

**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)**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 62209-2:2010 sisaldab Euroopa standardi EN 62209-2:2010 ingliskeelset teksti.

Standard on kinnitatud Eesti Standardikeskuse 31.08.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.

Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 04.06.2010.

Standard on kättesaadav Eesti standardiorganisatsioonist.

This Estonian standard EVS-EN 62209-2:2010 consists of the English text of the European standard EN 62209-2:2010.

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**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)**

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

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)  
(IEC 62209-2:2010)

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 106/195/FDIS, future edition 1 of IEC 62209-1, 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 was approved by CENELEC as EN 62209-2 on 2010-06-01.

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

The following dates were fixed:

- |  |       |            |
|--|-------|------------|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2011-03-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn   | (dow) | 2013-06-01 |

Annex ZA has been added by CENELEC.

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## Endorsement notice

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

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- |                     |      |   |
|---------------------|------|---|
| [30] IEC 62311:2007 | NOTE | Harmonized as EN 62311:2008 (modified).         |
| [31] IEC 62479      | NOTE | Harmonized as EN 62479.                         |
| [34] ISO 10012:2003 | NOTE | Harmonized as EN ISO 10012:2003 (not modified). |
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## **Annex ZA** (normative)

### **Normative references to international publications with their corresponding European publications**

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62209-1	2005	Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)	EN 62209-1	2006
ISO/IEC 17025	2005	General requirements for the competence of testing and calibration laboratories	EN ISO/IEC 17025	2005

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## INTRODUCTION

The IEC work item “Evaluation of the Human Exposure to Radio Fields from Hand-Held and Body-Mounted Wireless Communication Devices in the Frequency range 30 MHz to 6 GHz (Human Models, Instrumentation, Procedures),” has the objective to measure the human exposure from devices intended to be used at a position near the human body. This standard was developed to provide procedures to evaluate exposures due to any electromagnetic field (EMF) transmitting device when held in the hand or in front of the face, mounted on the body, combined with other transmitters within a product, or embedded in garments. The types of devices dealt with include but are not limited to mobile telephones, cordless telephones, cordless microphones, auxiliary broadcast devices and radio transmitters in personal computers. For transmitters used in close proximity to the human ear, specific absorption rate (SAR) measurements should be performed using the procedures of IEC 62209-1:2005.

TC 106 has the scope to prepare international standards on measurement and calculation methods used to assess human exposure to electric, magnetic and electromagnetic fields. The task includes assessment methods for the exposure produced by specific sources. It applies to basic restrictions and reference levels. Although the establishment of exposure limits is not within the scope of TC 106, the results of assessments performed in accordance with TC 106 standards can be compared with the basic restrictions of relevant standards and guidelines. Conformity assessment depends on the policy of national regulatory bodies.

A Category D liaison in IEC involves organizations that can make an effective technical contribution and participate at the working group level or specific project level of the IEC technical committees or subcommittees. Obvious goals are standards harmonization and minimizing duplication of effort. The work of IEC technical committee 106 (TC 106) and IEEE International Committee on Electromagnetic Safety (ICES SCC39), technical committee 34 (TC 34), is an example where two international committees worked together informally through common membership to achieve the goal of harmonization, specifically between IEC Project Team 62209 (PT 62209) on the “Procedure to Measure the Specific Absorption Rate (SAR) for Hand-Held Mobile Telephones” and IEEE/SCC39-ICES/TC34 on IEEE Std 1528-2003 “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques” [32].<sup>1</sup>

IEEE/SCC39-ICES/TC34 has a similar project. Because the project is more advanced in IEC, a Category D liaison was sought in order to avoid divergence of standards and duplication of work. Thus, rather than developing two separate standards (IEC and IEEE), the IEEE committee felt it would be more efficient to develop a single IEC standard with direct input from the members of IEEE/SCC39-ICES/TC34, many of whom are also members of PT 62209 or are from the same organizations that send delegates to participate in the work of PT 62209. The Category D liaison is limited only to this project (Part 2 of IEC 62209 series).

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<sup>1</sup> Figures in square brackets refer to the Bibliography.

# **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)**

### **1 Scope**

This part of IEC 62209 series is applicable to any wireless communication device capable of transmitting electromagnetic fields (EMF) intended to be used at a position near the human body, in the manner described by the manufacturer, with the radiating part(s) of the device at distances up to and including 200 mm from a human body, i.e. when held in the hand or in front of the face, mounted on the body, combined with other transmitting or non-transmitting devices or accessories (e.g. belt-clip, camera or Bluetooth add-on), or embedded in garments. For transmitters used in close proximity to the human ear, the procedures of IEC 62209-1:2005 are applicable.

This standard is applicable for radio frequency exposure in the frequency range of 30 MHz to 6 GHz, and may be used to measure simultaneous exposures from multiple radio sources used in close proximity to human body. Definitions and evaluation procedures are provided for the following general categories of device types: body-mounted, body-supported, desktop, front-of-face, hand-held, laptop, limb-mounted, multi-band, push-to-talk, clothing-integrated. The types of devices considered include but are not limited to mobile telephones, cordless microphones, auxiliary broadcast devices and radio transmitters in personal computers.

This International Standard gives guidelines for a reproducible and conservative measurement methodology for determining the compliance of wireless devices with the SAR limits.

Because studies suggest that exclusion of features to represent a hand in human models constitutes a conservative case scenario for SAR in the trunk and the head, a representation of a hand is not included if the device is intended to be used next to the head or supported on or near the torso [73], [80]. This standard does not apply for exposures from transmitting or non-transmitting implanted medical devices. This standard does not apply for exposure from devices at distances greater than 200 mm away from the human body.

IEC 62209-2 makes cross-reference to IEC 62209-1:2005 where complete clauses or subclauses apply, along with any changes specified.

### **2 Normative references**

The following referenced documents are indispensable for the application 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.

IEC 62209-1:2005, *Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures – Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)*

ISO/IEC 17025:2005, *General requirements for the competence of testing and calibration laboratories*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in the IEC 62209-1:2005, as well the following apply.

#### 3.1

##### **accessory**

optional component that can be used in conjunction with a transmitting device

##### EXAMPLES

Accessories for mobile phones, wireless transmitting devices, wireless receiving devices or wireless transceiving devices, or two-way radios include the following:

- a) accessories for holding, affixing, or otherwise carrying, wearing or attaching the device, as well as providing spacing from the body (e.g. a belt-clip, wrist-strap or any other body strap, or lanyard for wearing the device as necklace);
- b) electronic accessories for performing tasks or which provide features (e.g., GPS modules, outboard printers, MP3 players, cameras or viewing devices);
- c) electronic accessories providing audio or video input or output (e.g., headsets, microphones, cameras);
- d) accessories providing enhanced RF capability to the device (e.g., replacement or auxiliary antennas);
- e) batteries and related d.c. power components;
- f) combinations of accessories, where two or more of the above are combined within one component (e.g., belt clip with built-in Bluetooth and "pigtail" audio cable to device).

#### 3.2

##### **body-mounted device<sup>2</sup>**

body-worn device

portable device containing a wireless transmitter or transceiver which is positioned in close proximity to a person's torso or limbs (excluding the head) by means of a carry accessory during its intended use or operation of its radio functions

#### 3.3

##### **body-supported device**

a device whose intended use includes transmitting with any portion of the device being held directly against a user's body

NOTE This differs from a body-mounted device in that it is not attached to a user's body by means of a carry accessory

#### 3.4

##### **cable**

wire that is necessary for the functionality in the intended operational configuration

#### 3.5

##### **conservative exposure**

estimate of the peak spatial-average SAR, including uncertainties as defined in this standard, representative of and slightly higher than expected to occur in the bodies of a significant majority of persons during intended use of hand-held devices

NOTE Conservative estimate does not mean the absolute maximum SAR value that could possibly occur under every conceivable combination of body size, body shape, wireless device orientation, and spacing relative to the body. In order to ensure that the results are not overly restrictive, and thereby unnecessarily inhibit the

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<sup>2</sup> Both terms are used. Colloquially the term "body-worn" is preferred over "body-mounted".