IEC/IEEE 62704-4

Edition 1.0 2020-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Determining the peak spatial-average specific absorption rate (SAR) in the human body from wireless communication devices, 30 MHz to 6 GHz – Part 4: General requirements for using the finite element method for SAR calculations

Détermination du débit d'absorption spécifique (DAS) maximal moyenné dans le corps humain, produit par les dispositifs de communications sans fil, 30 MHz à 6 GHz – Partie 4: Exigences générales d'utilisation de la méthode des éléments finis pour les calculs du DAS

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Part 4: General requirements for using the finite element method for SAR calculations

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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
106/515/FDIS	106/521/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

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INTRODUCTION

Finite element methods have reached a level of maturity that allows their application in specific absorption rate (SAR) assessments of professional-use and consumer-use wireless communication devices. In the recent past, SAR compliance assessments for small transmitters were performed almost exclusively using measurements. 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, verification and validation techniques, benchmark data, reporting format and means for estimating the overall assessment uncertainty in order to produce valid, repeatable and reproducible data.

The purpose of this document is to specify numerical techniques and models to determine peak spatial-average specific absorption rates (SAR). SAR will be determined by applying finite element method simulations of the electromagnetic field conditions produced by wireless communication devices in models of the human anatomy. Intended users of this document are (but are not limited to) wireless communication device manufacturers, service providers for wireless communication that are required to certify that their products comply with the applicable SAR limits, and government agencies.

Several methods described in this document are based on techniques specified in IEC/IEEE 62704-1:2017.

DETERMINING THE PEAK SPATIAL-AVERAGE SPECIFIC ABSORPTION RATE (SAR) IN THE HUMAN BODY FROM WIRELESS COMMUNICATION DEVICES, 30 MHZ TO 6 GHZ –

Part 4: General requirements for using the finite element method for SAR calculations

1 Scope

This part of IEC/IEEE 62704 describes the concepts, techniques, and limitations of the finite element method (FEM) and specifies models and procedures for verification, validation and uncertainty assessment for the FEM when used for determining the peak spatial-average specific absorption rate (psSAR) in phantoms or anatomical models. It recommends and provides guidance on the modelling of wireless communication devices, and provides benchmark data for simulating the SAR in such phantoms or models.

This document does not recommend specific SAR limits because these are found elsewhere (e.g. in IEEE Std C95.1 [1][1] or in the guidelines published by the International Commission on Non-Ionizing Radiation Protection (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 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/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*

3 Terms and definitions

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- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp
- IEEE Dictionary Online: available at http://dictionary.ieee.org

[1] Numbers in square brackets refer to the Bibliography.