

BUREAU OF INDIAN STANDARDS

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मसौदा भारतीय मानक
मानव शरीर पर प्रभाव के मूल्यांकन के प्रयोजनार्थ बेस
स्टेशनों के समीप आर एफ फील्ड सामर्थ्य, बिजली घनत्व
एवं एस ए आर ज्ञात करना

Draft Indian Standard

Determination of RF Field Strength,
Power Density and SAR in the Vicinity of
Base Stations for the Purpose of
Evaluating Human Exposure

ICS 13.280; 17.240

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LITD 09 Electromagnetic Compatibility
Sectional Committee

Last Date for Comments: 30 June 2024.

NATIONAL FOREWORD

(Formal clauses will be added later)

This Draft Indian Standard which is identical with IEC 62232:2022 ‘Determination of RF field strength, power density and SAR in the vicinity of base stations for the purpose of evaluating human exposure’ issued by the International Electrotechnical Commission (IEC) *will be* adopted by the Bureau of Indian Standards on the recommendation of the Electromagnetic Compatibility Sectional Committee (LITD 09) and approval of the Electronics and Information Technology Division Council.

IS 16528:2017 was published in 2017 and was based on 'IEC 62232: 2011. The superseding of the above mentioned Indian Standard has been undertaken to align it with the latest version of IEC 62232:2022 and on publication of this draft standard, IS 16528:2017 will be stands withdrawn.

The text of IEC Standard *will be* approved as suitable for publication as an Indian Standard without deviations. Certain conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appears referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

This IEC Standard includes the following significant technical changes with respect to the previous edition:

- a) increased frequency range, from 110 MHz to 300 GHz (including consideration of ambient sources from 100 kHz to 300 GHz);
- b) specification of assessment procedures based on the actual maximum approach including methods for the validation of monitoring counter and control features;
- c) introduction of assessment methods relevant to 5G technologies and BS using beam steering such as massive MIMO systems;
- d) clarification of criteria for exposure from multiple sources;
- e) restructuring of Annex B (Evaluation methods) for better readability;
- f) update of the requirements and procedures for power density measurements in laboratory conditions;
- g) update of simplified assessment formulas for dish antennas used in radio relays and microwave links;
- h) compatibility with ICNIRP-2020 [1]1 exposure limits.

This document contains attached files that are cited in Figure B.30 and G.4.4.3. These files can be downloaded from <https://www.iec.ch/tc106/supportingdocuments>.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

<i>International standards</i>	<i>Corresponding Indian standards</i>	<i>Degree of Equivalence</i>
IEC 62209-3 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)	IS/IEC 62209-3 : 2019 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)	Identical with IEC 62209-3:2019
IEC 62311 Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)	IS/IEC 62311 : 2019 Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields 0 Hz - 300 GHz	Identical with IEC 62311 : 2019
IEC 62479 Assessment of the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz – 300 GHz)	IS/IEC 62479 : 2010 Assessment of the Compliance of Low-Power Electronic and Electrical Equipment with the Basic Restrictions Related to Human Exposure to Electromagnetic Fields (10 MHz to 300 GHz)	Identical with IEC 62473:2010
IEC/IEEE 62209-1528 Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures: Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-worn wireless communication devices (Frequency range of 4 MHz to 10 GHz)	IS/IEC/IEEE 62209-1528: 2020 Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures: Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-worn wireless communication devices (Frequency range of 4 MHz to 10 GHz)	Identical with IEC/IEEE 62209-1528:

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IEC/IEEE 63195-1 Measurement procedure for the assessment of power density of human exposure to radio frequency fields from wireless devices operating in close proximity to the head and body – Frequency range of 6 GHz to 300 GHz	IEC/IEEE 63195-1: 2022 Measurement procedure for the assessment of power density of human exposure to radio frequency fields from wireless devices operating in close proximity to the head and body – Frequency range of 6 GHz to 300 GHz	Identical with IEC/IEEE 63195-1: 2022
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(Under Wide circulation LITD 09 /25163)

IEC/IEEE 63195-2 Determining the power density of the electromagnetic field associated with human exposure to wireless devices operating in close proximity to the head and body using computational techniques, 6 GHz to 300 GHz	IS/IEC/IEEE 63195-2: 2022 Determining the power density of the electromagnetic field associated with human exposure to wireless devices operating in close proximity to the head and body using computational techniques, 6 GHz to 300 GHz	Identical with IEC/IEEE63195-2: 2022
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(Under Wide circulation LITD 09 /25163)

The technical committee has reviewed the provisions of the following International Standard referred in this adopted draft standard and has decided that it is acceptable for use in conjunction with this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

International Standards

Title

IEC/IEEE 62704-1	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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IEC/IEEE 62704-2	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
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IEC/IEEE 62704-3	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
IEC/IEEE 62704-4	Recommended practise for determining the Peak Spatial Average Specific Absorption Rate (SAR) in the human body from wireless communications devices, 30 MHz – 6 GHz: General requirements for using the Finite-Element Method (FEM) for SAR calculations and specific requirements for modelling vehicle-mounted antennas and personal wireless devices

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:2022 ‘Rules for rounding off numerical values (*Second Revision*)’. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

SCOPE OF IEC 62232: 2022

“This document provides methods for the determination of RF field strength, power density and specific absorption rate (SAR) in the vicinity of base stations (BS) for the purpose of evaluating human exposure.

This document:

- a) considers intentionally radiating BS which transmit on one or more antennas using one or more frequencies in the range 110 MHz to 300 GHz;
- b) considers the impact of ambient sources on RF exposure at least in the 100 kHz to 300 GHz frequency range;
- c) specifies the methods to be used for RF exposure evaluation for compliance assessment applications, namely:
 - 1) product compliance – determination of compliance boundary information for a BS product before it is placed on the market;

- 2) product installation compliance – determination of the total RF exposure levels in accessible areas from a BS product and other relevant sources before the product is put into operation;
 - 3) in-situ RF exposure assessment – measurement of in-situ RF exposure levels in the vicinity of a BS installation after the product has been taken into operation;
 - d) specifies how to perform RF exposure assessment based on the actual maximum approach;
 - e) describes several RF field strength, power density, and SAR measurement and computation methodologies with guidance on their applicability to address both the in-situ evaluation of installed BS and laboratory-based evaluations;
 - f) describes how surveyors establish their specific evaluation procedures appropriate for their evaluation purpose;
 - g) provides guidance on how to report, interpret and compare results from different evaluation methodologies and, where the evaluation purpose requires it, determine a justified decision against a limit value;
 - h) provides methods for the RF exposure assessment of BS using time-varying beam-steering technologies such as new radio (NR) BS using massive multiple input multiple output (MIMO).”
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Note: - The Technical content of this document has not been enclosed as these are identical with the corresponding IEC Standard. For details please refer to IEC 62232: 2022 or kindly contact.

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