
Sound and television broadcast receivers and associated equipment - Immunity characteristics - Limits and methods of measurement (CISPR 20:2002)

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EUROPEAN STANDARD

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NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2002

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Supersedes EN 55020:1994 + A11:1996 + A12:1999 + A13:1999 + A14:1999

English version

**Sound and television broadcast receivers and associated equipment -
Immunity characteristics -
Limits and methods of measurement
(CISPR 20:2002)**

Récepteurs de radiodiffusion et
de télévision et équipements associés -
Caractéristiques d'immunité -
Limites et méthodes de mesure
(CISPR 20:2002)

Ton- und Fernseh-Rundfunkempfänger
und verwandte Geräte
der Unterhaltungselektronik -
Störfestigkeitseigenschaften -
Grenzwerte und Prüfverfahren
(CISPR 20:2002)

This European Standard was approved by CENELEC on 2002-04-01. 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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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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/15/FDIS, future edition 5 of CISPR 20, prepared CISPR SC I, Electromagnetic compatibility of information technology equipment, multimedia equipment and receivers, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 55020 on 2002-04-01.

This European Standard supersedes EN 55020:1994 (+ corrigendum December 1997) + A11:1996 + A12:1999 (+ corrigendum January 2001) + A13:1999 + A14:1999.

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) 2003-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-04-01

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, D, E, F, G and ZA are normative and annex H is informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard CISPR 20:2002 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

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 16-1	- ¹⁾	Specification for radio disturbance and immunity measuring apparatus and methods Part 1: Radio disturbance and immunity measuring apparatus	-	-
CISPR 16-3	- ¹⁾	Part 3: Reports and recommendations of CISPR	-	-
CISPR 22 (mod)	- ¹⁾	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022 + corr. July	1998 ²⁾ 2001
CISPR 24 (mod)	- ¹⁾	Information technology equipment - Immunity characteristics - Limits and methods of measurement	EN 55024	1998 ²⁾
IEC 60050-161	- ¹⁾	International Electrotechnical Vocabulary (IEV) - Chapter 161: Electromagnetic compatibility	-	-
IEC 60268-1	- ¹⁾	Sound system equipment Part 1: General	HD 483.1 S2	1989 ²⁾
IEC 60651	- ¹⁾	Sound level meters	EN 60651	1994 ²⁾
IEC 60728-2	- ³⁾	Cabled distribution systems for television and sound signals Part 2: Electromagnetic compatibility of equipment	-	-

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

³⁾ To be published.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-2	- ¹⁾	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	1995 ²⁾
IEC 61000-4-3	- ¹⁾	Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2002 ²⁾
IEC 61000-4-4	- ¹⁾	Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	1995 ²⁾
ETS 300 158	1992	Satellite Earth Stations and Systems (SES) - Television Receive Only (TVRO-FSS) Satellite Earth Stations operating in the 11/12 GHz FSS bands	-	-
ETS 300 249	1993	Satellite Earth Stations and Systems (SES) - Television Receive-Only (TVRO) equipment used in the Broadcasting Satellite Service (BSS)	-	-
ITU-R Recommendation BS.468-4	- ¹⁾	Measurement of audio-frequency noise voltage level in sound broadcasting	-	-
ITU-R Recommendation BT.471-1	1986	Nomenclature and description of colour bar signals	-	-
ITU-R Recommendation BT.500-10	- ¹⁾	Methodology for the subjective assessment of the quality of television pictures	-	-
ITU-T Recommendation J.61	- ¹⁾	Transmission performance of television circuits designed for use in international connections	-	-

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INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**Récepteurs de radiodiffusion et de télévision
et équipements associés –
Caractéristiques d'immunité –
Limites et méthodes de mesure**

**Sound and television broadcast receivers
and associated equipment –
Immunity characteristics –
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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**SOUND AND TELEVISION BROADCAST RECEIVERS
AND ASSOCIATED EQUIPMENT –
IMMUNITY CHARACTERISTICS –
LIMITS AND METHODS OF MEASUREMENT**

FOREWORD

- 1) The formal decisions or 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 subject 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 International Standard CISPR 20 has been prepared by CISPR, subcommittee 1: Electromagnetic compatibility of information technology equipment, multimedia equipment and receivers.

This fifth edition of CISPR 20 cancels and replaces the fourth edition published in 1998. This fifth edition constitutes a technical revision.

The text of this CISPR publication is based on the fourth edition and the following documents:

FDIS	Report on voting
CISPR/1/15/FDIS	CISPR/1/27/RVD

Full information on the voting for the approval of this publication 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.

Annexes A, B, C, D, E, F and G form an integral part of this standard.

Annex H is for information only.

The committee has decided that the contents of this publication will remain unchanged until 2002-12. At this date, the publication will be

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

SOUND AND TELEVISION BROADCAST RECEIVERS AND ASSOCIATED EQUIPMENT – IMMUNITY CHARACTERISTICS – LIMITS AND METHODS OF MEASUREMENT

1 Scope and object

This standard for immunity requirements applies to television broadcast receivers, sound broadcast receivers and associated equipment intended for use in the residential, commercial and light industrial environment.

This standard describes the methods of measurement and specified limits applicable to sound and television receivers and to associated equipment with regard to their immunity characteristics to disturbing signals.

This standard is also applicable to the immunity of outdoor units of direct to home (DTH) satellite receiving systems for individual reception.

NOTE Receiving systems for collective reception, in particular cable distribution head ends (Community Antenna Television, CATV) and community reception systems (Master Antenna Television, MATV) are covered by IEC 60728-2.

Immunity requirements are given in the frequency range 0 Hz to 400 GHz. Radio-frequency tests outside the specified frequency bands or concerning other phenomena than given in this standard are not required.

The objective of this standard is to define the immunity test requirements for equipment defined in the scope in relation to continuous and transient, conducted and radiated disturbances including electrostatic discharges.

These test requirements represent essential electromagnetic immunity requirements.

Test requirements are specified for each port (enclosure or connector) considered.

NOTE 1 This standard does not specify electrical safety requirements for equipment such as protection against electric shocks, unsafe operation, insulation co-ordination and related dielectric tests.

NOTE 2 In special cases, situations will arise where the level of disturbances may exceed the levels specified in this standard e.g. where a hand-held transmitter is used in proximity to an equipment. In these instances special mitigation measures may have to be employed.

The environments encompassed by this standard are residential, commercial and light-industrial locations, both indoor and outdoor. The following list, although not comprehensive, gives an indication of locations which are included:

- residential properties, e.g. houses, apartments, etc.;
- retail outlets, e.g. shops, supermarkets, etc.;
- business premises, e.g. offices, banks, etc.;
- areas of public entertainment, e.g. cinemas, public bars, dance halls, etc.;
- outdoor locations, e.g. petrol stations, car parks, amusement and sports centres, etc.;

- light-industrial locations e.g. workshops, laboratories, service centres, etc.;
- car and boat.

Locations which are characterized by their mains power being supplied directly at low voltage from the public mains are considered to be residential, commercial or light industrial.

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.

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

CISPR 16-3, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 3: Reports and recommendations of CISPR*

CISPR 22, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

CISPR 24, *Information technology equipment – Immunity characteristics – Limits and methods of measurements*

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

IEC 60268-1, *Sound system equipment – Part 1: General*

IEC 60651, *Sound level meters*

IEC 60728-2: —, *Cabled distribution systems for television, sound and interactive multimedia signals – Part 2: Electromagnetic compatibility of equipment*¹

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test*. Basic EMC Publication

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test*. Basic EMC Publication

ETS 300 158:1992, *Satellite Earth Stations and Systems (SES) – Television Receive Only (TVRO-FSS) Satellite Earth Stations operating in the 11/12 GHz FSS bands*

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ETS 300 249:1993, *Satellite Earth Stations and Systems (SES) – Television Receive-Only (TVRO) equipment used in the Broadcasting Satellite Service (BSS)*

¹ To be published.

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

ITU-R BT.471-1:1986, *Nomenclature and description of colour bar signals*

ITU-R BT.500-10, *Methodology for the subjective assessment of the quality of television pictures*

ITU-T J.61, *Transmission performance of television circuits designed for use in international connections*

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this standard, the definitions contained in IEC 60050(161) as well as the following apply.

A non-exhaustive overview of equipment to which the standard is applicable is given in table 1. The terminology and abbreviations of table 1 are also used in other tables.

Table 1 – Survey (non exhaustive) of receiver and associated equipment types, including the appropriate parts of multifunction equipment

Equipment		Intended for mains powering and portable with external power connection facility		Battery powered portable, without external power connection facility (portable)	Car radio
		With a connection facility for an external antenna	Without a connection facility for an external antenna		
Sound broadcast receivers (radio) (including satellite receivers)	FM	FM radio ant. PC FM tuner card	FM radio	Portable radio	Car radio FM
	LW, MW, SW (AM)	AM radio ant. PC AM tuner card	AM radio		Car radio AM
Television broadcast receivers (TV) (including satellite receivers)		TV antenna PC TV tuner card	TV	Portable TV	Car TV
Associated equipment (ass.)	Video tape/disc equipment (recording and/or play-back)	With tuner	Ass. video tuner antenna	Portable ass. video	
		Without tuner	Ass. video		
	Audio tape/disc equipment	Ass. audio	Portable ass. audio		
	Other, e.g. audio amplifiers, decoders, electronic organs	Ass. other	Portable ass. other, e.g. infrared devices		

3.1.1

sound receivers

appliances intended for the reception of sound broadcast and similar services for terrestrial, cable and satellite transmissions; these sound receivers can be digital receivers with digital incoming signals or receivers with digital processing of digital or analogue incoming signals

3.1.2

television receivers

appliances intended for the reception of television broadcast and similar services for terrestrial, cable and satellite transmissions; these TV receivers can be digital receivers with digital incoming signals or receivers with digital processing of digital or analogue incoming signals

NOTE 1 Modular units which are part of sound or television receiving systems, like tuners, frequency converters, modulators, etc. are considered to be sound or television receivers respectively.

NOTE 2 Tuners may be provided with a broadcast-satellite-receiving stage and with demodulators, decoders, demultiplexers, D/A converters, encoders (e.g. NTSC, PAL or SECAM encoders) etc.

NOTE 3 Frequency converters may be provided with a broadcast-satellite-receiving stage and with devices which convert the signals to other frequency bands.

NOTE 4 Receivers, tuners, or frequency converters may be tuneable or may only be able to receive a fixed frequency.

3.1.3

associated equipment

appliance either intended to be connected directly to sound or television receivers, or to generate or to reproduce audio or visual information; excluded are information technology equipment even if they are intended to be connected to a television broadcast receiver

NOTE Information technology equipment is defined in CISPR 22.

3.1.4

multifunction equipment

appliances in which two or more functions are provided in the same unit, for instance television reception, radio reception, digital clock, tape-recorder or disc player etc.

3.1.5

disturbance signal

an unwanted signal which may degrade radio reception or cause malfunction in equipment; specific unwanted signals are simulating disturbance signals, generated under laboratory conditions

3.1.6

immunity

ability to maintain a specified performance when the equipment is subjected to disturbance (unwanted) signals of specified levels

NOTE In this standard the specified performance is [IST EN 55020:2003](https://standards.iteh.ai/catalog/standards/sist/7d9cbe8c-ebc4-4bc5-98a7-674a86767ead/sist-en-55020-2003)

- a specified sound signal-to-interference ratio and/or
- no greater than just perceptible degradation of the picture when a wanted signal and an unwanted signal occur simultaneously.

3.1.7

input immunity

immunity from unwanted signal voltages present at the antenna input terminal

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3.1.8 immunity from conducted voltages

immunity from unwanted signal voltages present at the equipment terminals for audio and mains input and audio output

3.1.9 immunity from conducted currents

immunity from unwanted signal (common mode) currents present in cables connected to the equipment

3.1.10 immunity from radiated fields

immunity from unwanted electromagnetic fields present at the equipment

3.1.11 screening effectiveness

characteristic of a coaxial connector terminal to attenuate the transfer of external currents into internal voltages

3.1.12 port

particular interface of the specified apparatus with the external electromagnetic environment (see figure 1)

3.1.13 enclosure port

physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

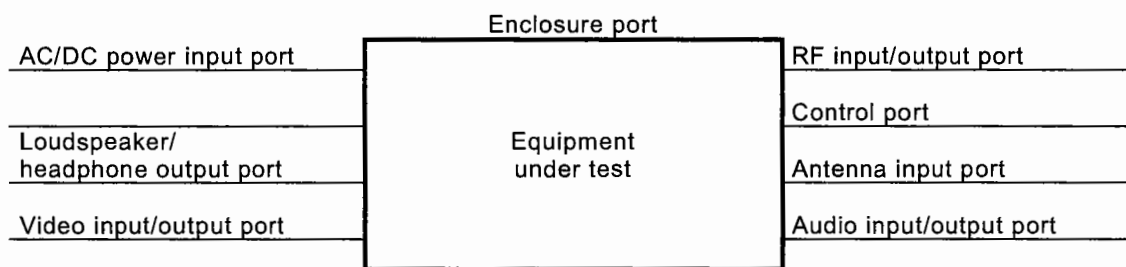


Figure 1 – Examples of ports

IEC 446/02

3.2 Abbreviations

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AC/DC	Alternate Current/Direct Current
AFC	Automatic Frequency Control
AM	Amplitude Modulation
BSS	Broadcast Satellite System
CATV	Community Antenna Television
CD	Compact Disc
DTH	Direct To Home (satellite receiving systems)
e.m.	Electromagnetic (field)
e.m.f.	Electro-motive-force
ESD	Electrostatic Discharge
EUT	Equipment Under Test
FM	Frequency Modulation
FSS	Fixed Satellite System
GSM	Global System for Mobile Communications
ITU-R	International Telecommunication Union - Radiocommunications

LW, MW and SW	Long Wave, Medium Wave and Short Wave
MATV	Master Antenna Television
PC	Personal Computer
RF	Radio Frequency
r.m.s.	Root-mean-square
TEM	Transverse Electromagnetic (cell)

4 Immunity requirements

4.1 Performance criteria

4.1.1 Performance criterion A

The equipment shall continue to operate as intended during the test.

No change of actual operating state (for example change of channel) is allowed as a result of the application of the test.

Multifunction equipment shall for each function meet the relevant requirements.

Evaluation is carried out for audio and video functions.

The equipment is supposed to operate as intended if the criteria of 4.1.1.1 and/or 4.1.1.2 are fulfilled.

4.1.1.1 Evaluation of audio quality

Unless otherwise specified in this standard, the criterion of compliance with the requirement is a wanted to unwanted audio signal ratio of ≥ 40 dB at a wanted audio signal level of 50 mW, or at another audio signal level specified by the manufacturer.

If the S/N ratio is less than 43 dB, the performance criterion for audio assessment is the actual S/N ratio minus 3 dB.

In this case, at the beginning of the audio quality evaluation the actual S/N ratio is measured and noted in the test report as reference value.

For AM sound receivers the criterion is ≥ 26 dB at 50 mW.

For AM and FM car radios and for broadcast receiver cards for computers the criterion is ≥ 26 dB at 500 mW.

4.1.1.2 Evaluation of picture quality SIST EN 55020:2003

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In the evaluation of picture interference the wanted test signal produces a standard picture (in the case of video tape equipment on the screen of the test-tv-set) and the unwanted signal produces a degradation of the picture. The degradation may be in a number of forms, such as a superposed pattern, disturbance of synchronization, geometrical distortion, loss of picture contrast, of colour, etc.

The criterion of compliance with the requirement is just perceptible degradation by observation of the picture. The screen shall be observed under normal viewing conditions (brightness 15 lx to 20 lx), at a viewing distance of six times the height of the screen.

In the case of video tape equipment the test criteria relate to the picture, assessed on a test-tv-set, which is connected to the video output terminal of the equipment.