

BS EN 50496:2008



BSI British Standards

Determination of workers' exposure to electromagnetic fields and assessment of risk at a broadcast site

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The UK participation in its preparation was entrusted to Technical Committee GEL/106, Human exposure to low frequency and high frequency electromagnetic radiation.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English version

Determination of workers' exposure to electromagnetic fields and assessment of risk at a broadcast site

Détermination de l'exposition
des travailleurs
aux champs électromagnétiques
et évaluation des risques
sur un site de radiodiffusion

Ermittlung der Exposition
von Arbeitnehmern gegenüber
elektromagnetischen Feldern
und Bewertung des Risikos
am Standort eines Rundfunksenders

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 106X, Electromagnetic fields in the human environment.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50496 on 2008-09-01.

The following dates were fixed:

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with the EN have to be withdrawn (dow) 2011-09-01
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1 Scope

The object of this standard is to provide methods for assessing compliance with the requirements of the Directive 2004/40/EC [8] at a site operating one or more broadcast transmitters.

This standard covers the frequency range up to 40 GHz.

NOTE The Council and European Parliament Directive 2004/40/EC will be transposed into national legislation in all the EU member countries. It is recommended that users of this standard consult the national legislation related to this transposition in order to identify the national regulations and requirements. These national regulations and requirements may have additional requirements that are not covered by this standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- [1] EN 50413, Basic standard on measurement and calculation procedures for human exposure to electric, magnetic and electromagnetic fields (0 Hz - 300 GHz)
- [2] EN 50420, Basic standard for the evaluation of human exposure to electromagnetic fields from a stand alone broadcast transmitter (30 MHz - 40 GHz)
- [3] EN 50475, Basic standard for the calculation and the measurement of human exposure to electromagnetic fields from broadcasting service transmitters in the HF bands (3 MHz - 30 MHz)
- [4] EN 50499, Procedure for the assessment of the exposure of workers to electromagnetic fields
- [5] EN 62226-2-1, Exposure to electric or magnetic fields in the low and intermediate frequency range - Methods for calculating the current density and internal electric field induced in the human body - Part 2-1: Exposure to magnetic fields - 2D models (IEC 62226-2-1)
- [6] IEEE C95.3, Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields
- [7] 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) (Official Journal L 199 of 30 July 1999)
- [8] Directive 2004/40/EC of the Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (Electromagnetic fields) – Official Journal of 30 April 2004
- [9] International Commission on Non-Ionizing Radiation Protection, 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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

action values

the magnitude of directly measurable parameters, provided in terms of electric field strength (E), magnetic field strength (H), magnetic flux density (B), power density (S_{eq}), limb induced current (I_L) and contact current (I_C) at which one or more of the specified measures in [8] must be undertaken. Compliance with these values will ensure compliance with the relevant exposure limit values of [8]

3.2

AIMD

Active Implantable Medical Device

3.3

antenna

device that serves as a transducer between a guided wave (e.g. coaxial cable) and a free space wave, or vice versa

3.4

near-field region

region generally in proximity to an antenna or other radiating structure, in which the electric and magnetic fields do not have a substantially plane-wave character, but vary considerably from point to point. The near-field region is further subdivided into the reactive near-field region, which is closest to the radiating structure and that contains most or nearly all of the stored energy, and the radiating near-field region where the radiation field predominates over the reactive field, but lacks substantial plane-wave character and is complicated in structure

3.5

broadcasting service

radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission e.g. data

3.6

broadcast site

site operating one or more broadcast transmitters

3.7

contact current

current flowing into the body resulting from contact with a conductive object in an electromagnetic field. This is the localised current flow into the body (usually the hand, for a light brushing contact). Shocks and burns can be the adverse indirect effects. Contact current relates to a short term effect and cannot be time-averaged

3.8

induced current

current flowing inside a human body resulting directly from an exposure to an electromagnetic field

3.9

employer

any natural or legal person who has an employment relationship with the worker and has responsibility for the undertaking and/or establishment (Directive 89/391/EEC)

3.10

exposure limit values

limits on exposure to electromagnetic fields in [8] which are based directly on established health effects and biological considerations. Compliance with these limits will ensure that workers exposed to electromagnetic fields are protected against all known adverse health effects of electromagnetic fields

3.11

local safety instruction

safety instructions relating to a specific broadcast site and containing the information specified in Clause 8:

- it must include all the necessary safety-related indications and, if applicable, point out the possible risk of exposure to electromagnetic fields where these are at levels above the worker action values;
- it could include all the necessary safety-related indications and, if applicable, point out the possible risk of exposure to electromagnetic fields where these are at levels above the limits for the general public

3.12

transmitter

device to generate the radio frequency broadcast signal which is fed into the antenna system

3.13

worker

any person employed by an employer, including trainees and apprentices but excluding domestic servants (Directive 89/391/EEC)

3.14

work place

location where workers have access as part of their duties;

particular place of work within the broadcast site as for example the area near a transmitter with an open enclosure, the area inside a transmitting antenna, on a ladder inside a broadcast mast / tower and platforms under and above the antennas, the area around feed lines, etc.

4 Assessment methods

4.1 Worker exposure assessment

The assessment should be done using the steps outlined below:

- collection of technical data (Clause 5);
- determination of exposure levels by calculation or measurement (Clause 6). This includes checking of operating procedures in the different exposure work places (Clause 8).

The results of the assessment process are:

- zoning of exposure work places (Clause 7);
- information and training (Clause 9);
- assessment report (Clause 10).

In the case of simultaneous exposure to multiple sources, the combined exposure shall be considered, referring to Annex A.

4.2 Use of public exposure assessment

If an evaluation has already been undertaken in accordance with the provisions of Council Recommendation 1999/519/EC [7], and the restrictions as specified therein are respected, then the exposure limit values for workers of [8] are also met.