SLOVENSKI STANDARD

SIST EN 55016-1-5:2005

julij 2005

Specifikacija za merilne naprave in metode za merjenje radijskih motenj in odpornosti – 1-5. del: Merilne naprave za merjenje radijskih motenj in odpornosti – Preskus umerjanja antene za 30 MHz do 1 000 MHz (CISPR 16-1-5:2003)

Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration test sites for 30 MHz to 1 000 MHz (CISPR 16-1-5:2003)

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ICS 17.220.20; 33.100.20

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EUROPEAN STANDARD **EN 55016-1-5**

NORME EUROPÉENNE

EUROPÄISCHE NORM October 2004

ICS 33.100.10; 33.100.20

English version

Specification for radio disturbance and immunity measuring apparatus and methods Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration test sites for 30 MHz to 1 000 MHz

(CISPR 16-1-5:2003)

Spécifications des méthodes et des appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques Partie 1-5: Appareils de mesure des perturbations radioélectriques et de l'immunité aux perturbations radioélectriques – Emplacements d'essai pour l'étalonnage des antennes de 30 MHz à 1 000 MHz (CISPR 16-1-5:2003)

Anforderungen an Geräte und Einrichtungen sowie Festlegung der Verfahren zur Messung der hochfrequenten Störaussendung (Funkstörungen) und Störfestigkeit Teil 1-5: Geräte und Einrichtungen zur Messung der hochfrequenten Störaussendung (Funkstörungen) und Störfestigkeit – Messplätze für die Antennenkalibrierung von 30 MHz bis 1 000 MHz (CISPR 16-1-5:2003)

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Ref. No. EN 55016-1-5:2004 E

Foreword

The text of the International Standard CISPR 16-1-5:2003, prepared by CISPR SCA, Radio-interference measurements and statistical methods, was submitted to the formal vote and was approved by CENELEC as EN 55016-1-5 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 16-1-5:2003 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE Where an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
CISPR 14-1	2000	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus Part 1: Emission	EN 55014-1	2000
CISPR 16-1-1	2003	Specification for radio disturbance and immunity measuring apparatus and methods Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus	EN 55016-1-1	2004
CISPR 16-1-4	2003	Part 1-4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances	EN 55016-1-4	2004
CISPR/TR 16-4-1	2003	Part 4-1: Uncertainties, statistics and limit modeling - Uncertainties in standardized EMC tests	-	-
CISPR 16-4-2	2003	Part 4-2: Uncertainties, statistics and limit modelling - Uncertainty in EMC measurements	EN 55016-4-2	2004
IEC 60050-161	1990	International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility	-	-
	1993	International Vocabulary of Basic and General Terms in Metrology, International Organization for Standardization		

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

CISPR 16-1-5

First edition
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INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Specification for radio disturbance and immunity measuring apparatus and methods –

Part 1-5:
Radio disturbance and immunity measuring apparatus – Antenna calibration test sites for 30 MHz to 1 000 MHz

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INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY MEASURING APPARATUS AND METHODS –

Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration test sites for 30 MHz to 1 000 MHz

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard CISPR 16-1-5 has been prepared by CISPR subcommittee A: Radio interference measurements and statistical methods.

This first edition of CISPR 16-1-5, together with CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3 and CISPR 16-1-4, cancels and replaces the second edition of CISPR 16-1, published in 1999, amendment 1 (2002) and amendment 2 (2003). It contains the relevant clauses of CISPR 16-1 without technical changes.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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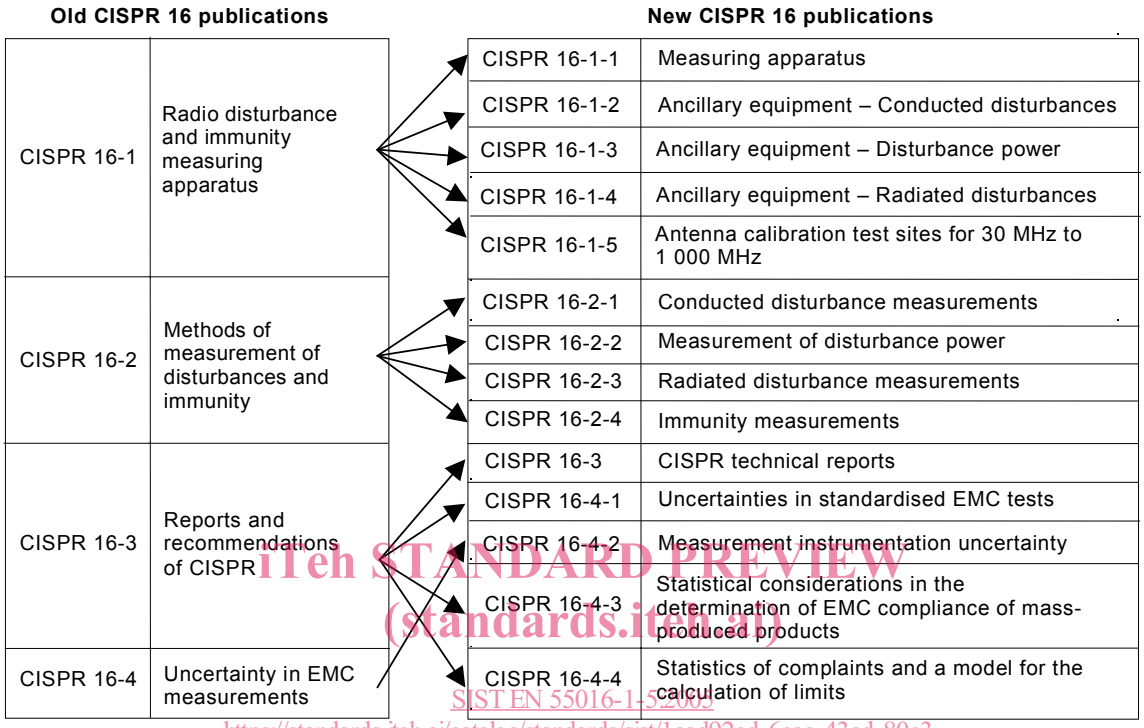
INTRODUCTION

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.



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More specific information on the relation between the 'old' CISPR 16-1 and the present 'new' CISPR 16-1-5 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 16-1 consists of the following parts, under the general title *Specification for radio disturbance and immunity measuring apparatus and methods – Radio disturbance and immunity measuring apparatus:*

- Part 1-1: Measuring apparatus,
- Part 1-2: Ancillary equipment – Conducted disturbances,
- Part 1-3: Ancillary equipment – Disturbance power,
- Part 1-4: Ancillary equipment – Radiated disturbances,
- Part 1-5: Antenna calibration test sites for 30 MHz to 1 000 MHz.

TABLE RECAPITULATING CROSS REFERENCES

Second edition of CISPR 16-1 Clauses, subclauses	First edition of CISPR 16-1-5 Clauses, subclauses
1	1
2	2
3	3
5.13	4
Annexes	**Annexes**
R	A
S	B
T	C
U	D
V	E
W	F
Figures	**Figures**
55, 56, 57, 58, 59	1, 2, 3, 4, 5
S.1, S.2, S.3, S.4	B.1, B.2, B.3, B.4
T.1, T.2, T.3	C.1, C.2, C.3
Tables	**Tables**
19, 20	1, 2

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SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY MEASURING APPARATUS AND METHODS –

Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration test sites for 30 MHz to 1 000 MHz

1 Scope

This part of CISPR 16 is designated a basic standard which specifies the requirements for calibration test sites, used to perform antenna calibrations, as well as the test antenna characteristics, calibration site verification procedure and site compliance criteria. Further information on calibration site requirements, test antenna considerations and the theory of antennas and site attenuation is provided in informative annexes.

Measurement instrumentation specifications are given in CISPR 16-1-1 and CISPR 16-1-4. Further information and background on uncertainties in general is given in CISPR 16-4-1, which may be helpful in establishing uncertainty estimates for the calibration processes of antennas.

2 Normative references

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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.

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CISPR 14-1:2000, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 16-1-1:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus*

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*

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 standardised 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 uncertainties*

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

International Vocabulary of Basic and General Terms in Metrology, International Organization for Standardization, Geneva, 2nd edition, 1993

3 Definitions

For the purpose of this section of CISPR 16, the following definitions apply. Also see IEC 60050(161).

3.1
calibration test site (CALTS)
open area test site with metallic ground plane and tightly specified site attenuation performance in horizontal and vertical electric field polarization

A CALTS is used for determining the free-space antenna factor of an antenna.

Site attenuation measurements of a CALTS are used for comparison to corresponding site attenuation measurements of a compliance test site, in order to evaluate the performance of the compliance test site

3.2
compliance test site (COMTS)
environment which assures valid, repeatable measurement results of disturbance field strength from equipment under test for comparison to a compliance limit

3.3
antenna
that part of a transmitting or receiving system that is designed to radiate or to receive electromagnetic waves in a specified way

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NOTE 1 In the context of this standard, the balun is a part of the antenna.

NOTE 2 See also the term "wire antenna".

3.4
balun

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passive electrical network for the transformation from a balanced to an unbalanced transmission line or device or vice versa

3.5
free-space-resonant dipole
wire antenna consisting of two straight colinear conductors of equal length, placed end to end, separated by a small gap, with each conductor approximately a quarter-wavelength long such that at the specified frequency the input impedance of the wire antenna measured across the gap is pure real when the dipole is located in the free space

NOTE 1 In the context of this standard, this wire antenna connected to the balun is also called the "test antenna".

NOTE 2 This wire antenna is also referred to as "tuned dipole".

3.6
site attenuation
site attenuation between two specified positions on a test site is the insertion loss determined by a two-port measurement, when a direct electrical connection between the generator output and receiver input is replaced by transmitting and receiving antennae placed at the specified positions

3.7
test antenna
combination of the free-space-resonant dipole and the specified balun

NOTE For the purpose of this standard only.

3.8
wire antenna
a specified structure consisting of one or more metallic wires or rods for radiating or receiving electromagnetic waves

NOTE A wire antenna does not contain a balun.

4 Specifications and validation procedures for a test site to be used to calibrate antennas in the frequency range of 30 MHz to 1 000 MHz

Clause 5 of CISPR 16-1-4 specifies the requirements for a test site used to make radio disturbance field strength measurements in the frequency range of 30 MHz to 1 000 MHz. Such a test site may not be suitable for calibrating antennas. This clause specifies the requirements and validation procedure for a test site suitable for the calibration of antennas above a conducting, flat metal plane in the frequency range of 30 MHz to 1 000 MHz. A test site meeting these stringent requirements may also be used as a reference test site for comparison purposes in an alternative validation procedure to 5.6 of CISPR 16-1-4.

4.1 Introduction

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A test site suitable for performing antenna calibration, referred to herein as CALTS, is intended to provide a suitable environment to calibrate an antenna for its free-space antenna factor. This calibration is performed most conveniently above a reflecting plane by using only horizontal polarization. Subclauses 4.3 through 4.6 specify the characteristics of a CALTS, the characteristics of a calculable test antenna and the CALTS verification (validation) procedure and performance criteria. The CALTS validation procedure given in 4.5 requires the use of a calculable dipole antenna as specified in 4.4, thus creating the possibility of comparing theoretically predicted site-attenuation to measured CALTS performance. Items to be reported in a CALTS validation report are summarized in 4.7. Annex A provides guidance for constructing a CALTS, which complies with validation criteria specified in 4.6.

In order for a CALTS to be used as a reference test site (REFSITE) for validating the performance of test sites according to clause 5 of CISPR 16-1-4, some additional requirements need to be specified. Subclause 4.7 specifies the additional characteristics and performance criteria. Test sites specified in clause 5 of CISPR 16-1-4, which are used for demonstrating compliance with radiated emission limits are referred to herein as a compliance test site (COMTS). Validation of a COMTS may be obtained by comparing it to the theoretical site attenuation given in clause 5 of CISPR 16-1-4 (which takes precedence) or by comparing site attenuation measurements of the REFSITE to corresponding site attenuation measurements of the COMTS, using the same measurement set-up and equipment (antennas, cables, generator, receiver, etc.).

The annexes to this standard contain informative specifications of a CALTS and of the calculable, free-space-resonant dipole (tuned dipole) to be used in the CALTS validation procedures. They also give a model for calculating theoretical site attenuation, numerical examples and a checklist for the validation procedure.