Australian/New Zealand Standard™

Specification for radio disturbance and immunity measuring apparatus and methods

Part 4.1: Uncertainties, statistics and limit modelling—Uncertainties in standardized EMC tests

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 28 November 2012 and on behalf of the Council of Standards New Zealand on 29 October 2012.
This Standard was published on 24 December 2012.

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This Standard was issued in draft form for comment as DR AS/NZS CISPR 16.4.1.

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First published as AS/NZS CISPR 16.4.1:2004.
Second edition 2006.
This edition 2012.

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

ISBN 978 1 74342 327 1

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE-003, Electromagnetic Interference, to supersede AS/NZS CISPR 16.4.1:2006.

This Standard covers the treatment of uncertainties for those who are involved in the development or modification of CISPR electromagnetic compatibility (EMC) standards. In addition, this Standard provides useful background information for those who apply the standards and the uncertainty aspects in practice. The objectives of this Standard are to—

(a) identify the parameters or sources governing the uncertainty associated with the statement that a given product complies with the requirement specified in a CISPR recommendation. This uncertainty will be called 'standards compliance uncertainty' (SCU, see 3.1.16);

(b) give guidance on the estimation of the magnitude of the standards compliance uncertainty; and

(c) give guidance for the implementation of the standards compliance uncertainty into the compliance criterion of a CISPR standardized compliance test.

This Standard is identical with, and has been reproduced from, CISPR/TR 16-4-1, Ed. 2.0 (2009), *Specification for radio disturbance and immunity measuring apparatus and methods*—Part 4-1: *Uncertainties, statistics and limit modelling—Uncertainties in standardized EMC tests.*

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 part of CISPR 16-4' 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		*Australian/New Zealand Standard*	
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
16-1-2	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—Conducted disturbances
16-1-3	Part 1-3: Radio disturbance and immunity measuring apparatus—Ancillary equipment—Disturbance power	16.1.3	Part 1.3: Radio disturbance and immunity measuring apparatus—Ancillary equipment—Disturbance power
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
16-1-5	Part 1-5: Radio disturbance and immunity measuring apparatus—Antenna calibration test sites for 30 MHz to 1 000 MHz	16.1.5	Part 1.5: Radio disturbance and immunity measuring apparatus—Antenna calibration test sites for 30 MHz to 1000 MHz
16-2-2	Part 2-2: Methods of measurement of disturbances and immunity—Measurement of disturbance power	16.2.2	Part 2.2: Methods of measurement of disturbances and immunity—Measurement of disturbance power

CISPR	AS/NZS CISPR
16-2-3 Part 2-3: Methods of measurement of disturbances and immunity—Radiated disturbance measurements	16.2.3 Part 2.3: Methods of measurement of disturbances and immunity—Radiated disturbance measurements
16-4-2 Part 4-2: Uncertainties, statistics and limit modelling—Measurement instrumentation uncertainty	16.4.2 Part 4.2: 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
CISPR/TR	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
16-4-3 Part 4-3: Uncertainties, statistics and limit modelling—Statistical considerations in the determination of EMC compliance of mass-produced products	16.4.3 Part 4.3: Uncertainties, statistics and limit modelling—Statistical considerations in the determination of EMC compliance of mass-produced products
ISO/IEC	AS ISO/IEC
17025 General requirements for the competence of testing and calibration laboratories	17025 General requirements for the competence of testing and calibration laboratories

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.

CONTENTS

Page

Page

Page

Page

INTRODUCTION

The result of the application of basic considerations (Clauses 4 and 5) in this part to existing or new CISPR standards will lead to proposals to improve and harmonise the uncertainty aspects of those CISPR standards. Such proposals will also be published as reports within this part and will give the background and rationale for improvement of certain CISPR standards. Clause 6 is an example of such a report.

The structure of clauses related to the CISPR standards compliance uncertainty work is depicted in Table 1. Clause 4 deals with the basic considerations of standards compliance uncertainties in emission measurements. Clauses 6, 7 and 8 contain uncertainty considerations related to voltage, absorbing clamp and radiated emission measurements, respectively.

Uncertainty work will also be considered for immunity compliance tests in the future. Clauses 5, 9 and 10 are reserved for this material. SCU (see 3.1.16) considerations of immunity tests differ from the emission SCU considerations in particular points. For instance, in an immunity test, the measurand is often a functional attribute of the EUT and not a specific quantity. This may cause additional specific SCU considerations. Priority has been given to the uncertainty evaluations for emission measurements at this stage of the work.

Table 1 – Structure of clauses related to the subject of standards compliance uncertainty

STANDARDS COMPLIANCE UNCERTAINTY			
Clause 1, 2, and 3: General			
EMISSION			**IMMUNITY**
Clause 4	Basic considerations	Clause 5	Basic considerations
Clause 6	Voltage measurements	Clause 9	Conducted immunity tests
Clause 7	Absorbing clamp measurements	Clause 10	Radiated immunity tests
Clause 8	Radiated emission measurements		

AUSTRALIAN/NEW ZEALAND STANDARD

Specification for radio disturbance and immunity measuring apparatus and methods

Part 4.1:
Uncertainties, statistics and limit modelling—Uncertainties in standardized EMC tests

1 Scope

This part of CISPR 16-4 gives guidance on the treatment of uncertainties to those who are involved in the development or modification of CISPR electromagnetic compatibility (EMC) standards. In addition, this part provides useful background information for those who apply the standards and the uncertainty aspects in practice.

The objectives of this part are to:

a) identify the parameters or sources governing the uncertainty associated with the statement that a given product complies with the requirement specified in a CISPR recommendation. This uncertainty will be called “standards compliance uncertainty” (SCU, see 3.1.16);

b) give guidance on the estimation of the magnitude of the standards compliance uncertainty;

c) give guidance for the implementation of the standards compliance uncertainty into the compliance criterion of a CISPR standardised compliance test.

As such, this part can be considered as a handbook that can be used by standards writers to incorporate and harmonise uncertainty considerations in existing and future CISPR standards. This part also gives guidance to regulatory authorities, accreditation bodies and test engineers to judge the performance quality of an EMC test-laboratory carrying out CISPR standardised compliance tests. The uncertainty considerations given in this part can also be used as guidance when comparing test results (and their uncertainties) obtained by using different alternative test methods.

The uncertainty of a compliance test also relates to the probability of occurrence of an electromagnetic interference (EMI) problem in practice. This aspect is recognized and introduced briefly in this part. However, the problem of relating uncertainties of a compliance test to the occurrence of EMI in practice is not considered within the scope of this part.

The scope of this part is limited to all the relevant uncertainty considerations of a standardized EMC compliance test.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-161:1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic Compatibility*

IEC 60050-300:2001, *International Electrotechnical Vocabulary (IEV) – Electrical and electronic measurements and measuring instruments – Part 311: General terms relating to measurements – Part 312: General terms relating to electrical measurements – Part 313: Types of electrical measuring instruments – Part 314: Specific terms according to the type of instrument*