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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

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Part 1: General requirements for using the finite-difference time-domain (FDTD) method for SAR calculations

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International Standard IEEE/IEC 62704-1 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 the International Committee on Electromagnetic Safety of the IEEE Standards Association[1], under the IEC/IEEE Dual Logo Agreement.

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

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

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

FDIS	Report on voting
106/401A/FDIS	106/413/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.

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 web site 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- withdrawn,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.

1 A list of IEEE participants can be found at the following URL: http://standards.ieee.org/downloads/62704/62704-1-2017/62704-1-2017_wg-participants.pdf.

INTRODUCTION

Computational techniques have reached a level of maturity which allows their use in specific absorption rate (SAR) assessment of wireless communication devices. Some wireless communication devices are used in situations where experimental SAR assessment is extremely complex or not possible at all. National regulatory bodies (e.g. US Federal Communications Commission) encourage the development of consensus standards and encouraged the establishment of the ICES Technical Committee 34 Subcommittee 2. The benefits to the users and the regulators include standardized and accepted protocols, anatomically correct body models, validation techniques, benchmark data, reporting format and means for estimating the computational uncertainty in order to produce valid, accurate, repeatable, and reproducible data.

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

1 Scope

This part of IEC/IEEE 62704 defines the methodology for the application of the finite-difference time domain (FDTD) technique when used for determining the peak spatial-average specific absorption rate (SAR) in the human body exposed to wireless communication devices with known uncertainty. It defines methods to validate the numerical model of the device under test (DUT) and to assess its uncertainty when used in SAR simulations. Moreover, it defines procedures to determine the peak spatial-average SAR in a cubical volume and to validate the correct implementation of the FDTD simulation software. The applicable frequency range is 30 MHz to 6 GHz.

NOTE Cubical averaging volumes are applied in all current experimental standards for the assessment of the peak spatial-average SAR (psSAR) and recommended by [1], [2] and [3]. Other averaging volumes have been proposed, for example, in [1], and may be included in future revisions of this document.

This document does not recommend specific SAR limits since these are found elsewhere, for example, in the guidelines published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) [1] or in IEEE Std C95.1 [3].

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.

NOTE The experimental standards that define the SAM phantom and the testing positions are IEEE Std 1528 and IEC 62209-1.

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*

IEC 62209-1, *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 devices used next to the ear (frequency range of 300 MHz to 6 GHz)*

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

IEEE Standards Dictionary Online (subscription available at: http://dictionary.ieee.org)