
**Road vehicles — (EMC) guidelines
for installation of aftermarket radio
frequency transmitting equipment**

*Véhicules routiers — Guide sur la compatibilité électromagnétique
(CEM) pour l'installation en seconde monte d'équipements radio-
téléphone*

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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. www.iso.org/directives

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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 3, *Electrical and electronic equipment*.

This second edition cancels and replaces the first edition (ISO/TS 21609:2003), which has been technically revised.

Road vehicles — (EMC) guidelines for installation of aftermarket radio frequency transmitting equipment

1 Scope

This Technical Specification gives requirements and recommendations for the installation in road vehicles of

- radio frequency (RF) transmitting and receiving equipment,
- “in-road-vehicle” mounting kits for transportable and hand-held RF equipment, and
- ancillary equipment associated with these.

As well as methods for installation, it establishes methods for minimizing the possibility of electromagnetic interference (EMI) between the installed equipment and the vehicle electrical and electronic systems.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050 (all parts), *International Electrotechnical Vocabulary (IEV)*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050 (all parts) and the following terms, definitions and abbreviated terms apply.

3.1.1

mobile equipment

receiver, transmitter or transmitter/receiver (transceiver) that is intended for installation and use in a vehicle, and powered by the main battery of the vehicle

3.1.2

ancillary equipment

any equipment required as part of the installation in addition to the radio

EXAMPLE Voltage converter

3.1.3

equipment supplier

supplier of the equipment to the installer

Note 1 to entry: The equipment supplier may be a dealer, distributor or manufacturer.

3.1.4

floating system

isolated ground return

3.1.5

ground plane

conducting plane of a minimum dimension proportional to the wavelength λ on which a panel mount antenna is fitted

3.1.6

installer

radio equipment installation technician

3.1.7

radiating element

part of an antenna which radiates the signal

3.1.8

vehicle supplier

supplier of the vehicle, who may be a dealer or the manufacturer/importer of the vehicle

3.2 Abbreviated terms

ABS anti-blocking system

CB citizen band

ECU electronic control unit

EMC electromagnetic compatibility

EMI electromagnetic interference

HT high tension (i.e. the high voltage circuits of the ignition system)

ICE in-car entertainment

PMR private mobile radio

RF radio frequency

RFI radio frequency interference

VSWR voltage standing wave ratio

4 General

Installation of RF-transmitting equipment shall be performed by competent personnel. The vehicle and RF transmitting equipment manufacturers' instruction manuals and installation notes shall be followed.

NOTE Vehicle manufacturer's instructions take priority in case of conflict.

It is the responsibility of the competent personnel to ensure the installation complies with national legal requirements for the installation and use of RF equipment in vehicles.

Installation shall be checked for possible interference between the RF-transmitting equipment and the vehicle electric systems in accordance with [6.3](#).

4.1 Customer liaison and installation requirements

4.1.1 General

The customer shall

- be advised to use a suitable antenna for the particular application and optimum position,
- be made aware of the various fixing locations and mounts available for the items to be fitted, and
- be asked whether or not an ignition switched supply to the equipment is required.

4.1.2 EMC requirements

After-market RF-transmitting equipment for installation in road vehicles shall fulfil the requirements of RF-product relevant EMC standards and road vehicle standards. Contact the road vehicle manufacturer and/or equipment supplier if necessary to ensure that the latest version is used.

The purpose of road vehicle EMC standards (see [Table 1](#)) and legal requirements ([Table 2](#)) is to ensure

- the protection of broadcast receivers in a residential environment from radio disturbances from vehicles at distances greater than 10 m,
- that vehicle RF-receivers have sufficient protection from unwanted emissions of other electric systems (RF-systems included) installed in the same vehicle, and
- that no vehicle functions are affected because of the susceptibility of RF-systems to radiated or conducted disturbances.

Table 1 — ISO and IEC/CISPR EMC and RFI standards for road vehicles

Standard	Title
ISO 7637 (all parts)	<i>Road vehicles — Electrical disturbances from conduction and coupling</i>
ISO 10605	<i>Road vehicles — Test methods for electrical disturbances from electrostatic discharge</i>
ISO 11451	<i>Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy</i>
ISO 11452	<i>Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy</i>
ISO 13766	<i>Earth-moving machinery — Electromagnetic compatibility</i>
ISO 14982	<i>Agricultural and forestry machinery — Electromagnetic compatibility — Test methods and acceptance criteria</i>
CISPR 12	<i>Vehicles, boats and internal combustion engines — Radio disturbance characteristics — Limits and methods of measurement for the protection of off-board receivers</i>
CISPR 25	<i>Vehicles, boats and internal combustion engines — Radio disturbance characteristics — Limits and methods of measurement for the protection of on-board receivers</i>