When work is to cease and the time of exit from the area.

## Medical Implants

23 Interference with the normal operation of implanted electronic devices such as cardiac pacemakers, and localised heating of metallic implants may occur below the occupational reference levels in Annex B. Line managers are to identify personnel within the workforce who have these implants and refer them to the Senior Medical Officer for occupational medical assessment. Advice on acceptable levels of EMF exposure for the safe operation of pacemakers and the heating of metallic implants can be obtained from the radiation medicine specialists at the Institute of Naval Medicine.

## Accidental Overexposure to RF Radiation

24 Any person known, or suspected, to have been accidentally exposed to EMFs above the occupational reference levels in Annex A is to be seen by the responsible medical officer as soon as possible following the incident. Any incident involving an accidental over-exposure is to be reported (with a copy to Dstl ESD) and investigated in accordance with JSP 375 Leaflet 14.

## Provisions for the Protection of the Public

25. The following measures are to be taken to protect the public from RF emissions on units and establishments:

- No EMF hazard area should include places to which the public has a legal right of unrestricted access. This includes heights above ground, for example, if an emission crosses a road used by a double-decker bus or public footpath, it will be necessary to ensure that the height of the emission is such that the public access is outside the area. Persons may suffer electric shock or burn from contact with sufficiently large conducting ungrounded objects, such as vehicles or mobile structures, at electric field strengths below the reference levels in Annex A. In areas of public access adjacent to an EMF hazard area where large ungrounded objects are likely to be present on a regular basis (roads, etc) it will be necessary to ensure that measured contact currents with ungrounded objects do not exceed those given in Annex A Tables 3 & 4. If the local assessment shows that there is no risk from this hazard, or that arrangements have been made to prevent public exposure to the hazard, it will not be necessary to measure contact currents with ungrounded objects.
- If an EMF hazard area includes places to which the public normally has access by grace and favour, such access is to be prevented by means of adequate physical barriers and warning signs as detailed in Para 22.
- If an EMF hazard area includes places where members of the public might trespass, such trespass is to be prevented as detailed in Para 22.
- If a proposed EMF hazard area includes any place legally occupied by a member of the public, as owner or tenant, his consent must be obtained before it is established.

- 26 The CO/HoE is responsible for applying these provisions to any mobile equipment capable of emitting RF radiation which is under the direct control of personnel under their command – see also JSP 846 (MOD Radio Site Clearance and Protection - UK).

## Provisions for Liaison with Contractors

27 The Management of Health and Safety at Work Regulations 1999 requires that where two or more employers share a workplace they must co-ordinate the preventative and protective measures, identified as a result of the hazard identification and risk assessment undertaken by the separate employers. The employers are also required to co-operate with each other by exchanging health and safety information with all that are considered at risk. The MOD policy for the management of contractors and other visiting workers at MOD establishments is detailed in JSP 375 Leaflet 34. This management system is commonly known as the 4C's (co-operate, communicate, co-ordinate and control). The competent person responsible for the emitting equipment is to liaise with the 4C's Area Custodian and is to provide the appropriate information to enable the Area Custodian to compile the master hazard register for their area. This information will include:

- The boundaries of the EMF hazard area.
- Areas adjacent to RF emitters where contact with large ungrounded objects may cause electric shock or burn.
- Details of special hazards associated with the operation of the installation.
- Details of hazards that might be encountered during maintenance (hidden obstacles for grass cutters, etc).

## Associated Documents

28 Related Documents:

- JSP 375, Volume 2 Leaflet 14 – Accident / Incident Investigation.
- JSP 375, Volume 2 Leaflet 34 – The management of contractors and other visiting workers (including MOD agencies) within the MOD.
- JSP 375, Volume 2 Leaflet 39 – Health and Safety Risk Assessment.
- JSP 846 (MOD Radio Site Clearance and Protection - UK).
- Statement and advice by the National Radiological Protection Board on Limiting Exposure to Electromagnetic Fields (0 – 300 GHz). Documents of the NRPB, Volume 15, No 2: HMSO  
London; 2004, ISBN 0-85951-532-X.
- Directive 2004/40/EC of the European Parliament and of the Council of 29 April 2004 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields).
- Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC).



## Leaflet 35 Annex A

### Reference Levels for Exposure to EMFs up to 300 GHz

#### Reference Levels

1. The reference levels for continuous whole body exposure to electric and magnetic fields set out in this Annex is taken from Documents of the NRPB Volume 15 No. 2 2004.

Table 1 Reference levels for occupational exposure to time varying electric and magnetic fields (unperturbed rms values)

Frequency range	Electric field strength, $E$ ( $Vm^{-1}$ )	Magnetic field strength, $H$ ( $Am^{-1}$ )	Magnetic flux density, $B(\mu T)$	Equivalent plane wave power density, $S_{eq}$ ( $W m^{-2}$ )
Up to 1 Hz	-	163 000	200 000	-
1 Hz - 8 Hz	20 000	$163\,000/f^2$	$200\,000/f^2$	-
8 Hz - 25 Hz	20 000	$20\,000/f$	$25\,000/f$	-
0.025 kHz - 0.82 kHz	$500/f$	$20/f$	$25/f$	-
0.82 kHz - 65 kHz	610	24.4	30.7	-
0.065 MHz - 1 MHz	610	$1.6/f$	$2.0/f$	-
1 MHz - 10 MHz	$610/f$	$1.6/f$	$2.0/f$	-
10 MHz - 400 MHz	61	0.16	0.2	10
400 MHz - 2000 MHz	$3f^{1/2}$	$0.008f^{1/2}$	$0.01f^{1/2}$	$f/40$
2 GHz - 300 GHz	137	0.36	0.45	50

#### NOTES

(a)  $f$  is the frequency as indicated in the frequency range column.

(b) Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded.

(c) For frequencies between 100 kHz and 10 GHz,  $S_{eq}$ ,  $E^2$ ,  $H^2$  and  $B^2$ , are to be averaged over any 6-minute period.

(d) Between 100 kHz and 10 MHz, peak values for the field strengths are obtained by interpolation from the 1.5-fold peak at 100 kHz to the 32-fold peak at 10 MHz. For frequencies exceeding 10 MHz it is suggested that the peak equivalent plane wave power density, as averaged over the pulse width, does not exceed 1000 times the  $S_{eq}$  restrictions, or that the field strength does not exceed 32 times the field strength exposure levels given in the table.

(e) For frequencies exceeding 10 GHz,  $S_{eq}$ ,  $E^2$ ,  $H^2$  and  $B^2$ , are to be averaged over any  $68/f$  1.05-minute period (where  $f$  is the frequency in gigahertz).

(f) No  $E$ -field value is provided for frequencies  $< 1$  Hz, which are effectively static electric fields. Electric shock from low impedance sources is prevented by established electrical safety procedures for such equipment.

Table 2 Reference levels for general public exposure to time varying electric and magnetic fields (unperturbed rms values)

Frequency range	Electric field strength, $E$ ( $Vm^{-1}$ )	Magnetic field strength, $H$ ( $Am^{-1}$ )	Magnetic flux density, $B(\mu T)$	Equivalent plane wave power density, $S_{eq}$ ( $Wm^{-2}$ )
Up to 1 Hz	-	32 000	40 000	-
1Hz-8Hz	10 000	$32\,000/f^2$	$40\,000/f^2$	-
8Hz-25Hz	10 000	$4\,000/f$	$5000/f$	-
0.025 kHz - 0.8 kHz	$250/f$	$4/f$	$5f$	-
0.8 kHz - 3 kHz	$250/f$	5	6.25	-
3kHz-150kHz	87	5	6.25	-
0.15 MHz - 1 MHz	87	$0.73/f$	$0.92/f$	-

1 MHz - 10 MHz	$87/f^{3/2}$	$0.73/f$	$0.92/f$	-
10 MHz - 400 MHz	28	0.073	0.092	2
400 MHz - 2000 MHz	$1.375f^{3/2}$	$0.0037f^{3/2}$	$0.0046f^{3/2}$	$f/200$
2 GHz - 300 GHz	61	0.16	0.20	10

NOTES

- (a)  $f$  is the frequency as indicated in the frequency range column.
- (b) Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded.
- (c) For frequencies between 100 kHz and 10 GHz,  $S_{eq}$ ,  $E 2$ ,  $H 2$  and  $B 2$ , are to be averaged over any 6-minute period.
- (d) Between 100 kHz and 10 MHz, peak values for the field strengths are obtained by interpolation from the 1.5 fold peak at 100 kHz to the 32-fold peak at 10 MHz. For frequencies exceeding 10 MHz it is suggested that the peak equivalent plane wave power density, as averaged over the pulse width, does not exceed 1000 times the  $S_{eq}$  restrictions, or that the field strength does not exceed 32 times the field strength exposure levels given in the table.
- (e) For frequencies exceeding 10 GHz,  $S_{eq}$ ,  $E 2$ ,  $H 2$  and  $B 2$ , are to be averaged over any  $68/f$  1.05-minute period (where  $f$  is the frequency in gigahertz).
- (f) No  $E$ -field value is provided for frequencies  $< 1$  Hz. which are effectively static electric fields. Perception of surface electric charges will not occur at field strengths less than 25 kVm<sup>-1</sup>. Spark discharges causing stress or annoyance should be avoided.

Table 3 Reference levels for time-varying contact currents from conductive objects

Exposure characteristics	Frequency range	Maximum contact current (mA)
<b>Occupational</b>	Up to 2.5 kHz	1.0
	2.5 kHz. - 100 kHz	$0.4f$
	100 kHz. - 110 MHz	40
<b>General public</b>	Up to 2.5 kHz	0.5
	2.5 kHz. - 100 kHz	$0.2f$
	100 kHz. - 110 MHz	20

NOTES

- (a)  $f$  is the frequency in kilohertz.
- (b) These values are set to avoid the possibility of indirect effects of exposure (shock and/or burn).

Table 4 Reference levels for current induced in any limb at frequencies between 10 and 110 MHz

Exposure characteristics	Current (mA)
Occupational	100
General public	45

NOTES

- (a) The general public reference level is equal to the occupational reference level divided by  $\sqrt{5}$ .
- (b) For compliance with the basic restriction on localised SAR, the square root of the time averaged value of the square of the induced current over any 6 minute period forms the basis of the reference levels.

## References

- ICNIRP (1998), Guidelines for limiting exposure to time-varying electric, Magnetic, and electromagnetic fields (up to 300 GHz). Health Phys, 74, 494-522.
- ICNIRP (1999), Guidelines on Limiting Exposure to Non Ionizing Radiation (R Matthes. J H Bernhardt and A F McKinlay, eds), München, ICNIRP 7/99

## **Leaflet 35 Annex B**

### **Special Considerations for Radio Equipment Including Mobile Communications Masts**

1. All new/upgraded radio equipment, including mobile phone transmitters on the Defence Estate, must be independently assessed by Defence Equipment & Support Air Defence and Air Traffic Systems PT (DES ADATS) under the Radio Site Clearance (RSC) procedure. A radiation exposure hazard assessment for personnel is conducted as part of the RSC, in addition to weapon storage and processing areas, explosives, fuels and gasses.
2. The RSC certificate must be passed to the originator of the request to install radio equipment on the Defence Estate. The request originator must provide a copy of the RSC certificate to the Head of Establishment/Commanding Officer of the site on which the radio system is to be installed, together with a statement of self-certification that the transmitter, when operational, complies with the International Commission on Non-Ionising Radiation Protection (ICNIRP) guidelines.
3. It is the responsibility of the HoE/CO to consider the presence of the radio transmitter, along with any other non-ionising radiation sources, for inclusion the Site Risk Assessment. Where no significant risk is identified, it is the decision of the HoE/CO whether or not to include the mast/tower information on the Site Risk Assessment. However, the HoE/CO must retain the planning application/RSC certificate in case of enquiries concerning the potential exposure from the transmitters.
4. The strategy and policy for Radio Site Clearances is outside the scope of JSP 392 and may be found at JSP 846 (MOD Radio Site Clearance and Protection - UK).

## Leaflet 35 Annex C

### Other Standards and Issues – UK, European and International Exposure Guidelines

#### Public Health England's Radiological Protection Division

1. The Public Health England's Radiological Protection Division (PHE/RPD) – formerly HPARPD and prior to that the National Radiological Protection Board (NRPB) – provides advice to the government of the UK and MOD Policy is based upon their publication. In arriving at their conclusions the NRPB considered the available scientific evidence and published their review as “Documents of the NRPB”, Volume 15, No. 3, 2004.

#### International Commission on Non-Ionizing Radiation Protection

2. Many nations, including most of Europe, use ICNIRP guidelines for the control of exposure to EMF.

They are also referred to in the European Union Recommendation (see Para 7). In the UK, the PHE Centre for Radiation, Chemical and Environmental Hazards have advised that the ICNIRP guidelines be used. Therefore:

- It is good practice to control public exposure such that it conforms to the lower tier of the ICNIRP guidelines;
- Anyone operating overseas may need to control public exposure to the lower tier of the ICNIRP guidelines in order to conform to the overall health and safety policy of the Secretary of State for Defence.

3. ICNIRP is a body of independent scientific experts with a number of consulting members whose expertise is brought to bear on addressing the important issues of possible adverse effects on human health of exposure to non-ionising radiation. Their principal aim is to disseminate information and advice on the potential health hazards of exposure to non-ionising radiation to everyone with an interest in the subject.

4. ICNIRP's information and advice covers all of the non-ionising radiations including the optical radiations (ultraviolet, visible and infrared - and lasers); static and time-varying electric and magnetic fields and radiofrequency (including microwave) radiation, and ultrasound. Much of the information that ICNIRP provides is published in the form of scientific reviews and reports and the proceedings of scientific meetings. The results of these reviews combined with risk assessments carried out in collaboration with the World Health Organization (WHO) result in the publication by ICNIRP of Exposure Guidelines. Examples of these are guidelines limiting exposure to electromagnetic fields, to laser radiation, to ultraviolet radiation, to incoherent optical radiation and to ultrasound.

#### European Union

##### *Occupational*

5. A European Directive on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) lays down the basis for controlling occupational exposure. This will be transposed into UK

legislation, no later than October 2015. It uses a scheme of basic restrictions and reference levels drawn from the ICNIRP guidelines.

### *Public*

6. The Council of the European Union has published "Council Recommendation (1999/519/EC) of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)". Being a Recommendation, it is not binding on EU Member States, hence the lack of UK legislation but the UK has moved towards its implementation. The principal feature is that it uses the lower tier of the ICNIRP guidelines. The wording of most interest in the Recommendation is that Member States should "implement measures according to this framework, in respect of sources or practices giving rise to electromagnetic exposure of the general public when the time of exposure is significant". The last part of which indicates that priority should be given to compliance in areas where members of the public are present for long periods.

### **IEEE**

7. The Institute of Electrical and Electronics Engineers Inc (IEEE) in the USA is a non-profit, technical professional association.

8. Their "standard" gives recommendations to prevent harmful effects in human beings exposed to electromagnetic fields in the frequency range from 3 KHz to 300 GHz. The recommendations are intended to apply to exposures in controlled, as well as uncontrolled, environments (i.e. it is a two-tier guidance). They are not intended to apply to the purposeful exposure of patients by or under the direction of practitioners of the healing arts. The recommendations at 300 GHz are compatible with existing recommendations of safe exposure in the infrared frequency range (starting at 300 GHz).

## **Other Standards**

### **BSI**

9. The role of BSI, in relation to EMF, is the body that:

- Represents the UK to the European Committee for Electro-technical Standardization, or CENELEC as it is better known;
- Publishes CENELEC standards in the BS (EN) series.

10. It is worth noting that not only BSI and CENELEC, but also the International Electro-technical Commission (IEC), do not set standards for the exposure of personnel, see Para 3. They believe that such prescription is only appropriate as a function of government.

## **Associated Documents**

### **Exposure**

- HPARPD - Review of the Scientific Evidence for Limiting Exposure to Electromagnetic Fields (0-300 GHz) Documents of the NRPB, Volume 15, No. 3, 2004.
- ICNIRP - Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz), Health Physics Vol. 74, No 4, pp 494-522, 1998.

- EU - Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC).
- Directive 2004/40/EC of the European Parliament and of the Council of 29 April 2004 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (18th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC); corrected version: Official Journal of the European Union L 184 24 May 2004.
- IEEE - IEEE C95.1-1991 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

## Leaflet 35 Annex D

### Legal and MoD Mandatory Requirements

Table 4 Legal and MOD mandatory requirements

Requirement	Applicable	Comments	Related leaflet
HSE authorisation	x		
HSE notification	x		
EA notification	x		
Risk assessment	✓	As required by MHSWR 99	
Restriction of exposure	✓	Comply with local orders	16
PPE	x		
Maintenance of radiation engineering controls	✓	See local orders	16
Contingency plans	✓	See local orders	16
Designation of areas	✓		
Monitoring	✓	On first installation then as local orders	
Training for users	✓	Information and instruction only	
Local orders	✓	See local orders	16
RPS	x		
Storage	x		
Accounting	x		
Leak testing	x		
Personal dosimetry	x		
Transport	x		
Disposal	✓	Return to stores	
MLSC	x		