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Vehicles, boats and internal combustion engines -
Radio disturbance characteristics - Limits and methods
of measurement for the protection of on-board
receivers

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 55025:2008 sisaldab Euroopa standardi EN 55025:2008 ingliskeelset teksti.

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English version

**Vehicles, boats and internal combustion engines -
Radio disturbance characteristics -
Limits and methods of measurement
for the protection of on-board receivers
(CISPR 25:2008)**

Véhicules, bateaux et moteurs
à combustion interne -
Caractéristiques
des perturbations radioélectriques -
Limites et méthodes de mesure
pour la protection
des récepteurs embarqués
(CISPR 25:2008)

Fahrzeuge, Boote
und von Verbrennungsmotoren
angetriebene Geräte -
Funkstöreigenschaften -
Grenzwerte und Messverfahren
für den Schutz von an Bord
befindlichen Empfängern
(CISPR 25:2008)

This European Standard was approved by CENELEC on 2008-06-01. 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.

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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/D/344/CDV, future edition 3 of CISPR 25, 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 Unique Acceptance Procedure and was approved by CENELEC as EN 55025 on 2008-06-01.

This European Standard supersedes EN 55025:2003.

The following significant changes were made with respect to EN 55025:2003:

- addition of required measurements with both an average detector and a peak or quasi-peak detector;
- addition of methods and limits for the protection of new analogue and digital radio services, which cover the frequency range up to 2 500 MHz;
- addition of a new measurement method for components (stripline) as an informative Annex G;
- addition of Annex H;
- deletion of narrowband / broadband determination;
- deletion of the annex on rod antenna characterisation (this is now covered by EN 55016-1-4);
- deletion of the annex on characterisation of shielded enclosure (EN 55025 will be amended when the CISPR/D / CISPR/A Joint Task Force on chamber validation finishes its work).

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) | 2009-03-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2011-06-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard CISPR 25:2008 was approved by CENELEC as a European Standard without any modification.

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 60050-161	1990	International Electrotechnical Vocabulary	-	-
A1	1997	(IEV) -		
A2	1998	Chapter 161: Electromagnetic compatibility		
CISPR 12	2007	Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers	EN 55012	2007
CISPR 16-1-1	2006	Specification for radio disturbance and immunity measuring apparatus and methods -	EN 55016-1-1	2007
A1	2006	Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus	A1	2007
A2	2007		A2	2008
CISPR 16-1-2	2003	Specification for radio disturbance and immunity measuring apparatus and methods -	EN 55016-1-2	2004
A1	2004	Part 1-2: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Conducted disturbances	A1	2005
A2	2006		A2	2006
CISPR 16-1-4	2007	Specification for radio disturbance and immunity measuring apparatus and methods -	EN 55016-1-4	2007
A1	2007	Part 1-4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances	A1	2008
CISPR 16-2-3	2006	Specification for radio disturbance and immunity measuring apparatus and methods -	EN 55016-2-3	2006
		Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements		
ISO 11452-4	2005	Road vehicles - Component test methods for electrical disturbances from narrowband radiated electromagnetic energy - Part 4: Bulk current injection (BCI)	-	-
SAE ARP 958.1	2003	Electromagnetic Interference Measurement Antennas; Standard Calibration Method	-	-

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	9
3 Terms and definitions.....	10
4 Requirements common to vehicle and component/module emissions measurement.....	12
4.1 General test requirements and test plan	12
4.1.1 Categories of disturbance sources (as applied in the test plan)	12
4.1.2 Test plan	13
4.1.3 Determination of conformance of EUT with limits	13
4.1.4 Operating conditions.....	15
4.1.5 Test report.....	15
4.2 Shielded enclosure.....	15
4.3 Absorber-lined shielded enclosure (ALSE).....	15
4.3.1 Reflection characteristics.....	15
4.3.2 Size	16
4.3.3 Objects in ALSE	16
4.4 Measuring instrument.....	16
4.4.1 Spectrum analyser parameters	16
4.4.2 Scanning receiver parameters	17
4.5 Power supply.....	18
5 Measurement of emissions received by an antenna on the same vehicle	19
5.1 Antenna measuring system	19
5.1.1 Type of antenna	19
5.1.2 Measuring system requirements	19
5.2 Method of measurement.....	20
5.3 Examples of limits for vehicle radiated disturbances.....	23
6 Measurement of components and modules	25
6.1 Test equipment	25
6.1.1 Ground plane.....	25
6.1.2 Power supply and AN	25
6.1.3 Load Simulator	25
6.1.4 Signal/control line filters	26
6.2 Conducted emissions from components/modules – Voltage method	26
6.2.1 General	26
6.2.2 Ground plane arrangement.....	26
6.2.3 Limits for conducted disturbances from components/modules – Voltage method	33
6.3 Conducted emissions from components/modules – current probe method	34
6.3.1 Test set-up	34
6.3.2 Test procedure	35
6.3.3 Limits for conducted disturbances from components/modules – Current probe method.....	37
6.4 Radiated emissions from components/modules - ALSE method	38
6.4.1 General	38
6.4.2 Test set-up	39

6.4.3	Test procedure	41
6.4.4	Limits for radiated disturbances from components/modules – ALSE method	47
6.5	Radiated emissions from components/modules – TEM cell method	49
6.5.1	General	49
6.5.2	Test set-up	51
6.5.3	Test procedure	52
6.5.4	Limits for radiated disturbances from components/modules – TEM cell method	54
6.6	Radiated emissions from components/modules – Stripline method	56
Annex A (informative)	Flow chart for checking the applicability of CISPR 25	57
Annex B (normative)	Antenna matching unit – Vehicle test	58
Annex C (informative)	Sheath-current suppressor	60
Annex D (informative)	Guidance for the determination of the noise floor of active vehicle antennas in the AM and FM Range	61
Annex E (normative)	Artificial network	64
Annex F (informative)	TEM cell dimensions	66
Annex G (informative)	Radiated emissions from components/modules – Stripline method	68
Annex H (informative)	Interference to mobile radio communication in the presence of impulsive noise – Methods of judging degradation	76
Annex I (informative)	Items Under Consideration	80
Bibliography		81
Figure 1	– Method of determination of conformance for all frequency bands	14
Figure 2	– Example of gain curve	20
Figure 3	– Vehicle-radiated emissions – Example for test layout (end view with monopole antenna)	22
Figure 4	– Average limit for radiated disturbances from vehicles GPS band 1 567,42 to 1 583,42 MHz	24
Figure 5	– Example for the required minimum attenuation of the signal / control line filters	26
Figure 6	– Conducted emissions – EUT with power return line remotely grounded	29
Figure 7	– Conducted emissions – EUT with power return line locally grounded	30
Figure 8	– Conducted emissions – Test layout for alternators and generators	31
Figure 9	– Conducted emissions – Test layout for ignition system components	32
Figure 10	– Conducted emissions – Example of test layout for current probe measurements	36
Figure 11	– Test harness bending requirements	40
Figure 12	– Example of test set-up – rod antenna	43
Figure 13	– Example of test set-up – biconical antenna	44
Figure 14	– Example of test set-up – log-periodic antenna	45
Figure 15	– Example of test set-up – above 1 GHz	46
Figure 16	– Example of average limit for radiated disturbances from components GPS band 1 567,42 to 1 583,42 MHz – Class 5	49
Figure 17	– TEM cell (example)	50

Figure 18 – Example of arrangement of leads in the TEM cell and to the connector panel	51
Figure 19 – Example of the arrangement of the connectors, the lead frame and the dielectric support	52
Figure 20 – Example of the TEM cell method test layout	53
Figure B.1 – Verification set-up	59
Figure C.1 – Attenuation vs. frequency	60
Figure D.1 – Vehicle test set up for equipment noise measurement in the AM/FM range	62
Figure D.2 – Vehicle test set up for antenna noise measurement in the AM/FM range	63
Figure E.1 – Characteristics of the AN impedance	64
Figure E.2 – Example of 5 μ H AN schematic	65
Figure F.1 – TEM cell	66
Figure G.1 – Example of a basic stripline test setup in a shielded enclosure	70
Figure G.2 – Example for a 50 Ω stripline	74
Figure G.3 – Example for a 90 Ω stripline	75
Table 1 – Spectrum analyser parameters	17
Table 2 – Scanning receiver parameters	18
Table 3 – Antenna types	19
Table 4 – Example for limits of disturbance – Complete vehicle	23
Table 5 – Examples of quasi-peak or peak limits for conducted disturbances – Voltage Method	33
Table 6 – Examples of average limits for conducted disturbances – Voltage Method	34
Table 7 – Examples of quasi-peak and peak limits for conducted disturbances - control/signal lines – Current probe method	37
Table 8 – Examples of average limits for conducted disturbances - control/signal lines – Current probe method	38
Table 9 – Examples of quasi-peak or peak limits for radiated disturbances – ALSE	47
Table 10 – Examples of average limits for radiated disturbances – ALSE	48
Table 11 – Examples of quasi-peak or peak limits for radiated disturbances – TEM cell	55
Table 12 – Examples of average limits for radiated disturbances – TEM Cell	56
Table F.1 – Dimensions for TEM cells	67
Table G.1 – Examples of quasi-peak or peak limits for radiated disturbances – Stripline	71
Table G.2 – Examples of average limits for radiated disturbances – Stripline	72

INTRODUCTION

This International Standard is designed to protect on-board receivers from disturbances produced by conducted and radiated emissions arising in a vehicle.

Test procedures and limits given are intended to provide provisional control of vehicle radiated emissions, as well as component/module conducted/radiated emissions of long and short duration.

To accomplish this end, this standard:

- establishes a test method for measuring the electromagnetic emissions from the electrical system of a vehicle;
- sets limits for the electromagnetic emissions from the electrical system of a vehicle;
- establishes test methods for testing on-board components and modules independent from the vehicle;
- sets limits for electromagnetic emissions from components to prevent objectionable disturbance to on-board receivers;
- classifies automotive components by disturbance duration to establish a range of limits.

NOTE Component tests are not intended to replace vehicle tests. Exact correlation between component and vehicle test performance is dependent on component mounting location, harness length, routing and grounding, as well as antenna location. Component testing, however, permits components to be evaluated prior to actual vehicle availability.

VEHICLES, BOATS AND INTERNAL COMBUSTION ENGINES – RADIO DISTURBANCE CHARACTERISTICS – LIMITS AND METHODS OF MEASUREMENT FOR THE PROTECTION OF ON-BOARD RECEIVERS

1 Scope

This International Standard contains limits and procedures for the measurement of radio disturbances in the frequency range of 150 kHz to 2 500 MHz. The standard applies to any electronic/electrical component intended for use in vehicles, trailers and devices. Refer to International Telecommunications Union (ITU) publications for details of frequency allocations. The limits are intended to provide protection for receivers installed in a vehicle from disturbances produced by components/modules in the same vehicle. The method and limits for a complete vehicle are in Clause 5 and the methods and limits for components/modules are in Clause 6. Only a complete vehicle test can be used to determine the component compatibility with respect to a vehicle's limit.

The receiver types to be protected are, for example, broadcast receivers (sound and television), land mobile radio, radio telephone, amateur, citizens' radio, Satellite Navigation (GPS, etc.) and Bluetooth. For the purpose of this standard, a vehicle is a machine, which is self-propelled. Vehicles include (but are not limited to) passenger cars, trucks, agricultural tractors and snowmobiles. Annex A provides guidance in determining whether this standard is applicable to particular equipment.

The limits in this standard are recommended and subject to modification as agreed between the vehicle manufacturer and the component supplier. This standard is also intended to be applied by manufacturers and suppliers of components and equipment which are to be added and connected to the vehicle harness or to an on-board power connector after delivery of the vehicle.

This International Standard does not include protection of electronic control systems from radio frequency (RF) emissions, or from transient or pulse-type voltage fluctuations. These subjects are included in ISO publications.

Since the mounting location, vehicle body construction and harness design can affect the coupling of radio disturbances to the on-board radio, Clause 6 of this standard defines multiple limit levels. The level class to be used (as a function of frequency band) is agreed upon between the vehicle manufacturer and the component supplier.

CISPR 25 defines test methods for use by vehicle manufacturers and suppliers, to assist in the design of vehicles and components and ensure controlled levels of on-board radio frequency emissions.

Vehicle test limits are provided for guidance and are based on a typical radio receiver using the antenna provided as part of the vehicle, or a test antenna if a unique antenna is not specified. The frequency bands that are defined are not applicable to all regions or countries of the world. For economic reasons, the vehicle manufacturer must be free to identify what frequency bands are applicable in the countries in which a vehicle will be marketed and which radio services are likely to be used in that vehicle.

As an example, many vehicle models will probably not have a television receiver installed; yet the television bands occupy a significant portion of the radio spectrum. Testing and mitigating noise sources in such vehicles is not economically justified.

The vehicle manufacturer should define the countries in which the vehicle is to be marketed, then choose the applicable frequency bands and limits. Component test parameters can then be selected from CISPR 25 to support the chosen marketing plan.

The World Administrative Radio communications Conference (WARC) lower frequency limit in region 1 was reduced to 148,5 kHz in 1979. For vehicular purposes, tests at 150 kHz are considered adequate. For the purposes of this standard, test frequency ranges have been generalized to cover radio services in various parts of the world. Protection of radio reception at adjacent frequencies can be expected in most cases.

Annex H defines a qualitative method of judging the degradation of radio communication in the presence of impulsive noise.

Annex I lists work being considered for future revisions.

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 60050-161:1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*
Amendment 1:1997
Amendment 2:1998

CISPR 12:2007, *Vehicles, motorboats, 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 16-1-1:2006, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*
Amendment 1:2006
Amendment 2:2007

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*
Amendment 1:2004
Amendment 2:2006

CISPR 16-1-4:2007, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Radiated disturbances*
Amendment 1:2007

CISPR 16-2-3:2006, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements*

ISO 11452-4:2005 - *Road vehicles – Component test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 4: Bulk current injection (BCI)*

SAE ARP 958.1 Rev D:2003-02 – Electromagnetic Interference Measurement Antennas; Standard Calibration Method

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

absorber lined shielded enclosure (ALSE)

shielded enclosure/screened room with radio frequency-absorbing material on its internal ceiling and walls

3.2

antenna factor

the factor which is applied to the voltage measured at the input connector of the measuring instrument to give the field strength at the antenna

3.3

antenna matching unit

a unit for matching the impedance of an antenna to that of the 50 Ω measuring instrument over the antenna measuring frequency range

3.4

class

a performance level agreed upon by the purchaser and the supplier and documented in the test plan

3.5

component continuous conducted emissions

the noise voltages/currents of a steady-state nature existing on the supply or other leads of a component/module which may cause disturbance to reception in an on-board receiver.

3.6

compression point

the input signal level at which the gain of the measuring system becomes non-linear such that the indicated output deviates from an ideal linear receiving system's output by the specified increment in dB

3.7

device

a machine driven by an internal combustion engine which is not primarily intended to carry persons or goods.

NOTE Devices include, but are not limited to, chainsaws, irrigation pumps, snow blowers, air compressors, and landscaping equipment.

3.8

receiver terminal voltage (antenna voltage)

the voltage generated by a source of radio disturbance and measured in dB (μ V) by a radio disturbance measuring instrument conforming to the requirements of CISPR 16