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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 3: Vector measurement-based systems (Frequency range of 600 MHz to 6 GHz)



AS IEC 62209.3:2020

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The following are represented on Committee TE-007:

- Australian Centre for Radiofrequency Bioeffects Research
- Australian Communications and Media Authority
- Australian Industry Group
- Australian Mobile Telecommunications Association
- Australian Radiation Protection and Nuclear Safety Agency
- Commercial Radio Australia
- Communications, Electrical and Plumbing Union — Electrical Trades Division
- Department of Defence (Australian Government)
- Engineers Australia
- National Measurement Institute

Additional Interests

- Telstra Corporation

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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 3: Vector measurement-based systems (Frequency range of 600 MHz to 6 GHz)

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Preface

This Standard was prepared by the Australian members of the Joint Standards Australia/Standards New Zealand Committee TE-007, Human Exposure to Electromagnetic Fields.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

The objective of this document is to specify measurement protocols and test procedures for the reproducible measurement of peak spatial-average specific absorption rate (psSAR) induced inside a simplified model of a human head or body by radio-frequency (RF) transmitting devices, with a specified measurement uncertainty. Requirements are provided for psSAR assessment using vector measurement-based systems. Such systems determine the psSAR by three-dimensional (3D) field reconstruction within the volume of interest in accordance with the requirements herein for the measurement system, calibration, uncertainty assessment and validation methods. The protocols and procedures apply for the psSAR assessments covering a significant majority of people including children during use of wireless communication devices operated in close proximity to the head or body.

This document is applicable to wireless communication devices intended to be used at a position near the human head or body at distances up to and including 200 mm. This document may be employed to evaluate SAR compliance of different types of wireless communication devices used next to the ear, in front of the face, mounted on the body, combined with other RF-transmitting or non-transmitting devices or accessories (e.g. belt-clip), or embedded in garments. The overall applicable frequency range is from 600 MHz to 6 GHz.

The system validation procedures provided within this document cover frequencies from 600 MHz to 6 GHz.

With a vector measurement-based system this document can be employed to evaluate SAR compliance of different types of wireless communication devices.

The wireless communication device categories covered include but are not limited to mobile telephones, cordless microphones, auxiliary broadcast devices and radio-transmitters in personal computers, desktop and laptop devices, multi-band, multi-antenna, and push-to-talk devices.

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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 3: Vector measurement-based systems
(Frequency range of 600 MHz to 6 GHz)**

FOREWORD

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

This document 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.

This standard contains attached files in the form of four *.IGS files of inner and outer surfaces for the left and right halves extracted from the CAD model of the SAM phantom (see A.1.2). These files are available in the supporting documents folder at www.iec.ch/tc106/supportingdocuments.

This standard contains attached files for the analytical functions that are to be used for the evaluation of the reconstruction algorithm uncertainty in Table H.1. These files are available in the supporting documents folder at www.iec.ch/tc106/supportingdocuments.

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,
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INTRODUCTION

This document specifies the requirements for vector measurement-based systems to measure the Specific Absorption Rate (SAR) of devices that are used in close proximity to the human body or head.

Because SAR measurement systems are used for showing compliance with national and international exposure limits, the test procedures have to be standardized. This standardization aims at achieving comparable results for the equipment approval process.

Vector measurement-based systems and the associated protocols can differ from traditional SAR measurement systems and protocols. These systems use more advanced field reconstruction methods, allowing the application of indirect measurement approaches in which the SAR is evaluated in three dimensions from a limited number of measurement points that may be located in a limited part of the volume of interest, or even outside this volume. Such new SAR assessment approaches result in significantly reduced SAR measurement times.

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 3: Vector measurement-based systems (Frequency range of 600 MHz to 6 GHz)

1 Scope

This part of IEC 62209 specifies measurement protocols and test procedures for the reproducible measurement of peak spatial-average specific absorption rate (psSAR) induced inside a simplified model of a human head or body by radio-frequency (RF) transmitting devices, with a specified measurement uncertainty. Requirements are provided for psSAR assessment using vector measurement-based systems. Such systems determine the psSAR by three-dimensional (3D) field reconstruction within the volume of interest in accordance with the requirements herein for the measurement system, calibration, uncertainty assessment and validation methods. The protocols and procedures apply for the psSAR assessments covering a significant majority of people including children during use of wireless communication devices operated in close proximity to the head or body.

This document is applicable to wireless communication devices intended to be used at a position near the human head or body at distances up to and including 200 mm. This document may be employed to evaluate SAR compliance of different types of wireless communication devices used next to the ear, in front of the face, mounted on the body, combined with other RF-transmitting or non-transmitting devices or accessories (e.g. belt-clip), or embedded in garments. The overall applicable frequency range is from 600 MHz to 6 GHz.

The *system validation* procedures provided within this document cover frequencies from 600 MHz to 6 GHz.

With a vector measurement-based system this document can be employed to evaluate SAR compliance of different types of wireless communication devices.

The wireless communication device categories covered include but are not limited to mobile telephones, cordless microphones, auxiliary broadcast devices and radio transmitters in personal computers, desktop and laptop devices, multi-band, multi-antenna, and push-to-talk devices.

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 62209-1:2016, *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)*