

Denna standard ersätter SS-ISO 11451-2, utgåva 2.


This standard supersedes the Swedish Standard SS-ISO 11451-2, edition 2.
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**Foreword**

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 11451-2 was prepared by Technical Committee ISO/TC 22, Road vehicles, Subcommittee SC 3, Electrical and electronic equipment.

This third edition cancels and replaces the second edition (ISO 11451-2:2001), which has been technically revised.

ISO 11451 consists of the following parts, under the general title Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy:

— **Part 1: General principles and terminology**
— **Part 2: Off-vehicle radiation sources**
— **Part 3: On-board transmitter simulation**
— **Part 4: Bulk current injection (BCI)**
Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy —

Part 2: Off-vehicle radiation sources

1 Scope

This part of ISO 11451 specifies a vehicle test method for determining the immunity of passenger cars and commercial vehicles to electrical disturbances from off-vehicle radiation sources, regardless of the vehicle propulsion system (e.g. spark-ignition engine, diesel engine, electric motor). It can also be readily applied to other types of vehicles.

The electromagnetic disturbances considered are limited to narrowband electromagnetic fields.

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.


3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11451-1 apply.

4 General test conditions

The applicable frequency range of this test method is 0,01 MHz to 18 000 MHz. Testing over the full frequency range could require different field-generating devices, but this does not imply that testing of overlapping frequency ranges is required.

The user shall specify the test severity level or levels over the frequency range. Suggested test severity levels are given in Annex A.

See ISO 11451-1 for descriptions of, and requirements for, the following standard test conditions, applicable to this part of ISO 11451:

— test temperature;
— supply voltage;
— modulation;
5 Test location

The test should be performed in an absorber-lined shielded enclosure, the aim being to create an indoor electromagnetic compatibility testing facility that simulates open field testing.

The size, shape and construction of the enclosure may vary considerably. Typically, the floor is not covered with absorbing material, but such covering is allowed\(^1\). The minimum size of the shielded enclosure is determined by the size of the test region needed, the size of the field generation device or devices, the needed clearances between these and the largest vehicle to be tested, and the characteristics of the absorbing material. To create the test region, the absorber, field generation system and enclosure shape are selected such that the amount of extraneous energy in the test region is reduced to below a minimum value that will give the desired measurement accuracy. The design objective is to reduce the reflected energy in the test region to \(-10\) dB or less over the test frequency range [not applicable to transmission line system (TLS) field generation systems]. An example of a rectangular shielded enclosure is shown in Figure 1.

Alternatively, the test may be performed at an outdoor test site. The test facility shall comply with (national) legal requirements regarding the emission of electromagnetic fields.

\[\text{Diagram of rectangular shielded enclosure} \]

\[\text{a) Vertical polarization} \]

\(^1\) Measurements in enclosures with or without floor absorbers can lead to different results.
b) Horizontal polarization

Key
1 absorber-lined shielded enclosure
2 RF absorber material
3 vehicle dynamometer on turntable\(^a\)
4 antenna
5 amplifier room
6 control room

\(^a\) Turntable shown rotatable through \(\pm 180^\circ\) with two pairs of variable wheelbase rollers to accommodate all vehicle sizes and functions.

Figure 1 — Example of absorber-lined shielded enclosure

6 Test apparatus

Testing consists of generating radiated electromagnetic fields using antenna sets with radio frequency (RF) sources capable of producing the desired field strength over the range of test frequencies, for which the following apparatus/instrumentation shall be used.

6.1 Field generating device, which may be an antenna or antennas, or a TLS, and whose construction and orientation shall be such that the generated field can be polarized in the mode specified in the test plan (see 9.2).

See Figure 2 for an example of a parallel-plate TLS. Multiple antennas, amplifiers and directional couplers could be necessary to cover the complete frequency range.

6.2 Field probe(s), which shall be electrically small in relation to the wavelength and isotropic.

The communication lines from the probes shall be fibre-optic links.

6.3 RF signal generator, with internal or external modulation capability.
6.4 High power amplifier(s).

6.5 **Powermeter** (or equivalent measuring instrument), for measuring forward and reflected power.

![Diagram of parallel-plate TLS]

**Key**
1. shielded enclosure (absorbers permitted)
2. conductive plate or set of wires
3. non-metallic supports
4. shielded enclosure floor
5. signal source feed line (coaxial cable)
6. coaxial cable
7. load
8. conductive wires
9. signal source feed connection
10. turntable (not required for this test)

**Figure 2 — Example of parallel-plate TLS**