

# Safety Note 85

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## EMF (ELECTROMAGNETIC FIELDS)



<b>Summary</b>			
This safety note serves as an introduction to and to raise awareness of The Control of Electromagnetic Fields at Work Regulations 2016 CEMFAW.			
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## Introduction

This safety note offers a basic introduction to the hazards posed by Electromagnetic Fields (EMF). We all encounter EMF on a daily basis from sources such as mobile phones, computers and power lines. At low energies these fields are understood by the scientific community to have no detrimental effects on the human body. The issues arise when there is potential for exposure to strong EMF and the transfer of the energy within those fields to the tissues of the human body with subsequent harmful effects.

The scientific theory behind this subject is complex and beyond the scope of this safety note.

If you are unsure about anything to do with EMF safety or how the regulations apply to your work, please contact the Scientific Safety Advisor.

[Contact details \(reading.ac.uk\)](http://reading.ac.uk)

## The regulations

The Control of Electromagnetic Fields at Work (CEMFAW) Regulations contain a Schedule which introduces limits, explains the effects of EMF and provides details of safety conditions which must be met.

The limits are based around the concept of “action levels” (ALs) and “exposure limit values” (ELVs) and are guided by the ICNIRP Guidelines for the protection of humans exposed to radiofrequency electromagnetic fields (RF) in the range 100 kHz to 300 GHz. The guidelines cover many applications such as 5G technologies, Wi-Fi, Bluetooth, mobile phones, and base stations.

This publication replaces and supersedes the 100 kHz to 300 GHz part of the ICNIRP (1998) radiofrequency guidelines, as well as the 100 kHz to 10 MHz part of the ICNIRP (2010) low-frequency guidelines.

## What are EMFs?

“electromagnetic field” means a static electric, static magnetic and time-varying electric, magnetic and electromagnetic field with a frequency of up to 300 GHz;

Radiofrequency electromagnetic fields (EMFs) are used to enable a number of modern devices, including mobile telecommunications infrastructure and phones, Wi-Fi, and Bluetooth. As EMFs at sufficiently high power levels can adversely affect health the government introduced legislation in 2016 to set limits in an attempt to protect workers from exposure to dangerously high strength EMFs.

## What are the effects of EMFs

There are two main consequences from EMF exposure: indirect and direct effects. Indirect effects include uncontrolled attraction of ferromagnetic metals, interference with active or passive medical devices, electric shocks and sparks that trigger fires or explosions. Direct effects include sensory and health effects experienced by the person who is in the field. Sensory effects are caused by a stimulation of the central or peripheral nervous systems resulting in nausea, vertigo, metallic taste in the mouth and flashes to the eyes. Health effects are thermal stress in body tissue, tingling and muscle contractions and heart arrhythmia.

These effects vary based on the different frequencies and energy of the exposure.

## Examples of sources that generate EMFs

MRI machines

Broadcasting and TV antennas

Radar and radio transmitters

Dielectric heating (eg vulcanising, plastics welding or microwave drying)

High voltage power lines

Nuclear magnetic resonance spectrometers

Electromagnetic lifting cranes

The above list is not exhaustive and if you are unsure about the ability of a source to generate an EMF please seek advice from Health and Safety Services.

## Employees at higher risk

An employee who has declared to his or her employer a condition which may lead to a higher susceptibility to the potential effects of exposure to electromagnetic fields;

In particular, you'll need to be able to identify workers who have:

- Body-worn medical devices (BWMDs)

- Passive implantable medical devices (PIMDs)
- Active implantable medical devices (AIMDs)
- Metal plates, artificial joints, pins or shrapnel in their body.

Examples of these medical devices include but are not limited to pacemakers, neurostimulators, hormone infusion pumps and cochlear implants.

Expectant mothers would also be considered higher risk workers and risk assessments for any exposure to EMFs must take these workers into consideration.

## Exemptions

### MRI exemption for medical purposes

The exposure limit requirements of the CEMFAW Regulations do not apply during the development, testing, installation, use and maintenance of, or research related to, MRI equipment for **patients in the health sector**, where:

- the exposure of employees to EMFs is as low as is reasonably practicable; and
- employees are protected against the health effects and safety risks related to that exposure.

You will need to comply with all other requirements of the CEMFAW Regulations, except the requirement to develop an action plan.

## References and useful information

CEMFAW Regulations

<https://www.legislation.gov.uk/uksi/2016/588/schedule/made>

[https://www.legislation.gov.uk/uksi/2016/588/pdfs/uksi\\_20160588\\_en.pdf](https://www.legislation.gov.uk/uksi/2016/588/pdfs/uksi_20160588_en.pdf)

A guide to the Control of Electromagnetic Fields at Work Regulations 2016

<https://www.hse.gov.uk/pubns/priced/hsg281.pdf>

<https://www.icnirp.org/en/publications/article/rf-guidelines-2020.html>