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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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## 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 11451-1 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 11451-1:2001), 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 source*
- *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 for a given 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 of this part of ISO 11451 specifies a general method for function performance status classification (FPSC), while Annex B 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.

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# 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 Terms and definitions

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

#### 2.1

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

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

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

#### 2.2

##### **amplitude modulation**

##### **AM**

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

#### 2.3

##### **bulk current**

total amount of common mode current in a harness

#### 2.4

##### **compression point**

input signal level at which the measurement system becomes non-linear, when the output value will deviate from the value given by an ideal linear system

#### 2.5

##### **coupling**

means or device for transferring power between systems

NOTE Adapted from IEC 60050-726.