SLOVENSKI STANDARD
SIST EN 61566:1999

01-januar-1999

Measurement of exposure to radio-frequency electromagnetic fields - Field strength in the frequency range 100 kHz to 1 GHz (IEC 61566:1997)

Measurement of exposure to radio-frequency electromagnetic fields - Field strength in the frequency range 100 kHz to 1 GHz

Messung der Belastung durch hochfrequente elektromagnetische Felder - Feldstärke im Frequenzbereich 100 kHz bis 1 GHz

Mesure de l'exposition aux champs électromagnétiques à radiofréquence - Intensité du champ dans la gamme de fréquences entre 100 kHz et 1 GHz

Ta slovenski standard je istoveten z: **EN 61566:1997**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

SIST EN 61566:1999 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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English version

Measurement of exposure to radio-frequency electromagnetic fields Field strength in the frequency range 100 kHz to 1 GHz (IEC 61566:1997)

Mesure de l'exposition aux champs électromagnétiques à radiofréquence Intensité du champ dans la gamme de fréquences entre 100 kHz et 1 GHz (CEI 61566:1997)

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This European Standard was approved by CENELEC on 1997-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

The text of document 103/1/FDIS, future edition 1 of IEC 61566, prepared by IEC TC 103, Transmitting equipment for radiocommunication, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61566 on 1997-07-01.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-04-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-04-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annexes A and B are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61566:1997 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60215	1987	Safety requirements for radio transmitting equipment	EN 60215	1989

NORME INTERNATIONALE

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Measurement of exposure to radio-frequency electromagnetic fields – Field strength in the frequency range 100 kHz to 1 GHz

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MEASUREMENT OF EXPOSURE TO RADIOFREQUENCY ELECTROMAGNETIC FIELDS –

Field strength in the frequency range 100 kHz to 1 GHz

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61566 has been prepared by subcommittee 12C: Transmitting equipment, of IEC technical committee 12: Radiocommunications.

The text of this standard is based on the following documents:

FDIS	Report on voting
103/1/FDIS	103/4/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

Annexes A and B are given for information only.

INTRODUCTION

Recent publications by national and international authorities responsible for developing safety limits on exposure to radiofrequency electromagnetic fields show a consensus towards making specific energy absorption rate (SAR) and induced current in the human body the basic limits.

Since instruments are not yet available to measure SAR directly, and because SAR and circulating current will vary from person to person, depending on their height and weight, recent standards specify derived secondary levels for field strength, and/or equivalent plane-wave power flux density, for worst case conditions of electrical coupling and body size and weight. However, in some situations, where a wide spatial variation of field strength is present, for example, when climbing an antenna tower or mast, it may be more appropriate to measure the contact current through the hands or feet.

Measurements of contact current are not covered by this International Standard.

MEASUREMENT OF EXPOSURE TO RADIOFREQUENCY ELECTROMAGNETIC FIELDS –

Field strength in the frequency range 100 kHz to 1 GHz

1 Scope

This International Standard applies to measurements of electromagnetic fields from operational transmitting equipment to ensure that the transmissions do not constitute a potential hazard to workers or to the general public.

The purpose of this standard is to promote a common understanding of technical requirements and precautions necessary for the accurate measurement of electromagnetic fields carried out in conjunction with relevant national exposure regulations.

This standard covers transmissions in the frequency range 100 kHz to 1 GHz.

NOTE – Possible extension of this frequency range up to 2 GHz or 3 GHz will be investigated.

This International Standard does not specify limiting values for exposure as these are usually given in exposure standards issued by responsible health authorities. This standard is, therefore, intended to be used in conjunction with the relevant national standards or regulations applicable in the country concerned. In the absence of any national rules restricting exposure to radiofrequency electromagnetic fields, the recommendations of the International Non-Ionizing Radiation Committee (INIRC) may be followed. The 1988 INIRC recommendations on exposure limits are summarized in annex A.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60215: 1987, *Safety requirements for radio transmitting equipment*

3 Definitions

For the purpose of this International Standard, the following definitions apply.

3.1 **dipole, elementary**: Dipole of short length compared to wavelength. A mathematical concept, widely used in theoretical antenna analysis, based on a short element of wire compared to the wavelength carrying an oscillatory current.

3.2 **exposure**: Occurs where a person is subjected to electric, magnetic, or electromagnetic fields or to contact currents other than those originating from physiological processes in the body and other natural phenomena.

3.3 **exposure, partial – body**: Occurs where RF fields are substantially non-uniform over the body. Fields which are non-uniform over volumes comparable to the human body may occur due to highly directional sources, standing waves, re-radiating sources, RF hot-spots, or in the near-field.

3.4 **exposure standard**: Regulations, recommendations or a standard dealing with limits of permissible exposure, published by a responsible authority.

3.5 **far-field region**: That region of the field of an antenna where the angular field distribution is essentially independent of the distance from the antenna. In this region, the field has predominately a plane-wave character, i.e. with locally uniform distributions of electric field strength and of magnetic field strength in planes transverse to the direction of propagation.

NOTES

1 If the antenna has a maximum overall dimension D which is large compared to the wavelength, the far-field region is commonly taken to exist at distances greater than $2D^2/\lambda$ from the antenna, λ being the wavelength. This is the Rayleigh distance corresponding to a path difference of $\lambda/16$.

2 The far-field region is sometimes referred to as the Fraunhofer region.

3.6 **near-field region**: That region generally in proximity to an antenna, or other radiating structure, where the angular field distribution is dependent upon the distance from the antenna. In this region, the electric and magnetic fields do not have a plane-wave character. The near-field region is further subdivided into the reactive near-field region, which is closest to the radiating structure and which 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.

NOTES

1 For most antennas, the outer boundary of the reactive near-field region is commonly taken to exist at a distance of one-half wavelength from the antenna surface.

2 The radiating near-field region is sometimes referred to as the Fresnel region.

3.7 **non-ionizing radiation**: Any electromagnetic radiation incapable of dissociating electrons from atoms or molecules to produce ions or ionized molecules directly or indirectly. RF waves are non-ionizing radiations.

3.8 **polarization (radiated wave)**: That property of a radiated electromagnetic wave describing the time varying direction and amplitude of the electric field vector; specifically the figure traced as a function of time by the extremity of the vector at a fixed location in space, as observed along the direction of propagation.

NOTE – In general, this figure is elliptical, traced in a clockwise or counterclockwise sense. The commonly referenced circular and linear polarizations are obtained when the ellipse becomes a circle or a straight line, respectively. For an observer looking in the direction of propagation, clockwise sense rotation of the electric vector is designated right-hand polarization and counterclockwise sense rotation is designated left-hand polarization.

3.9 **power flux density**: In radio wave propagation, the power crossing unit area perpendicular to the direction of propagation (unit: W/m^2).

For plane waves, power flux density S, r.m.s. electric field strength E and r.m.s. magnetic field strength H are related by the impedance of free-space, i.e. 377 Ω.

$$S = E^2/377 = 377\ H^2$$