IEC/IEEE 62704-3

Edition 1.0 2017-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Determining the peak spatial-average specific absorption rate (SAR) in the human body from wireless communications devices, 30 MHz to 6 GHz – Part 3: Specific requirements for using the finite difference time domain (FDTD) method for SAR calculations of mobile phones

Détermination du débit d'absorption spécifique (DAS) maximal moyenné dans le corps humain, produit par les dispositifs de communication sans fil, 30 MHz à 6 GHz – Partie 3: Exigences spécifiques pour l'utilisation de la méthode des différences finies dans le domaine temporel (FDTD) pour les calculs de DAS des téléphones mobiles

IEC/IEEE 62704-3:2017-10(en-fr)

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Part 3: Specific requirements for using the finite difference time domain (FDTD) method for SAR calculations of mobile phones

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International Standard IEC/IEEE 62704-3 has been prepared by IEC technical committee 106: Methods for the assessment of electric, magnetic, and electromagnetic fields associated with human exposure, in cooperation with International Committee on Electromagnetic Safety of the IEEE Standards Association[1], under the IEC/IEEE Dual Logo Agreement between IEC and IEEE.

This publication is published as an IEC/IEEE Dual Logo standard.

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

FDIS	Report on voting
106/404/FDIS	106/414/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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

This standard contains attached files in the form of CAD models described in Clause 6. These files are available at:
http://www.iec.ch/dyn/www/f?p=103:227:0::::FSP_ORG_ID,FSP_LANG_ID:1303,25

A list of all parts in the IEC/IEEE 62704 series, published under the general title *Determining the peak spatial-average specific absorption rate (SAR) in the human body from wireless communications devices, 30 MHz to 6 GHz*, can be found on the IEC website.

The IEC technical committee and IEEE technical committee have 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,
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[1] A list of IEEE participants can be found at the following URL:
http://standards.ieee.org/downloads/62704/62704-3-2017/62704-3-2017_wg-participants.pdf.

INTRODUCTION

The increasing complexity of assessing product compliance with exposure standards according to specific absorption rate (SAR) limits calls for new compliance or pre-compliance techniques. Currently standardized experimental SAR compliance assessments of wireless communication devices are time-consuming and costly. Computational techniques have reached a level of maturity which allows their use in the pre-compliance assessments of wireless communication devices such as mobile phones. For example, pre-compliance testing is important for mobile phone manufacturers in their product development phase where this document may be applied. The benefits to the users and manufacturers include standardized and accepted protocols, validation techniques, benchmark results, reporting format and means for estimating the overall uncertainty in order to produce valid, repeatable, and reproducible data.

The results obtained by following the protocols specified in this document represent a conservative estimate of the peak spatial-average SAR induced in the standard human body models due to mobile phones. The protocols set forth herein produce results subject to modelling, simulations and other uncertainties that are defined in this document.

It is not the intent of this document to provide a result representative of the absolute maximum SAR value possible under every conceivable combination of human body and mobile phone usage. The following items are described in detail: simulation concepts, simulation techniques, finite difference time domain (FDTD) numerical method, benchmark results, standardized numerical models of the human body. Procedures for validating the numerical tools used for SAR simulations and assessing the SAR simulation uncertainties are provided. This document is intended primarily for use by engineers and other specialists who are familiar with electromagnetic (EM) theory, numerical methods, and, in particular, FDTD techniques. This document does not recommend specific SAR limit values since these are found in other documents.

DETERMINING THE PEAK SPATIAL-AVERAGE SPECIFIC ABSORPTION RATE (SAR) IN THE HUMAN BODY FROM WIRELESS COMMUNICATIONS DEVICES, 30 MHz TO 6 GHz –

Part 3: Specific requirements for using the finite difference time domain (FDTD) method for SAR calculations of mobile phones

1 Scope

This part of IEC/IEEE 62704 defines the concepts, techniques, benchmark phone models, validation procedures, uncertainties and limitations of the finite difference time domain (FDTD) technique when used for determining the peak spatial-average specific absorption rate (SAR) in standardized head and body phantoms exposed to the electromagnetic fields generated by wireless communication devices, in particular pre-compliance assessment of mobile phones, in the frequency range from 30 MHz to 6 GHz. It recommends and provides guidance on the numerical modelling of mobile phones and benchmark results to verify the general approach for the numerical simulations of such devices. It defines acceptable modelling requirements, guidance on meshing and test positions of the mobile phone and the phantom models. This document does not recommend specific SAR limits since these are found in other documents, e.g. IEEE C95.1-2005[1][2] and ICNIRP[2].

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.

IEC 60050 (all parts), *International Electrotechnical Vocabulary (IEV)* (available at: www.electropedia.org)

IEC 62209-1, *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)*

IEC 62209-2, *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/IEEE 62704-1:2017, *Determining the peak spatial-average specific absorption rate (SAR) in the human body from wireless communications devices, 30 MHz to 6 GHz – Part 1: General requirements for using the finite-difference time-domain (FDTD) method for SAR calculations*

IEEE Std 1528, *IEEE recommended practice for determining the peak spatial-average specific absorption rate (SAR) in the human head from wireless communications devices: measurement techniques*

IEEE Standards Dictionary Online[3]

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2 Numbers in square brackets refer to the Bibliography.

3 Subscription available at: http://dictionary.ieee.org.