SLOVENSKI STANDARD
SIST EN 62209-2:2010/A1:2019

01-september-2019

Izpostavljenost ljudi elektromagnetnim sevanjem brezžičnih komunikacijskih naprav, ki se držijo v roki ali pritrdijo na telo - Modeli človeka, instrumenti in postopki - 2. del: Postopki za določanje stopnje specifične absorpcije (SAR) za brezžične komunikacijske naprave, ki se uporabljajo v bližini telesa (frekvenčno območje od 30 MHz do 6 GHz)

Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

Sicherheit von Personen in hochfrequenten Feldern von handgehaltenen und am Körper getragenen schnurlosen Kommunikationsgeräten – Körpermodelle, Messgeräte und Verfahren – Teil 2: Verfahren zur Bestimmung der spezifischen Absorptionsrate (SAR) von schnurlosen Kommunikationsgeräten, die in enger Nachbarschaft zum menschlichen Körper verwendet werden (Frequenzbereich von 30 MHz bis 6 GHz)

Exposition humaine aux champs radiofréquence produits par les dispositifs de communications sans fils tenus à la main ou portés près du corps - Modèles de corps humain, instrumentation et procédures - Partie 2: Procédure de détermination du débit d'absorption spécifique produit par les appareils de communications sans fil utilisés très près du corps humain (gamme de fréquences de 30 MHz à 6 GHz)

Ta slovenski standard je istoveten z: EN 62209-2:2010/A1:2019

ICS:

13.280	Varstvo pred sevanjem	Radiation protection
33.050.10	Telefonska oprema	Telephone equipment

SIST EN 62209-2:2010/A1:2019 en

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62209-2:2010/A1

June 2019

ICS 33.050.10

English Version

Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz) (IEC 62209-2:2010/A1:2019)

Exposition humaine aux champs radiofréquence produits par les dispositifs de communications sans fils tenus à la main ou portés près du corps - Modèles de corps humain, instrumentation et procédures - Partie 2: Procédure de détermination du débit d'absorption spécifique produit par les appareils de communications sans fil utilisés très près du corps humain (gamme de fréquences de 30 MHz à 6 GHz)
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(IEC 62209-2:2010/A1:2019)

This amendment A1 modifies the European Standard EN 62209-2:2010; it was approved by CENELEC on 2019-06-21. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 106/484/FDIS, future IEC 62209-2/A1, prepared by IEC/TC 106 "Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62209-2:2010/A1:2019.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2020-03-21
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2022-06-21

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62209-2:2010/A1:2019 was approved by CENELEC as a European Standard without any modification.

IEC 62209-2

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
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FOREWORD

This amendment has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.

The text of this amendment is based on the following documents:

FDIS	Report on voting
106/484/FDIS	106/492/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

6.3 Measurement procedure

6.3.1 General procedure

Replace paragraph d) with the following:

d) Measure the three-dimensional SAR distribution at each of the local maxima locations identified in step c) (zoom scan procedure).

For frequencies at or below 3 GHz, the following procedure shall be applied (see Table 8): The horizontal grid step shall be 8 mm or less. The grid step in the vertical direction shall be 5 mm or less if uniform spacing is used. If variable spacing is used in the vertical direction, the maximum spacing between the two closest measured points to the phantom shell (M1 and M2, see Figure 14) shall be 4 mm or less and the spacing between farther points shall increase by a factor of 1,5 or less. The minimum size of the zoom scan volume shall be 30 mm by 30 mm by 30 mm. For other parameters, see Table 8 and Figure 14.

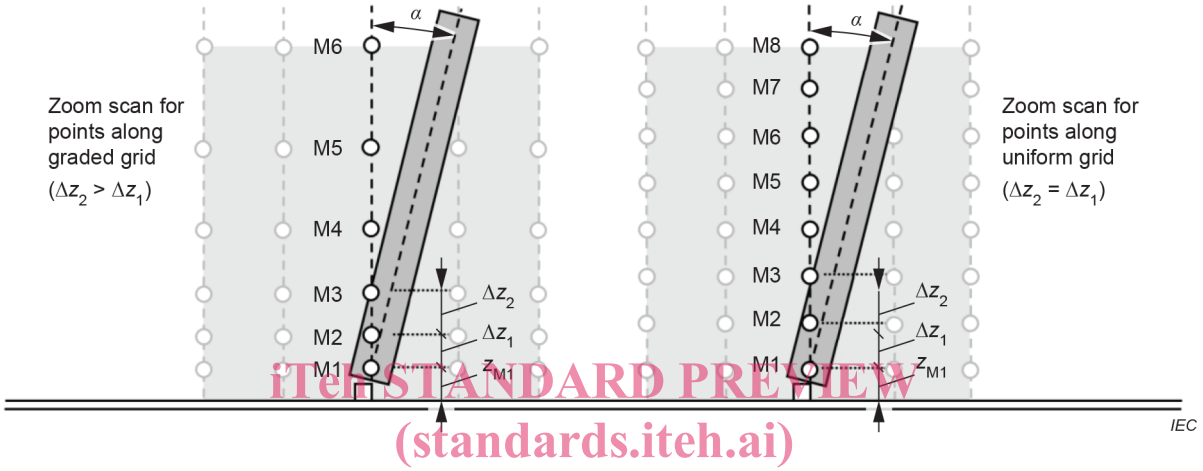
For frequencies above 3 GHz, the minimum size of the zoom scan volume may be reduced to 22 mm by 22 mm by 22 mm. The horizontal grid step shall be (24/f [GHz]) mm or less. If uniform spacing in the vertical direction is used, the grid step in the vertical direction shall be (10/(f [GHz] − 1)) mm or less. If variable spacing is used in the vertical direction, the maximum spacing between the two measured points closest to the phantom shell shall be (12/f [GHz]) mm or less and the spacing between further points shall increase by a factor of 1,5 or less. For other parameters, see Table 8 and Figure 14.

When the highest 1 g or 10 g cube is touching the boundary of a zoom-scan volume, the entire zoom scan shall be repeated with the new centre located at the maximum psSAR location indicated by the preceding zoom scan measurement.

If the zoom scan measured as defined above complies with both of the following criteria, or if the peak spatial-average SAR is below 0,1 W/kg, no additional measurements are needed:

1) the smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both x and y directions (Δx, Δy). This shall be checked for the measured zoom scan plane conformal to the phantom at the distance z_{M1}. The minimum distance shall be recorded in the SAR test report;

2) the ratio of the SAR at the second measured point (M2) to the SAR at the closest measured point (M1) at the x-y location of the measured maximum SAR value shall be at least 30 % (see Figure 14). This ratio (in %) shall be recorded in the SAR test report.



NOTE M1 to M8 are example measurement points used for extrapolation to the surface. The maximum of the angle α between the evaluation axis and the surface normal line is given in Table 2 and Table 8. The distance z_{M1} is from the phantom shell to the first measurement point M1, and its maximum value is given in Table 2 and Table 8. The distances Δz_i (i = 1, 2, 3, …) are the distances from measurement points M_i to M_{i-1}. For uniform grids, Δz_i are equal. For graded grids, $\Delta z_{i+1} > \Delta z_i$. $R_z = \Delta z_{i+1}/\Delta z_i$ is a ratio with a maximum value given in Table 8. The z direction corresponds to the vertical direction, the x direction is horizontal and the y direction is horizontal into the page.

Figure 14 – Orientation of the probe with respect to the line normal to the phantom surface, shown at two different locations

NOTE 1 The evaluation of the zoom scan is typically done by the post-processor by interpolation and extrapolation and without reconstruction of the field. More focused induced SAR distributions (e.g., for more localized sources such as capacitively coupled sources) require a more dense grid such that the same integration and extrapolation algorithms can be used for the same assessment uncertainty.

NOTE 2 The minimum ratio of 30 % is derived from the plane wave penetration depth at 6 GHz.

If one or both of the above criteria are not met, the zoom scan measurement shall be repeated using a finer resolution while keeping the other zoom scan parameters compatible with Table 8. New horizontal and vertical grid steps shall be determined from the measured SAR distribution so that the above criteria are met. Compliance with the above two criteria shall be demonstrated for the new measured zoom scan. The size of the higher resolution zoom scan and other parameters of Table 8 shall apply. The closest point to the phantom shell shall be 2 mm or less for graded grids and the grading factor shall be 1,5 or less.

Uncertainties due to field distortion between the media boundary and the dielectric enclosure of the probe should also be minimized, which is achieved if the distance between the phantom surface and physical tip of the probe is larger than the probe tip diameter. Other methods may utilize correction procedures to compensate for boundary effects that enable high precision measurements closer than half the probe tip diameter [2],[61]. For all measurement points, the angle of the probe normal to the flat phantom surface shall be less than 5°. If this cannot be achieved, an additional uncertainty evaluation according to 7.2.2.6 is required.

Table 8 – Zoom scan parameters

Parameter	DUT transmit frequency being tested	
	$f \leq 3$ GHz	3 GHz < $f \leq 6$ GHz
Maximum distance between the closest measured points and the phantom surface (z_{M1} in Figure 14 and Table 2, in mm)	5	$\delta \ln(2)/2$ [a]
Maximum angle between the probe axis and the flat phantom surface normal (α in Figure 14)	5°	5°
Maximum spacing between measured points in the x- and y-directions (Δx and Δy, in mm)	8	$24/f$ [b,c]
For uniform grids: Maximum spacing between measured points in the direction normal to the phantom shell (Δz_1 in Figure 14, in mm)	5	$10/(f - 1)$
For graded grids: Maximum spacing between the two closest measured points in the direction normal to the phantom shell (Δz_1 in Figure 14, in mm)	4	$12/f$
For graded grids: Maximum incremental increase in the spacing between measured points in the direction normal to the phantom shell ($R_z = \Delta z_2/\Delta z_1$ in Figure 14)	1,5	1,5
Minimum edge length of the zoom scan volume in the x- and y-directions (L_z in 7.2.5.3, in mm)	30	22
Minimum edge length of the zoom scan volume in the direction normal to the phantom shell (L_h in 7.2.5.3, in mm)	30	22
Tolerance in the probe angle	1°	1°

[a] δ is the penetration depth for a plane-wave incident normally on a planar half-space.

[b] This is the maximum spacing allowed, which may not work for all circumstances.

[c] f is the frequency in GHz.