SVENSK STANDARD SS-EN 55016-1-5

Fastställd	Utgåva	Sida	Ansvarig kommitté
2015-04-15	2	1 (1+95)	SEK TK EMC

EMC – Utrustning och metoder för mätning av radiostörningar och immunitet – Del 1-5: Kalibrerings- och referensprovplatser för antenner, 5 MHz till 18 GHz

Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration sites and reference test sites for 5 MHz to 18 GHz

Som svensk standard gäller europastandarden EN 55016-1-5:2015. Den svenska standarden innehåller den officiella engelska språkversionen av EN 55016-1-5:2015.

Nationellt förord

Europastandarden EN 55016-1-5:2015

består av:

- **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
- **CISPR 16-1-5, Second edition, 2014 - Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-5: Radio disturbance and immunity measuring apparatus - Antenna calibration sites and reference test sites for 5 MHz to 18 GHz**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 55016-1-5, utgåva 1, 2005 och SS-EN 55016-1-5/A1, utgåva 1, 2013, gäller ej fr o m 2018-01-21.

ICS 33.100.10; 33.100.20

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Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

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SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 55016-1-5

February 2015

ICS 33.100.10; 33.100.20

Supersedes EN 55016-1-5:2004

English Version

Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-5: Radio disturbance and immunity measuring apparatus - Antenna calibration sites and reference test sites for 5 MHz to 18 GHz (CISPR 16-1-5:2014)

Spécification 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'étalonnage d'antenne et emplacements d'essai de référence pour la plage comprise entre 5 MHz et 18 GHz (CISPR 16-1-5:2014)

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 und Referenz-Messplätze für den Frequenzbereich von 5 MHz bis 18 GHz (CISPR 16-1-5:2014)

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 55016-1-5:2015 E

SEK Svensk Elstandard

Foreword

The text of document CISPR/A/1086A/FDIS, future edition 2 of CISPR 16-1-5, prepared by CISPR SC A “Radio-interference measurements and statistical methods" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 55016-1-5:2015.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-10-21
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2018-01-21

This document supersedes EN 55016-1-5:2004.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard CISPR 16-1-5:2014 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

CISPR 16-1-1:2010	NOTE	Harmonized as EN 55016-1-1:2010 (not modified).
CISPR 16-1-1:2010/A1:2010	NOTE	Harmonized as EN 55016-1-1:2010/A1:2010 (not modified).
CISPR 16-2-3:2010	NOTE	Harmonized as EN 55016-2-3:2010 (not modified).
CISPR 16-2-3:2010/A1:2010	NOTE	Harmonized as EN 55016-2-3:2010/A1:2010 (not modified).
CISPR 16-4 Series	NOTE	Only Part 4-2 harmonized as EN 55016-4-2.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

Publication	Year	Title	EN/HD	Year
CISPR 16-1-4	2010	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements	EN 55016-1-4	2010
+A1	2012		+A1	2012
CISPR 16-1-6	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-6: Radio disturbance and immunity measuring apparatus - EMC-antenna calibration	EN 55016-1-6	2015
IEC 60050	Series	International Electrotechnical Vocabulary	-	-

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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 sites and reference test sites for 5 MHz to 18 GHz

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 second edition cancels and replaces the first edition published in 2003, and its Amendment 1 (2012). It constitutes a technical revision.

It has the status of a basic EMC publication in accordance with IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications*.

This edition includes the following significant technical changes with respect to the previous edition:

– site validation methods for other sites covered in CISPR 16-1-6 are added;
– smaller step sizes are specified for swept-frequency measurements;
– the minimum ground plane size is increased;
– other miscellaneous technical and editorial refinements are included.

The text of this standard is based on the following documents:

FDIS	Report on voting
CISPR/A/1086A/FDIS	CISPR/A/1097/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

A list of all parts of the CISPR 16 series can be found, under the general title *Specification for radio disturbance and immunity measuring apparatus and methods*, on the IEC website.

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This standard describes validation procedures for Calibration Test Sites (CALTS) that are used to calibrate antennas in the frequency range 5 MHz to 18 GHz. The associated antenna calibration procedures are described in CISPR 16-1-6.

Due to problems with suppressing ground reflections in the frequency range 30 MHz to 200 MHz, the main function of a reflecting ground plane is for the calibration of dipole, biconical, and hybrid antennas over the frequency range for which their H-plane patterns are uniform. The free-space antenna factor, F_a, for dipole antennas may be measured in a free-space environment above 200 MHz. Because of the difficulty of reducing reflections from objects that surround an antenna, and in particular the ground surface, a flat metal ground plane is used to ensure reproducibility of results and to enable the ground reflected signal to be precisely removed mathematically.

Requirements for the construction of a CALTS are given in Annex A. The specifications and validation procedures for a CALTS are given in Clause 4. The most precise way of validating a CALTS is to use calculable dipole antennas, which are the basis of the validation procedure in this standard. The design principles of calculable antennas are given in Annex B, and the theory and methods for calculating site insertion loss (SIL) are given in Annex C and Annex D.

Validation procedures for other antenna calibration sites are given in Clause 5 through Clause 7. Where an antenna calibration method utilizes the ground reflection, a CALTS is required. The validation methods are summarized in Table 1 with reference to the associated antenna calibration methods in CISPR 16-1-6.

All site validation methods involve the measurement of SIL between two antennas. It is critical that the validation of the site itself not be unduly compromised by reflections from antenna supports; see A.3 for associated guidance.

Table 1 – Summary of site validation methods by subclause number

Calibration site(s)		CISPR 16-1-5 validation method(s) Subclause	CISPR 16-1-6:2014 calibration method(s) Subclause	Frequency range MHz	Antenna type(s)	Polarization	Notes
1	CALTS for monopoles	4.10	G.1	5 to 30	Monopole	VP	With tolerance of ± 1 dB
2	CALTS or SAC[a]	4, 7.2	8.4	30 to 1 000	Biconical, LPDA, hybrid	HP	SSM
3	CALTS or SAC	4	9.2.2	30 to 300	Biconical, hybrid, dipole	HP or VP	At large height or with absorber on ground
4	FAR	5.3.2	9.2.2	30 to 300 60 to 1 000	Biconical, hybrid, dipole Biconical, dipole	HP	
5	REFTS CALTS	4.7 4.9	9.3	30 to 300	Biconical, hybrid	VP	
6	Free space	6.1	9.4.2 9.4.3	200 to 18 000	LPDA, hybrid, horn	VP	HP with greater height
7	Free space	6.2	9.4.4	200 to 18 000	LPDA, hybrid, horn	VP (or HP)	With absorber on ground
8	FAR	5.3.3	9.5	1 000 to 18 000	Horn, LPDA	HP or VP	
9	FAR	5.3.2	9.2 and 9.4	140 to 1 000	LPDA, hybrid	HP or VP	
10	CALTS	4.6	B.4, B.5	30 to 300	Biconical, dipole	HP	
11	Transfer of properties of a validated site to a site not validated by methods in other clauses	7.1 (excluding 5.3 FAR)	A.9.4	30 and above	Any, but not monopole or loop	HP or VP	Use primarily for SAM and FAR, for particular antenna types and frequencies, except 5.3

[a] A CALTS is well specified as being free of reflecting obstacles, and if the antenna supports have negligible reflections the ground plane itself is likely to provide results that agree with the theoretical performance to better than 0,5 dB. However for a Semi Anechoic Chamber (SAC), it is important that the entire allowed acceptance criterion of 1 dB is not taken up by wall reflections, leaving no latitude for other uncertainty components such as reducing reflections from masts and cables.

SPECIFICATION FOR RADIO DISTURBANCE AND IMMUNITY MEASURING APPARATUS AND METHODS –

Part 1-5: Radio disturbance and immunity measuring apparatus – Antenna calibration sites and reference test sites for 5 MHz to 18 GHz

1 Scope

This part of CISPR 16 specifies the requirements for calibration sites in the frequency range 5 MHz to 18 GHz used to perform antenna calibrations according to CISPR 16-1-6. It also specifies the requirements for reference test sites (REFTS) that are used for the validation of compliance test sites (COMTS) in the frequency range 30 MHz to 1 000 MHz according to CISPR 16-1-4.

It has the status of a basic EMC standard in accordance with IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications.*

Measurement instrumentation specifications are given in CISPR 16-1-1 [1][1] and CISPR 16-1-4. Further information and background on uncertainties in general is given in CISPR 16-4 [3], which can also be helpful in establishing uncertainty estimates for the calibration processes of antennas and site validation measurements.

2 Normative references

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

CISPR 16-1-4:2010, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus – Antennas and test sites for radiated disturbance measurements*
CISPR 16-1-4:2010/AMD 1:2012

CISPR 16-1-6:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-6: Radio disturbance and immunity measuring apparatus – EMC antenna calibration*

IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at <http://www.electropedia.org>)

[1] Numbers in square brackets refer to the bibliography.