SLOVENSKI STANDARD
SIST EN 50554:2021

01-oktober-2021

Nadomešča:
SIST EN 50554:2011

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

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

Ta slovenski standard je istoveten z: **EN 50554:2021**

ICS:

17.240	Merjenje sevanja	Radiation measurements

SIST EN 50554:2021 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 50554

May 2021

ICS 17.240

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

English Version

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

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

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

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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.

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CENELEC

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

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European foreword

This document (EN 50554:2021) 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	2022–04–26	2022–04–26
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2024–04–26

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

EN 50554:2021 includes the following significant technical changes with respect to EN 50554:2010:

— consideration of the new Directive 2013/35 /EU related to workers exposure;

— update of referenced standards;

— provision of a method to determine the relevant domain.

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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 can play an essential role in the coordination of different stakeholders, with respect to ensuring EMF exposure compliance in the vicinity of 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*

EN 50413, *Basic standard on measurement and calculation procedures for human exposure to electric, magnetic and electromagnetic fields (0 Hz - 300 GHz)*

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)*

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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, L199, of 1999-7-30, p.59-70*

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3 Terms and definitions

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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 https://www.electropedia.org/

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

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

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 where access is controlled by the operator and is not accessible to the public

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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 300 GHz:

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

where

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

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

HL is the 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;

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

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Note 1 to entry: Assessed means measured, calculated or simulated.

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3.6
reference level
<of exposure> provided for the purpose of comparison with values of measured quantities and respect of recommended levels will ensure respect of basic restrictions

Note 1 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 2 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 300 GHz, the equivalent plane wave power density can also be used.

3.7
relevant distance
RD
horizontal distance from the antenna to the boundary of the relevant domain

3.8
relevant domain
in the absence of a national or local definition, domain surrounding the site where the TER (3.13) exceeds 0,05 at some height

Note to entry 1: The ratio of 0,05 is from EN 62232:2017, 6.2 and EN 50499:2019, D.2.2.3.

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3.9
relevant source
principle of relevance establishes the conditions under which a radio source is considered relevant such that account is taken of the contribution of that source when assessing RF exposure at an assessed location

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 300 GHz, which has an exposure ratio of more than 0,05 at an assessed location.

3.10
site operator
party controlling access to the controlled area

3.11
stakeholder
party involved in the process of this document in accordance with the local or national legislation

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

3.12
threshold distance
TD
minimum vertical or horizontal distance in a given direction, from the antenna, at which compliance with reference levels which, in the absence of national or local definition, are established by Council Recommendation 1999/519/EC, is achieved at all heights when considering emissions from the site alone

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3.13
total exposure ratio
TER
sum of exposure ratios:

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$$TER = \sum_i ER_i$$

where ER_i is the exposure ratio of the source i

4 Assessment fundamentals

4.1 Level of protection

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

4.2 Stakeholders

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

Potentially involved stakeholders:

a) site owner;

b) licence holder;

c) national authority;

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d) technical operator;

e) community representatives;

f) broadcaster;

g) local authority;

h) content provider;

i) party originating the change;

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 exposure assessment.

If a national or local relevant regulation treating multiple sources is available, then this regulation applies. 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.

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4.4 Area to perform a detailed assessment

4.4.1 General

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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

In far field conditions, the relevant distance (RD) for each source can be deduced from the threshold distance (TD) if exists:

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

Or

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

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

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).

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

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

$$RD = \sqrt{\frac{EIRP}{0,05 \cdot SL \cdot 4\pi}} = 1,3 \cdot \sqrt{\frac{EIRP}{SL}}$$

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

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

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 exceeds 0,05 then it is considered as relevant.

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

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

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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)

EN 50413 and EN 62232 methodology shall be used to determine the threshold distance using the radiation pattern of the antennas.

The TD shall be determined by the broadcast operator of the highest cumulative 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 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 horizontal threshold distance but inside the relevant domain.

NOTE See Figure 1.

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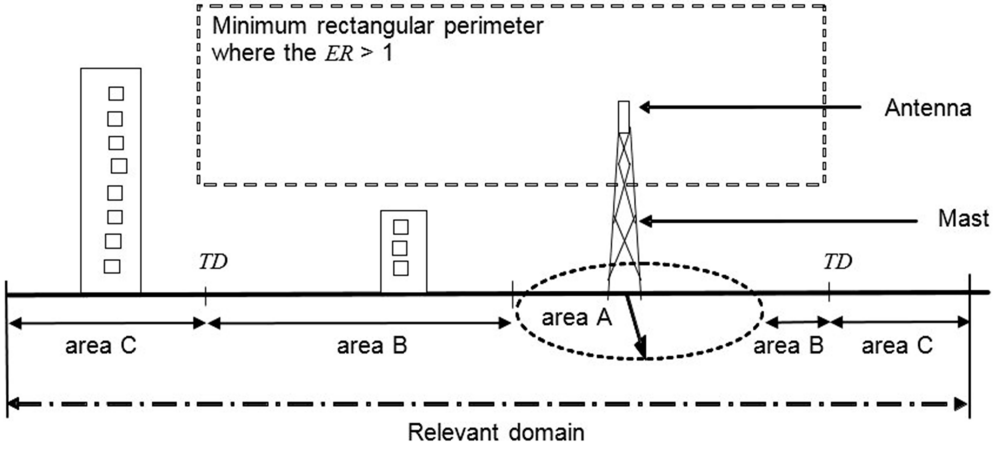

Figure 1 — Area definition

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

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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.

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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.

NOTE For more information see national regulations.

The stakeholder in charge of the assessment shall use EN 50496.

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;