

INTERNATIONAL STANDARD

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Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices –

Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)

Procédure de mesure pour l'évaluation du débit d'absorption spécifique de l'exposition humaine aux champs radiofréquences produits par les dispositifs de communications sans fil tenus à la main ou portés près du corps –

Partie 1: Dispositifs utilisés à proximité de l'oreille (Plage de fréquences de 300 MHz à 6 GHz)



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MEASUREMENT PROCEDURE FOR THE ASSESSMENT OF SPECIFIC
ABSORPTION RATE OF HUMAN EXPOSURE TO RADIO FREQUENCY
FIELDS FROM HAND-HELD AND BODY-MOUNTED WIRELESS
COMMUNICATION DEVICES –****Part 1: Devices used next to the ear
(Frequency range of 300 MHz to 6 GHz)**

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International Standard IEC 62209-1 has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.

This second edition cancels and replaces the first edition published in 2005. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Extension of the frequency range to 300 MHz to 6 GHz.
- b) Fast SAR methods.

- c) Test reduction techniques.
- d) SAR measurements of terminals with multiple antennas and multiple transmitters.
- e) Deviation of dielectric characteristics of the tissue-equivalent liquids is relaxed up to 10 %.
- f) Uncertainty evaluation guidelines for temperature and dielectric parameter deviations of tissue-equivalent liquids.
- g) Addition of the following annexes:
 - Annex K (informative) Measurement uncertainty of specific fast SAR methods and fast SAR examples
 - Annex L (informative) SAR test reduction supporting information
 - Annex M (informative) Applying the head SAR test procedures
 - Annex N (informative) Studies for potential hand effects on head SAR
 - Annex O (informative) Quick start guide.

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

FDIS	Report on voting
106/361/FDIS	106/365/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this standard, the following print types are used:

- specific test protocols: in *italic* type.

A list of all parts in the IEC 62209 series, published under the general title *Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

IEC 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. IEC TC 106 has developed this part of IEC 62209 to provide procedures to evaluate the specific absorption rate (SAR) of human exposures due to electromagnetic field (EMF) transmitting devices when held close to the ear. The types of devices include but are not limited to mobile telephones, cordless telephones, headphones, etc., which are used close to the ear. The IEC TC 106 standards do not deal with the exposure limits. Conformity assessment depends on the policy of national regulatory bodies. While basic restrictions on SAR in the ICNIRP Guidelines [64]¹ go up to 10 GHz, the frequency range for this part of IEC 62209 is limited to an upper end frequency of 6 GHz since current wireless handsets operate below this frequency.

IEC TC 106 and IEEE/ICES TC34² worked together formally through common membership to achieve the goal of harmonization, between IEC TC 106 Maintenance Team 1 for this part of IEC 62209 and IEEE/ICES TC34 for IEEE Std 1528 [66]. During the process a primary effort involved was to harmonize these two standards.

To aid the user of this part of IEC 62209, a quick start guide has been prepared and included as an informative annex (see Annex O). The quick start guide is not a substitute for following the detailed procedure of the standard.

¹ Numbers in square brackets refer to the Bibliography.

² The International Committee on Electromagnetic Safety of the IEEE.

MEASUREMENT PROCEDURE FOR THE ASSESSMENT OF SPECIFIC ABSORPTION RATE OF HUMAN EXPOSURE TO RADIO FREQUENCY FIELDS FROM HAND-HELD AND BODY-MOUNTED WIRELESS COMMUNICATION DEVICES –

Part 1: Devices used next to the ear (Frequency range of 300 MHz to 6 GHz)

1 Scope

This part of IEC 62209 specifies protocols and test procedures for measurement of the peak spatial-average SAR induced inside a simplified model of the head with defined reproducibility. It applies to certain electromagnetic field (EMF) transmitting devices that are positioned next to the ear, where the radiating structures of the device are in close proximity to the human head, such as mobile phones, cordless phones, certain headsets, etc. These protocols and test procedures provide a conservative estimate with limited uncertainty for the peak-spatial SAR that would occur in the head for a significant majority of people during normal use of these devices. The applicable frequency range is from 300 MHz to 6 GHz.

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.

ISO/IEC 17043:2010, *Conformity assessment – General requirements for proficiency testing*

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 following terms and definitions apply.

3.1

axial isotropy

maximum deviation of the SAR measured when rotating around the major axis of the probe while it is exposed to a wave impinging from a direction along its major axis

3.2

conducted power

power delivered by the power amplifier to a matched load

3.3

frequency band

transmitting frequency range associated with a specific wireless operating mode

Note 1 to entry: The frequency band is usually referred to using rounded figures; however the actual frequency allocation may be slightly different, e.g. GSM 850 MHz band actually uses 824 MHz to 849 MHz and 869 MHz to 894 MHz, GSM 900 MHz band actually uses 880 MHz to 915 MHz and 925 MHz to 960 MHz.