

## Australian/New Zealand Standard™

**Vehicles, boats, and internal  
combustion engine driven devices—  
Radio disturbance characteristics—  
Limits and methods of measurement for  
the protection of receivers except those  
installed in the vehicle/boat/device itself  
or in adjacent vehicles/boats/device**



## **AS/NZS CISPR 12:2006**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee TE-003, Electromagnetic Interferences. It was approved on behalf of the Council of Standards Australia on 10 April 2006 and on behalf of the Council of Standards New Zealand on 19 May 2006.

This Standard was published on 2 June 2006.

---

The following are represented on Committee TE-003:

Australian Broadcasting Corporation  
Australian Chamber of Commerce and Industry  
Australian Communications and Media Authority  
Australian Electrical and Electronic Manufacturers Association  
Australian Information Industry Association  
Consumer Electronics Supplier Association  
Electrical Compliance Testing Association  
Engineers Australia  
Free TV Australia  
Ministry of Economic Development, New Zealand  
National Measurement Institute  
SingTel Optus  
Society of Automotive Engineers, Australasia  
Telstra Corporation  
University of Western Australia  
Wireless Institute Australia

---

### **Keeping Standards up-to-date**

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at [www.standards.com.au](http://www.standards.com.au) or Standards New Zealand web site at [www.standards.co.nz](http://www.standards.co.nz) and looking up the relevant Standard in the on-line catalogue.

Alternatively, both organizations publish an annual printed Catalogue with full details of all current Standards. For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

---

*This Standard was issued in draft form for comment as DR 06058.*

---

Australian/New Zealand Standard™

**Vehicles, boats, and internal  
combustion engine driven devices—  
Radio disturbance characteristics—  
Limits and methods of measurement for  
the protection of receivers except those  
installed in the vehicle/boat/device itself  
or in adjacent vehicles/boats/device**

Originated as AS 2557—1982.  
Previous edition AS/NZS CISPR 12:2004.  
Second edition 2006.

**COPYRIGHT**

© Standards Australia/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 7460 1

## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE-003, Electromagnetic Interferences, to supersede AS/NZS CISPR 12:2004, as one of a series of Standards intended to facilitate control of electromagnetic interference and the compatibility of electrical and electronic equipment.

This Standard is identical with, and has been reproduced from CISPR 12:2005, *Vehicles, boats, and internal combustion engine driven devices—Radio disturbance characteristics—Limits and methods of measurement for the protection of receivers except those installed in the vehicle/boat/device itself or in adjacent vehicles/boats/device*.

The objective of this Standard is to provide limits of protection for broadcast receivers in the frequency range of 30 MHz to 1 000 MHz when used in the residential environment. This Standard applies to the emission of broadband and narrowband electromagnetic energy which may cause interference to radio reception and which is emitted from vehicles or boats propelled by an internal combustion engine, electrical means or both, and devices equipped with an internal combustion engine. Aircraft and traction systems are beyond the scope of this Standard, nor does it specify the measurement of electromagnetic disturbances while the vehicle is connected to power mains for charging.

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (b) In the source text ‘this International Standard’ should read ‘this Australian/New Zealand Standard’.
- (c) A full point should be substituted for a comma when referring to a decimal marker.
- (d) Any French text on figures should be ignored.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

<i>Reference to International Standard</i>		<i>Australian/New Zealand Standard</i>	
IEC		AS/NZS	
60050	International Electrotechnical Vocabulary (IEV)	—	
60050-161	Chapter 161: Electromagnetic compatibility	—	
CISPR		AS/NZS CISPR	
16	Specification for radio disturbance and immunity measuring apparatus and methods	16	Specification for radio disturbance and immunity measuring apparatus and methods
16-1	Part 1: Radio disturbance and immunity measuring apparatus	16.1	Part 1: Radio disturbance and immunity measuring apparatus
25	Limits and methods of measurement of radio disturbance characteristics for the protection of receivers used on board vehicles	25	Limits and methods of measurement of radio disturbance characteristics for the protection of receivers used on board vehicles

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annex to which they apply. A ‘normative’ annex is an integral part of a Standard, whereas an ‘informative’ annex is only for information and guidance.

## CONTENTS

	<i>Page</i>
1 Scope.....	1
2 Normative references .....	2
3 Definitions .....	2
4 Limits of disturbance .....	4
4.1 Determination of the appropriate limit level.....	4
4.2 Broadband emissions .....	5
4.3 Narrowband emissions .....	5
5 Methods of measurement .....	6
5.1 Measuring apparatus requirements.....	6
5.2 Measuring location requirements .....	9
5.3 Test object conditions.....	14
5.4 Test frequencies.....	15
5.5 Data collection .....	16
6 Methods of checking for compliance with CISPR requirements .....	16
6.1 General .....	16
6.2 Application of limit curves.....	16
6.3 Evaluation (general).....	16
6.4 Type approval test.....	16
6.5 Surveillance (quality audit) of series production.....	17
6.6 Quick prototype check for development testing (broadband emissions only) .....	17
Annex A (normative) Statistical analysis of the results of measurements .....	18
Annex B (informative) Rod antenna (monopole) performance equations and characterization of the rod antenna matching amplifier – The equivalent capacitance substitution method .....	20
Annex C (informative) Antenna and transmission line maintenance and characterization .....	24
Annex D (informative) Construction features of motor vehicles affecting the emission of ignition noise.....	29
Annex E (informative) Measurement of the insertion loss of ignition noise suppressors .....	30
Annex F (informative) Methods of measurement to determine the attenuation characteristics of ignition noise suppressors for high-tension ignition systems .....	37
Annex G (informative) Flow chart for checking the applicability of CISPR 12 .....	46
Annex H (normative) Procedure to determine an alternative emission limit for measurements at 3 m antenna distance.....	47

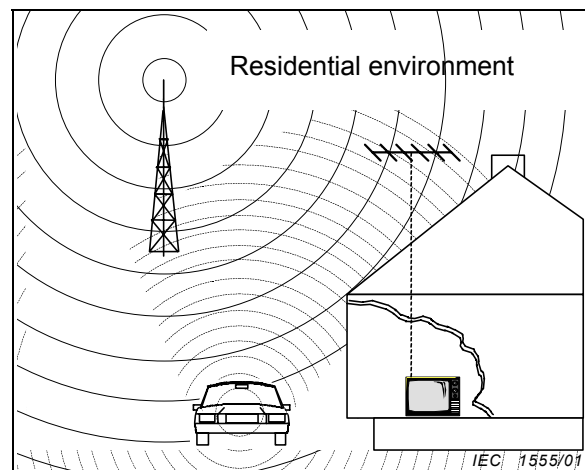
Figure 1 – Example method of determination of conformance of radiated disturbance.....	4
Figure 2 – Limits of disturbance (broadband) at 10 m antenna distance.....	5
Figure 3 – Limits of disturbance (narrowband) at 10 m antenna distance.....	6
Figure 4 – Measuring site (OATS) for vehicles and devices.....	10
Figure 5 – Measuring site (OATS) for boats.....	11
Figure 6 – Antenna position to measure emissions – Vertical polarization.....	12
Figure 7 – Antenna position to measure emissions – Horizontal polarization.....	13
Figure B.1 – Example of mounting capacitor in dummy antenna.....	21
Figure B.2 – Measurement of 1 m monopole antenna factor.....	23
Figure C.1 – Alternate antenna factor determination (10 m test distance).....	28
Figure E.1 – Test circuit.....	32
Figure E.2 – General arrangement of the test box.....	33
Figure E.3 – Details of the test-box lid.....	34
Figure E.4 – Details of the test box.....	34
Figure E.5 – Straight spark-plug ignition noise suppressor (screened or unscreened).....	35
Figure E.6 – Right-angle spark-plug ignition noise suppressor (screened or unscreened).....	35
Figure E.7 – Noise suppression spark plug.....	35
Figure E.8 – Resistive distributor brush.....	35
Figure E.9 – Noise suppressor in distributor cap.....	36
Figure E.10 – Noise suppression distributor rotor.....	36
Figure E.11 – Noise suppression ignition cable (resistive or reactive).....	36
Figure F.1 – Test set-up, side view.....	39
Figure F.2 – Test set-up, top view.....	40
Figure F.3 – Pressure chamber with ventilation.....	41
Figure F.4 – Top view of the set-up of a right-angle ignition noise suppressor for distributors.....	42
Figure F.5 – Side view of the test set-up for the distributor rotors.....	43
Figure F.6 – Top view of the test set-up for distributor rotors.....	44
Figure F.7 – Side view of the test set-up for ready-to-use resistive ignition cables.....	45
Figure H.1 – Determination of the maximum antenna angle.....	47
Figure H.2 – Calculation of the resulting gain reduction $a$ .....	48
Table 1 – Minimum scan time.....	7
Table 2 – Recommended measuring instrument bandwidth (6 dB).....	7
Table 3 – Internal combustion engine operating speeds.....	14
Table A.1 – Statistical factors.....	18
Table A.2 – Example of frequency sub-bands.....	19
Table F.1 – Limits.....	37

## AUSTRALIAN/NEW ZEALAND STANDARD

# Vehicles, boats, and internal combustion engine driven devices—Radio disturbance characteristics—Limits and methods of measurement for the protection of receivers except those installed in the vehicle/boat/device itself or in adjacent vehicles/boats/devices

## 1 Scope

The limits in this International Standard are designed to provide protection for broadcast receivers in the frequency range of 30 MHz to 1 000 MHz when used in the residential environment. Compliance with this standard may not provide adequate protection for new types of radio transmissions or receivers used in the residential environment nearer than 10 m to the vehicle or device.



NOTE 1 Experience has shown that compliance with this standard may provide satisfactory protection for receivers of other types of transmissions when used in the residential environment, including radio transmissions in frequency ranges other than that specified.

This standard applies to the emission of broadband and narrowband electromagnetic energy which may cause interference to radio reception and which is emitted from

- a) vehicles propelled by an internal combustion engine, electrical means or both (see 3.1);
- b) boats propelled by an internal combustion engine, electrical means or both (see 3.2). Boats are to be tested in the same manner as vehicles except where they have unique characteristics as explicitly stated in this standard;
- c) devices equipped with internal combustion engines (see 3.3).

This standard includes limits and test methods for both broadband and narrowband emissions.

This standard does not apply to aircraft, traction systems (railway, tramway and trolley bus), or to incomplete vehicles.

NOTE 2 Protection of receivers used on board the same vehicle as the disturbance source(s) are covered by CISPR 25.

The measurement of electromagnetic disturbances while the vehicle is connected to power mains for charging is not covered in this standard. The user is referred to appropriate IEC and CISPR standards which define measurement techniques and limits for this condition.