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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

Som svensk standard gäller europastandarden EN 55025:2017. Den svenska standarden innehåller den officiella engelska språkversionen av EN 55025:2017.

Nationellt förord

Europastandarden EN 55025:2017

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **CISPR 25, Fourth edition, 2016 - Vehicles, boats, and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers**

utarbetad inom International Electrotechnical Commission, IEC.

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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 25:2016)**

Véhicules, bateaux et moteurs à combustion interne -
Caractéristiques des perturbations radioélectriques -
Limites et méthodes de mesure pour la protection des
récepteurs embarqués
(CISPR 25:2016)

Fahrzeuge, Boote und von Verbrennungsmotoren
angetriebene Geräte - Funkstöreigenschaften - Grenzwerte
und Messverfahren für den Schutz von an Bord befindlichen
Empfängern
(CISPR 25:2016)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document CISPR/D/432/FDIS, future edition 4 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 vote and approved by CENELEC as EN 55025:2017.

The following dates are fixed:

- latest date by which the document has to be (dop) 2017-09-01
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2019-12-01
standards conflicting with the
document have to be withdrawn

This document supersedes EN 55025:2008.

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Endorsement notice

The text of the International Standard CISPR 25:2016 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

CISPR 22	NOTE	Harmonized as EN 55022.
CISPR 12:2007	NOTE	Harmonized as EN 55012:2007.
CISPR 12:2007/AMD1:2009	NOTE	Harmonized as EN 55012:2007/A1:2009.
CISPR 16-2-3:2010	NOTE	Harmonized as EN 55016-2-3:2010.
CISPR 16-2-3:2010/AMD1:2010	NOTE	Harmonized as EN 55016-2-3:2010/A1:2010.
CISPR 16-2-3:2010/AMD2:2014	NOTE	Harmonized as EN 55016-2-3:2010/A2:2014.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 7637-3	2016	Road vehicles -- Electrical disturbances from conduction and coupling -- Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines	-	-
ISO 11452-4	2011	Road vehicles_ - Component test methods - for electrical disturbances from narrowband radiated electromagnetic energy_ - Part_4: Harness excitation methods	-	-
CISPR 16-1-1	2015	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus	-	-
CISPR 16-1-2	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements	EN 55016-1-2	2014
CISPR 16-1-4	2010	Specification for radio disturbance and immunity measuring apparatus and methods -- Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements	EN 55016-1-4	2010
+ A1	2012		+ A1	2012
CISPR 16-2-1	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements	EN 55016-2-1	2014
SAE ARP 958.1	-	Electromagnetic Interference Measurement-Antennas; Standard Calibration Method		-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

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

FOREWORD

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International Standard CISPR 25 has been prepared by CISPR subcommittee D: Electromagnetic disturbances related to electric/electronic equipment on vehicles and internal combustion engine powered devices.

This fourth edition cancels and replaces the third edition published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) inclusion of charging mode for electric vehicles (EV) and plug-in electric vehicles (PHEV),
- b) the methods for chamber validation have been included,

- c) test methods for shielded power supply systems for high voltages for electric and hybrid electric vehicles have been included,
- d) overall improvement.

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

FDIS	Report on voting
CISPR/D/432/FDIS	CISPR/D/435/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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. Components can be evaluated with component testing 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 (whether connected to the power mains for charging purposes or not) 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.), Wi-Fi and Bluetooth. For the purpose of this standard, a vehicle is a machine, which is self-propelled by an internal combustion engine, electric means, or both. 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.

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.

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.

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.

This standard 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 is 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 this standard 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 E defines artificial networks used for the measurement of conducted disturbances and for tests on vehicles in charging mode.

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

Annex I defines test methods for shielded power supply systems for high voltage networks in electric and hybrid vehicles.

Annex J defines methods for the validation of the ALSE and the reference ground plane used for component testing.

Annex K lists work being considered for future revisions.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 16-1-1:2015, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements*

CISPR 16-1-4:2010, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus –Antennas and test sites for radiated disturbances measurements*
CISPR 16-1-4:2010/AMD1:2012

CISPR 16-2-1:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*

ISO 7637-3:2016, *Road vehicles – Electrical disturbances from conduction and coupling – Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines*

ISO 11452-4:2011, *Road vehicles – Component test methods for electrical disturbances from narrowband radiated electromagnetic energy – Part 4: Harness excitation methods*

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