
Specifikacija za merilne naprave in metode za merjenje radijskih motenj in odpornosti – 2-1. del: Metode za merjenje radijskih motenj in odpornosti – Merjenje motenj po vodnikih (CISPR 16-2-1:2003)

Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements (CISPR 16-2-1:2003)

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English version

**Specification for radio disturbance and immunity
measuring apparatus and methods
Part 2-1: Methods of measurement of disturbances and immunity -
Conducted disturbance measurements
(CISPR 16-2-1:2003)**

Spécifications des méthodes
et des appareils de mesure
des perturbations radioélectriques
et de l'immunité aux perturbations
radioélectriques

Partie 2-1: Méthodes de mesure
des perturbations et de l'immunité -
Mesures des perturbations (conduites)
(CISPR 16-2-1:2003)

Anforderungen an Geräte und
Einrichtungen sowie Festlegung der
Verfahren zur Messung der
hochfrequenten Störaussendung
(Funkstörungen) und Störfestigkeit
Teil 2-1: Verfahren zur Messung der
hochfrequenten Störaussendung
(Funkstörungen) und Störfestigkeit -
Messung der leitungsgeführten
Störaussendung

(CISPR 16-2-1:2003)

SIST EN 55016-2-1:2005

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard CISPR 16-2-1:2003, prepared by CISPR SC A, Radio-interference measurements and statistical methods, was submitted to the formal vote and was approved by CENELEC as EN 55016-2-1 on 2004-09-01 without any modification.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2005-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-09-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard CISPR 16-2-1:2003 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60083	1997	Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC	-	-
IEC 60364-4	Series	Electrical installations of buildings Part 4: Protection for safety	HD 384.4/ HD 60364-4	Series
CISPR 11	2003	Industrial scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement	-	-
CISPR 13 (mod)	2001	Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55013	2001
CISPR 14-1	2000	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus Part 1: Emission	EN 55014-1	2000
CISPR 16-1-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus	EN 55016-1-1	2004
CISPR 16-1-2	2003	Part 1-2: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Conducted disturbances	EN 55016-1-2	2004
CISPR 16-2-2	2003	Part 2-2: Methods of measurement of disturbances and immunity - Measurement of disturbance power	EN 55016-2-2	2004
CISPR 16-2-3	2003	Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements	EN 55016-2-3	2004

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 16-2-4	2003	Part 2-4: Methods of measurement of disturbances and immunity - Immunity measurements	EN 55016-2-4	2004
CISPR/TR 16-3	2003	Part 3: CISPR technical reports	-	-
CISPR/TR 16-4-1	2003	Part 4-1: Uncertainties, statistics and limit modeling - Uncertainties in standardized EMC tests	-	-
CISPR 16-4-2	2003	Part 4-2: Uncertainties, statistics and limit modelling - Uncertainty in EMC measurements	EN 55016-4-2	2004
CISPR/TR 16-4-3	2003	Part 4-3: Uncertainties, statistics and limit modelling - Statistical considerations in the determination of EMC compliance of mass-produced products	-	-
CISPR/TR 16-4-4	2003	Part 4-4: Uncertainties, statistics and limit modeling - Statistics of complaints and a model for the calculation of limits	-	-
ITU-R Recommendation BS.468-4	1994	Measurement of audio-frequency noise voltage level in sound broadcasting	-	-

[SIST EN 55016-2-1:2005](https://standards.iteh.ai/catalog/standards/sist/acbe536d-d084-40d1-ad91-324b29884ab8/sist-en-55016-2-1-2005)
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INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**Spécifications des méthodes et des appareils
de mesure des perturbations radioélectriques
et de l'immunité aux perturbations
radioélectriques –**

Partie 2-1:

**Méthodes de mesure des perturbations
et de l'immunité – Mesures des perturbations
conduites**

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**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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CONTENTS

FOREWORD.....	5
INTRODUCTION.....	9
TABLE RECAPITULATING CROSS-REFERENCES.....	11
1 Scope.....	13
2 Normative references.....	13
3 Definitions	15
4 Types of disturbance to be measured.....	23
5 Connection of measuring equipment	23
6 General measurement requirements and conditions	25
7 Measurement of disturbances conducted along leads, 9 kHz to 30 MHz.....	43
8 Automated measurement of emissions.....	95
Annex A (informative) Guidelines to connection of electrical equipment to the artificial mains network.....	103
Annex B (informative) Use of spectrum analyzers and scanning receivers.....	121
Annex C (informative) Decision tree for use of detectors for conducted measurements	127

[SIST EN 55016-2-1:2005](https://standards.iteh.ai/catalog/standards/sist/acbe536d-d084-40d1-ad91-324b29884ab8/sist-en-55016-2-1-2005)
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INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

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

**Part 2-1: Methods of measurement of disturbances and immunity –
Conducted disturbance measurements**

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 16-2-1 has been prepared by CISPR subcommittee A: Radio interference measurements and statistical methods.

This first edition of CISPR 16-2-1, together with CISPR 16-2-2, CISPR 16-2-3 and CISPR 16-2-4, cancels and replaces the second edition of CISPR 16-2, published in 2003. It contains the relevant clauses of CISPR 16-2 without technical changes.

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 2005. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

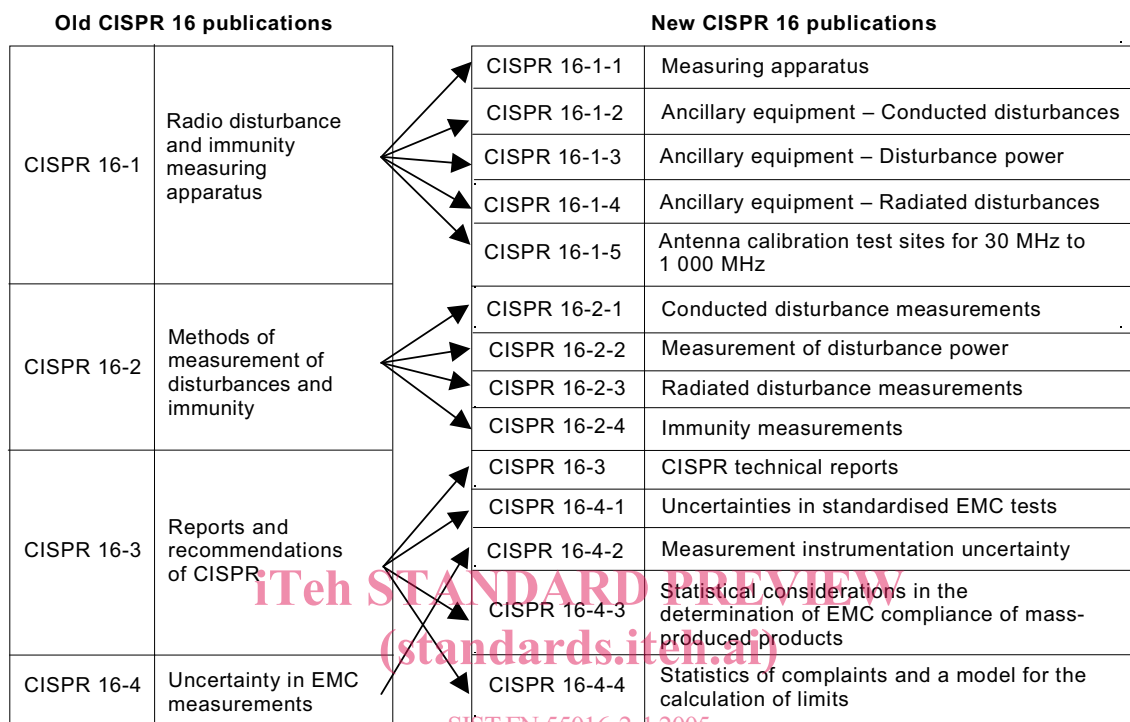
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INTRODUCTION

CISPR 16-1, CISPR 16-2, CISPR 16-3 and CISPR 16-4 have been reorganised into 14 parts, to accommodate growth and easier maintenance. The new parts have also been renumbered. See the list given below.



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More specific information on the relation between the ‘old’ CISPR 16-2 and the present ‘new’ CISPR 16-2-1 is given in the table after this introduction (TABLE RECAPITULATING CROSS REFERENCES).

Measurement instrumentation specifications are given in five new parts of CISPR 16-1, while the methods of measurement are covered now in four new parts of CISPR 16-2. Various reports with further information and background on CISPR and radio disturbances in general are given in CISPR 16-3. CISPR 16-4 contains information related to uncertainties, statistics and limit modelling.

CISPR 16-2 consists of the following parts, under the general title *Specification for radio disturbance and immunity measuring apparatus and methods – Methods of measurement of disturbances and immunity*:

- Part 2-1: Conducted disturbance measurements,
- Part 2-2: Measurement of disturbance power,
- Part 2-3: Radiated disturbance measurements,
- Part 2-4: Immunity measurements.

TABLE RECAPITULATING CROSS-REFERENCES

Second edition of CISPR 16-2 Clauses, subclauses	First edition of CISPR 16-2-1 Clauses, subclauses
1.1	1
1.2	2
1.3	3
2.1	4
2.2	5
2.3	6
2.4	7
4.1	8
Annexes	Annexes
A	A
B	B
D	C
Figures	Figures
1, ...,16	1, ..., 16

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SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY MEASURING APPARATUS AND METHODS –

Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements

1 Scope

This part of CISPR 16 is designated a basic standard, which specifies the methods of measurement of disturbance phenomena in general in the frequency range 9 kHz to 18 GHz and especially of conducted disturbance phenomena in the frequency range 9 kHz to 30 MHz.

2 Normative references

The following referenced documents are indispensable for the application 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 60083:1997, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 60364-4: *Electrical installations of buildings – Part 4: Protection for safety*

CISPR 11:2003, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*

CISPR 13:2001, *Sound and television broadcast receivers and associated equipment – Radio disturbance characteristics – Limits and methods of measurement*

CISPR 14-1:2000, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 16-1-1:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

CISPR 16-1-2:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Conducted disturbances*

CISPR 16-2-2:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-2: Methods of measurement of disturbances and immunity – Measurement of disturbance power*

CISPR 16-2-3:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements*

CISPR 16-2-4:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-4: Methods of measurement of disturbances and immunity – Immunity measurements*

CISPR 16-3: 2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 3: CISPR technical reports*

CISPR 16-4-1:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-1: Uncertainties, statistics and limit modelling – Uncertainties in standardized EMC tests*

CISPR 16-4-2:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Measurement instrumentation uncertainty*

CISPR 16-4-3:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-3: Uncertainties, statistics and limit modelling – Statistical considerations in the determination of EMC compliance of mass-produced products*

CISPR 16-4-4:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-4: Uncertainties, statistics and limit modelling – Statistics of complaints and a model for the calculation of limits*

ITU-R Recommendation BS.468-4: Measurement of audio-frequency noise voltage level in sound broadcasting

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3 Definitions

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For the purpose of this part of CISPR 16, the definitions of IEC 60050(161) apply, as well as the following:

3.1

associated equipment

- 1) Transducers (e.g. probes, networks and antennas) connected to a measuring receiver or test generator
- 2) Transducers (e.g. probes, networks, antennas) which are used in the signal or disturbance transfer between an EUT and measuring equipment or a (test-) signal generator

3.2

EUT

the equipment (devices, appliances and systems) subjected to EMC (emission) compliance tests

3.3

product publication

publication specifying EMC requirements for a product or product family, taking into account specific aspects of such a product or product family

3.4

emission limit (from a disturbing source)

the specified maximum emission level of a source of electromagnetic disturbance

[IEV 161-03-12]

3.5

ground reference

a connection that constitutes a defined parasitic capacitance to the surrounding of an EUT and serves as reference potential

NOTE See also IEC 161-04-36.

3.6

(electromagnetic) emission

the phenomenon by which electromagnetic energy emanates from a source

[IEV 161-01-08]

3.7

coaxial cable

a cable containing one or more coaxial lines, typically used for a matched connection of associated equipment to the measuring equipment or (test-)signal generator providing a specified characteristic impedance and a specified maximum allowable cable transfer impedance

3.8

common mode (asymmetrical disturbance voltage)

the RF voltage between the artificial midpoint of a two-conductor line and reference ground, or in case of a bundle of lines, the effective RF disturbance voltage of the whole bundle (vector sum of the unsymmetrical voltages) against the reference ground measured with a clamp (current transformer) at a defined terminating impedance

NOTE See also IEC 161-04-09.

3.9

common mode current

the vector sum of the currents flowing through two or more conductors at a specified cross-section of a "mathematical" plane intersected by these conductors

3.10

differential mode voltage; symmetrical voltage

the RF disturbance voltage between the wires of a two conductor line

[IEV 161-04-08, modified]

3.11

differential mode current

half the vector difference of the currents flowing in any two of a specified set of active conductors at a specified cross-section of a "mathematical" plane intersected by these conductors

3.12

unsymmetrical mode (V-terminal voltage)

the voltage between a conductor or terminal of a device, equipment or system and a specified ground reference. For the case of a two-port network, the two unsymmetrical voltages are given by:

- a) the vector sum of the asymmetrical voltage and half of the symmetrical voltage; and
- b) the vector difference between the asymmetrical voltage and half of the symmetrical voltage.

NOTE See also IEC 161-04-13.