Australian/New Zealand Standard[™]

Industrial, scientific and medical equipment—Radio-frequency disturbance characteristics—Limits and methods of measurement





AS/NZS CISPR 11:2011

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee TE-003, Electromagnetic Interference. It was approved on behalf of the Council of Standards Australia on 30 November 2010 and on behalf of the Council of Standards New Zealand on 10 December 2010. This Standard was published on 27 January 2011.

The following are represented on Committee TE-003:

Australian Broadcasting Corporation Australian Chamber of Commerce and Industry Australian Communications and Media Authority Australian Information Industry Association Consumer Electronics Suppliers Association Department of Defence (Australia) Electrical Compliance Testing Association Engineers Australia Free TV Australia Ministry of Economic Development (New Zealand) National Measurement Institute New Zealand Testing Interests (Co-opted by Standards New Zealand) SingTel Optus 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 Standards may also be withdrawn.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.saiglobal.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

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 AS/NZS CISPR 11.

Australian/New Zealand Standard™

Industrial, scientific and medical equipment—Radio-frequency disturbance characteristics—Limits and methods of measurement

Originated as part of AS 2064—1977. Previous edition AS/NZS CISPR 11:2004. Third edition November 2004. This edition 2011.

COPYRIGHT

© Standards Australia Limited/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, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, Private Bag 2439, Wellington 6140

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE-003, Electromagnetic Interference, to supersede AS/NZS CISPR 11:2004.

The objective of this Standard is to identify limits and methods of measurement of electromagnetic disturbance characteristics in ISM radio frequency equipment.

This Standard is identical with, and has been reproduced from IEC CISPR 11, Ed. 5.1 (2010), *Industrial, scientific and medical equipment—Radio-frequency disturbance characteristics—Limits and methods of measurement.*

The fifth edition of CISPR 11 has a more transparent structure, introduces another set of particular limits for conducted and radiated disturbances of 'heavy duty' general purpose equipment of class A group 1 with a rated input power in excess of 20 kVA, in accordance with the needs of the industries, and refers to the full approach in respect of the measurement instrumentation uncertainty specified in CISPR 16-4-4. Furthermore, any kind of 'legal statements' were removed from the normative main body of this Standard.

It has the status of a Product Family EMC standard in accordance with IEC Guide 107, *Electromagnetic compatibility—Guide to the drafting of electromagnetic compatibility* publications (2009).

The main content of this Standard is based on CISPR Recommendation No. 39/2, Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.

Considering that—

- (a) ISM RF equipment is an important source of disturbance;
- (b) methods of measuring such disturbances have been prescribed by the CISPR; and
- (c) certain frequencies are designated by the International Telecommunication Union (ITU) for unrestricted radiation from ISM equipment.

CISPR recommends that the latest edition of CISPR 11 be used for the application of limits and methods of measurement of ISM equipment.

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

- (i) Its number appears on the cover and title page, while the international standard number appears only on the cover.
- (ii) In the source text 'this International Standard' should read 'this Australian/New Zealand Standard'.
- (iii) A full point substitutes for a comma when referring to a decimal marker.

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

Reference to International Standard CISPR

- 16 Specification for radio disturbance and immunity measuring apparatus and methods
- 16-1-4 Part 1-4: Radio disturbance and immunity measuring apparatus— Ancillary equipment—Radiated disturbances (CISPR 16-1-4:2007)
- 16-4-2 Part 4-2: Uncertainties, statistics and limit modelling—Uncertainty in EMC measurements (CISPR 16-4-2:2003)

Australian/New Zealand Standard AS/NZS CISPR

- 16 Specification for radio disturbance and immunity measuring apparatus and methods
- 16.1.4 Part 1.4: Radio disturbance and immunity measuring apparatus— Ancillary equipment—Radiated disturbances (AS/NZS CISPR 16.1.4:2009)
- 16.4.2 Part 4.2: Uncertainties, statistics and limit modelling—Uncertainty in EMC measurements (AS/NZS CISPR 16.4.2:2004)

The terms 'normative' and 'informative' are used 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

			Page				
Scop	cope1						
Norm	mative references1						
Term	ms and definitions						
Frea	quencies designated for ISM use						
	Classification of ISM equipment						
5.1							
5.2							
5.3							
Limits of electromagnetic disturbances							
6.1 General							
6.2		1 equipment measured on a test site					
	6.2.1	Limits of terminal disturbance voltage					
	6.2.2	Limits of electromagnetic radiation disturbance					
6.3	Group 2 equipment measured on a test site						
	6.3.1	Limits of terminal disturbance voltage	9				
	6.3.2	Limits of electromagnetic radiation disturbance	11				
6.4	Group	1 and group 2 class A equipment measured in situ	19				
	6.4.1	Limits of terminal disturbance voltage	19				
	6.4.2	Limits of electromagnetic radiation disturbance					
Measurement requirements							
7.1	Gener	al	21				
7.2	Ambient noise						
7.3	Measu	ıring equipment	21				
	7.3.1	Measuring instruments					
	7.3.2	Artificial mains network					
	7.3.3	Voltage probe					
	7.3.4	Antennas					
	7.3.5	Artificial hand					
7.4 Frequency measurement							
7.5	-	juration of equipment under test					
	7.5.1	General					
	7.5.2 7.5.3	Interconnecting cables					
7.6		Connection to the electricity supply network on a test site					
7.0	7.6.1	General					
	7.6.2	Medical equipment					
	7.6.3	Industrial equipment					
	7.6.4	Scientific, laboratory and measuring equipment					
	7.6.5	Microwave cooking appliances					
	7.6.6	Other equipment in the frequency range 1 GHz to 18 GHz					
	7.6.7	Single and multiple-zone induction cooking appliances					
	7.6.8	Electric welding equipment					
7.7	Record	ding of test-site measurement results	29				
	7.7.1	General	29				

		7.7.2	Conducted emissions	29			
	_	7.7.3	Radiated emissions				
8							
	8.1	d planes					
	8.2		rement of mains terminal disturbance voltage				
		8.2.1	General	29			
		8.2.2	Handheld equipment which are normally operated without an earth connection	30			
	8.3	Radiat	ion test site for 9 kHz to 1 GHz				
	0.0	8.3.1	General				
		8.3.2	Validation of the radiation test site (9 kHz to 1 GHz)				
		8.3.3	Disposition of equipment under test (9 kHz to 1 GHz)				
		8.3.4	Radiation measurements (9 kHz to 1 GHz)				
	8.4		ative radiation test sites for the frequency range 30 MHz to 1 GHz				
9	Radiation measurements: 1 GHz to 18 GHz						
	9.1	Test a	rrangement	32			
	9.2		/ing antenna				
	9.3		tion and calibration of test site				
	9.4	Measu	ring procedure	32			
10	Meas	suremer	nt in situ	32			
11	Safe	ty preca	utions				
12	Asse	ssment	of conformity of equipment				
		al					
			ical assessment of compliance of series produced equipment				
			nent in small-scale production				
	12.4	Equipr	nent produced on an individual basis	34			
	12.5	Measu	rement uncertainty	34			
13	Figur	es and	flowcharts	34			
Annex A (informative) Examples of equipment classification							
Annex B (informative) Precautions to be taken in the use of a spectrum analyzer (see 7.3.1)							
•		,		40			
			tive) Measurement of electromagnetic radiation disturbance in the als from radio transmitters	41			
•		-	ative) Propagation of interference from industrial radio-frequency				
		•	quencies between 30 MHz and 300 MHz	42			
			ative) Recommendations of CISPR for protection of certain radio cular areas	12			
		•					
Annex F (informative) Frequency bands allocated for safety-related radio services							
Anr	nex G	(information)	ative) Frequency bands allocated for sensitive radio services	45			
Bib	liogra	phy		46			
Fig	ure 1	– Test s	site	34			
Figure 2 – Minimum size of metal ground plane							
Figure 3 – Disposition of medical (capacitive type) and dummy load (see 7.6.2.1)							
9							