

Australian/New Zealand Standard[®]

**Guide to the installation in vehicles
of mobile communication equipment
intended for connection to a cellular
mobile telecommunication service
(CMTS)**

AS/NZS 4346:1995

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee RC/2, Radiocommunications Communications Equipment—Satellite and Telecommunications Network. It was approved on behalf of the Council of Standards Australia on 7 August 1995 and on behalf of the Council of Standards New Zealand on 24 July 1995. It was published on 5 December 1995.

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Cellular Dealers Association of Australia
Federal Chamber of Automotive Industries, Australia
Vodac Australia

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee RC/2 on Radiocommunications Equipment—Satellite and Telecommunications Networks and is based on the UK Department of Trade and Industry publication MPT-1362, *Code of Practice for Vehicle Installation*, with significant changes.

The objective of this Standard is to assist communication equipment installers and technicians to provide the mobile user with an efficient and safe communications system.

The installation report in Appendix A has been provided courtesy of Vodac Pty Ltd.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

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to a cellular mobile telecommunication service (CMTS)**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard provides guidance for the installation in vehicles of communication equipment intended for connection to the CMTS. It details the requirements for the efficient installation of the equipment in the vehicle.

This Standard does not apply to—

- (a) temporary installations in vehicles, although many of the contained guidelines may be applied; and
- (b) the installation of mobile communication equipment in aeronautical or marine environments.

1.2 APPLICATION This Standard is intended for use by the installers of communication equipment in vehicles, which is intended for connection to a CMTS.

NOTES:

- 1 Many of the requirements in this Standard can also be applied to the installation of land mobile radio equipment.
- 2 Installations of equipment in vehicles carrying flammable liquids and combustible gases and in other specialized vehicles may be subject to specific regulation pertinent to that vehicle.

1.3 REFERENCED DOCUMENTS

AS

1425 LP gas fuel systems for vehicle engines (known as the SAA Automotive LP Gas Code)

2772 Radiofrequency radiation

2772.1 Part 1: Maximum exposure levels—100 kHz to 300 GHz

2772.2 Part 2: Principles and methods of measurement—300 kHz to 100 GHz

2809 Road tank vehicles for dangerous goods

2809.1 Part 1: General requirements

NZS

6609 Radiofrequency radiation

6609.1 Part 1: Maximum exposure levels—100 kHz to 300 GHz

6609.2 Part 2: Principles and methods of measurement—300 kHz to 100 GHz

1.4 DEFINITIONS For the purpose of this Standard, the following definitions apply.

1.4.1 Advanced Mobile Phone System (AMPS)—a first generation mobile communication system, using cellular analogue transmission technology, operating in the 825 to 890 MHz frequency band.

1.4.2 Cellular Mobile Telephone Service (CMTS)—a generic term for public land mobile phone services, such as those based in AMPS, DAMPS and GSM Standards.

NOTE: It is also used in referring to the terminal, and sometimes the network, associated with the delivery of such services.

1.4.3 Customer—the user of the equipment, agent or appointed agent.

1.4.4 Digital Advanced Mobile Phone System (DAMPS)—a second generation mobile communications system using cellular digital transmission technology and operating in the 825 to 890 MHz frequency band.

1.4.5 Electromagnetic compatibility (EMC)—the compatibility or otherwise of a device to the electromagnetic waves emanating from adjacent devices or vice versa, commonly described as interference.

1.4.6 Feeder cable—an interconnecting coaxial cable between the antenna and transceiver unit, with a characteristic impedance of 50 Ω .

NOTE: The standard specification for the feeder cable is RG58.

1.4.7 Fixed-in-vehicle phone—a mobile phone that is permanently installed in the customer's vehicle and cannot normally be removed by the customer for portable use.

1.4.8 Glass-mounted antenna—an antenna designed to mount on the vehicle glass, usually the rear window, adhered to by pressure-sensitive, double-sided tape. The device is capacitively coupled through the glass to the feeder cable.

1.4.9 Global System for Mobile Communications (GSM)—a second generation mobile communications system using cellular digital transmission technology, incorporating secure encoding and decoding for enhanced security, and operating in the 890 to 960 MHz band.

1.4.10 Ground-plane—a metal screen or plate located at the base of an antenna extending typically a minimum of half a wavelength in every direction.

NOTE: The function of the ground plane is to mimic the earth surface effect of reflecting the received signal, in order to optimize impedance matching with the antenna's coaxial feeder and thereby maximizing the received signal strength.

1.4.11 Hands-free adaptor (cradle)—a permanently fixed or installed cradle or adaptor in the customer's vehicle which allows the temporary installation of portable phones for in-vehicle hands-free use.

1.4.12 High tension (HT) circuits—electrical circuits within the vehicle's electrical system, operating at relatively high voltages, usually in excess of 1000 V.

1.4.13 Ignition-sensed supply—the switched d.c. supply for the vehicle's electrical system that is controlled by the operation of the ignition key of the vehicle.

1.4.14 Isolated power supply—a switched d.c. supply derived from the vehicle's battery system which is able to be electrically isolated from the rest of the vehicle's electrical system.

NOTE: Typically used in fuel-carrying vehicles for safety purposes and will always give d.c. isolation between the vehicle battery terminals and the vehicle chassis.

1.4.15 Low tension (LT) circuits—electrical circuits within the vehicle's electrical system operating at relatively low voltages, usually less than 750 V; for motor vehicles, typically 12 V or 24 V.

1.4.16 Master isolation switch—a battery isolation switch arranged to isolate the battery from all circuits and equipment, with the exception that an unswitched supply may be maintained to certain vehicle equipment (e.g. an operation recorder) which cannot be shut off.

1.4.17 Mobile communication equipment—equipment used for the transmission and reception of information, primarily in the form of speech and data, that is portable or mountable (on vehicles).

1.4.18 Mobile data equipment—equipment used for data communications that interfaces with mobile communication equipment, and can include an interface, modem, data terminal equipment fax, or personal computer.

1.4.19 Panel-mounted antenna—an antenna designed to mount on vehicle panels, usually the roof, guard or boot lid. The antenna is mounted through a hole of suitable size in the desired panel, with direct coupling to the feeder cable.

1.4.20 Transceiver—a combined transmitter and receiver set, packaged in the one housing, to perform the transmission and reception of radio signals to communicate with the network infrastructure.

1.4.21 Voltage standing wave ratio (VSWR)—a measure of the transmitted power compared to the reflected power at the antenna caused by imperfect matching of impedances between the antenna and the transceiver. VSWR is expressed as a ratio where 1:1 is considered as perfect matching and a figure greater than 1:1, e.g. 1.5:1, which would be less than perfect matching.

SECTION 2 GENERAL REQUIREMENTS

2.1 INTRODUCTION The mobile communication equipment should, where possible, harmonize with the vehicle's interior and appear as an integral part of the vehicle.

It is recommended that installers have a basic electronic certificate or equivalent and a demonstrated level of competency in the installation of mobile equipment.

Apart from the general quality of the installation, particular consideration shall be given to the location of the antenna.

2.2 VEHICLE INSPECTION When accepting the vehicle, the bodywork, interior and electrical fittings should be checked. Any defects should be brought to the attention of the customer and noted on the installation documentation.

Whilst inspecting the vehicle, if any installation problems are identified, they should be noted and stated during consultation with the customer, before any work proceeds.

NOTE: Typical points to be checked are covered in Appendix A which will provide a record of the vehicle's condition before and after installation.

2.3 CUSTOMER INSTALLATION REQUIREMENTS

2.3.1 Equipment compatibility The customer should—

- (a) be made aware by the installer that the equipment provided for vehicle installation is compatible with the make and type of handset proposed for use in the vehicle;

NOTE: In particular equipment intended for use with AMPS may not be compatible with equipment intended for GSM usage.

- (b) be advised on the most suitable antenna for the particular application and optimum position;
- (c) be made aware of the various fixing locations and mounts available, which should not be installed in such a way as to affect the safety design of the vehicle or cause possible injury; and
- (d) be asked whether an ignition-sensed supply to the equipment is required.

2.3.2 Master isolation switch In the case of those vehicles fitted with a master isolation switch, the low tension (LT) supply to the communication equipment should normally be connected to the 'switched' side. However, for certain applications, this may not be practicable. In these instances, the customer shall specify, in writing, whether the switch is to be bypassed and this fact recorded in the installation report.

2.3.3 Manufacturer's guidelines In consultation with the customer, the installer should ensure that the installation complies with the manufacturer's guidelines for that particular type of vehicle, when available.

2.3.4 Battery disconnection In certain cases, when the vehicle battery is disconnected, problems may occur to certain types of electrical equipment, including—

- (a) in-car entertainment equipment fitted with an anti-theft security code;
- (b) vehicle alarm systems; and
- (c) in-car data management systems.

NOTE: Refer to the manufacturer's manual for further information on the requirements for disconnection of specific equipment in the vehicle.

The installer should check with the customer that the necessary information is at hand to make the equipment function correctly if the battery is disconnected.