



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 50401:2017

Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100

Norme de produit pour démontrer la
conformité des équipements de station
de base aux limites d'exposition aux
champs électromagnétiques

Produktnorm zum Nachweis der
Übereinstimmung von Einrichtungen für
Basisstationen bei ihrer Inbetriebnahme
mit Grenzwerten für die Exposition von

10/2017



National Foreword

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EUROPEAN STANDARD ILNAS-EN 50401:2017 **EN 50401**
NORME EUROPÉENNE
EUROPÄISCHE NORM

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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.

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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

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- latest date by which the national standards conflicting (dow) 2020-07-24 with this document have to be withdrawn

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