

SÕIDUKID, LAEVAD JA SISEPÕLEMISMOOTORI VÕI
VEOAKUGA SEADMED. RAADIOHÄIRINGU
TUNNUSSUURUSED. PIIRVÄÄRTUSED JA
MÕÕTEMEETODID PARDAVÄLISTE VASTUVÕTJATE
KAITSEKS.

Vehicles, boats and devices with internal combustion
engines or traction batteries - Radio disturbance
characteristics - Limits and methods of measurement
for the protection of off-board receivers

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN IEC 55012:2025 sisaldab Euroopa standardi EN IEC 55012:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 19.09.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN IEC 55012:2025 consists of the English text of the European standard EN IEC 55012:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 19.09.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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English Version

Vehicles, boats and devices with internal combustion engines or
traction batteries - Radio disturbance characteristics - Limits and
methods of measurement for the protection of off-board
receivers
(CISPR 12:2025)

Véhicules, bateaux et engins à moteurs à combustion
interne ou batteries de traction - Caractéristiques de
perturbation radioélectrique - Limites et méthodes de
mesure pour la protection des récepteurs extérieurs
(CISPR 12:2025)

Fahrzeuge, Boote und Geräte mit Verbrennungsmotoren
oder Antriebsbatterien - Funkstöreigenschaften -
Grenzwerte und Messverfahren zum Schutz von außerhalb
befindlichen Empfängern
(CISPR 12:2025)

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European foreword

The text of document CIS/D/507/FDIS, future edition 7 of CISPR 12, prepared by SC CISPR/D "Electromagnetic disturbances related to electric/electronic equipment on vehicles and internal combustion engine powered devices" of IEC/TC CISPR "International special committee on radio interference" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 55012:2025.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2026-09-30 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2028-09-30 document have to be withdrawn

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The text of the International Standard CISPR 12:2025 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 standard indicated:

CISPR 14-1	NOTE	Approved as EN IEC 55014-1
CISPR 25:2021	NOTE	Approved as EN IEC 55025:2022 (not modified)
IEC 61851-21-1:2017	NOTE	Approved as EN 61851-21-1:2017 (not modified)
IEC 61000-6-3:2020	NOTE	Approved as EN IEC 61000-6-3:2021 (not modified)
IEC 61000-6-4:2018	NOTE	Approved as EN IEC 61000-6-4:2019 (not modified)
IEC 61000-6-8:2020	NOTE	Approved as EN IEC 61000-6-8:2020 (not modified)
IEC 62196-1:2022	NOTE	Approved as EN IEC 62196-1:2022 (not modified)
IEC 61980-1:2020	NOTE	Approved as EN IEC 61980-1:2021 (not modified)
IEC 63281-1:2023	NOTE	Approved as EN IEC 63281-1:2023 (not modified)
CISPR 16-2-3:2016	NOTE	Approved as EN 55016-2-3:2017 (not modified)

CISPR 11	NOTE	Approved as EN IEC 55011
CISPR 16-4-2:2011	NOTE	Approved as EN 55016-4-2:2011 (not modified)
CISPR 12:2007	NOTE	Approved as EN 55012:2007 (not modified)

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INTERNATIONAL STANDARD

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Vehicles, boats and devices with internal combustion engines or traction batteries – Radio disturbance characteristics – Limits and methods of measurement for the protection of off-board receivers



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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	10
3 Terms, definitions and abbreviated terms	11
3.1 Terms and definitions	11
3.2 Abbreviated terms	17
4 Limits of radiated disturbance	18
4.1 General.....	18
4.2 Group definitions.....	18
4.3 Determination of conformance of the vehicle, boat and device with the limits	18
4.4 Peak and quasi-peak detector limits	19
4.5 Average detector limit	21
5 Methods of measurement.....	22
5.1 Measuring instruments	22
5.1.1 Measuring receiver	22
5.1.2 Antenna types.....	23
5.2 Measurement instrumentation uncertainty.....	24
5.3 Measuring site requirements.....	24
5.3.1 General	24
5.3.2 Outdoor test site (OTS) requirements	24
5.3.3 Alternative test site requirements	27
5.4 Test setup for measurement.....	27
5.4.1 Antenna requirements.....	27
5.4.2 Test setup for vehicle in charging mode.....	32
5.5 Test object conditions	42
5.5.1 General	42
5.5.2 Vehicles and boats.....	42
5.5.3 Devices	44
5.6 Data collection	44
6 Methods of checking for compliance with CISPR requirements	45
6.1 General.....	45
6.2 Application of limit curves.....	45
6.2.1 Measurements under dry conditions	45
6.2.2 Measurements under wet conditions.....	45
Annex A (normative) Procedure to determine an alternative emission limit for measurements.....	46
Annex B (informative) Measurement of the insertion loss of ignition noise suppressors	47
B.1 Overview	47
B.1.1 General	47
B.1.2 CISPR box method (50/75 Ω laboratory method).....	47
B.1.3 Field comparison method	47
B.2 Comparison of test methods	47
B.2.1 CISPR box method.....	47
B.2.2 Field comparison method	47

B.3	CISPR box method (50/75 Ω laboratory method of measurement of insertion loss of ignition noise suppressors).....	48
B.3.1	General conditions and limitations of measurement.....	48
B.3.2	Test procedure.....	48
B.3.3	Test box construction.....	48
B.3.4	Results.....	48
Annex C (informative) Methods of measurement to determine the attenuation characteristics of ignition noise suppressors for high voltage ignition systems.....		52
C.1	General.....	52
C.2	Recommended requirements for ignition noise suppressors.....	52
C.3	Test set-up.....	52
C.4	Test procedure.....	53
C.5	Measuring spark-plugs without suppression elements.....	57
C.6	Test setup examples.....	57
C.6.1	General.....	57
C.6.2	Connection of a right-angle spark-plug ignition noise suppressor.....	57
C.6.3	Connection of a distributor rotor.....	58
C.6.4	Connection of distributor caps with integrated ignition noise suppressors.....	59
C.6.5	Connection of resistive ignition cables.....	59
Annex D (informative) Applicability of CISPR 12.....		61
D.1	Flow chart.....	61
D.2	Example products that are in the scope of CISPR 12.....	63
D.2.1	General.....	63
D.2.2	Vehicles.....	63
D.2.3	Boats and boat ICE(s) and EM(s).....	63
D.2.4	Devices.....	64
D.3	Grouping.....	64
Annex E (normative) Direct current charging artificial networks (DC-charging-AN), artificial mains networks (AMN) and asymmetric artificial networks (AAN).....		67
E.1	General.....	67
E.2	Direct current charging artificial networks (DC-charging-AN).....	67
E.3	Artificial mains networks (AMN).....	69
E.4	Asymmetric artificial network (AAN).....	69
E.4.1	General.....	69
E.4.2	Signal and control port with symmetric lines.....	69
E.4.3	Signal and control port with PLC (technology) on control pilot line.....	70
E.4.4	Signal and control port with control pilot line.....	71
Annex F (informative) Measurement instrumentation uncertainty.....		73
F.1	General.....	73
F.2	Uncertainty sources.....	73
F.3	Measurand.....	75
F.4	Input quantities to be considered.....	75
Annex G (informative) Uncertainty budgets for radiated disturbance measurements of electric field strength.....		78
G.1	General.....	78
G.2	Typical CISPR 12 uncertainty budgets.....	78
G.3	Receiver's frequency step.....	81
Annex H (informative) Justification for the limits for an electric vehicle.....		83

H.1	General.....	83
H.2	Background.....	83
H.3	Consideration on the effect of radio receivers	83
H.4	Calculation of limits	84
H.4.1	General	84
H.4.2	Electric vehicles in a driven mode.....	84
H.4.3	Electric vehicles in a charging mode.....	85
H.5	Conclusion.....	87
Annex I	(informative) Items under consideration	88
I.1	General.....	88
I.2	Frequency range.....	88
I.2.1	General considerations	88
I.2.2	Testing between 1 GHz to 6 GHz.....	88
I.3	Correlation between OTS, ALSE and OATS measurements.....	88
I.4	Calibration of antennas	88
I.5	Charging mode for boats	88
I.6	Necessity for the use of artificial networks in the test setups	88
I.7	Electric vehicle limits.....	88
I.7.1	Charging.....	88
I.7.2	Driven mode	88
I.8	Dynamic test modes	89
Bibliography	90
Figure 1	– Method of determination of conformance.....	19
Figure 2	– Quasi-peak limits at 10 m antenna distance	20
Figure 3	– Peak limits at 10 m antenna distance	21
Figure 4	– Average limits at 10 m antenna distance	21
Figure 5	– Measuring site (OTS) for vehicles, boats and devices.....	25
Figure 6	– Measuring site (OTS) for boats	26
Figure 7	– Antenna height to measure emissions – Elevation view (vertical polarization shown)	28
Figure 8	– Antenna distance to measure emissions – Plan view (horizontal polarization shown)	29
Figure 9	– Antenna position for $N = 1$ (one antenna position to be used) – Horizontal polarization shown	31
Figure 10	– Example antenna positions for $N = 2$ (multiple antenna positions to be used) – Horizontal polarization shown	31
Figure 11	– Example of test setup for vehicle with vehicle inlet located on vehicle side (charging mode 1 or 2, AC powered, without communication)	34
Figure 12	– Example of test setup for vehicle with vehicle inlet located front or rear of vehicle (charging mode 1 or 2, AC powered, without communication).....	35
Figure 13	– Example of test setup for vehicle with vehicle inlet located on vehicle side (charging mode 3 or mode 4, AC/DC powered, with communication)	38
Figure 14	– Example of test setup for vehicle with vehicle inlet located front or rear of vehicle (charging mode 3 or mode 4, AC/DC powered, with communication)	39
Figure 15	– Example of test setup for vehicle in charging mode through wireless power transfer.....	41
Figure A.1	– Calculation of the resulting gain reduction X_{dB}	46

Figure B.1 – Test circuit.....	49
Figure B.2 – General arrangement of the test box.....	49
Figure B.3 – Details of the test box lid.....	50
Figure B.4 – Details of the test box.....	50
Figure B.5 – Straight spark-plug ignition noise suppressor (screened or unshielded).....	50
Figure B.6 – Right-angle spark-plug ignition noise suppressor (screened or unshielded).....	50
Figure B.7 – Noise suppression spark-plug.....	51
Figure B.8 – Resistive distributor brush.....	51
Figure B.9 – Noise suppressor in distributor cap.....	51
Figure B.10 – Noise suppression distributor rotor.....	51
Figure B.11 – Noise suppression ignition cable (resistive or reactive).....	51
Figure C.1 – Test set-up, side view.....	54
Figure C.2 – Test set-up, top view.....	55
Figure C.3 – Pressure chamber with ventilation.....	56
Figure C.4 – Top view of the set-up of a right-angle ignition noise suppressor for distributors.....	57
Figure C.5 – Location of high voltage ignition components.....	58
Figure C.6 – Top view of the test set-up for distributor rotors.....	59
Figure C.7 – Side view of the test set-up for ready-to-use resistive ignition cables.....	60
Figure D.1 – Flowchart for the applicability of CISPR 12.....	62
Figure E.1 – Example of 5 μ H / 50 Ω DC-charging-AN schematic.....	67
Figure E.2 – Characteristics of the DC-charging-AN impedance.....	68
Figure E.3 – Example of an AAN for signal and control port with symmetric lines (e.g. CAN).....	70
Figure E.4 – Example of AAN circuit for signal and control port with PLC (technology) on control pilot.....	71
Figure E.5 – Example of AAN circuit for pilot line.....	72
Figure F.1 – Typical sources of measurement instrumentation uncertainty.....	74
Figure G.1 – Example of measurement for frequency step uncertainty evaluation for 120 kHz bandwidth.....	82
Figure H.1 – Histogram – Peak to quasi-peak delta, EV driving mode.....	85
Figure H.2 – Histogram – Peak to quasi-peak delta, vehicle in AC or DC charging mode.....	86
Figure H.3 – Degradation to 12 dB SINAD (LO-VHF) from Mode 3 charging vs. CW noise.....	87
Table 1 – Detection limits.....	18
Table 2 – Quasi-peak limits at 10 m antenna distance.....	20
Table 3 – Peak limits at 10 m antenna distance.....	20
Table 4 – Spectrum analyser parameters.....	23
Table 5 – Scanning receiver parameters.....	23
Table 6 – ICE operating speeds.....	43
Table C.1 – Limits.....	52

Table D.1 – Examples of products in the scope of CISPR 12 with their assignment to the groups	65
Table E.1 – Magnitude of the DC-charging-AN impedance Z_{PB}	68
Table F.1 – Input quantities to be considered for radiated disturbance measurements	75
Table G.1 – Typical uncertainty budget – 3 m/10 m distance – Biconical antenna	78
Table G.2 – Typical uncertainty budget – 3 m/10 m distance – Log-periodic antenna.....	80

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Vehicles, boats and devices with internal combustion engines or traction batteries - Radio disturbance characteristics - Limits and methods of measurement for the protection of off-board receivers

FOREWORD

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International Standard CISPR 12 has been prepared by CISPR subcommittee D: Electromagnetic disturbances related to electric/electronic equipment on vehicles and internal combustion engine powered devices.

This seventh edition cancels and replaces the sixth edition published in 2007 and its Amendment 1 (2009). This edition constitutes a technical revision.

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

- a) test setups and requirements for electric vehicles and hybrid electric vehicles in charging mode were added,
- b) antenna positions relative to the vehicle were defined,
- c) some statements dealing with series surveillance and type approval were deleted,
- d) annexes for measurement instrumentation uncertainty were added,
- e) the vehicles, boats and devices subject to this document are separated into three groups with corresponding limits applied accordingly,
- f) an annex describing networks to be used for the charging mode was added,
- g) an annex describing justification for the limits of an electric vehicle was added, and
- h) general improvements were made.

The text of this International Standard is based on the following documents:

Draft	Report on voting
CIS/D/507/FDIS	CIS/D/509/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

There is a specific need for standards to define acceptable radio frequency performances of all electrical and electronic products. CISPR 12 has been developed to serve the vehicles, boats, devices with internal combustion engines and related industries with test methods and limits that provide satisfactory protection for radio reception.

CISPR 12 has been used for many years as a regulatory requirement in numerous countries, to provide protection for radio receivers at a 10 m distance. It has been effective in protecting the radio environment outside the vehicle.

1 Scope

The limits in this document are designed to provide protection in the frequency range of 30 MHz to 1 000 MHz for off-board receivers. Compliance with this document does not guarantee adequate protection for receivers nearer than 10 m to the vehicle, boat or device.

This document applies to the emission of electromagnetic energy that can cause interference to radio reception and which is emitted from:

- 1) vehicles propelled by an internal combustion engine (ICE), electrical means or both (see 3.1.34);
- 2) boats propelled by an ICE, electrical means or both (see 3.1.4). Boats are tested in the same manner as vehicles except where they have unique characteristics as explicitly stated in this document;
- 3) devices equipped with ICE (see 3.1.9). In the case of hybrid devices (e.g. equipped with both ICE and traction batteries), only the ICE mode is included in this document;
- 4) inboard and outboard boat engines and motors [i.e. equipped with ICE, electric motor (EM), or both], when marketed independently.

See Annex D for a flow chart and a list of examples to help determine the applicability of CISPR 12.

This document does not apply to aircraft, household appliances, medical devices, traction systems (railway engine or locomotive, streetcar or tram and electric trolley bus), vehicle, boat and device off-board chargers or to incomplete vehicles, boats and devices. In the case of a dual-mode trolley bus (e.g. propelled by power from either AC/DC mains or an ICE), the ICE propulsion system is included, but the EM propulsion portion of the vehicle is excluded from this document. In addition, domestic helper robots, such as household cleaning robots, hotel service robots and personal safety robots are also excluded from the scope of this document.

NOTE 1 Other than inboard or outboard boat engines and motors that are marketed independently, this document does not apply to components or incomplete products, such as an ICE, an incomplete vehicle or boat that has not yet been fitted with an ICE or EM, or spare parts. This document only applies to the final product, which is equipped with all applicable parts and components to be able to function as intended.

NOTE 2 Appliances without ICE for typical housekeeping and service functions in the household and similar environment are covered by the requirements of CISPR 14-1[1].

NOTE 3 Protection of receivers used on board the same vehicle as the disturbance source(s) are covered by CISPR 25[2].

This document does not prescribe measurement methods or limits for conducted disturbances, for the charging mode of operation, where the (electric or hybrid) vehicle or boat is connected to power mains, either directly (i.e. plug-in vehicle or boat) or indirectly (i.e. wireless power charging). The user is referred to appropriate IEC and CISPR standards, which define measurement techniques and limits for this condition.

NOTE 4 See IEC 61851-21-1[3] for road vehicles and IEC 61000-6-3[4], IEC 61000-6-4[5] and IEC 61000-6-8[6] for other types of vehicles or boats.

The emission requirements in this document are not applicable to the intentional transmissions from a radio transmitter, as defined by the ITU-R, including its spurious emissions.

Equipment that is covered by other CISPR product and product family emission standards are excluded from the scope of this document, except where they include ICE(s). In the latter case, the equipment complies with this document in all modes of operation where the ICE(s) is(are) active.

NOTE 5 The other CISPR product or product family emission standard can also apply to the equipment for those modes of operation where the ICE(s) is (are) not active. In case the ICE(s) is (are) always in operation, the other CISPR product or product family emission standard can still apply, for verifying the emissions from the other components and circuitry of the equipment.

Annex B and Annex C contain methods to evaluate the disturbance characteristics of high voltage ignition systems.

Annex H contains a justification for the limits for an electric vehicle.

Annex I 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.

IEC 61851-1:2017, *Electric vehicle conductive charging system - Part 1: General requirements*

CISPR 16-1-1:2019, *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 measurement apparatus - Coupling devices for conducted disturbance measurements*
CISPR 16-1-2:2014/AMD1:2017

CISPR 16-1-3:2004, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-3: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Disturbance power*
CISPR 16-1-3:2004/AMD1:2016
CISPR 16-1-3:2004/AMD2:2020

CISPR 16-1-4:2019, *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*
CISPR 16-1-4:2019/AMD1:2020
CISPR 16-1-4:2019/AMD2:2023

CISPR 16-1-6:2014, *Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-6: Radio disturbance and immunity measuring apparatus - EMC antenna calibration*
CISPR 16-1-6:2014/AMD1:2017
CISPR 16-1-6:2014/AMD2:2022

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*
CISPR 16-2-1:2014/AMD1:2017

ANSI C63.5:2017, *American National Standard for Electromagnetic Compatibility - Radiated Emission Measurements in Electromagnetic Interference (EMI) Control - Calibration and Qualification of Antennas (9 kHz to 40 GHz)*
Corrigendum 1:2018