

Australian/New Zealand Standard™

**Limits and methods of measurement of
radio disturbance characteristics of
electrical lighting and similar equipment
(CISPR 15, Ed.7.2 (2009) MOD)**



AS/NZS CISPR 15:2011

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 25 November 2011 and on behalf of the Council of Standards New Zealand on 6 December 2011.
This Standard was published on 20 December 2011.

The following are represented on Committee TE-003:

Australian Broadcasting Corporation
Australian Chamber of Commerce and Industry
Australian Communications and Media Authority
Australian Industry Group
Australian Information Industry Association
Australian Subscription Television and Radio Association
Consult Australia
Consumer Electronics Suppliers Association
Consumers Federation of Australia
Curtin University of Technology
Department of Defence (Australia)
Electrical Compliance Testing Association
Energy Networks Association
Engineers Australia
Free TV Australia
Lighting Council of Australia
Ministry of Economic Development, New Zealand
National Measurement Institute
New Zealand Testing Interests
SingTel Optus
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 Standards may also be withdrawn.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 15.

Australian/New Zealand Standard™

Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment (CISPR 15, Ed.7.2 (2009) MOD)

Originated as AS/NZS 4051:1992.
Previous edition AS/NZS CISPR 15:2006.
Third 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 15:2006, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*, as one of a series of Standards intended to facilitate control of electromagnetic interference and the compatibility of electrical and electronic equipment.

The objective of this Standard is to specify the limits and methods of test for the measurement of radio disturbance characteristics of electrical lighting and similar equipment. The frequency range covered is 9 kHz to 400 GHz.

This Standard is an adoption with national modifications and has been reproduced from CISPR 15, Ed.7.2 (2009), *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment* and has been varied as indicated to take account of Australian/New Zealand conditions.

The Australian variations are found in Appendix ZZ and are related to the suitability of the CDN test method, which has been limited for use for products producing broadband noise disturbances only. This limitation was put in place because the CDN test method fails to consider the VSWR (voltage standing wave ratio) present on the products cables especially for narrowband emissions. Hence the CDN test method given in Annex B is not suitable for narrowband emission measurements.

The source document incorporates Amendment 1 (2006) and Amendment 2 (2008). The amended text is indicated by vertical lines in the margins.

As this Standard is reproduced from an International Standard, 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:

<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	—	
60155	Glow-starters for fluorescent lamps	—	
60598	Luminaires	60598	Luminaires
60598-1	Part 1: General requirements and tests	60598.1	Part 1: General requirements and tests (IEC 60598-1:2003, MOD)
CISPR		AS/NZS CISPR	
11	Industrial, scientific and medical (ISM) radio-frequency equipment—Electromagnetic disturbance characteristics—Limits and methods of measurement	11	Industrial, scientific and medical equipment—Radiofrequency disturbance characteristics—Limits and methods of measurement

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
16-1-1	Part 1-1: Radio disturbance and immunity measuring apparatus—Measuring apparatus	16.1.1	Part 1.1: Radio disturbance and immunity measuring apparatus—Measuring apparatus
16-1-2	Part 1-2: Radio disturbance and immunity measuring apparatus—Ancillary equipment—Conducted disturbances	16.1.2	Part 1.2: Radio disturbance and immunity measuring apparatus—Ancillary equipment—Conducted disturbances
16-1-4	Part 1-4: Radio disturbance and immunity measuring apparatus—Ancillary equipment—Radiated disturbances	16.1.4	Part 1.4: Radio disturbance and immunity measuring apparatus—Ancillary equipment—Radiated disturbances
16-2-1	Part 2-1: Methods of measurement of disturbances and immunity—Conducted disturbance measurements	16.2.1	Part 2.1: Methods of measurement of disturbances and immunity—Conducted disturbance measurements
16-4-2	Part 4-2: Methods of measurement of disturbances and immunity—Uncertainties, statistics and limit modelling—Uncertainty in EMC measurements	16.4.2	Part 4.2: Methods of measurement of disturbances and immunity—Uncertainties, statistics and limit modelling—Uncertainty in EMC measurements
22	Information technology equipment—Radio disturbance characteristics—Limits and methods of measurement	22	Information technology equipment—Radio disturbance characteristics—Limits and methods of measurement

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

CONTENTS

1	Scope	7
2	Normative references.....	8
3	Terms and definitions	8
4	Limits	9
4.1	Frequency ranges	9
4.2	Insertion loss	9
4.3	Disturbance voltages	9
4.4	Radiated electromagnetic disturbances	10
5	Application of the limits	11
5.1	General	11
5.2	Indoor luminaires	12
5.3	Independent auxiliaries exclusively for use with lighting equipment	13
5.4	Self-ballasted lamps	15
5.5	Outdoor lighting appliances.....	15
5.6	UV and IR radiation appliances	16
5.7	Transport lighting.....	17
5.8	Neon and other advertising signs	17
5.9	Self-contained emergency lighting luminaires.....	17
5.10	Replaceable starters for fluorescent lamps.....	18
6	Operating conditions for lighting equipment.....	18
6.1	General	18
6.2	Lighting equipment	18
6.3	Supply voltage and frequency	19
6.4	Ambient conditions	19
6.5	Lamps	19
6.6	Replaceable starters.....	19
7	Method of insertion loss measurement	20
7.1	Circuits for the measurement of insertion loss	20
7.2	Measuring arrangement and procedure	20
7.3	Luminaire	21
7.4	Measurement procedure	21
8	Method of measurement of disturbance voltages	22
8.1	Measuring arrangement and procedure	22
8.2	Indoor and outdoor luminaires.....	24
8.3	Independent light regulating devices	25
8.4	Independent transformers and convertors for incandescent lamps.....	25
8.5	Independent ballasts for fluorescent and other discharge lamps	25
8.6	Self-ballasted lamps and semi-luminaires	26
8.7	UV and IR radiation appliances	26
8.8	Self-contained emergency lighting luminaires.....	26
8.9	Independent starters and igniters for fluorescent and other discharge lamps	27

9	Method of measurement of radiated electromagnetic disturbances	27
9.1	Measuring arrangement and procedure related to Subclause 4.4.1	27
9.2	Measuring arrangement and procedure related to Subclause 4.4.2	27
9.3	Indoor and outdoor luminaires.....	28
9.4	Independent convertors for incandescent lamps.....	28
9.5	Independent ballasts for fluorescent and other discharge lamps	28
9.6	Self-ballasted lamps and semi-luminaires	28
9.7	UV and IR radiation appliances	28
9.8	Self-contained emergency lighting luminaires	28
10	Interpretation of CISPR radio disturbance limits	28
10.1	Significance of a CISPR limit	28
10.2	Tests.....	28
10.3	Statistical method of evaluation.....	29
10.4	Non-compliance.....	29
11	Measurement uncertainty.....	30
	Annex A (normative) Electrical and constructional requirements for the low-capacitance balance-to-unbalance transformer.....	43
	Annex B (normative) Independent method of measurement of radiated disturbances	48
	Annex C (normative) Example test arrangements during CISPR 22 radiated disturbance measurement	51
	Figure 1 – Insertion loss measurement on linear and U-type fluorescent lamp luminaires	31
	Figure 2 – Insertion loss measurement on circular fluorescent lamp luminaires	32
	Figure 3 – Insertion loss measurement on luminaires for single-capped fluorescent lamps with integrated starter	33
	Figure 4a – Configuration of linear and U-type dummy lamps.....	34
	Figure 4b – Configuration of circular dummy lamps.....	35
	Figure 4c – Dummy lamp for 15 mm fluorescent lamps	36
	Figure 4d – Dummy lamp for 15 mm single-capped fluorescent lamps	37
	Figure 4e – Dummy lamp for single-capped fluorescent lamps, linear-shaped, twin tube, tube diameter 12 mm.....	38
	Figure 4f – Dummy lamp for single-capped fluorescent lamps, linear-shaped, quad tube, diameter 12 mm.....	39
	Figure 5 – Measuring arrangements for an independent light regulating device, transformer or convertor.....	40
	Figure 6 – Measuring arrangements for measuring a luminaire (Figure 6a), an independent ballast (Figure 6b) and a self-ballasted lamp (Figure 6c)	41
	Figure 7 – Conical metal housing for self-ballasted fluorescent lamps.....	42
	Figure A.1 – Isolation test configuration.....	44
	Figure A.2a – Balance-to-unbalance transformer circuit.....	45
	Figure A.2b – Details of transformer core construction.....	46
	Figure A.2c – Details of transformer core construction.....	46
	Figure A.2d – Construction of transformer	47

Figure B.1 – Test set-up for CDN method	49
Figure B.2 – Calibration set-up for determining CDN voltage division factor	50
Table 1 – Minimum values of insertion loss.....	9
Table 2a – Disturbance voltage limits at mains terminals	9
Table 2b – Disturbance voltage limits at load terminals.....	10
Table 2c – Disturbance voltage limits at control terminals	10
Table 3a – Radiated disturbance limits in the frequency range 9 kHz to 30 MHz.....	11
Table 3b – Radiated disturbance limits in the frequency range 30 MHz to 300 MHz at a measuring distance of 10 m	11
Table 4 – Sample size and corresponding k factor in a non-central t-distribution	29
Table B.1 – Common mode terminal voltage limits, CDN method	49
Table C.1 – Arrangement of typical luminaires during the CISPR 22 radiated disturbance measurement	51

AUSTRALIAN/NEW ZEALAND STANDARD

Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment (CISPR 15, Ed.7.2 (2009) MOD)**1 Scope**

This standard applies to the emission (radiated and conducted) of radiofrequency disturbances from:

- all lighting equipment with a primary function of generating and/or distributing light intended for illumination purposes, and intended either for connection to the low voltage electricity supply or for battery operation;
- the lighting part of multi-function equipment where one of the primary functions of this is illumination;
- independent auxiliaries exclusively for use with lighting equipment;
- UV and IR radiation equipment;
- neon advertising signs;
- street/flood lighting intended for outdoor use;
- transport lighting (installed in buses and trains).

Excluded from the scope of this standard are:

- lighting equipment operating in the ISM frequency bands (as defined in Resolution 63 (1979) of the ITU Radio Regulation);
- lighting equipment for aircraft and airports;
- apparatus for which the electromagnetic compatibility requirements in the radio-frequency range are explicitly formulated in other IEC or CISPR standards.

NOTE Examples are:

- built-in lighting devices in other equipment, for example scale illumination or neon devices;
- photocopiers;
- slide projectors;
- lighting equipment for road vehicles.

The frequency range covered is 9 kHz to 400 GHz.

Multi-function equipment which is subjected simultaneously to different clauses of this standard and/or other standards shall meet the provisions of each clause/standard with the relevant functions in operation.

The limits in this standard have been determined on a probabilistic basis to keep the suppression of disturbances within economically reasonable limits while still achieving an adequate level of radio protection and electromagnetic compatibility. In exceptional cases, additional provisions may be required.