IEC/IEEE 62704-2

Edition 1.0 2017-06

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 2: Specific requirements for finite difference time domain (FDTD) modelling of exposure from vehicle mounted antennas

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 2: Exigences spécifiques relatives à la modélisation de l'exposition des antennes sur véhicule, à l'aide de la méthode des différences finies dans le domaine temporel (FDTD)

IEC/IEEE 62704-2:2017-06(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue
New York, NY 10016-5997
United States of America
stds.ipr@ieee.org
www.ieee.org

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.220.20

ISBN 978-2-8322-4259-9

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International Standard IEC/IEEE 62704-2 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.

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
106/391/FDIS	106/392/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 model datasets described in Annex A. 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/24748-5/24748-5-2017/24748-5-2017_wg-participants.pdf

INTRODUCTION

Computational techniques have reached a level of maturity which allows their use in compliance assessments of wireless communication devices with vehicle mounted antennas. The increasing complexity of assessing product compliance with exposure standards according to specific absorption rate (SAR) limits calls for new compliance techniques. This technique should be time efficient and cost effective. Experimental compliance assessments for wireless communication devices used in combination with vehicles are extremely complex to perform or even not possible at all. National regulatory bodies (e.g. US Federal Communications Commission) encouraged the development of consensus standards as well as the establishment of the related IEEE TC34 SC2 subcommittee and IEC PT62704-2 working group. The benefits to the user include standardized and accepted protocols, standardized anatomical models, validation techniques, benchmark data, reporting format, means for estimating the overall uncertainty in order to produce valid, accurate, repeatable, and reproducible results.

The results obtained by following the protocols specified in this document represent a conservative estimate of the peak spatial-average and whole-body average SAR induced in the standard human body models and exposure conditions established for this document inside or nearby the vehicles representing typical use cases with transmitting mobile radios. The protocols set forth in this document produce results subject to modeling, simulations and other uncertainties that are defined in this document.

The standardized vehicle and human models, test configurations, and related results are representative of the typical exposure conditions expected by the passengers and bystanders near the vehicle with vehicle mounted antennas. 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 body size, posture, vehicle model, and distance from the vehicle and antenna. The following items are described in detail: simulation concepts, simulation techniques, finite difference time domain (FDTD) numerical method, benchmarking techniques, standardized anatomically correct human body models of the passenger and bystander, exposure conditions, reference exposure configurations for validation of the SAR simulation software, and the limitations of these models and tools when used for simulating the peak spatial-average and whole-body average SAR. 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 2: Specific requirements for finite difference time domain (FDTD) modelling of exposure from vehicle mounted antennas

1 Scope

This part of IEC/IEEE 62704 establishes the concepts, techniques, validation procedures, uncertainties and limitations of the finite difference time domain technique (FDTD) when used for determining the peak spatial-average and whole-body average specific absorption rate (SAR) in a standardized human anatomical model exposed to the electromagnetic field emitted by vehicle mounted antennas in the frequency range from 30 MHz to 1 GHz, which covers typical high power mobile radio products and applications. This document specifies and provides the test vehicle, human body models and the general benchmark data for those models. It defines antenna locations, operating configurations, exposure conditions, and positions that are typical of persons exposed to the fields generated by vehicle mounted antennas. The extended frequency range up to 6 GHz will be considered in future revisions of this document. This document does not recommend specific peak spatial-average and whole-body average SAR limits since these are found in other documents, e.g. IEEE C95.1-2005, ICNIRP (1998).

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: http://www.electropedia.org)

IEC/IEEE 62704-1:—[2], *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 Standards Dictionary Online (subscription available at: http://ieeexplore.ieee.org/xpls/dictionary.jsp)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC/IEEE 62704-1:—, the IEEE Standards Dictionary Online, IEC 60050 (all parts) and the following apply.

3.1
bystander model
heterogeneous human body model in the standing posture defined in this document to represent a bystander near the standardized vehicle

2 Under preparation. Stage at time of publication: IEC/IEEE FDIS 62704-1:2016.