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

**Part 1:  
General principles and terminology**

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

*Partie 1: Principes généraux et terminologie*



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# Contents

Page

<b>Foreword</b>	<b>iv</b>
<b>Introduction</b>	<b>v</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>1</b>
<b>4 General aim and practical use</b>	<b>5</b>
<b>5 General test conditions</b>	<b>6</b>
5.1 General	6
5.2 Test temperature	7
5.3 Supply voltage	7
5.3.1 Vehicle Low Voltage (LV) power supply	7
5.3.2 Hybrid or electric vehicle not connected to power mains	7
5.3.3 Hybrid or electric vehicle in charging mode (AC or DC)	7
5.4 Modulation	7
5.5 Dwell time	8
5.6 Frequency step sizes	8
5.7 Definition of test severity levels	9
5.8 Disturbance application	9
<b>6 Instrumentation</b>	<b>9</b>
6.1 AN, AMN, and AAN	9
6.2 Test signal quality	9
<b>7 Test procedure</b>	<b>10</b>
7.1 Test plan	10
7.2 Test methods	10
7.2.1 General	10
7.2.2 Substitution	10
7.2.3 Closed loop levelling	11
7.2.4 Vehicle immunity measurement	11
7.3 Test report	12
<b>Annex A (normative) Function Performance Status Classification (FPSC)</b>	<b>13</b>
<b>Annex B (normative) Artificial Networks (AN), Artificial Mains Networks (AMN) and Asymmetric Artificial Networks (AAN)</b>	<b>16</b>
<b>Annex C (informative) Constant peak test level</b>	<b>22</b>
<b>Bibliography</b>	<b>25</b>

## 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 11451-1:2005), which has been technically revised. It also incorporates the Amendment ISO 11451-1:2005/Amd 1:2008.

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)*

## 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 the 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 and 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 a vehicle to radiated disturbances have to be established. ISO 11451 provides various test methods for the evaluation of vehicle immunity characteristics (not all methods need be used to test a vehicle).

ISO 11451 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](#) specifies a general method for function performance status classification (FPSC), [Annex B](#) specifies Artificial Networks (AN), Artificial Mains Networks (AMN) and Asymmetric Artificial Networks (AAN), while annex C explains the principle of constant peak test level. Typical severity levels are included in an annex of each of the other parts of ISO 11451.

Protection from potential disturbances needs to be considered in a total system validation, and this can be achieved using the various parts of ISO 11451.

**NOTE** Immunity measurements of complete vehicles are generally able to be carried out only by the vehicle manufacturer, owing to, for example, high costs of absorber-lined shielded enclosures, the desire to preserve the secrecy of prototypes or a large number of different vehicle models. ISO 11452 specifies test methods for the analysis of component immunity, which are better suited for supplier use.



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

## Part 1: General principles and terminology

### 1 Scope

This part of ISO 11451 specifies general conditions, defines terms, gives practical guidelines, and establishes the basic principles of the vehicle tests used in the other parts of ISO 11451, for determining the immunity 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 (0,01 MHz to 18 000 MHz) is allowed for the immunity testing in this and the other parts of ISO 11451.

### 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 can 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