
Industrial, scientific and medical (ISM) radio-frequency equipment - Radio disturbance characteristics - Limits and methods of measurement (CISPR 11:1997, modified)

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Descriptors: Electrical equipment, industrial equipment, medical equipment, radio disturbance, measurement, characteristic, limit

English version

**Industrial, scientific and medical (ISM) radio-frequency equipment
Radio disturbance characteristics - Limits and methods of measurement
(CISPR 11:1997, modified)**

Appareils industriels, scientifiques et
médicaux (ISM) à fréquence
radioélectrique
Caractéristiques de perturbations
radioélectriques
Limites et méthodes de mesure
(CISPR 11:1997, modifiée)

Industrielle, wissenschaftliche und
medizinische Hochfrequenzgeräten
(ISM-Geräten)
Funkstörungen
Grenzwerte und Meßverfahren
(CISPR 11:1997, modifiziert)

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This European Standard was approved by CENELEC on 1997-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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 document CISPR/B/189/FDIS, future edition 3 of CISPR 11, prepared by CISPR SC B, Interference relating to industrial, scientific and medical radio-frequency apparatus, was submitted to the IEC-CENELEC parallel vote.

The text of the draft together with common modifications prepared by the SC 210A, EMC Products, of the Technical Committee CENELEC TC 210, EMC, was approved by CENELEC as EN 55011 on 1997-10-01.

This European Standard replaces EN 55011:1991 and its amendments A1:1997 and A2:1996.

The following dates are applicable:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 1999-03-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2001-01-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes C and ZA are normative and annexes A, B, D, E and F are informative.

Annex ZA has been added by CENELEC.
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Endorsement notice

The text of the International Standard CISPR 11:1997 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

Title Replace "Electromagnetic" by "Radio".

2 Definitions

Add a new definition 2.5:

2.5

low voltage

A set of voltage levels used for the distribution of electricity and whose upper limit is 1000 V a.c. rms.

3 Frequencies designated for ISM use

Replace clause 3 by: standards.iteh.ai

3 National measures and frequencies designated for ISM use

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3.1 Certain frequencies are designated by the International Telecommunication Union (ITU) for use as fundamental frequencies for ISM equipment.

The limits have been determined on a probabilistic basis taking into account the likelihood of interference. In cases of interference additional provisions may be required.

3.2 National Authorities may allow the installation and use of Class A apparatus in a domestic establishment or in an establishment connected directly to domestic electricity power supplies, with whatever national measures they consider necessary.

3.3 The frequencies designated for ISM use are listed in table 1a.

In some CENELEC countries different or additional frequencies may be designated for ISM equipment. These frequencies are listed in table 1b.

The limits for terminal voltages and radiation do not apply to these ISM frequencies. If ISM equipment uses fundamental frequencies other than the ITU or nationally designated frequencies the limits for terminal voltage and radiation in this standard apply also to the fundamental frequencies.

3.4 When ISM equipment cannot be brought in conformity with the limits of table 5, the National Authorities shall be notified by the manufacturer or importer before the equipment is being placed on the market.

For equipment measured on a test site the notification shall be accompanied by the results of the measurements. For equipment measured in situ the user shall inform the National Authorities of the installation of the equipment before it is set into operation.

National Authorities may apply whatever national measures they consider necessary to protect radio communications.

Table 1a: Frequencies designated by ITU for use as fundamental ISM frequencies¹⁾

Centre frequency MHz	Frequency range MHz	Maximum radiation limit ³⁾	Number of appropriate footnote to the table of frequency allocation to the ITU Radio Regulations
6,780	6,765 - 6,795	Under consideration	524 ²⁾
13,560	13,553 - 12,567	Unrestricted	534
27,120	26,957 - 27,283	Unrestricted	546
40,680	40,66 - 40,70	Unrestricted	548
433,920	433,05 - 434,79	Under consideration	661 ²⁾ , 662
2 450	2 400 - 2 500	Unrestricted	752
5 800	5 725 - 5 875	Unrestricted	806
24 125	24 000 - 25 250	Unrestricted	881
61 250	61 000 - 61 500	Under consideration	911 ²⁾
122 500	122 000 - 123 000	Under consideration	916 ²⁾
245 000	244 000 - 246 000	Under consideration	922 ²⁾

1) Resolution No. 63 of the ITU Radio Regulations applies.
 2) Use of these frequency bands is subject to special authorization by administrations concerned in agreement with other administrations whose radio communication services might be affected.
 3) The term "Unrestricted" applies to the fundamental and all other frequency components falling within the designated band. Special measures to achieve compatibility may be necessary where other equipment satisfying immunity requirements (e.g. EN 55020), is placed close to ISM equipment.

Table 1b: Frequencies designated on a national basis in CENELEC countries for use as fundamental ISM frequencies

Frequency MHz	Maximum radiation limit ¹⁾	Notes
0,009 - 0,010	Unlimited	Germany only
3,370 - 3,410	Unlimited	Netherlands only
13,533 - 13,553	110 dB(µV/m) at 100 m	United Kingdom only
13,567 - 13,587	110 dB(µV/m) at 100 m	United Kingdom only
83,996 - 84,004	130 dB(µV/m) at 30 m	United Kingdom only
167,992 - 168,008	130 dB(µV/m) at 30 m	United Kingdom only
886,000 - 906,000	120 dB(µV/m) at 30 m	United Kingdom only

1) Distance measured from the exterior wall outside the building in which the equipment is situated.

5 Limits of electromagnetic disturbances

Table 5 **Delete** "(40)¹⁾" and "(50)¹⁾" and the corresponding note 1).

Annex ZA (normative)

**Normative references to international publications
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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>
CISPR 15	1996	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment	EN 55015	1996
CISPR 16-1	1993	Specification for radio disturbance and immunity measuring apparatus and methods Part 1: Radio disturbance and immunity measuring apparatus	-	-
CISPR 16-2	1996	Part 2: Methods of measurement of disturbances and immunity	-	-
CISPR 19	1983	Guidance on the use of the substitution method for measurements of radiation from microwave ovens for frequencies above 1 GHz	-	-
CISPR 20	1996 ¹⁾	Limits and methods of measurement of immunity characteristics of sound and television broadcast receivers and associated equipment	-	-
IEC 60050(161)	1990	International Electrotechnical Vocabulary (IEV) - Chapter 161: Electromagnetic compatibility	-	-
IEC 60083	1975	Plugs and socket-outlets for domestic and similar general use - Standards	-	-
IEC 61689	1996	Ultrasonics - Physiotherapy systems - Performance requirements and methods of measurement in the frequency range 0,5 MHz to 5 MHz	EN 61689	1996

1) Instead of CISPR 20:1996, EN 55020:1994 + corr. December 1997 + A11:1996, *Electromagnetic immunity of broadcast receivers and associated equipment*, applies.

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

**Appareils industriels, scientifiques et médicaux (ISM)
à fréquence radioélectrique –
Caractéristiques de perturbations
électromagnétiques –
Limites et méthodes de mesure**

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

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**INDUSTRIAL, SCIENTIFIC AND MEDICAL (ISM)
RADIO-FREQUENCY EQUIPMENT –
ELECTROMAGNETIC DISTURBANCE CHARACTERISTICS –
LIMITS AND METHODS OF MEASUREMENT**

FOREWORD

- 1) The formal decisions of agreements of the CISPR on technical matters, prepared by Sub-Committees on which all the National Committees and other Member Organizations of the CISPR having a special interest therein are represented, express, as nearly as possible, an international consensus on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees and other Member Organizations of the CISPR in that sense.
- 3) In order to promote international unification, the CISPR expresses the wish that all National Committees should adopt the text of the CISPR recommendation for their national rules in so far as national conditions will permit. Any divergence between the CISPR recommendations and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

This publication was prepared by CISPR Subcommittee B: Interference relating to industrial, scientific and medical radio-frequency apparatus.

This third edition replaces the second edition published in 1990, its amendment 1 (1996) and its amendment 2 (1996). It has the status of a Product Family EMC standard in accordance with IEC Guide 107.

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

FDIS	Reports on voting
CISPR/B(CO)23	CISPR/B(CO)25 CISPR/B(CO)25A
CISPR/B(CO)28 CISPR/B(CO)31 CISPR/B(CO)35	CISPR/B(CO)30 CISPR/B(CO)32A CISPR/B/132/RVD
CISPR/B/147/FDIS CISPR/B/148/FDIS	CISPR/B/158/RVD CISPR/B/159/RVD
CISPR/B/189/FDIS	CISPR/B/200/RVD

Full information on the voting for the approval of this standard can be found in the reports on voting indicated in the above table.

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Annex C forms an integral part of this standard.

Annexes A, B, D, E and F are for information only.

The main content of this standard is based on CISPR Recommendation No. 39/2 given below:

CISPR RECOMMENDATION No. 39/2

Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment

The CISPR

CONSIDERING

- a) that ISM r.f. equipment is an important source of disturbance;
- b) that methods of measuring such disturbances have been prescribed by the CISPR;
- c) that certain frequencies are designated by the International Telecommunication Union (ITU) for unrestricted radiation from ISM equipment,

RECOMMENDS

that the latest edition of CISPR 11 be used for the application of limits and methods of measurement of ISM equipment.

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INDUSTRIAL, SCIENTIFIC AND MEDICAL (ISM) RADIO-FREQUENCY EQUIPMENT – ELECTROMAGNETIC DISTURBANCE CHARACTERISTICS – LIMITS AND METHODS OF MEASUREMENT

1 General

1.1 Scope and object

The limits and methods of measurement laid down in this International Standard apply to industrial, scientific and medical (ISM) equipment as defined in clause 2, and to spark erosion equipment.

NOTE – The limits have been determined on a probabilistic basis taking into account the likelihood of interference. In cases of interference, additional provisions may be required.

Procedures are given for the measurement of radio-frequency disturbances and limits are laid down within the frequency range 9 kHz to 400 GHz.

Requirements for lighting apparatus are contained in CISPR 15.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

CISPR 15:1996, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*

CISPR 16-1:1993, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1: Radio disturbance and immunity measuring apparatus*

CISPR 16-2:1996, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2: Methods of measurement of disturbances and immunity*

CISPR 19:1983, *Guidance on the use of the substitution method for measurements of radiation from microwave ovens for frequencies above 1 GHz*

CISPR 20:1996, *Limits and methods of measurement of immunity characteristics of sound and television broadcast receivers and associated equipment*

IEC 60050(161):1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

IEC 60083:1975, *Plugs and socket-outlets for domestic and similar general use – Standards*

IEC 61689:1996, *Ultrasonics – Physiotherapy systems – Performance requirements and methods of measurement in the frequency range 0,5 MHz to 5 MHz*