

INTERNATIONAL STANDARD



**Safety requirements for radio transmitting equipment – General requirements
and terminology**

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IEC 60215:2016

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY REQUIREMENTS FOR RADIO TRANSMITTING EQUIPMENT –
GENERAL REQUIREMENTS AND TERMINOLOGY**

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International Standard IEC 60215 has been prepared by IEC technical committee 103: Transmitting equipment for radiocommunication.

This fourth edition cancels and replaces the third edition, published in 1987, Amendment 1:1989 and Amendment 2:1993. This edition constitutes a technical revision.

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

- The test methods in this standard are similar to those given in IEC 60215:1987 and continue to apply only to radio transmitting equipment and equipment defined in Clause 1, operating under the responsibility of SKILLED persons.
- Reorganization and revision of the content are summarized in Annex F.

Words printed in SMALL CAPITALS are terms that are defined in Clause 3.

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

FDIS	Report on voting
103/143/FDIS	103/146/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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- withdrawn,
- replaced by a revised edition, or
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SAFETY REQUIREMENTS FOR RADIO TRANSMITTING EQUIPMENT – GENERAL REQUIREMENTS AND TERMINOLOGY

1 Scope

This International Standard applies to radio transmitting equipment, operating under the responsibility of SKILLED persons. It also applies to auxiliary equipment and ancillary apparatus, including combining units and matching networks and cooling systems where these form an integral part of the transmitter system.

The requirements of IEC 60215 may also be used to meet safety requirements for cognate equipment. Examples of equipment that could be within the scope of this International Standard are shown in Table 1.

Table 1 – Examples of equipment

Generic product type	Specific example of generic type
RF amplifiers	High power RF amplifiers used for industrial, medical or scientific applications
High-voltage power supplies (HVPS)	DC HVPS based on PSM technology or any cognate technology

Table 1 is not intended to be comprehensive, and equipment that is not listed is not necessarily excluded.

When the equipment is to be manufactured and/or installed in territories that have safety standards covering the scope of this International Standard that are more stringent, then those standards apply.

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Antenna systems, associated feeder lines and matching networks, not forming an integral part of the transmitter, are excluded.

This International Standard does not apply to transmitters of safety-insulated construction using DOUBLE INSULATION or REINFORCED INSULATION and without provision for protective earthing. This type of equipment is designated CLASS II EQUIPMENT and is usually marked with a symbol as shown in 3.2.2 b).

This International Standard does not apply to battery powered transmitters or to radio base stations and fixed terminal stations for wireless telecommunication, as this equipment is covered by other standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60244-6, *Methods of measurement for radio transmitters – Part 6: Cabinet radiation at frequencies between 130 kHz and 1 GHz*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60695-1-10, *Fire hazard testing – Part 1-10: Guidance for assessing the fire hazard of electrotechnical products – General guidelines*

IEC 60695-1-11, *Fire hazard testing – Part 1-11: Guidance for assessing the fire hazard of electrotechnical products – Fire hazard assessment*

IEC 60825-12, *Safety of laser products – Part 12: Safety of free space optical communication systems used for transmission of information*

IEC 62232, *Determination of RF field strength and SAR in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure*

IEC 62311, *Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)*

ISO 1999, *Acoustics – Estimation of noise-induced hearing loss*

Directive 2011/65/EU of the European Parliament and the Council of 8 June 2011 on the restriction of the use of hazardous substances in electrical and electronic equipment

3 Terms, definitions and symbols

For the purposes of this document, the following terms, definitions and symbols apply.

3.1 Terms and definitions

[IEC 60215:2016](https://standards.iteh.ai/IEC/60215/2016)

3.1.1

skilled

having the necessary knowledge and practical experience of electrical and radio engineering to appreciate the various hazards that can arise from working on radio transmitters including auxiliaries, and to take appropriate precautions to ensure the safety of personnel

Note 1 to entry: Guidance on assessing the competence of personnel for designation as SKILLED is given in Annex B.

Note 2 to entry: The above definition and the guidance in Annex B detail the minimum requirements for a SKILLED PERSON. In some countries more stringent requirements for qualifications, training and experience are stipulated, with formal certification.

3.1.2

unskilled

not SKILLED

3.1.3

operator

operating company and operating personnel

3.1.4

operator area

area in which the ICNIRP occupational exposure limits apply

3.1.5**electrically safe**

unable to cause a harmful electric shock or radio-frequency skin burn

3.1.6**creepage distance**

shortest distance measured in air, over the surface of the insulation, between two conductive parts, or between a conductive part and the chassis of the equipment

3.1.7**clearance**

shortest distance, measured in air, between two conductive parts, or between a conductive part and the chassis of the equipment

3.1.8**by hand**

without the use of a tool, coin or any other object

3.1.9**accessible part**

part which can be touched by either of the standard test fingers described in IEC 60529, when applied in any direction with a force not exceeding 30 N

Note 1 to entry: In addition to guarding against flashover, any part carrying a voltage is regarded as an ACCESSIBLE PART if its distance to the test finger is less than the CLEARANCE given in Annex A.

3.1.10**enclosure**

space in which items of the equipment that might be dangerous are located, and access to which is prevented, for example, with locked doors or with cover plates which cannot be removed without using a tool

3.1.11**safety device**

part or component provided for the purpose of protecting personnel from possible injury

3.1.12**Class II equipment**

equipment in which protection against electric shock does not rely on BASIC INSULATION only, but in which additional safety precautions, such as DOUBLE INSULATION or REINFORCED INSULATION are provided, there being no reliance on protective earthing

3.1.13**basic insulation**

insulation that provides basic protection against electric shock

3.1.14**double insulation**

insulation comprising both BASIC INSULATION and an independent insulation in order to reduce the risk of electric shock in the event of a failure of the BASIC INSULATION








3.1.15**reinforced insulation**

single insulation system that provides a degree of protection against electric shock equivalent to DOUBLE INSULATION






3.2 Symbols

As far as practicable, the symbols given below conform to those given in IEC 60417.

3.2.1 General symbols

a) AC supply		IEC 60417-5032 (2002-10)
b) DC supply		IEC 60417-5031 (2002-10)
c) AC and DC supply		IEC 60417-5033 (2002-10)
d) Three-phase AC supply		IEC 60417-5032-1 (2002-10)
e) Earth		IEC 60417-5017 (2006-08)
f) Aerial; antenna		IEC 60417-5039 (2006-08)
g) Special disposal restrictions apply		

3.2.2 Symbols relating to safety

a) Safety earth		IEC 60417-5019 (2006-08)
b) Equipment of safety insulated construction (CLASS II EQUIPMENT)		IEC 60417-5172 (2003-02)
c) Dangerous voltage		IEC 60417-5036 (2002-10)
d) Ionizing radiation		ISO 7000-0907 (2004-01)
e) High temperature		IEC 60417-5041 (2002-10)

3.2.3 Symbols relating to degree of protection against moisture

IP codes (International Protection Marking) are used to indicate the degree of protection against the intrusion of solid particles or water. The first digit of the code indicates the protection against solid particles and the second digit the protection against ingress of water. Where no protection is specified for solid particles, this digit is replaced with the letter X.

The the following IP codes apply for ingress of water:

IPX0	Non-protected
IPX1	Protected against vertically falling water drops
IPX2	Protected against vertically falling water drops when enclosure tilted up to 15°
IPX3	Protected against spraying water
IPX4	Protected against splashing water
IPX5	Protected against water jets
IPX6	Protected against powerful water jets
IPX7	Protected against the effects of temporary immersion in water
IPX8	Protected against the effects of continuous immersion in water
IPX9	Protected against high pressure and temperature water jets