CISPR 16-1-6

Edition 1.0 2014-12

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INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE
COMITÉ INTERNATIONAL SPÉCIAL DES PERTURBATIONS RADIOÉLECTRIQUES

BASIC EMC PUBLICATION
PUBLICATION FONDAMENTALE EN CEM

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Specification for radio disturbance and immunity measuring apparatus and methods –
Part 1-6: Radio disturbance and immunity measuring apparatus – EMC antenna calibration

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Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques –
Partie 1-6: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Étalonnage des antennes CEM

CISPR 16-1-6:2014-12(en-fr)

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PRICE CODE
CODE PRIX XH

ICS 33.100.10; 33.100.20

ISBN 978-2-8322-1931-7

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY MEASURING APPARATUS AND METHODS –

Part 1-6: Radio disturbance and immunity measuring apparatus – EMC antenna calibration

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It has the status of a basic EMC Standard in accordance with IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications.*

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

FDIS	Report on voting
CISPR/A/1087/FDIS	CISPR/A/1098/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.

A list of all parts of CISPR 16 series, under the general title *Specification for radio disturbance and immunity measuring apparatus and methods*, can be found on the IEC website.

The committee has 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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SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY MEASURING APPARATUS AND METHODS –

Part 1-6: Radio disturbance and immunity measuring apparatus – EMC antenna calibration

1 Scope

This part of CISPR 16 provides procedures and supporting information for the calibration of antennas for determining antenna factors (AF) that are applicable to antennas intended for use in radiated disturbance measurements.

It has the status of a basic EMC Standard in accordance with IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications.*

The AF of an antenna is influenced by nearby surroundings and by its position in space relative to the radiating source. This standard focuses on antenna calibrations that provide the AF in a free-space environment in the direction of the boresight of the antenna. The frequency range addressed is 9 kHz to 18 GHz. The relevant antenna types covered in this standard are monopole, loop, dipole, biconical, log-periodic dipole-array (LPDA), hybrid and horn antennas.

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Guidance is also provided on measurement uncertainties associated with each calibration method and configuration, and the test instrumentation used.

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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.

CISPR 16-1-4:2010, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements*
CISPR 16-1-4:2010/AMD 1:2012

CISPR 16-1-5:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration sites and reference test sites for 5 MHz to 18 GHz*

IEC 60050-161, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions, as well as those given in IEC 60050-161, apply.

NOTE Full terms for abbreviations not already given in 3.1 are listed in 3.2.

3.1.1 Antenna terms

3.1.1.1
antenna
transducer that converts the guided electromagnetic energy of the feed line into a radiated wave in space and vice versa

Note 1 to entry: In the context of this standard, for antennas for which a balun is intrinsic to the functioning of the antenna, the term “antenna” includes the balun.

3.1.1.2
biconical antenna
symmetric antenna formed by two conical radiating elements having a common axis, and adjacent vertices at which they are fed

Note 1 to entry: For use in the VHF band, biconical antennas are usually made of two conical-shaped wire cages. Often each cage has a cross-bar connecting the centre conductor and one of the peripheral wires to remove a narrowband resonance. Such shorting cross-bars can affect the characteristics of the antenna above 215 MHz. For more details, see also A.4.3.

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Note 2 to entry: For the purpose of this standard, a biconical antenna for which the tip-to-tip length is between 1,3 m and 1,4 m (based on the MIL-STD-461 design with tip-to-tip length of 1,37 m [45][1)]), is referred to as a classical biconical antenna, to distinguish from small biconicals whose upper frequency is above 300 MHz.

3.1.1.3
broadband antenna
antenna having acceptable characteristics over a wide range of radio frequencies

3.1.1.4
calculable antenna
dipole-like antenna of which the antenna factor of a single antenna, and the site insertion loss between a pair of antennas, may be calculated using either analytical or numerical (method of moments) techniques based on the dimensions, load impedance and geometrical parameters, and that can be verified by measurement

Note 1 to entry: The calculable dipole antenna is a special case of calculable antenna; the good agreement between the analytical and numerical formulations confirms the very low uncertainties achievable with the linear dipole. A calculable dipole antenna is described in CISPR 16-1-5.

3.1.1.5
horn antenna
antenna consisting of a waveguide section in which the cross-sectional area increases towards an open end, which is known as the aperture

Note 1 to entry: Rectangular-waveguide pyramidal horn antennas are popular in the microwave frequency range above about 1 GHz. Double-ridged-waveguide horn antennas (DRH; sometimes also referred to as DRG horn, for double-ridged-guide) cover a very wide frequency range. The mainlobe of some DRH antennas splits into several beams at higher frequencies; for other details see the NOTE in 9.5.1.3.

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1) Numbers in square brackets refer to the Bibliography.