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Vehicles, boats and internal combustion engine driven devices - Radio disturbance characteristics - Limits and methods of measurement for the protection of receivers except those installed in the vehicle/boat/device itself or adjacent vehicles/boats/devices (CISPR 12:2001)

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English version

**Vehicles, boats and internal combustion engine driven devices -  
Radio disturbance characteristics -  
Limits and methods of measurement for the protection of receivers  
except those installed in the vehicle/boat/device itself  
or in adjacent vehicles/boats/devices  
(CISPR 12:2001)**

Véhicules, bateaux et engins entraînés  
par des moteurs à combustion interne -  
Caractéristiques de perturbation  
radioélectrique -  
Limites et méthodes de mesure  
pour la protection des récepteurs  
à l'exception de ceux installés dans  
les véhicules/bateaux/engins eux-mêmes  
ou dans des véhicules/bateaux/engins  
proches  
(CISPR 12:2001)

Fahrzeuge, Boote und von Verbrennungs-  
motoren angetriebene Geräte -  
Funkstöreigenschaften -  
Grenzwerte und Messverfahren  
zum Schutz von Empfängern  
mit Ausnahme derer,  
die in den Fahrzeugen, Booten, Geräten  
selbst oder in benachbarten Fahrzeugen,  
Booten, Geräten installiert sind  
(CISPR 12:2001)

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This European Standard was approved by CENELEC on 2002-02-01. 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.

## 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/D/255/FDIS, future edition 5 of CISPR 12, prepared by CISPR SC D, Electromagnetic disturbances related to electric/electronic equipment on vehicles and internal combustion engine powered devices, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 55012 on 2002-02-01.

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) 2002-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-02-01

The standard is applicable to vehicles, boats and other devices equipped with combustion engines, as well as their electrical means.

In the European Union, the EMC requirements for this kind of "vehicles" are regulated in the following directives:

- 95/54/EC on motor vehicles;
- 97/24/EC on two- or three-wheel motor vehicles;
- 2000/2/EC on agricultural or forestry tractors.

Vehicles and other combustion engine powered devices not covered by these directives (e.g. pleasure motor boats) have to fulfil the requirements of the directive 89/336/EC on EMC. The r.f. emission requirements are specified in this standard.

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

Annexes designated "informative" are given for information only.

In this standard, annexes A, H and ZA are normative and annexes B to G are informative.

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard CISPR 12:2001 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>
IEC 60050-161	- <sup>1)</sup>	International Electrotechnical Vocabulary (IEV) - Chapter 161: Electromagnetic compatibility	-	-
CISPR 16-1	- <sup>1)</sup>	Specification for radio disturbance and immunity measuring apparatus and methods Part 1: Radio disturbance and immunity measuring apparatus	-	-
CISPR 25	- <sup>1)</sup>	Limits and methods of measurement of radio disturbance characteristics for the protection of receivers used on board vehicles, boats, and on devices	-	-

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<sup>1)</sup> Undated reference.

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

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**Véhicules, bateaux et engins  
entraînés par des moteurs à combustion interne –  
Caractéristiques de perturbation radioélectrique –  
Limites et méthodes de mesure pour la protection  
des récepteurs à l'exception de ceux installés  
dans les véhicules/bateaux/engins eux-mêmes  
ou dans des véhicules/bateaux/engins proches**

**Vehicles, boats, and internal combustion  
engine driven devices –  
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Limits and methods of measurement for the  
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in the vehicle/boat/device itself or in adjacent  
vehicles/boats/devices**

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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*Pour prix, voir catalogue en vigueur  
For price, see current catalogue*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION  
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**VEHICLES, BOATS, AND INTERNAL COMBUSTION  
ENGINE DRIVEN DEVICES –  
RADIO DISTURBANCE CHARACTERISTICS –  
LIMITS AND METHODS OF MEASUREMENT FOR THE PROTECTION OF  
RECEIVERS EXCEPT THOSE INSTALLED IN THE VEHICLE/BOAT/DEVICE  
ITSELF OR IN ADJACENT VEHICLES/BOATS/DEVICES**

FOREWORD

- 1) The formal decisions or agreements 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 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 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 D: Electromagnetic disturbances related to electric/electronic equipment on vehicles and internal combustion engine powered devices.

This fifth edition cancels and replaces the fourth edition published in 1997. This edition constitutes a technical revision.

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

FDIS	Report on Voting
CISPR/D/255/FDIS	CISPR/D/263/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.

Annexes A and H form an integral part of this CISPR publication.

Annexes B to G are for information only.

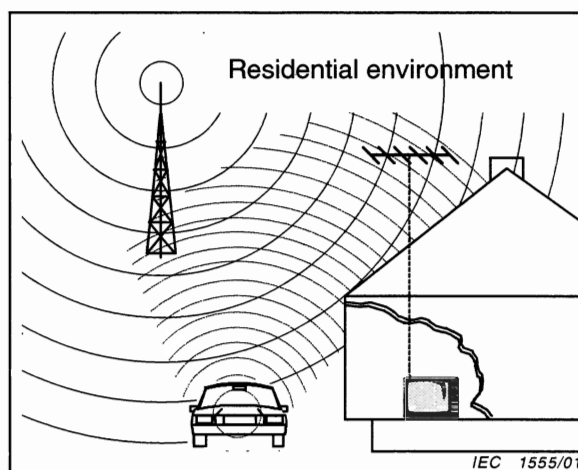
The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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

**VEHICLES, BOATS, AND INTERNAL COMBUSTION  
ENGINE DRIVEN DEVICES –  
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## 1 Scope

The limits in this International Standard are designed to provide protection for broadcast receivers in the frequency range of 30 MHz to 1 000 MHz when used in the residential environment. Compliance with this standard may not provide adequate protection for new types of radio transmissions or receivers used in the residential environment nearer than 10 m to the vehicle or device.



NOTE 1 Experience has shown that compliance with this standard may provide satisfactory protection for receivers of other types of transmissions when used in the residential environment, including radio transmissions in frequency ranges other than that specified.

This standard applies to the emission of broadband and narrowband electromagnetic energy which may cause interference to radio reception and which is emitted from

- a) vehicles propelled by an internal combustion engine, electrical means or both (see 3.1);
- b) boats propelled by an internal combustion engine, electrical means or both (see 3.2). Boats are to be tested in the same manner as vehicles except where they have unique characteristics as explicitly stated in this standard;
- c) devices equipped with internal combustion engines (see 3.3).

This standard includes limits and test methods for both broadband and narrowband emissions.

This standard does not apply to aircraft, traction systems (railway, tramway and trolley bus), or to incomplete vehicles.

NOTE 2 Protection of receivers used on board the same vehicle as the disturbance source(s) are covered by CISPR 25.

The measurement of electromagnetic disturbances while the vehicle is connected to power mains for charging is not covered in this standard. The user is referred to appropriate IEC and CISPR standards which define measurement techniques and limits for this condition.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, 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. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

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

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

CISPR 25, *Limits and methods of measurement of radio disturbance characteristics for the protection of receivers used on board vehicles*

## 3 Definitions

For the purpose of this International Standard, the definitions contained in IEC 60050(161) are applicable.

The following definitions are specific to this standard.

### 3.1 vehicle

machine operating on land which is intended to carry persons or goods. Vehicles include, but are not limited to, cars, trucks, buses, mopeds, agricultural machinery, earth-moving machinery, material-handling equipment, mining equipment and snowmobiles

### 3.2 boat

vessel intended to be used on the surface of water, its length being no greater than 15 m

### 3.3 device

machine driven by an internal combustion engine which is not primarily intended to carry persons or goods. Devices include, but are not limited to, chainsaws, irrigation pumps, snow blowers, air compressors, and landscaping equipment

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### 3.4 impulsive ignition noise

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unwanted emission of electromagnetic energy, predominantly impulsive in content, arising from the ignition system within a vehicle or device

### 3.5 ignition noise suppressor

that portion of a high-voltage ignition circuit intended to limit the emission of impulsive ignition noise

**3.6****resistive distributor brush**

resistive pick-up brush in an ignition distributor cap

**3.7****frequency sub-band**

segment of the frequency spectrum (30 MHz to 1 000 MHz) defined to enable statistical evaluation of the test data acquired by swept frequency testing

**3.8****representative frequency**

assigned frequency of a frequency sub-band to be used for comparison of the data to the limit. To be used only in 6.4 and 6.5 and annex A

**3.9****characteristic level**

controlling (or dominant) emission level experienced in each frequency sub-band. The characteristic level is the maximum measurement obtained for both antenna polarizations and for all the specified measurement positions of the vehicle or device. Known ambient signals shall not be considered part of the characteristic level

**3.10****tracking generator**

test signal oscillator (continuous wave, cw) that is frequency locked to the receive frequency of a measuring instrument

**3.11****RF disturbance power**

RF power measured with a current transformer of an absorbing clamp and an RF measuring instrument. It may be measured – as the RF disturbance voltage – in a peak or quasi-peak mode

**3.12****spark discharge**

spark discharge in this document is the discharge of energy stored in the ignition coil, in an arc across the electrodes of a measuring spark plug

**3.13****resistive high-tension (HT) ignition cable**

ignition cable whose conductor has a high resistance (attenuation)

**3.14****residential environment**

residential environment has a 10 m protection distance between the source and the point of radio reception and where the source uses the public low-voltage power system or battery power. For example, rooming houses, private dwellings, entertainment halls, theatres, schools, public streets, etc.

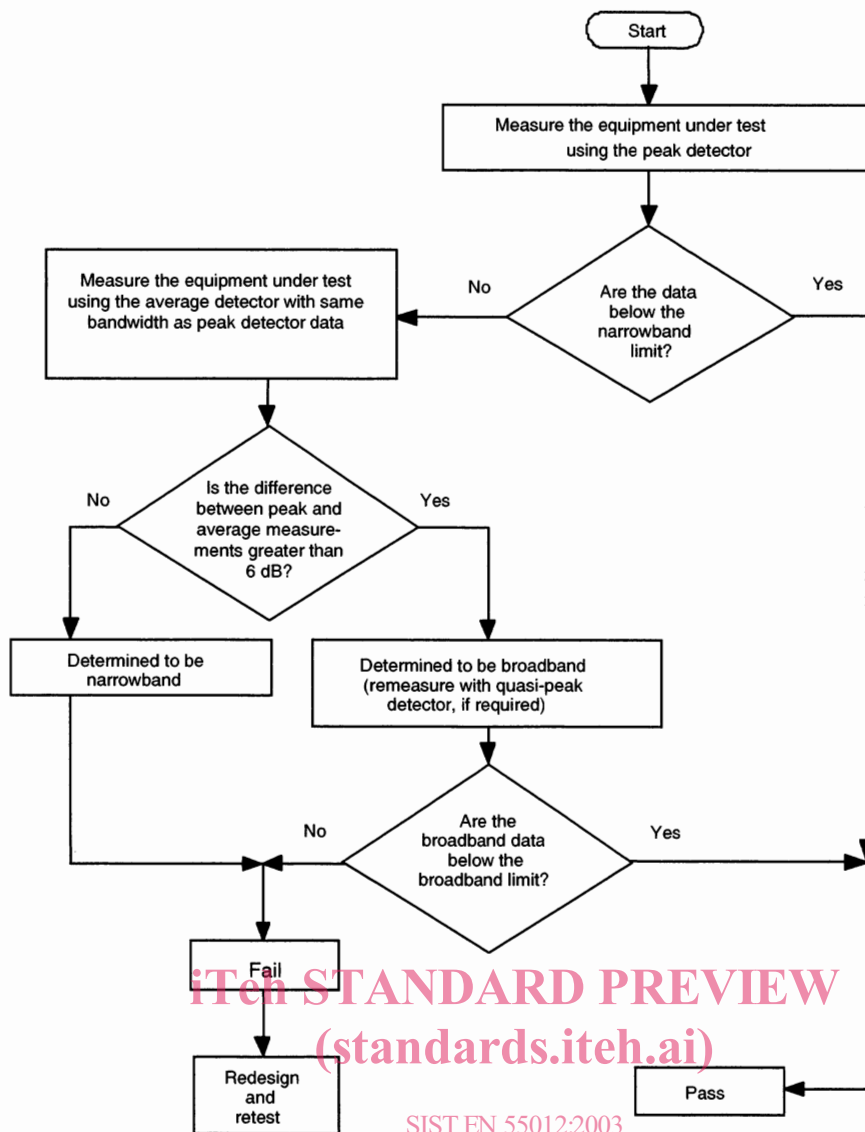
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## 4 Limits of disturbance

### 4.1 Determination of the appropriate limit level

If the type of disturbance is unknown, the flow chart shown in figure 1 may be used to determine which limit shall be applied.

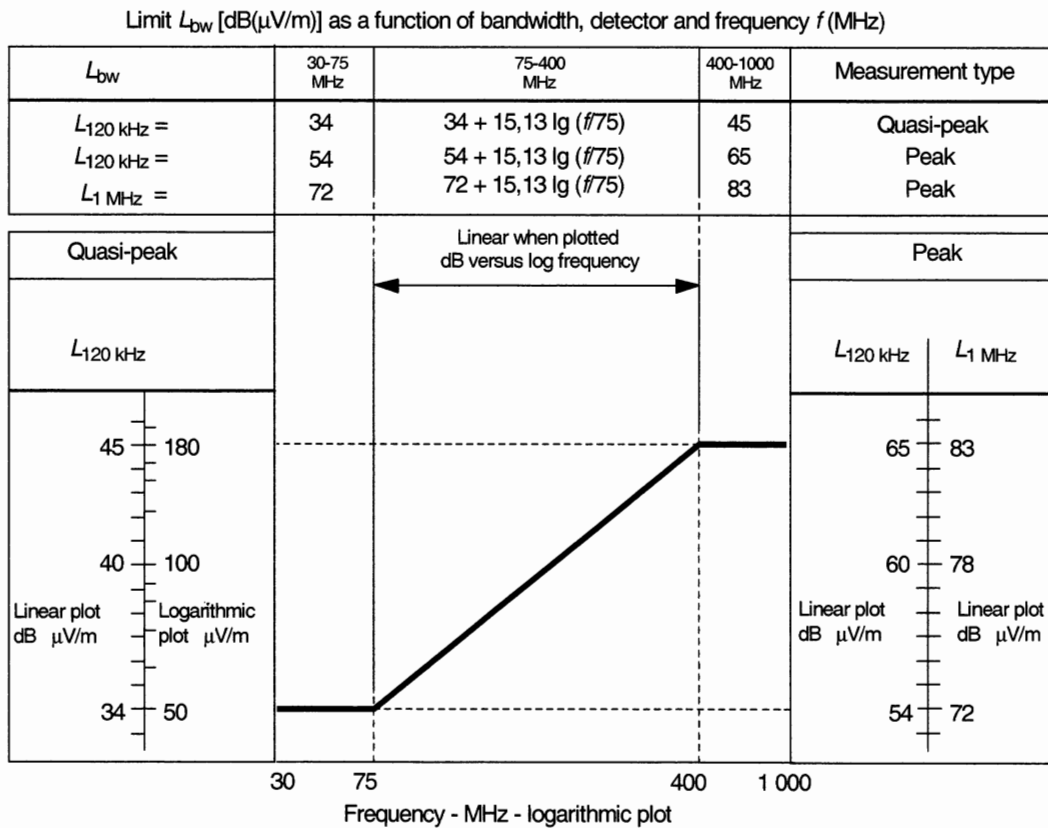


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Figure 1 – Example method of determination of conformance of radiated disturbance

**4.2 Broadband emissions**

The limit for broadband emissions measured at 10 m antenna distance is given in the table of figure 2 and is shown graphically in figure 2. Only one of the bandwidths listed needs to be chosen for testing. For more accurate determination, the equations given in Figure 2 shall be used. For measurements at 3 m antenna distance, 10 dB shall be added to the limit.



IEC 1557/01

NOTE 1 For vehicles equipped with electric propulsion motors, see 5.3.2.

NOTE 2 For peak measurements, see 5.5.

NOTE 3 The correlation factor between quasi-peak and peak measurements is +20 dB at 120 kHz bandwidth, based on experimental data accumulated in several countries.

NOTE 4 Limits from 1 GHz to 18 GHz are under consideration.

**Figure 2 – Limits of disturbance (broadband) at 10 m antenna distance**

**4.3 Narrowband emissions**

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The limit for narrowband emissions measured at 10 m antenna distance is shown in figure 3. The limit applies to peak or quasi-peak detector measurements. Vehicles/boats/devices not including electronic oscillators with an operating frequency greater than 9 kHz shall be deemed to be in compliance with the narrowband requirements of this clause without performing tests for narrowband emissions. Vehicles/boats/devices which meet the narrowband emissions requirements of CISPR 25 Section 2 shall also be deemed to be in compliance with the narrowband requirements of this subclause and no further testing is necessary.