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BASIC EMC PUBLICATION
PUBLICATION FONDAMENTALE EN CEM

**Specification for radio disturbance and immunity measuring apparatus and methods –
Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus**

**Spécification des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques –
Partie 1-1: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Appareils de mesure**



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Partie 1-1: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Appareils de mesure**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CISPR 16-1-1
Edition 4.0 2015-09

**SPECIFICATION FOR RADIO DISTURBANCE
AND IMMUNITY MEASURING APPARATUS AND METHODS –**

**Part 1-1: Radio disturbance and immunity measuring apparatus –
Measuring apparatus**

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by subcommittee CISPR A: Radio-interference measurements and statistical methods, of IEC technical committee CISPR: International special committee on radio interference.

The text of this interpretation sheet is based on the following documents:

FDIS	Report on voting
CIS/A/1244/FDIS	CIS/A/1255/RVD

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

INTRODUCTION:

CISPR/A/1118/FDIS was approved (see CISPR/A/1135/RVD) and consequently the corresponding international standard, CISPR 16-1-1:2015 (Edition 4.0) was published on 22 September 2015.

However, seven National Committees had submitted a negative vote. Most concerns were related to the measuring receiver specifics covered in K.4. That clause states:

“This standard specifies measuring receiver requirements using a “black box” approach. This means that the instrument shall show a specific response when a defined signal is applied to its input. Therefore, the demonstration of compliance of measuring receivers with specifications defined in this standard can be provided through the manufacturer’s calibration process or the procedures and measuring equipment defined in this standard.

In case compliance of a measuring receiver is determined with the specifications in this standard, the following minimum set of parameters shown in Table K.1 shall be included in the verification process.”

It was argued that the wording in these two cited paragraphs might be misinterpreted in such a way that the specifications in CISPR 16-1-1 are not met when using the manufacturer's calibration process. Furthermore, concerns were raised that the wording may have the effect that only manufacturers' calibration procedures can be used to show compliance with the specifications in CISPR 16-1-1.

Because of these concerns, K.4 could benefit from further clarification. An interpretation sheet would be helpful to users of the standard, with the intent that this clarification would be published in a future amendment to the standard.

This information does not change the standard; it serves only to clarify the points noted.

INTERPRETATION:

Demonstration of compliance with CISPR 16-1-1

For demonstrating compliance with CISPR 16-1-1 using the manufacturer's calibration process, the specifications in CISPR 16-1-1 shall be met, including verification of the minimum set of parameters listed in Table K.1.

It is permissible to use either the manufacturer's calibration process or a calibration laboratory's own process that is applying the procedures and measuring equipment defined in this standard. The user of CISPR 16-1-1 is responsible for deciding which of these two approaches to use, both which are considered equivalent.

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CISPR 16-1-1:2015

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16-1-1-2015

Withhold

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INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY
MEASURING APPARATUS AND METHODS –**

**Part 1-1: Radio disturbance and immunity measuring apparatus –
Measuring apparatus**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard CISPR 16-1-1 has been prepared by CISPR subcommittee A: Radio-interference measurements and statistical methods.

This fourth edition cancels and replaces the third edition published in 2010, Amendment 1:2010 and Amendment 2:2014. This edition constitutes a technical revision.

The main technical change with respect to the previous edition consists of the addition of a new normative annex on calibration requirements for measuring receivers.

It has the status of a basic EMC publication 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/1118/FDIS	CISPR/A/1135/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 the CISPR 16 series can be found, under the general title *Specification for radio disturbance and immunity measuring apparatus and methods*, 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 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
- amended.

The contents of the Interpretation sheet of April 2018 have been included in this copy.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The CISPR 16 series, published under the general title *Specification for radio disturbance and immunity measuring apparatus and methods*, is comprised of the following sets of standards and reports:

- CISPR 16-1 – six parts covering measurement instrumentation specifications;
- CISPR 16-2 – five parts covering methods of measurement;
- CISPR 16-3 – a single publication containing various technical reports (TRs) with further information and background on CISPR and radio disturbances in general;
- CISPR 16-4 – five parts covering uncertainties, statistics and limit modelling.

CISPR 16-1 consists of the following parts, under the general title *Specification for radio disturbance and immunity measuring apparatus and methods – Radio disturbance and immunity measuring apparatus*:

- Part 1-1: Measuring apparatus
- Part 1-2: Ancillary equipment – Conducted disturbances
- Part 1-3: Ancillary equipment – Disturbance power
- Part 1-4: Ancillary equipment – Radiated disturbances
- Part 1-5: Antenna calibration sites and reference test sites for 5 MHz to 18 GHz
- Part 1-6: EMC-antenna calibration

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning the measuring receiver with rms-average detector (patent no DE 10126830) given in Clause 7.

IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that he/she is willing to negotiate licences either free of charge or under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with IEC. Information may be obtained from:

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SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY MEASURING APPARATUS AND METHODS –

Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus

1 Scope

This part of CISPR 16 specifies the characteristics and performance of equipment for the measurement of radio disturbance in the frequency range 9 kHz to 18 GHz. In addition, requirements are provided for specialized equipment for discontinuous disturbance measurements.

NOTE In accordance with IEC Guide 107, CISPR 16-1-1 is a basic EMC standard for use by product committees of the IEC. As stated in Guide 107, product committees are responsible for determining the applicability of the EMC standard. CISPR and its sub-committees are prepared to co-operate with product committees in the evaluation of the value of particular EMC tests for specific products.

The specifications in this standard apply to EMI receivers and spectrum analyzers. The term “measuring receiver” used in this standard refers to both EMI receivers and spectrum analyzers. The calibration requirements for measuring receivers are detailed in Annex J.

Further guidance on the use of use of spectrum analyzers and scanning receivers can be found in Annex B of any one of the following standards: CISPR 16-2-1:2014, CISPR 16-2-2:2010 or CISPR 16-2-3:2010.

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 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

CISPR 14-1:2005, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 14-1:2005/AMD1:2008

CISPR 14-1:2005/AMD2:2011

CISPR 16-2-1:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*

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IEC 60050-161:1990/AMD1:1997
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IEC 60050-161:1990/AMD5:2015

3 Terms and definitions

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

3.1 bandwidth

B_n

width of the overall selectivity curve of the receiver between two points at a stated attenuation, below the midband response

Note 1 to entry: n is the stated attenuation in dB.

3.2 CISPR indication range

range specified by the manufacturer which gives the maximum and the minimum meter indications within which the measuring receiver meets the requirements of this part of CISPR 16

3.3 electrical charge time constant

T_C

time needed after the instantaneous application of a constant sine-wave voltage to the stage immediately preceding the input of the detector for the output voltage of the detector to reach 63 % of its final value

Note 1 to entry: This time constant is determined as follows: a sine-wave signal of constant amplitude and having a frequency equal to the mid-band frequency of the IF amplifier is applied to the input of the stage immediately preceding the detector. The indication, D , of an instrument having no inertia (e.g. an oscilloscope) connected to a terminal in the d.c. amplifier circuit so as not to affect the behaviour of the detector, is noted. The level of the signal is chosen such that the response of the stages concerned remains within the linear operating range. A sine-wave signal of this level, applied for a limited time only and having a wave train of rectangular envelope is gated such that the deflection registered is 0,63 D . The duration of this signal is equal to the charge time of the detector.

3.4 electrical discharge time constant

T_D

time needed after the instantaneous removal of a constant sine-wave voltage applied to the stage immediately preceding the input of the detector for the output of the detector to fall to 37 % of its initial value

Note 1 to entry: The method of measurement is analogous to that for the charge time constant, but instead of a signal being applied for a limited time, the signal is interrupted for a definite time. The time taken for the deflection to fall to 0,37 D is the discharge time constant of the detector.