SLOVENSKI STANDARD
SIST EN 50401:2018

01-januar-2018

Nadomešča:
SIST EN 50401:2006
SIST EN 50401:2006/A1:2012

Produktni standard za prikaz skladnosti opreme baznih postaj z mejnimi vrednostmi v povezavi z izpostavljenostjo elektromagnetnim sevanjem (110 MHz - 100 GHz), namenjene za uporabo

Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when put into service

Produktnorm zum Nachweis der Übereinstimmung von stationären Einrichtungen für Funkübertragungen (110 MHz bis 40 GHz), die zur Verwendung in schnurlosen Telekommunikationsnetzen vorgesehen sind, bei ihrer Inbetriebnahme mit den Basisgrenzwerten oder den Referenzwerten bezüglich der Exposition der Allgemeinbevölkerung gegenüber hochfrequenten elektromagnetischen Feldern

Norme de produit pour démontrer la conformité des équipements de station de base aux limites d’exposition aux champs électromagnétiques radiofréquences, (110 MHz - 100 GHz), lors de leur mise en service

Ta slovenski standard je istoveten z: **EN 50401:2017**

ICS:

13.280	Varstvo pred sevanjem	Radiation protection
33.070.01	Mobilni servisi na splošno	Mobile services in general

SIST EN 50401:2018 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 50401

October 2017

ICS 17.220.20; 33.070.01

Supersedes EN 50401:2006

English Version

Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when put into service

Norme de produit pour démontrer la conformité des équipements de station de base aux limites d'exposition aux champs électromagnétiques radiofréquences, (110 MHz - 100 GHz), lors de leur mise en service

Produktnorm zum Nachweis der Übereinstimmung von Einrichtungen für Basisstationen bei ihrer Inbetriebnahme mit Grenzwerten für die Exposition von Personen gegenüber hochfrequenten elektromagnetischen Feldern (110 MHz bis 100 GHz)

This European Standard was approved by CENELEC on 2017-07-24. 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 CEN-CENELEC Management Centre 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 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 50401:2017 E

Contents

Page

European foreword 3
1 Scope 4
2 Normative references 4
3 Terms and definitions 4
4 Exposure conditions 6
5 Normative limits 6
6 Evaluation of compliance 6
6.1 General public exposure 6
6.2 Workers exposure 6
7 Assessment uncertainty 6
8 Documentation 7
9 Assessment of compliance 7
Annex ZZ (informative) Relationship between this European standard and the essential requirements of Directive 2014/53/EU [2014 OJ L153] aimed to be covered 8
Bibliography 9

European foreword

This document (EN 50401:2017) has been prepared by CLC/TC 106X “Electromagnetic fields in the human environment”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2018-07-24
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2020-07-24

This document supersedes EN 50401:2006.

EN 50401:2017 includes the following significant technical changes with respect to EN 50401:2006:

1) the standard requires that the assessment has to take into account all reasonably foreseeable operating conditions (Clause 4);

2) the standard covers equipment intended for use only by workers as well as equipment intended for use by the general public and different limits are given for each case (Clause 5).

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

1 Scope

This product standard is related to human exposure to radiofrequency electromagnetic fields transmitted by base station equipment in the frequency range 110 MHz to 100 GHz.

The object is to assess the compliance of such equipment with the general public basic restrictions (directly or indirectly via compliance with reference levels) and the workers' exposure limits values (directly or indirectly via compliance with action levels), when it is put into service in its operational environment.

2 Normative references

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

EN 62232:2017, *Determination of RF field strength, power density and SAR in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure (IEC 62232:2017)*

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, 30.6.1999, p. 59-70)*

Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013 *on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and repealing Directive 2004/40/EC (Official Journal L 179, 29.6.2013, p. 1–21)*

3 Terms and definitions

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

3.1
action levels
levels which are provided for practical exposure assessment purposes and which are derived from exposure limit values

Note 1 to entry: Respect of the action level will ensure respect of the relevant exposure limit value. If the action level is exceeded, it does not necessarily follow that the exposure limit value will be exceeded.

3.2
ambient fields
background electromagnetic fields in the frequency range from at least 100 kHz to 300 GHz other than the emissions from the EUT in the frequency range 110 MHz to 100 GHz

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, and that can be used either to emit or to receive a radio signal

Note 1 to entry: In the present standard, if not mentioned, the term antenna is used only for emitting antenna(s).

3.4
average emitted power
time-averaged rate of energy transfer defined by:

$$P_{aep} = \frac{1}{t_2 - t_1} \int_{t_1}^{t_2} P(t)dt$$

where

$t_2 - t_1$ is the averaging time, t_{avg} defined as a function of frequency in the Council Recommendation 1999/519/EC of 12 July 1999;

P(t) is the power radiated by the antenna at the maximum duty cycle of the equipment at the maximum power setting of the equipment

3.5
base station
BS
fixed equipment including the radio transmitter and associated antenna(s) as used in wireless telecommunications networks

Note 1 to entry: A base station comprises the hardware, including transceivers, necessary to transmit and receive radio signals. Base stations with integrated antennas, base stations with connectors for external antennas and base stations intended for use with external antennas not supplied by the same manufacturer are covered.

Note 2 to entry: Examples of BS equipment include base stations for mobile communications, radio-relays, wireless local area network access points, base stations for cordless telephony, etc. that are not normally used in close proximity (i.e. within 20 cm) to the human body.

Note 3 to entry: Examples of wireless telecommunications networks include those used in mobile telecommunication systems according to ITU-R M.1224–1 “Vocabulary of terms for International Mobile Telecommunications (IMT)”, wireless local area networks, public safety networks and fixed wireless systems (including radio-relay systems, point-to-point communication and point-to-multipoint communication according to ITU-R F.592–4 “Vocabulary of terms for the fixed service” and ITU-R F.1399–1 “Vocabulary of terms for Wireless Access”).

Note 4 to entry: Equipment for radar, TV and radio broadcast services is not considered to be a BS.

3.6
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

3.7
equivalent isotropic radiated power
EIRP
product of the radiofrequency input power to an antenna and the absolute gain of the antenna in a given direction

3.8
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

3.9
reference levels (or derived reference levels)
levels which are provided for practical exposure assessment purposes and which are derived from basic restrictions

Note 1 to entry: Respect of the reference level will ensure respect of the relevant basic restriction. If the reference level is exceeded, it does not necessarily follow that the basic restriction will be exceeded.

3.10
worker
person exposed to electromagnetic fields under the conditions defined in Directive 2013/35/EU

4 Exposure conditions

RF exposure from the product installation which meets the limits for general public exposure as given in this document (Clause 5) will automatically meet the limits for workers without further testing.

RF exposure from the product installation which meets the limits for workers will not necessarily meet the limits for the general public and, unless RF exposure conditions are restricted to workers' when at work, equipment shall also be tested against general public limits.

RF exposure conditions restricted to workers' when at work shall have this condition clearly identified in the product documentation. This condition shall be identified in the test report.

All intended operating conditions as well as the reasonably foreseeable conditions of human exposure from the product installation shall be taken into account in the evaluation.

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 varying of transmitted power, simultaneously operated frequency bands and time averaging as defined in normative limits.

5 Normative limits

For the assessment of general public exposure from the product installation, the relevant limits specified as basic restrictions, in Council Recommendation 1999/519/EC Annex II Table 1, or reference levels, in Council Recommendation 1999/519/EC Annex III Table 2, and the accompanying notes to these tables, shall be applied.

For the assessment of worker exposure from the product installation, the relevant limits specified as exposure limit values, in Directive 2013/35/EU Annex III Tables A.1 and A.3, or action levels in Directive 2013/35/EU Annex III Table B1, and the accompanying notes to these tables, shall be applied.

6 Evaluation of compliance

6.1 General public exposure

The product installation is deemed to comply with the applicable normative limits defined in Clause 5 without RF exposure evaluation if it fulfils the criteria defined in EN 62232:2017, Table 2.

Otherwise, the evaluation of the total exposure from the base station installation shall be performed according to EN 62232:2017, 6.2 and Clause 8 using the applicable normative limits defined in Clause 5. When applying EN 62232:2017, 6.2 and Clause 8, the base station shall be operating in accordance with the manufacturer's specifications.

The RF exposure shall be assessed where the general public has access and where the exposure resulting from the product's RF emission is higher than 5 % of the applicable exposure limits defined in Clause 5 for the general public. When the evaluation is based on reference level measurements, the measurement type, as defined in EN 62232:2017, 6.3.2.1 shall be either "detailed evaluation" or "comprehensive evaluation".

6.2 Workers exposure

The RF exposure shall be assessed where workers have access. The evaluation of the total exposure from the base station installation shall be performed according to EN 62232:2017, 6.2 and Clause 8 using the applicable normative limits defined in Clause 5. When applying EN 62232:2017, 6.2 and Clause 8, the base station shall be operating in accordance with the manufacturer's specifications.

7 Assessment uncertainty

The uncertainty of the assessment shall be calculated and used for comparison with limits as defined in EN 62232:2017, 6.2.8 and Clause 9.

8 Documentation

The compliance documentation shall include at least:

1) maximum transmitted power for each transmit frequency band of the base station as installed;

2) antenna characteristics (gain, horizontal and vertical beamwidth) for each transmit frequency band, total EIRP, and a detailed description of the configuration of the base station in its operational environment, including antenna system (feeders, connectors, combiners, etc.). If the product installation compliance has been assessed using the simplified evaluation process as defined in 6.1, then all parameters used to define the installation class in EN 62232:2017, Table 2 shall be included;

3) information related to the radiofrequency exposure evaluation (methods, uncertainties, etc.) according to EN 62232:2017, Clause 10, including the relevant parameters related to reasonably foreseeable conditions of radiofrequency exposure;

4) general public access restrictions if any;

5) guidelines on how to comply with the applicable normative limits defined in Clause 5 for workers during installation, maintenance and repair of the product.

The documentation may cover several base station installations with similar technical specifications and environmental conditions.

9 Assessment of compliance

The product installation is deemed to fulfil the requirements of this standard if the evaluation results performed according to Clause 6 are less than or equal to the applicable normative limits defined in Clause 5. The results of the radiofrequency exposure evaluation as performed in Clause 6 shall be compared directly to the normative limits.

When the product installation is put into service in its operational environment:

- the general public shall not be allowed to freely reach (because of access restrictions or because of the site configuration) any place in the vicinity of the base station antenna(s) where the total exposure to emissions in the frequency range 100 kHz to 300 GHz is exceeding the applicable normative limits defined in Clause 5 for the general public;

- workers shall not be allowed to enter areas where the total exposure to emissions in the frequency range 100 kHz to 300 GHz is exceeding the applicable normative limits defined in Clause 5 for workers.