



SLOVENSKI STANDARD
oSIST prEN IEC 55012:2024
01-junij-2024

**Vozila, plovila in naprave, ki jih poganjajo motorji z notranjim zgorevanjem -
Karakteristike občutljivosti za radijske motnje - Mejne vrednosti in merilne metode
za zaščito zunanjih sprejemnikov**

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

Fahrzeuge, Boote und von Verbrennungsmotoren angetriebene Geräte -
Funkstöreigenschaften - Grenzwerte und Messverfahren zum Schutz von außerhalb
befindlichen Empfängern

Véhicules, bateaux et moteurs à combustion interne - Caractéristiques de perturbation
radioélectrique - Limites et méthodes de mesure pour la protection des récepteurs
extérieurs

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<https://standards.iteh.ai/catalog/standards/sist/2e9999c8-2e8c-4889-9e9d-de8721726c3c/osist-pren-iec-55012-2024>

Ta slovenski standard je istoveten z: prEN IEC 55012:2024

ICS:

27.020	Motorji z notranjim zgorevanjem	Internal combustion engines
33.100.10	Emisija	Emission

oSIST prEN IEC 55012:2024 **en**



CIS/D/498/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:

CISPR 12 ED7

DATE OF CIRCULATION:

2024-04-12

CLOSING DATE FOR VOTING:

2024-07-05

SUPERSEDES DOCUMENTS:

CIS/D/497/RR

IEC CIS/D : ELECTROMAGNETIC DISTURBANCES RELATED TO ELECTRIC/ELECTRONIC EQUIPMENT ON VEHICLES AND INTERNAL COMBUSTION ENGINE POWERED DEVICES

SECRETARIAT:

Germany

SECRETARY:

Mr Holger Hirsch

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 69, TC 125, CIS/H

PROPOSED HORIZONTAL STANDARD:

Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

 EMC

 ENVIRONMENT

 QUALITY ASSURANCE

 SAFETY

 SUBMITTED FOR CENELEC PARALLEL VOTING

 NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

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TITLE:

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

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

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**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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1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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

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

226

227

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

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- a) test setups 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,

- 232 e) an annex describing networks to be used for the charging mode was added and
233 f) general improvements were made.
234 g) the vehicles, boats and devices subject to this standard are separated into three groups
235 with corresponding limits applied accordingly

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

FDIS	Report on voting
CISPR/XX/FDIS	CISPR/XX/RVD

237
238 Full information on the voting for the approval of this International Standard can be found in the
239 report on voting indicated in the above table.

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

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

- 244 • reconfirmed,
- 245 • withdrawn,
- 246 • replaced by a revised edition, or
- 247 • amended.

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250

INTRODUCTION

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

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

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260 **VEHICLES, BOATS AND DEVICES WITH INTERNAL COMBUSTION**
261 **ENGINES OR TRACTION BATTERIES – RADIO DISTURBANCE**
262 **CHARACTERISTICS – LIMITS AND METHODS OF MEASUREMENT**
263 **FOR THE PROTECTION OF OFF-BOARD RECEIVERS**
264
265
266

267 **1 Scope**

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

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

- 273 1) vehicles propelled by an internal combustion engine (ICE), electrical means or both (see
274 3.1.30);
- 275 2) boats propelled by an ICE, electrical means or both (see 3.1.4). Boats are to be tested in
276 the same manner as vehicles except where they have unique characteristics as explicitly
277 stated in this document;
- 278 3) devices equipped with ICE (see 3.1.8). In the case of hybrid devices (e.g. equipped with
279 both ICE and traction batteries), only the ICE mode is included in this document;
- 280 4) inboard and outboard boat engines/ motors [i.e. equipped with ICE, electric motor (EM), or
281 both], when marketed independently.

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

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

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

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

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

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

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

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

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

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

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

318 Annex H lists work being considered for future revisions.

319

320 2 Normative references

321 The following documents are referred to in the text in such a way that some or all of their content
 322 constitutes requirements of this document. For each reference, only the edition cited applies.

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

324 IEC 61980-1:2020, *Electric vehicle wireless power transfer (WPT) systems - Part 1: General*
 325 *requirements*

326 CISPR 16-1-1:2019, *Specification for radio disturbance and immunity measuring apparatus and*
 327 *methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring*
 328 *apparatus*

329 CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and*
 330 *methods – Part 1-2: Radio disturbance and immunity measurement apparatus – Coupling*
 331 *devices for conducted disturbance measurements* 55012:2024

332 CISPR 16-1-2:2014/AMD1:2017 [/sist/2e9999c8-2e8c-4889-9e9d-de8721726c3c/osist-pren-iec-55012-2024](https://standards.globalspec.com/stden/61199/iec-55012-2024/sist/2e9999c8-2e8c-4889-9e9d-de8721726c3c/osist-pren-iec-55012-2024)

333 CISPR 16-1-3:2004, *Specification for radio disturbance and immunity measuring apparatus and*
 334 *methods – Part 1-3 Radio disturbance and immunity measuring apparatus – Ancillary equipment*
 335 *– Disturbance power*

336 CISPR 16-1-3:2004/AMD1:2016

337 CISPR 16-1-3:2004/AMD2:2020

338 CISPR 16-1-4:2019, *Specification for radio disturbance and immunity measuring apparatus and*
 339 *methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test*
 340 *sites for radiated disturbance measurements*

341 CISPR 16-1-4:2019/AMD1:2020

342 CISPR 16-1-6:2014, *Specification for radio disturbance and immunity measuring apparatus and*
 343 *methods – Part 1-6: Radio disturbance and immunity measuring apparatus – EMC antenna*
 344 *calibration*

345 CISPR 16-1-6:2014/AMD1:2017

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

349 CISPR 16-2-1:2014/COR1:2020

350 CISPR 16-2-3:2016, *Specification for radio disturbance and immunity measuring apparatus and*
 351 *methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated*
 352 *disturbance measurements*
 353 CISPR 16-2-3:2016/AMD1:2019

354 CISPR 16-4-2:2011 *Specification for radio disturbance and immunity measuring apparatus and*
 355 *networks – Part 4-2: Uncertainties, statistics and limit modelling – Measurement instrumentation*
 356 *uncertainty*
 357 CISPR 16-4-2:2011/AMD1:2014
 358 CISPR 16-4-2:2011/AMD2:2018

359 CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission*
 360 *requirements*
 361 CISPR 32:2015/AMD1:2019

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

366

367 **3 Terms, definitions and abbreviations**

368 **3.1 Terms and definitions**

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

370 ISO and IEC maintain terminological databases for use in standardization at the following
 371 addresses:

- 372 • IEC Electropedia: available at <http://www.electropedia.org/>
- 373 • ISO Online browsing platform: available at <http://www.iso.org/obp>

374 **3.1.1**

375 **absorber lined shielded enclosure**

376 **ALSE**

377 shielded enclosure or screened room with radio frequency absorbing material on its internal
 378 ceiling and walls

379 **3.1.2**

380 **artificial mains network**

381 **AMN**

382 network that provides a defined impedance to the EUT at radio frequencies, couples the
 383 disturbance voltage to the measuring receiver, and decouples the test circuit from the supply
 384 mains

385 Note 1 to entry: There are two basic types of this network, the V-network (V-AMN), which couples the unsymmetric
 386 voltages, and the delta-network (Δ -AMN), which couples symmetric (DM) and asymmetric (CM) voltages separately.

387 Note 2 to entry: The coupling feature of the AMN is not used for CISPR 12 testing. The coaxial port (“receiver port”)
 388 of the AMN is equipped with a 50 Ω termination for all measurements according to this standard.

389 [SOURCE: CISPR 16-1-2:2014/AMD1:2017, 3.1.6 modified – added Note 2 to entry]

390 3.1.3**391 asymmetric artificial network****392 AAN**

393 network used to measure (or inject) asymmetric (common mode) voltages on unshielded
394 symmetric signal (e.g., telecommunication) lines while rejecting the symmetric (differential
395 mode) signal

396 Note 1 to entry: The term “Y-network” is a synonym for AAN.

397 Note 2 to entry: The coupling feature of the AAN is not used for CISPR 12 testing. The coaxial port of the AAN is
398 equipped with a 50 Ω termination for all measurements according to this standard.

399 [SOURCE: CISPR 16-1-2:2014/AMD1:2017, 3.1.7 modified – added Note 2 to entry]

400 3.1.4**401 boat**

402 vessel intended to be used on the surface of water, its length being no greater than 15 m,
403 intended to carry persons or goods and equipped with inboard or outboard boat
404 engine(s)/motor(s)

405 3.1.5**406 bond**, verb

407 connect to ground using a ground connection complying with 5.3 of CISPR 16-2-1:2014, with a
408 DC resistance not exceeding 2,5 m Ω

409 Note 1 to entry: A low current (≤ 100 mA) 4-wire milliohm meter is recommended for these measurements.

410 3.1.6**411 charging mode**

412 mode of operation intended for charging the rechargeable energy storage system (REESS)

413 3.1.6.1**414 charging mode 1**

415 charging mode as defined in 6.2.1 of IEC 61851-1:2017

416 Note 1 to entry: In some countries, mode 1 charging can be prohibited or requires special precautions.

417 3.1.6.2**418 charging mode 2**

419 charging mode as defined in 6.2.2 of IEC 61851-1:2017, where the vehicle is connected to AC
420 mains using a charging cable, which has an electric vehicle supply equipment (EVSE) box in-
421 line (e.g. In-cable control box / In-cable control and protection device), providing control pilot
422 signalling between the vehicle and the EVSE box and personal protection against electric shock

423 Note 1 to entry: In some countries, special restrictions have to be applied for mode 2 charging.

424 Note 2 to entry: There is no communication between the vehicle and the charging infrastructure.

425 3.1.6.3**426 charging mode 3**

427 charging mode as defined in 6.2.3 of IEC 61851-1:2017, where the vehicle is connected to a
428 fixed installation (EVSE; e.g. AC charging station, AC wallbox) providing AC power to the
429 vehicle, with communication between the vehicle and the EVSE (through signal/control lines
430 and/or through wired network lines)

431 3.1.6.4**432 charging mode 4**

433 charging mode as defined in 6.2.4 of IEC 61851-1:2017, where the vehicle is connected to a
434 fixed installation (EVSE; e.g. DC charging station), providing DC power to the vehicle (with an
435 off-board charger), with communication between the vehicle and the EVSE (through
436 signal/control lines and/or through wired network lines)