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**Road vehicles — Component test  
methods for electrical disturbances  
from narrowband radiated  
electromagnetic energy —**

Part 1:

**General principles and terminology**

*Véhicules routiers — Méthodes d'essai d'un équipement soumis  
à des perturbations électriques par rayonnement d'énergie  
électromagnétique en bande étroite —*

*Partie 1: Principes généraux et terminologie*





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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#).

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

This fourth edition cancels and replaces the third edition (ISO 11452-1:2005) which has been technically revised. It also incorporates the Amendment ISO 11452-1:2005/Amd 1:2008.

ISO 11452 consists of the following parts, under the general title *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy*:

- *Part 1: General principles and terminology*
- *Part 2: Absorber-lined shielded enclosure*
- *Part 3: Transverse electromagnetic mode (TEM) cell*
- *Part 4: Harness excitation methods*
- *Part 5: Stripline*
- *Part 7: Direct radio frequency (RF) power injection*
- *Part 8: Immunity to magnetic fields*
- *Part 9: Portable transmitters*
- *Part 10: Immunity to conducted disturbances in the extended audio frequency range*
- *Part 11: Reverberation chamber*

## Introduction

In recent years, an increasing number of electronic devices for controlling, monitoring, and displaying a variety of functions have been introduced into vehicle designs. It is necessary to consider the electrical and electromagnetic environment in which these devices operate.

Electrical and radio-frequency disturbances occur during normal operation of many items of motor vehicle equipment. They are generated over a wide frequency range with various electrical characteristics and can be distributed to on-board electronic devices and systems by conduction, radiation, or both. Narrowband signals generated from sources on or off the vehicle can also be coupled into the electrical or electronic system, affecting the normal performance of electronic devices. Such sources of narrowband electromagnetic disturbances include mobile radios and broadcast transmitters.

The characteristics of the immunity of components to radiated disturbances have to be established. The ISO 11452 series provides various test methods for the evaluation of component immunity characteristics. Not all test methods need be used for a given device under test (DUT). For example, stripline and transverse electromagnetic (TEM) cell test methods provide very similar exposure to the DUT. Only those tests necessary for replicating the use and mounting location of the DUT need to be included in the test plan. This will help to ensure a technically and economically optimized design for potentially susceptible components and systems.

The ISO 11452 series is not intended as a product specification and cannot function as one (see [A.1](#)). Therefore, no specific values for the test severity level are given.

[Annex A](#) of this part of ISO 11452 specifies a general method for functional performance status classification (FPSC), [Annex B](#) specifies Artificial Networks (AN), Artificial Mains Networks (AMN), and Asymmetric Artificial Networks (AAN), [Annex C](#) explains the principle of constant peak test level while [Annex D](#) describes an example for the design of a load simulator. Typical severity levels are included in an annex of each of the other parts of ISO 11452.

Protection from potential disturbances has to be considered as a part of total vehicle validation as described in ISO 11451, which covers vehicle test methods. Component test method described in the ISO 11452 series is to be performed prior to vehicle test. Due to the vehicle's shape, harness, and component location diversities, conformity to parts of ISO 11452 does not guarantee conformity to parts of ISO 11451. Nevertheless, the ISO 11452 series component tests are essential for giving a sufficient level of confidence before integration on vehicle(s).



# Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy —

## Part 1: General principles and terminology

### 1 Scope

This part of ISO 11452 specifies general conditions, defines terms, gives practical guidelines, and establishes the basic principles of the component tests used in the other parts of ISO 11452 for determining the immunity of electronic components of passenger cars and commercial vehicles to electrical disturbances from narrowband radiated electromagnetic energy, regardless of the vehicle propulsion system (e.g. spark-ignition engine, diesel engine, electric motor).

The electromagnetic disturbances considered are limited to continuous narrowband electromagnetic fields. A wide frequency range (d.c. and 15 Hz to 18 GHz) is allowed for the immunity testing of the components in this and in the other parts of ISO 11452.

### 2 Normative references

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.

CISPR 16-1-2; *Specification for radio disturbance and immunity measuring apparatus and methods — Part 1-2: Radio disturbance and immunity measuring apparatus — Ancillary equipment — Conducted disturbances; Edition 1.2*

### 3 Terms and definitions

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

#### 3.1

##### **absorber-lined shielded enclosure**

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

Note 1 to entry: The common practice is for the room to have a metallic floor, but absorbing material may also be used on the floor.

#### 3.2

##### **amplitude modulation**

AM

process by which the amplitude of a carrier wave is varied following a specified law, resulting in an AM signal