

Specification for radio disturbance and immunity measuring apparatus and methods —

Part 2-4: Methods of measurement of disturbances and immunity — Immunity measurements

The European Standard EN 55016-2-4:2004 has the status of a
British Standard

ICS 33.100.10; 33.100.20

National foreword

This British Standard is the official English language version of EN 55016-2-4:2004. It is identical with CISPR 16-2-4:2003. Together with BS EN 55016-2-1:2004, BS EN 55016-2-2:2004 and BS EN 55016-2-3:2004 it supersedes BS CISPR 16-2:1996 which will be withdrawn on 2007-09-01.

The standards in the new BS EN 55016 series referred to above have been produced following the publication by CISPR of a new multi-part edition of CISPR 16 and constitute an editorial reorganisation of CISPR 16 without technical changes. This has resulted in the BS CISPR 16 series being replaced as follows:

BS CISPR 16-1:1999 replaced by BS EN 55016-1-1:2004,
BS EN 55016-1-2:2004, BS EN 55016-1-3:2004, BS EN 55016-1-4:2004
and BS EN 55016-1-5:2004.

BS CISPR 16-2:1996 replaced by BS EN 55016-2-1:2004,
BS EN 55016-2-2:2004, BS EN 55016-2-3:2004 and BS EN 55016-2-4:2004.

BS CISPR 16-3:2000 replaced by PD CISPR/TR 16-3:2003,
PD CISPR/TR 16-4-1:2003, PD CISPR/TR 16-4-3:2003 and
PD CISPR/TR 16-4-4:2003.

BS CISPR 16-4:2002 replaced by BS EN 55016-4-2:2004.

The UK participation in its preparation was entrusted by Technical Committee GEL/210, EMC — Policy, to Subcommittee GEL/210/12, EMC — Basic and generic standards, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled “International Standards Correspondence Index”, or by using the “Search” facility of the *BSI Electronic Catalogue* or of British Standards Online.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 25 and a back cover.

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**Specification for radio disturbance and immunity
measuring apparatus and methods
Part 2-4: Methods of measurement of disturbances and immunity –
Immunity measurements
(CISPR 16-2-4:2003)**

Spécifications des méthodes
et des appareils de mesure
des perturbations radioélectriques
et de l'immunité aux perturbations
radioélectriques
Partie 2-4: Méthodes de mesure
des perturbations et de l'immunité –
Mesures de l'immunité
(CISPR 16-2-4:2003)

Anforderungen an Geräte und
Einrichtungen sowie Festlegung der
Verfahren zur Messung der
hochfrequenten Störaussendung
(Funkstörungen) und Störfestigkeit
Teil 2-4: Verfahren zur Messung der
hochfrequenten Störaussendung
(Funkstörungen) und Störfestigkeit –
Messungen der Störfestigkeit
(CISPR 16-2-4:2003)

This European Standard was approved by CENELEC on 2004-09-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard CISPR 16-2-4:2003, prepared by CISPR SC A, Radio-interference measurements and statistical methods, was submitted to the formal vote and was approved by CENELEC as EN 55016-2-4 on 2004-09-01 without any modification.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2005-09-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2007-09-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard CISPR 16-2-4:2003 was approved by CENELEC as a European Standard without any modification.

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INTRODUCTION

CISPR 16-1, CISPR 16-2, CISPR 16-3 and CISPR 16-4 have been reorganised into 14 parts, to accommodate growth and easier maintenance. The new parts have also been renumbered. See the list given below.

Old CISPR 16 publications		New CISPR 16 publications	
CISPR 16-1	Radio disturbance and immunity measuring apparatus	CISPR 16-1-1	Measuring apparatus
		CISPR 16-1-2	Ancillary equipment – Conducted disturbances
		CISPR 16-1-3	Ancillary equipment – Disturbance power
		CISPR 16-1-4	Ancillary equipment – Radiated disturbances
		CISPR 16-1-5	Antenna calibration test sites for 30 MHz to 1 000 MHz
CISPR 16-2	Methods of measurement of disturbances and immunity	CISPR 16-2-1	Conducted disturbance measurements
		CISPR 16-2-2	Measurement of disturbance power
		CISPR 16-2-3	Radiated disturbance measurements
		CISPR 16-2-4	Immunity measurements
CISPR 16-3	Reports and recommendations of CISPR	CISPR 16-3	CISPR technical reports
		CISPR 16-4-1	Uncertainties in standardised EMC tests
		CISPR 16-4-2	Measurement instrumentation uncertainty
CISPR 16-4	Uncertainty in EMC measurements	CISPR 16-4-3	Statistical considerations in the determination of EMC compliance of mass-produced products
		CISPR 16-4-4	Statistics of complaints and a model for the calculation of limits

More specific information on the relation between the 'old' CISPR 16-2 and the present 'new' CISPR 16-2-4 is given in the table after this introduction (TABLE RECAPITULATING CROSS REFERENCES).

Measurement instrumentation specifications are given in five new parts of CISPR 16-1, while the methods of measurement are covered now in four new parts of CISPR 16-2. Various reports with further information and background on CISPR and radio disturbances in general are given in CISPR 16-3. CISPR 16-4 contains information related to uncertainties, statistics and limit modelling.

CISPR 16-2 consists of the following parts, under the general title *Specification for radio disturbance and immunity measuring apparatus and methods – Methods of measurement of disturbances and immunity*:

- Part 2-1: Conducted disturbance measurements,
- Part 2-2: Measurement of disturbance power,
- Part 2-3: Radiated disturbance measurements,
- Part 2-4: Immunity measurements.

TABLE RECAPITULATING CROSS-REFERENCES

Second edition of CISPR 16-2 Clauses, subclauses	First edition of CISPR 16-2-4 Clauses, subclauses
1.1	1
1.2	2
1.3	3
3.1	4
3.2	5
3.3	6
Figures	Figures
25, ... 31	1, ... 7

SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY MEASURING APPARATUS AND METHODS –

Part 2-4: Methods of measurement of disturbances and immunity – Immunity measurements

1 Scope

This part of CISPR 16 is designated a basic standard, which specifies the methods of measurement of immunity to EMC phenomena in the frequency range 9 kHz to 18 GHz.

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 60083:1997, *Plugs and socket-outlets for domestic and similar general use standardized in member countries of IEC*

IEC 60364-4: *Electrical installations of buildings – Part 4: Protection for safety*

CISPR 16-1-2:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Conducted disturbances*

CISPR 16-1-4:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Radiated disturbances*

ITU-R Recommendation BS.468-4: *Measurement of audio-frequency noise voltage level in sound broadcasting*

3 Definitions

For the purpose of this part of CISPR 16, the definitions of IEC 60050(161) apply, as well as the following:

3.1

associated equipment

- 1) Transducers (e.g. probes, networks and antennas) connected to a measuring receiver or test generator
- 2) Transducers (e.g. probes, networks, antennas) which are used in the signal or disturbance transfer between an EUT and measuring equipment or a (test-) signal generator

3.2

EUT

the equipment (devices, appliances and systems) subjected to EMC (emission and immunity) compliance tests

3.3

product publication

publication specifying EMC requirements for a product or product family, taking into account specific aspects of such a product or product family

3.4

immunity limit

the specified minimum immunity level

[IEV 161-03-15]

3.5

ground reference

a connection that constitutes a defined parasitic capacitance to the surrounding of an EUT and serves as reference potential

NOTE See also IEV 161-04-36.

3.6

(electromagnetic) emission

the phenomenon by which electromagnetic energy emanates from a source

[IEV 161-01-08]

3.7

coaxial cable

a cable containing one or more coaxial lines, typically used for a matched connection of associated equipment to the measuring equipment or (test-)signal generator providing a specified characteristic impedance and a specified maximum allowable cable transfer impedance

3.8

common mode (asymmetrical disturbance voltage)

the RF voltage between the artificial midpoint of a two-conductor line and reference ground, or in case of a bundle of lines, the effective RF disturbance voltage of the whole bundle (vector sum of the unsymmetrical voltages) against the reference ground measured with a clamp (current transformer) at a defined terminating impedance

NOTE See also IEV 161-04-09.

3.9

common mode current

the vector sum of the currents flowing through two or more conductors at a specified cross-section of a "mathematical" plane intersected by these conductors

3.10

differential mode voltage; symmetrical voltage

the RF disturbance voltage between the wires of a two conductor line

[IEV 161-04-08, modified]

3.11

differential mode current

half the vector difference of the currents flowing in any two of a specified set of active conductors at a specified cross-section of a "mathematical" plane intersected by these conductors