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Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement (CISPR 22:1997, modified)

Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement

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Einrichtungen der Informationstechnik - Funkstöreigenschaften - Grenzwerte und Meßverfahren

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Appareils de traitement de l'information - Caractéristiques des perturbations radioélectriques - Limites et méthodes de mesure

Ta slovenski standard je istoveten z: EN 55022:1998

ICS:

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EUROPEAN STANDARD
NORME EUROPÉENNE
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EN 55022

September 1998

ICS 33.100

Supersedes EN 55022:1994 + A1:1995 + A2:1997

Descriptors: Radio interference, information technology equipment, methods of measurement, characteristic

English version

**Information technology equipment - Radio disturbance characteristics
Limits and methods of measurement
(CISPR 22:1997, modified)**

Appareils de traitement de l'information
Caractéristiques des perturbations
radioélectriques
Limites et méthodes de mesure
(CISPR 22:1997, modifiée)

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Funkstörungen
Grenzwerte und Meßverfahren
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This European Standard was approved by CENELEC on 1998-08-01. 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/G/112/FDIS, future edition 3 of CISPR 22, prepared by CISPR SC G, Interference relating to information technology equipment, was submitted to the IEC-CENELEC parallel vote.

The text of document CISPR/G/121/FDIS, a further part of CISPR 22, which failed to pass the IEC-CENELEC parallel vote within CENELEC, together with the common modifications prepared by SC 210A, EMC Products, of Technical Committee CENELEC TC 210, EMC, was submitted to the Unique Acceptance Procedure.

The combined text of edition 3 of CISPR 22, the common modifications in amendment A2:1997 to EN 55022:1994 and those for CISPR/G/121/FDIS were approved by CENELEC as EN 55022 on 1998-08-01.

This European Standard supersedes EN 55022:1994 + corrigendum August 1997 + A1:1995 + corrigendum August 1997 + A2:1997.

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) 1999-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2001-08-01

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

Annexes designated "informative" are given for information only.

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

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard CISPR 22:1997 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

5 Limits for conducted disturbance at mains terminals and telecommunication ports

Table 4 *Add to note 3:*

The provisional relaxation of 10 dB will be reviewed no later than three years after the date of withdrawal based on the results and interference cases seen in this period. Wherever possible it is recommended to comply with the limits without the provisional relaxation.

8 General measurement conditions

8.1 In the second paragraph, *delete* the second sentence "The number of additional ... with respect to the limit".

In the eighth paragraph, *delete* the second sentence "The number of additional ... with respect to the limit".

8.2 *Add before the first paragraph:*

The operational conditions of the EUT shall be determined by the manufacturer according to the typical use of the EUT with respect to the expected highest level of emission. The determined operational mode and the rationale for the conditions shall be stated in the test report. <https://standards.iteh.ai/catalog/standards/sist/bdb23593-626d-462e-8ebb-565c3ca018e5/sist-en-55022-2000>

Delete subclauses 8.2.1, 8.2.2 and 8.2.3.

9 Method of measurement of conducted disturbance at mains terminals and telecommunication ports

9.4 *Add after the second paragraph:*

In case of dispute tests shall be carried out as originally performed.

9.5.3.1 *Add:*

Where normal functioning cannot be achieved because of the impact of the ISN on the EUT, the measurement shall be carried out using the method given in 9.5.3.5.

10 Method of measurement of radiated disturbance

10.4 In the second paragraph, *replace* "12 mm" by "15 cm".

Figure 8 In note 4) *replace* "12 mm" by "15 cm".

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>
IEC 60083	1997	Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC	-	-
IEC 61000-4-6	1996	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques -- Section 6: Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	1996
CISPR 11 (mod)	1990	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment	EN 55011 ¹⁾	1991
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	-	-
ISO/IEC 11801	1995	Information technology - Generic cabling for customer premises	-	-

1) EN 55011 is superseded by EN 55011:1998, which is based on CISPR 11:1997 (mod).

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

**Appareils de traitement de l'information –
Caractéristiques des perturbations
radioélectriques –
Limites et méthodes de mesure**

**Information technology equipment –
Radio disturbance characteristics –
Limits and methods of measurement**

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For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**INFORMATION TECHNOLOGY EQUIPMENT –
RADIO DISTURBANCE CHARACTERISTICS –
LIMITS AND METHODS OF MEASUREMENT**

FOREWORD

- 1) The formal decisions of the CISPR on technical matters, prepared by subcommittees 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 recommendations 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 has been prepared by CISPR, subcommittee G: Interference relating to information technology equipment.

This third edition cancels and replaces the second edition published in 1993, amendment 1 (1995) and amendment 2 (1996) and constitutes a technical revision.

The text of this publication is based on the second edition, the corrigendum, the amendments 1 and 2, and the following documents:

FDIS	Report on voting
CISPR/G/112/FDIS	CISPR/G/123/RVD
CISPR/G/121/FDIS	CISPR/G/124/RVD

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

Annexes A, B and C form an integral part of this publication.

Annexes D and E are for information only.

INTRODUCTION

The scope is extended to the whole radio-frequency range from 9 kHz to 400 GHz, but limits are formulated only in restricted frequency bands, which is considered sufficient to reach adequate emission levels to protect radio broadcast and telecommunication services, and to allow other apparatus to operate as intended at reasonable distance.

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INFORMATION TECHNOLOGY EQUIPMENT – RADIO DISTURBANCE CHARACTERISTICS – LIMITS AND METHODS OF MEASUREMENT

1 Scope and object

This publication applies to ITE as defined in 3.1.

Procedures are given for the measurement of the levels of spurious signals generated by the ITE and limits are specified for the frequency range 9 kHz to 400 GHz for both class A and class B equipment. No measurements need be performed at frequencies where no limits are specified.

The intention of this publication is to establish uniform requirements for the radio disturbance level of the equipment contained in the scope, to fix limits of disturbance, to describe methods of measurement and to standardize operating conditions and interpretation of results.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this publication. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this publication 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.

IEC 60083:1997, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 61000-4-6:1996, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields*

CISPR 11:1990, *Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific, and medical (ISM) radio-frequency 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*

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ISO/IEC 11801:1995, *Information technology – Generic cabling for customer premises*

3 Definitions

For the purpose of this publication the following definitions apply:

3.1

information technology equipment (ITE)

Any equipment:

- a) which has a primary function of either (or a combination of) entry, storage, display, retrieval, transmission, processing, switching, or control, of data and of telecommunication messages and which may be equipped with one or more terminal ports typically operated for information transfer;
- b) with a rated supply voltage not exceeding 600 V.

It includes, for example, data processing equipment, office machines, electronic business equipment and telecommunication equipment.

Any equipment (or part of the ITE equipment) which has a primary function of radio transmission and/or reception according to the ITU Radio Regulations are excluded from the scope of this publication.

NOTE – Any equipment which has a function of radio transmission and/or reception according to the definitions of the ITU Radio Regulations should fulfil the national radio regulations, whether or not this publication is also valid.

Equipment, for which all disturbance requirements in the frequency range are explicitly formulated in other IEC or CISPR publications, are excluded from the scope of this publication.

3.2

equipment under test (EUT)

A representative ITE or functionally interactive group of ITE (system) which includes one or more host unit(s) and is used for evaluation purposes.

3.3

host unit

Part of an ITE system or unit that provides the mechanical housing for modules, which may contain radio-frequency sources, and may provide power distribution to other ITE. Power distribution may be a.c., d.c., or both between the host unit(s) and modules or other ITE.

3.4

module

Part of an ITE which provides a function and may contain radio-frequency sources.

3.5

identical modules and ITE

Modules and ITE produced in quantity and within normal manufacturing tolerances to a given manufacturing specification.

3.6

telecommunication ports

Ports which are intended to be connected to telecommunication networks (e.g. public switched telecommunication networks, integrated services digital networks), local area networks (e.g. Ethernet, Token Ring) and similar networks.

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4 Classification of ITE

ITE is subdivided into two categories denoted class A ITE and class B ITE.

4.1 Class B ITE

Class B ITE is a category of apparatus which satisfies the class B ITE disturbance limits.

Class B ITE is intended primarily for use in the domestic environment and may include:

- equipment with no fixed place of use; for example, portable equipment powered by built-in batteries;
- telecommunication terminal equipment powered by a telecommunication network;
- personal computers and auxiliary connected equipment.

NOTE – The domestic environment is an environment where the use of broadcast radio and television receivers may be expected within a distance of 10 m of the apparatus concerned.

4.2 Class A ITE

Class A ITE is a category of all other ITE which satisfies the class A ITE limits but not the class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use:

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

5 Limits for conducted disturbance at mains terminals and telecommunication ports

The equipment under test (EUT) shall meet the limits in tables 1 and 3 or 2 and 4, as applicable, including the average limit and the quasi-peak limit when using, respectively, an average detector receiver and quasi-peak detector receiver and measured in accordance with the methods described in clause 9. Either the voltage limits or the current limits in table 3 or 4, as applicable, shall be met except for the measurement method of C.1.3 where both limits shall be met. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

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If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

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5.1 Limits of mains terminal disturbance voltage

Table 1 – Limits for conducted disturbance at the mains ports of class A ITE

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60

NOTE – The lower limit shall apply at the transition frequency.

Table 2 – Limits for conducted disturbance at the mains ports of class B ITE

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE 1 – The lower limit shall apply at the transition frequencies.
NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

5.2 Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports 1)

Table 3 – Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0,15 MHz to 30 MHz for class A equipment

Frequency range MHz	Voltage limits dB (μV)		Current limits dB (μA)	
	Quasi-peak	Average	Quasi-peak	Average
0,15 to 0,5	97 to 87	84 to 74	53 to 43	40 to 30
0,5 to 30	87	74	43	30

NOTE 1 – The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz.
NOTE 2 – The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150 / 1 = 44$ dB).

1) See 3.6.

Table 4 – Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0,15 MHz to 30 MHz for class B equipment

Frequency range MHz	Voltage limits dB (µV)		Current limits dB (µA)	
	Quasi-peak	Average	Quasi-peak	Average
0,15 to 0,5	84 to 74	74 to 64	40 to 30	30 to 20
0,5 to 30	74	64	30	20

NOTE 1 – The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz.

NOTE 2 – The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150 / I = 44$ dB).

NOTE 3 – Provisionally, a relaxation of 10 dB over the frequency range of 6 MHz to 30 MHz is allowed for high-speed services having significant spectral density in this band. However, this relaxation is restricted to the common mode disturbance converted by the cable from the wanted signal.

6 Limits for radiated disturbance

The EUT shall meet the limits of tables 5 or 6 when measured at the measuring distance R in accordance with the methods described in clause 10. If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the highest reading shall be recorded, with the exception of any brief isolated high reading, which shall be ignored.

Table 5 – Limits for radiated disturbance of class A ITE at a measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(µV/m)
30 to 230	40
230 to 1 000	47

NOTE 1 – The lower limit shall apply at the transition frequency.

NOTE 2 – Additional provisions may be required for cases where interference occurs.

Table 6 – Limits for radiated disturbance of class B ITE at a measuring distance of 10 m

Frequency range MHz	Quasi-peak limits dB(µV/m)
30 to 230	30
230 to 1 000	37

NOTE 1 – The lower limit shall apply at the transition frequency.

NOTE 2 – Additional provisions may be required for cases where interference occurs.