SLOVENSKI STANDARD
oSIST prEN 50554:2019

01-december-2019

Osnovni standard za terensko ocenjevanje mesta oddajanja v zvezi z izpostavljenostjo ljudi elektromagnetnemu sevanju

Basic standard for the in-situ assessment of a broadcast site related to general public exposure to radio frequency electromagnetic fields

Grundnorm für die Bewertung eines Rundfunkstandorts vor Ort in Bezug auf die Exposition der Allgemeinbevölkerung gegenüber hochfrequenten elektromagnetischen Feldern

Norme de base pour l'évaluation in-situ de l'exposition du public aux champs électromagnétiques de radiofréquence d'un site de radiodiffusion

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EUROPEAN STANDARD

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Will supersede EN 50554:2010 and all of its amendments and corrigenda (if any)

English Version

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This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2020-01-03.

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, Turkey 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.

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

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European foreword

This document (prEN 50554:2019) has been prepared by CLC/TC 106X “Electromagnetic fields in the human environment”.

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)	dor + 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)	dor + 12 months
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dor + 36 months (to be confirmed or modified when voting)

This document will supersede EN 50554:2010 and all of its amendments and corrigenda (if any).

1 Scope

This document specifies the method for assessing overall exposure from all fixed radio frequency sources at a broadcast site. This assessment can be applied at any time but is carried out when the exposure situation changes in or around the aforementioned site.

This document plays an essential role in the coordination of different stakeholders, with respect to ensuring EMF exposure compliance in and around a broadcast site especially for equipment installed within the site.

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 50496, *Determination of workers' exposure to electromagnetic fields and assessment of risk at a broadcast site*

3 Terms and definitions

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

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

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

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

3.1
basic restriction
restriction on exposure to time-varying and static electric, magnetic, and electromagnetic fields that is based directly on established health effects

Note 1 to entry: In the frequency range from 100 kHz to 10 GHz, the physical quantity used is the specific absorption rate. Between 10 GHz and 40 GHz, the physical quantity is the power density.

3.2
broadcasting service
radiocommunication service in which the transmissions are intended for direct reception by the general public

Note 1 to entry: This service may include sound transmissions, television transmissions or other types of transmission.

3.3
broadcast site
site where one or more broadcast transmitters are operated

3.4
controlled area
area in which the operator may decide who is permitted to enter or remain or an area which, due to actual circumstances, the public is prohibited from entering

3.5
exposure ratio
ER
for an individual source, between 100 kHz to 10 GHz:

$$ER = MAX\left[\left(\frac{E}{EL}\right)^2, \left(\frac{H}{HL}\right)^2\right];$$

between 10 MHz and 40 GHz:

$$ER = \left(\frac{S}{SL}\right)$$

where

ER is the exposure ratio at frequency f of the source;

EL is the investigation E-field reference level at frequency f;

HL is the investigation H-field reference level at frequency f;

E is the assessed E-field at frequency f for the source;

H is the assessed H-field at frequency f for the source;

SL is the Equivalent plane wave power density reference level at frequency f;

S is the assessed Equivalent plane wave power density at frequency f for the source

3.6
reference level
level of exposure provided for comparison with measured values of physical quantities

Note 1 to entry: Compliance with all reference levels given in the Council Recommendation 1999/519/EC will ensure compliance with basic restrictions.

Note 2 to entry: If measured values are higher than reference levels, it does not necessarily follow that the basic restrictions have been exceeded, but a more detailed analysis is necessary to assess compliance with the basic restrictions.

Note 3 to entry: In the frequency range from 100 kHz to 10 GHz, the physical quantity used is electric field strength, and magnetic field strength. In the frequency range from 10 MHz to 40 GHz, the equivalent plane wave power density can also be used.

3.7
relevant domain
in the absence of a national or local definition, domain surrounding the site where the TER (3.12) exceed 0,05 at any height

3.8
relevant source
principle of relevance establishes the conditions under which a radio source is considered relevant such that account has to be taken of the contribution of that source when assessing RF exposure

Note 1 to entry: In the absence of a national or local definition, the relevant source is a fixed radio source, in the frequency range 100 kHz to 40 GHz, which has an exposure ratio more than 0,05 at an examinated location.

3.9
site operator
party controlling access to the controlled area

106 **3.10**
107 **stakeholder**
108 ***SH***
109 party involved in the process of this document in accordance with the local or national legislation

110 Note 1 to entry: More than one stakeholder can be concerned (national authority, licence holder, broadcaster, site
111 operator, etc.).

112 **3.11**
113 **threshold distance**
114 ***TD***
115 minimum distance in a given direction, beginning from the boundary of the controlled area, at which
116 compliance with reference level is achieved at all heights when considering emissions from the site
117 alone

118 **3.12**
119 **Total Exposure Ratio**
120 ***TER***
121 total exposure ratio is the sum of exposure ratios:

$$TER = \sum_{i} ER_i$$

122

123 where ER_i is the exposure ratio of the source i

124 # 4 Assessment fundamentals

125 ## 4.1 Level of protection

126 National or local relevant regulations provide information on the level of protection for applying this
127 document, expressed in basic restrictions and/or reference levels.

128 ## 4.2 Stakeholders

129 National or local relevant regulations provide information on the stakeholders responsible for applying
130 this document.

131 Potentially involved stakeholders:

132 a) site owner;

133 b) licence holder;

134 c) national authority;

135 d) technical operator;

136 e) community representatives;

137 f) broadcaster;

138 g) local authority;

139 h) content provider;

140 i) party originating the change;

141 j) assessment manager;

k) measurement laboratory.

4.3 Simultaneous exposure to electromagnetic fields at different frequencies

Simultaneous exposure to electromagnetic fields of different frequencies is the common case at broadcast sites and shall be taken into account during the public and worker exposure assessment.

If a national or local relevant regulation treating multiple sources is available, then this regulation must be applied. If not, a threshold level shall be set, linked with the level of protection: each relevant source needs to be included to evaluate its influence.

4.4 Area to perform a detailed assessment

4.4.1 General

The emissions from a broadcast site only need to be taken into account within its relevant domain. Within the relevant domain every place where the public can access needs to be assessed.

4.4.2 Determination of the relevant domain

Domain surrounding the site where the total exposure ratio (*TER*) is more than 0,05.

The relevant distance (RD) is the distance to the boundary of the relevant domain. In far field conditions, the relevant distance for each source can be can deduced from the threshold distance (TD) if exists:

$$\frac{RD^2}{TD^2} = \frac{SL}{S_{RD}} = \frac{1}{0,05}$$

Or

$$\frac{RD^2}{TD^2} = \frac{EL^2}{E_{RD}^2} = \frac{HL^2}{H_{RD}^2} = \frac{1}{0,05}$$

$$RD = \frac{TD}{\sqrt{0,05}} = 4,5TD$$

Where S_{RD} and *SL* are respectively the Equivalent plane wave power density at the relevant distance and the Equivalent plane wave power density reference level (W/m^2).

E_{RD} and *EL* are respectively the E field intensity at the relevant distance and the E field reference level (V/m).

H_{RD} and *HL* are respectively the H field intensity at the relevant distance and the E field reference level (A/m).

RD can be also calculated from the EIRP using the following formula:

$$RD = \sqrt{\frac{EIRP}{0,05SL4\pi}} = 1,3\sqrt{\frac{EIRP}{SL}}$$

RD of all sources of the site can be calculated using the next formula:

$$RD = 1,3\sqrt{\sum_i \frac{EIRP_i}{SL_i}}$$

Where *EIRP*i is the *EIRP* of the source i and SL_i is the equivalent plane wave power density reference level at frequency of source i.

More information can be found in EN 62232.

4.4.3 Determination of relevant sources

The relevant sources can be determined by calculation or measurement.

Within the relevant domain, the ER of every source is calculated or measured separately. If the ER of a source exceed 0,05 then is considered as relevant.

More information on calculation and measurement can be found in EN 62232.

5 Assessment methodology in the relevant domain when the exposure situation changes

5.1 Introduction

Change is defined as a variation in the exposure situation which has not been previously assessed.

5.2 Determination of the Threshold Distance (*TD*)

The *TD* is the minimum distance out from the boundary of the controlled area at which compliance with the recommendation 1999/519/EC reference level is achived at all heights when considering emissions from the site alone. EN 50413 and EN 62232 give the methodology for determining the threshold distance using the radiation pattern of the antennas.

The *TD* shall be determined by the broadcast operator of the highest authorized ERP value on the site.

In the absence of data to carry out the required calculation, the threshold distance can be defined by using the worst-case configuration of the services.

An example of a simple method for estimation of the *TD* from a broadcast site is described in Annex A.

5.3 Area definition

Assessment of the overall exposure can be made by many stakeholders.

The analysis is split into three areas:

— area A: inside the controlled area;

— area B: outside the controlled area of the site but within the threshold distance;

— area C: outside the threshold distance but inside the relevant domain.

NOTE See Figure 1.

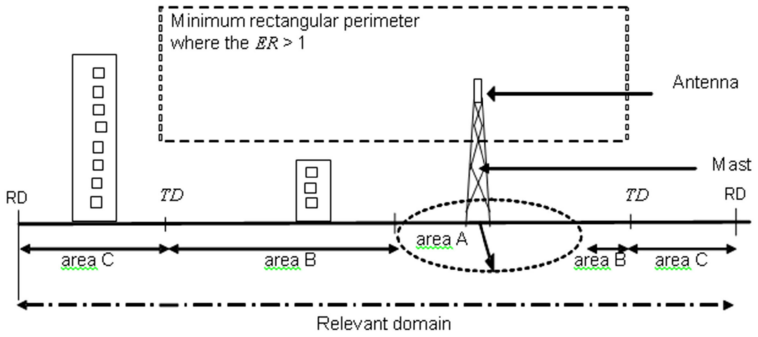

Figure 1 — Area definition

In the absence of national rules, these areas are used to define the parties responsible for collating the relevant data and also for carrying out the assessment.

5.4 Assessment

5.4.1 General

The stakeholder in charge of the assessment is defined in accordance with national rules (see Annex B for German and Italian examples). This responsible stakeholder might not be unique for all areas. As an example, the result of the assessment in area A, carried out by a site owner, could be an input to a telecom operator assessing areas A, B and C following a change in its equipment configuration.

5.4.2 For area A

The stakeholders in charge of the assessment will be the site operator or the broadcast operator.

The site operator is responsible for gathering the data required for the assessment within area A from:

— characteristics of services from other stakeholders;

— worst case characteristics of services.

The site operator shall inform people accessing the controlled area. For more information see national national regulations.

The stakeholder in charge of the assessment shall use EN 50496. For more information see Directive 2013/35/EU.

The assessment will be carried out as often as this is deemed necessary.

5.4.3 For area B

In the absence of national rules, the stakeholders may be the service operator, the site operator, and local and/or national authorities.

In the absence of national rules, the site operator is responsible for gathering the data required for the assessment within area B including:

— RF data from the site (similar to the data collected for area A);

— RF data from signals originating outside the site (to collect from national or local authorities) or the worst-case characteristics of these services;

— additional information such as building planning applications, exclusion areas following local rules, etc;