International Standard

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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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# Contents

Page

# Foreword

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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 document 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).

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

This fifth edition cancels and replaces the fourth edition (ISO 11452-1:2015), which has been technically revised.

The main changes are as follows:

— update of the frequency ranges in Table 1;

— update on modulations (type and frequency range);

— technical revision of Annex B;

— new Annex E on broadband test signal generation;

— new Annex F on remote/local grounding;

— new Annex G on evaluation of test instrumentation uncertainties.

A list of all parts in the ISO 11452 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

# 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 (RF) 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.

It is important to establish the characteristics of the immunity of components to radiated disturbances. The ISO 11452 series provides various test methods for the evaluation of component immunity characteristics. Not all test methods need to 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 are 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.

It is important to consider protection from potential disturbances as a part of total vehicle validation as described in the ISO 11452 series, which covers vehicle test methods. A component test method described in the ISO 11452 series is performed prior to vehicle test. Due to the vehicle's shape, harness and component location diversities, conformity to parts of the ISO 11452 series does not guarantee conformity to parts of the ISO 11451 series. 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 document specifies general conditions, defines terms, gives practical guidelines, and establishes the basic principles of the component tests used in the other parts of the ISO 11452 series 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 the ISO 11452 series.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 11452 (all parts), *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy*

CISPR 16-1-2:2014+AMD1:2017 CSV, *Specification for radio disturbance and immunity measuring apparatus and methods — Part 1-2: Radio disturbance and immunity measuring apparatus — Coupling devices for conducted disturbance measurements*

## 3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

**3.1**
**1 dB compression point**
input signal level at which a system becomes non-linear, when the output value will deviate by 1 dB of the value given by an ideal linear system