SLOVENSKI STANDARD
oSIST prEN 50663:2025

01-marec-2025

Splošni standard za oceno skladnosti nizkonapetostne elektronske in električne opreme glede na mejne vrednosti izpostavljenosti ljudi elektromagnetnemu sevanju (10 MHz - 300 GHz)

Generic standard for assessment of low power electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (10 MHz - 300 GHz)

Produktnorm für die Beurteilung der Übereinstimmung von elektronischen und elektrischen Geräten kleiner Leistung mit den Basisgrenzwerten für die Exposition von Personen gegenüber elektromagnetischen Feldern (10 MHz bis 300 GHz)

Norme de produit pour l'évaluation de la conformité des appareils électriques et électroniques de faible puissance aux restrictions de base concernant l'exposition des personnes aux champs électromagnétiques (10 MHz à 300 GHz)

Ta slovenski standard je istoveten z: **prEN 50663:2025**

ICS:

13.280	Varstvo pred sevanjem	Radiation protection
17.240	Merjenje sevanja	Radiation measurements

oSIST prEN 50663:2025 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
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Will supersede EN 50663:2017

English Version

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This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2025-04-04.

It has been drawn up by CLC/TC 106X.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

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European foreword

This document (prEN 50663:2025) has been prepared by Technical Committee CLC/TC 106X “Electromagnetic fields in the human environment”, the secretariat of which is held by DKE.

This document is currently submitted to the Enquiry.

The following dates are proposed:

• latest date by which the existence of this document has to be announced at national level	(doa)	dav + 6 months
• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	dav + 12 months
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dav + 36 months (to be confirmed or modified when voting)

This document will supersede EN 50663:2017 and all of its amendments and corrigenda (if any).

prEN 50663:2025 includes the following significant technical changes with respect to EN 50663:2017:

— The value applied to head and trunk is also applied to the limb in this edition.

— The conformity assessment is more detailed.

This document has been prepared under a standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annexes ZZA and ZZB, which are an integral part of this document.

1 Scope

This document provides electromagnetic field (EMF) exposure conformity assessment methods for low power electronic and electrical equipment. It is applicable to intentionally radiating equipment operating at frequencies between 10 MHz and 300 GHz with time-averaged transmitted power less than or equal to 20 mW in case of equipment intended for use by the general public, or less than or equal to 100 mW in case of equipment intended for use only by workers when at work, respectively. In the context of this document, time-averaging is over any 6-min period up to 10 GHz and over any $68/f^{1.05}$ -minute period (f in GHz) for frequencies exceeding 10 GHz.

It also applies to non-intentionally radiating equipment in the same frequency range.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 62479:2010, *Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz) (IEC 62479:2010)*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
low power equipment
equipment where the maximum time-averaged transmitted power is less than or equal to the low power exclusion level

3.2
low power exclusion level
P_{max}
maximum time-averaged transmitted power which, depending on the user group, ensures that the applicable basic restrictions for the general public laid down in Annex A, or the exposure limit values for workers laid down in Annex B, are met

Note 1 to entry: values of P_{max} and the user groups are given in Table 1.

[SOURCE: EN 62479:2010, modified]

3.3
basic restrictions
restrictions on exposure of the general public to electric, magnetic and electromagnetic fields that are based directly on established health effects and biological considerations as defined in Annex A

3.4
exposure limit values
restrictions on exposure of workers to electric, magnetic and electromagnetic fields that are based directly on established health effects and biological considerations as defined in Annex B

3.5
reasonably foreseeable conditions
intended conditions of use as well as use of equipment in conditions, which results from lawful and readily predictable human and system behaviour, that can be anticipated by the manufacturer

Note 1 to entry: Use conditions explicitly excluded by the manufacturer in the information for use or user training, but nevertheless reasonably foreseeable under the assumption that the user has not read the information for use or has not followed training instructions, are deemed to represent reasonably foreseeable misuse and such conditions fall outside this definition. The first sentence of this note applies only if a potentially exposed person is given free access to the information for use or user training. The first sentence of this note does not apply to RF sources installed in public areas in a way that they are not clearly and obviously perceivable as sources of RF, such that a potentially exposed person can take appropriate action as required by the information of use.

Note 2 to entry: The reasonably foreseeable conditions of exposure should be based on realistic exposure and/or installation parameters representative of all readily-predictable human and system behaviour such as the duration of exposure, time variability of transmitted power, simultaneously operated frequency bands and time averaging as defined in normative limits.

3.6
specific absorption
SA
energy absorbed by (dissipated in) an incremental mass contained in a volume element of biological tissue when exposure to a radio frequency electromagnetic field occurs

Note 1 to entry: Specific absorption is expressed in joules per kilogram.

[SOURCE: EN 62479:2010]

3.7
specific absorption rate
SAR
power absorbed by (dissipated in) an incremental mass contained in a volume element of biological tissue when exposure to a radio frequency electromagnetic field occurs

Note 1 to entry: SAR is expressed in watts per kilogram.

[SOURCE: EN 62479:2010]

3.8
time-averaged transmitted power
power transmitted by device or equipment under test, assessed either at the antenna input port(s) (conducted power) or as the total radiated power (TRP), averaged over time as specified in the normative limits

Note 1 to entry: In the context of this document, both the basic restrictions and exposure limit values, for general public and workers, respectively, require time-averaging over any 6-minute period up to 10 GHz and over any $68/f^{1.05}$ -minute period (f in GHz) for frequencies exceeding 10 GHz

3.9
worker
person employed by an employer, including trainees and apprentices but excluding domestic servants, exposed to electric, magnetic and electromagnetic fields as defined in Directive 2013/35/EU

[SOURCE: Directive 89/391/EEC, modified]

4 Exposure conditions

All intended operating conditions as well as the reasonably foreseeable conditions of exposure from the equipment shall be taken into account in the evaluation of compliance with the applicable exposure limits.

5 Normative limits

5.1 Equipment used by the general public

The basic restrictions for frequencies above 10 MHz in Table A.1 of Annex A shall be applied.

NOTE Items 1, 6, 7 and 8 of Table A.1 are an integral part of the table.

5.2 Equipment used only by workers

The exposure limit values in Tables B.8, B.9 and B.10 of Annex B shall be applied.

NOTE Item 1 of these Tables also are integral part of the tables.

If it is reasonably foreseeable that equipment intended for professional use can be used by members of the general public, then 5.1 shall be applied.

6 Evaluation of compliance

6.1 General considerations

The low power exclusion level *(P_{max})* is a specified condition of an equipment's maximum time-averaged transmitted power such that the exposure level produced by the source will not exceed the normative limits defined in Clause 5.

Equipment complying with the basic restrictions for the general public is deemed to comply with the exposure limits values for workers without further testing.

Equipment which meets the exposure limit values for workers do not necessarily meet the basic restrictions for the general public. Unless the equipment is intended exclusively for use by workers when at work and use by the general public can reasonably be excluded, such equipment shall also be tested against the basic restrictions for the general public. Equipment intended only for use by workers when at work shall have this condition clearly identified in the user instructions and in the test report.

The conformity assessment to demonstrate equipment compliance shall be performed according to EN 62479:2010, 4.1.

If the equipment time-averaged transmitted power is less than or equal to P_{max}, then the equipment is deemed to comply with the basic restrictions or the exposure limit values.

The following equipment is deemed to be compliant without further assessment:

1. if low power equipment includes unintentional (or non-intentional) radiators, and typical usage, installation and the physical characteristics of the equipment make it inherently compliant;

2. if the input power level to electrical or electronic components that are capable of radiating electromagnetic energy in the relevant frequency range is so low that the available maximum time-averaged transmitted power cannot exceed the low power exclusion level P_{max};

3. if the available maximum time-averaged transmitted power is limited by product standards for transmitters to levels below or equal to the low power exclusion level P_{max}.

For other equipment, further compliance evaluation is required by way of measurements or calculations to assess that the available maximum time-averaged transmitted power is below or equal to the low power exclusion level P_{max}.

If the low power criteria specified in 6.2 cannot be met, the equipment is deemed to be out of the scope of this document.

6.2 Low power exclusion level (P_{max})

6.2.1 P_{max} based on considerations on *SAR*

The values of P_{max} to be used for conformity assessment purposes as referred to in 6.1, based on *SAR* considerations, are those provided in Table 1. Further details to derive conservative minimum value for P_{max} are provided in Clause A.2 of Annex A of EN 62479:2010.

Table 1 — Values of P_{max} based on *SAR*

Exposure tier/user groups	P_{max} (mW)
General public (Annex A)	20
Workers (Annex B)	100

6.2.2 P_{max} based on considerations on *SA*

For low power equipment using pulsed signals, other limits may apply in addition to those considered in Table 1. Both Annex A and Annex B have additional restrictions on *SA* for localized exposure of the head to pulsed fields in the frequency range 0,3 to 10 GHz (0,3 to 6 GHz in Annex B). The *SA* should not exceed 10 mJ kg^{-1} for workers and 2 mJ kg^{-1} for the general public averaged over 10 g tissue.

If the pulse repetition frequency of the signal is greater than 1000 Hz, compliance with the *SAR* restriction will ensure compliance with the *SA* restriction. Accordingly, the values of $P_{max,}$ to be used for conformity assessment purposes are those provided in Table 1.

If the pulse repetition frequency is less than 1000 Hz, specific considerations shall be given to showing compliance with the *SA* restriction, as discussed in Annex C of EN 62479:2010, leading to Formula (1) if there is one pulse per repetition period:

$$SAR_{avg} = SA \cdot PRF \quad (1)$$

where:

SAR_{avg} is the *SAR* (W kg^{-1}) as averaged over any 6-min period in 10 g mass of tissue in the head and trunk, for which the basic restrictions is equal to 2 W kg^{-1} for the exposure of the general public, and the exposure limit value is 10 W kg^{-1} for the exposure of workers, respectively;

SA is the specific absorption (mJ kg^{-1}) for localized exposure of the head as averaged in a 10 g mass of tissue, for which the basic restriction is equal to 2 mJ kg^{-1} for the exposure of the general public in the frequency range from 0,3 to 10 GHz, and the exposure limit value is 10 mJ kg^{-1} for the exposure of workers in the frequency range from 0,3 to 6 GHz, respectively;

PRF is the pulse repetition frequency (Hz).

Accordingly, if the pulse repetition frequency is less than 1000 Hz and there is one pulse per repetition period, the values of $P_{max,}$ to be used for conformity assessment purposes, based on considerations on *SA*, are those provided in Table 2.

Table 2 — Values of P_{max} based on *SA*

Exposure tier/user groups	P_{max} (mW)
General public (Annex A)	0,02 x *PRF (for PRF ≤ 1000 Hz)*
Workers (Annex B)	0,1 x *PRF (for PRF ≤ 1000 Hz)*

Further details to a derive conservative minimum value for P_{max} based on considerations on *SA* are provided in Annex C of EN 62479:2010.

6.2.3 P_{max} based on considerations on power density

The values of $P_{max,}$ based on considerations on power density are 20 mW (over the 10 GHz to 300 GHz frequency range) and 100 mW (over the 6 GHz to 300 GHz frequency range) for general public and occupational exposures, respectively. Further details to a derive conservative minimum value for P_{max} based on considerations on power density are provided in Clause A.3 of Annex A of EN 62479:2010.

7 Assessment of uncertainty

Measurement uncertainty should be assessed in compliance with JCGM 100:2008 or ISO/IEC Guide 98-3:2008 (see bibliography). Although JCGM 100:2008 is concerned with measurement uncertainty, the same concepts can be extended to computational uncertainty.

Uncertainty should be estimated for every measured and calculated electromagnetic field strength, power density or SAR evaluation. It should take into account specific requirements as specified in EN 50413:2019 or EN IEC 62311:2020.

NOTE There are two major groups of uncertainty contributions (see Annex A of EN 50413:2019):

— random effects resulting in errors that vary in an unpredictable way while the measurement is being made or is repeated under the same conditions. The uncertainty associated with these contributions can be evaluated by statistical techniques from repeated measurements;

— contributions to uncertainty arising from systematic effects are those that remain constant while the measurement is being made but can change if the measurement conditions, method or equipment is altered.

In order to determine the total uncertainty associated with root-mean square (RMS) measurements of the electric or magnetic field in different measurement environments, there should be an appropriate accounting of the various sources of uncertainty. Standard uncertainty associated with each quantity influencing the measurement should be determined on the basis of measurements performed *(type A*) or on the basis of experience (*type B*).

Possible sources of type-A uncertainty are: calibration uncertainty, repeatability of the measurement, reproducibility of the measurement;

Possible sources of type-B uncertainty are: correction factor, averaging effects of coil probes during non-uniform field measurements, errors in positioning the probe in non-uniform fields, frequency response or pass-band limitations (choice of the filter), instrument measurement time constant, metrological drift, resolution, temperature, proximity to objects or obstacles, humidity (only for electric field), hysteresis of scale in automatic range mode.

Some sources of uncertainty can be reduced to negligible levels. For example, stands fabricated from insulating materials may be used for precise positioning of the field meter probe.

Known correction factors should be applied to readings obtained when possible. This may be complex due to the fact that the correction factors are defined for each axis.

The combined standard uncertainty is based on a mathematical model that defines how the influence quantities are added. A simple multiplicative model, expressed as a linear series of dB variation terms, is generally