

Australian/New Zealand Standard™

Specification for radio disturbance and immunity measuring apparatus and methods

Part 4.3: Uncertainties, statistics and limit modelling—Statistical considerations in the determination of EMC compliance of mass-produced products

AS/NZS CISPR 16.4.3:2004

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 24 March 2004 and on behalf of the Council of Standards New Zealand on 16 April 2004. It was published on 2 June 2004.

The following are represented on Committee TE-003:

Australian Broadcasting Authority
Australian Broadcasting Corporation
Australian Chamber of Commerce and Industry
Australian Communications Authority
Australian Electrical and Electronic Manufacturers Association
Australian Information Industry Association
CSIRO Telecommunications and Industrial Physics
Commercial Television Australia
Department of Defence (Australia)
Electrical Compliance Testing Association
Institution of Engineers Australia
Ministry of Economic Development (New Zealand)
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 Standards may also be withdrawn.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 or Standards New Zealand web site at 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 International or Standards New Zealand at the address shown on the back cover.

Australian/New Zealand Standard™

Specification for radio disturbance and immunity measuring apparatus and methods

Part 4.3: Uncertainties, statistics and limit modelling—Statistical considerations in the determination of EMC compliance of mass-produced products

First published as AS/NZS CISPR 16.4.3:2004.

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 International Ltd, GPO Box 5420, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 5996 3

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE-003, Electromagnetic Interference.

This Standard is identical with, and has been reproduced from, CISPR 16-4-3:2003, *Specification for radio disturbance and immunity measuring apparatus and methods, Part 4-3: Uncertainties, statistics and limit modelling—Statistical considerations in the determination of EMC compliance of mass-produced products*.

The objective of this Standard is to specify recommendations on statistics of disturbance complaints, on the significance of CISPR limits, and specific reports.

This Standard is Part 4.3 of AS/NZS CISPR 16.4, *Specification for radio disturbance and immunity measuring apparatus and methods*, which consists of the following:

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

Part 4.2: Uncertainties, statistics and limit modelling—Uncertainty in EMC measurements

Part 4.3: Uncertainties, statistics and limit modelling—Statistical considerations in the determination of EMC compliance of mass-produced products (this Standard)

Part 4.4: Uncertainties, statistics and limit modelling—Statistics of complaints and a model for the calculation of limits

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.

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

- (a) Its number appears on the cover and title page while the international standard number appears only on the cover.
- (b) In the source text ‘this International Standard’ should read ‘this Australian/New Zealand Standard’.
- (c) 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>	
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

16-1-3	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 1 000 MHz
16-2-1	Part 2-1: Methods of measurement of immunity and disturbance—Conducted disturbance measurements	16.2.1	Part 2.1: Methods of measurement of immunity and disturbance—Conducted disturbance measurements
16-2-2	Part 2-2: Methods of measurement of immunity and disturbance—Measurement of disturbance power	16.2.2	Part 2.2: Methods of measurement of immunity and disturbance—Measurement of disturbance power
16-2-3	Part 2-3: Methods of measurement of immunity and disturbance—Radiated disturbance measurements	16.2.3	Part 2.3: Methods of measurement of immunity and disturbance—Radiated disturbance measurements
16-2-4	Part 2-4: Methods of measurement of immunity and disturbance—Immunity measurements	16.2.4	Part 2.4: Methods of measurement of immunity and disturbance—Immunity measurements
16-3	Part 3: CISPR technical reports	16.3	Part 3: CISPR technical reports
16-4-1	Part 4-1: Uncertainties, statistics and limit modelling—Uncertainties in standardized EMC tests	16.4.1	Part 4.1: Uncertainties, statistics and limit modelling—Uncertainties in standardized EMC tests
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—Measurement instrumentation uncertainty
16-4-4	Part 4-4: Uncertainties, statistics and limit modelling—Statistics of complaints and a model for the calculation of limits	16.4.4	Part 4.4: Uncertainties, statistics and limit modelling—Statistics of complaints and a model for the calculation of limits

CONTENTS

	<i>Page</i>
1 Scope	1
2 Normative references	1
3 Definitions	2
4 Recommendation 46/2: Significance of a CISPR limit	4
5 Report 48: Statistical considerations in the determination of limits of radio interference	7
5.1 Introduction	7
5.2 Tests based on the non-central t -distribution (sampling by variables)	7
5.2.1 Determination of the constant k	7
5.2.2 Determination of the sample size n	10
5.2.3 Example (see Graph 1)	10
5.3 Tests based on the binomial distribution (sampling by attributes)	10
5.3.1 Determination of constant c	11
5.3.2 Determination of sample size n	12
5.3.3 Control charts	12
5.4 Bibliography	12
6 Report 59: An analytical assessment of statistical parameters of radio disturbance in the case of an incompletely defined sample	14

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard**Specification for radio disturbance and immunity measuring apparatus
and methods****Part 4.3: Uncertainties, statistics and limit modelling—Statistical
considerations in the determination of EMC compliance of mass-produced
products**

1 Scope

This part of CISPR 16 contains recommendations on statistics of disturbance complaints, on the significance of CISPR limits, and specific reports.

Over the years, the CISPR prepared a number of recommendations and reports that have significant technical merit but were not generally available. Reports and recommendations were for some time published in CISPR 7 and 8.

At its meeting in Campinas, Brazil, in 1988, subcommittee A agreed on the table of contents of the first edition of part 3 and to publish the reports for posterity by giving the reports a permanent place in part 3. In 2003, the relevant clauses on statistics were transferred to CISPR 16-4-3.

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.

CISPR 16-1 (all parts), Specification for radio disturbance and immunity measuring apparatus and methods – Radio disturbance and immunity measuring apparatus

CISPR 16-2 (all parts), Specification for radio disturbance and immunity measuring apparatus and methods – Methods of measurement of disturbances and immunity

CISPR 16-3, Specification for radio disturbance and immunity measuring apparatus and methods – Part 3: CISPR technical reports

CISPR 16-4-1:2003, Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-1: Uncertainties, statistics and limit modelling – Uncertainties in standardized EMC tests

CISPR 16-4-2:2003, Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Measurement instrumentation uncertainty

CISPR 16-4-4:2003, Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-4: Uncertainties, statistics and limit modelling – Statistics of complaints and a model for the calculation of limits