

INTERNATIONAL STANDARD



INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement

WITHDRAWN

<https://standards.iteh.ai/en/standards/iec/64057157-34f6-4b65-aae3-b5661a0417a7/cispr-11-2015>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

<https://standards.iteh.ai/catalog/standards/iec/64057157-34f6-4b65-aae3-b5661a0417a7/cispr-11-2015>

INTERNATIONAL STANDARD



INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement

ITeC Standards
(<https://standards.iteh.ai>)
Document Preview

CISPR 11:2015
<https://standards.iteh.ai/standards/iec/64057157-34f6-4b65-aae3-b5661a0417a7/cispr-11-2015>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.100.10

ISBN 978-2-8322-2742-8

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	8
INTRODUCTION.....	11
1 Scope.....	12
2 Normative references	12
3 Terms and definitions	13
4 Frequencies designated for ISM use.....	16
5 Classification of ISM equipment.....	17
5.1 Separation into groups.....	17
5.2 Division into classes	17
5.3 Information Documentation for the user	17
6 Limits of electromagnetic disturbances	18
6.1 General.....	18
6.2 Group 1 equipment measured on a test site	18
6.2.1 Limits of terminal disturbance voltage for conducted disturbances	18
6.2.2 Limits of electromagnetic radiation disturbance.....	21
6.3 Group 2 equipment measured on a test site.....	22
6.3.1 Limits of terminal disturbance voltage for conducted disturbances	22
6.3.2 Limits of electromagnetic radiation disturbance.....	24
6.4 Group 1 and group 2 class A equipment measured <i>in situ</i>	31
6.4.1 Limits of terminal disturbance voltage for conducted disturbances	31
6.4.2 Limits of electromagnetic radiation disturbance.....	31
7 Measurement requirements	33
7.1 General.....	33
7.2 Ambient noise.....	33
7.3 Measuring equipment.....	34
7.3.1 Measuring instruments.....	34
7.3.2 Artificial mains network (AN).....	35
7.3.3 Voltage probe.....	35
7.3.4 Antennas	36
7.3.5 Artificial hand	36
7.4 Frequency measurement.....	36
7.5 Configuration of equipment under test.....	37
7.5.1 General	37
7.5.2 Interconnecting cables.....	39
7.5.3 Connection to the electricity supply network on a test site	40
7.6 Load conditions of equipment under test.....	42
7.6.1 General	42
7.6.2 Medical equipment.....	43
7.6.3 Industrial equipment	44
7.6.4 Scientific, laboratory and measuring equipment.....	45
7.6.5 Microwave cooking appliances.....	45
7.6.6 Other equipment in the frequency range 1 GHz to 18 GHz.....	45
7.6.7 Single and multiple zone induction cooking appliances.....	46
7.6.7 Electric welding equipment	46
7.6.8 ISM RF lighting equipment.....	47

7.6.9	Medium voltage (MV) and high voltage (HV) switchgear	47
7.6.10	Grid connected power converters	47
7.7	Recording of test-site measurement results	47
7.7.1	General	47
7.7.2	Conducted emissions.....	48
7.7.3	Radiated emissions	48
8	Special provisions for test site measurements (9 kHz to 1 GHz)	48
8.1	Ground planes	48
8.2	Measurement of mains terminal disturbance voltage conducted disturbances	48
8.2.1	General	48
8.2.2	Measurements on grid connected power converters.....	49
8.2.3	Handheld equipment which are normally operated without an earth connection	53
8.3	Radiation test site for 9 kHz to 1 GHz	54
8.3.1	General	54
8.3.2	Validation of the radiation test site (9 kHz to 1 GHz).....	55
8.3.3	Disposition of equipment under test (9 kHz to 1 GHz).....	55
8.3.4	Radiation measurements (9 kHz to 1 GHz).....	55
8.4	Alternative radiation test sites for the frequency range 30 MHz to 1 GHz	55
9	Radiation measurements: 1 GHz to 18 GHz.....	56
9.1	Test arrangement.....	56
9.2	Receiving antenna	56
9.3	Validation and calibration of test site.....	56
9.4	Measuring procedure	56
9.4.1	General	56
9.4.2	Operating conditions of the EUT	57
9.4.3	Preliminary measurement	57
9.4.4	Final measurement	58
10	Measurement <i>in situ</i>	59
11	Safety precautions for emission measurements on ISM RF equipment	60
12	Assessment of conformity of equipment.....	60
12.1	General.....	60
12.2	Statistical assessment of compliance of series produced equipment.....	60
12.3	Equipment in small scale production.....	60
12.4	Equipment produced on an individual basis.....	60
12.5	Measurement uncertainty.....	61
13	Figures and flowcharts	61
Annex A (informative)	Examples of equipment classification	62
Annex B (informative)	Precautions to be taken in the use of a spectrum analyzer (see 7.3.1).....	64
Annex C (normative)	Measurement of electromagnetic radiation disturbance in the presence of signals from radio transmitters.....	65
Annex D (informative)	Propagation of interference from industrial radio-frequency equipment at frequencies between 30 MHz and 300 MHz	66
Annex E (informative)	Recommendations of CISPR for protection of certain radio services in particular areas	67
E.1	Introduction General	67
E.2	Recommendations for protection of safety-related radio services	67

E.3	Recommendations for protection of specific sensitive radio services	67
Annex F (informative)	Frequency bands allocated for safety-related radio services	68
Annex G (informative)	Frequency bands allocated for sensitive radio services	69
Annex H (informative)	Statistical assessment of series produced equipment against the requirements of CISPR standards	71
H.1	Significance of a CISPR limit	71
H.2	Type tests	71
H.3	Statistical assessment of series produced equipment	71
H.3.1	Assessment based on a general margin to the limit	71
H.3.2	Assessment based on the non-central <i>t</i> -distribution	72
H.3.3	Assessment based on the binomial distribution	74
H.3.4	Equipment produced on an individual basis	74
Annex I (normative)	Artificial Network (AN) for the assessment of disturbance voltages at d.c. power ports of semiconductor power converters	75
I.1	General information and purpose	75
I.2	Structures for a DC-AN	75
I.2.1	AN suitable for measurement of unsymmetrical mode (UM) disturbances	75
I.2.2	AN suitable for measurement of common mode (CM) and differential mode (DM) disturbances	75
I.2.3	AN suitable for measurement of UM, CM and DM disturbances	76
I.3	Employment of DC-ANs for compliance measurements	76
I.3.1	General	76
I.3.2	Pseudo V-AN	76
I.3.3	Delta-AN	76
I.4	Normative technical requirements for the DC-AN	77
I.4.1	Parameters and associated tolerances in the range 150 kHz to 30 MHz	77
I.4.2	Parameters and associated tolerances in the range 9 kHz to 150 kHz	78
I.5	Examples of practical implementations of DC-ANs	78
Annex J (informative)	Measurements on Grid Connected Power Converters (GCPC) – Setups for an effective test site configuration	81
J.1	General information and purpose	81
J.2	Setup of the test site	81
J.2.1	Block diagram of test site	81
J.2.2	DC power supply	82
J.2.3	AC power source	82
J.2.4	Other components	83
J.3	Other test setups	83
J.3.1	Configuration comprising laboratory AC power source and resistive load	83
J.3.2	Configuration in case of reverse power flow to the AC mains	84
Annex K (informative)	Test site configuration and instrumentation – Guidance on prevention of saturation effects in mitigation filters of transformer-less power converters during type tests according to this standard	86
K.1	General information and purpose	86
K.2	Recommendations for avoidance of saturation effects in the range 9 kHz to 150 kHz	87
K.3	Detailed advice	87
K.3.1	General	87
K.3.2	Insert of series inductors (or common mode chokes) in the laboratory's d.c. power supply chain	88

K.3.3	Employment of additional common mode decoupling capacitors at the interface between the AE port of the DC-AN and the laboratory d.c. power supply port allocated in the test environment.....	89
K.4	Background information	90
	Bibliography.....	92
Figure 1	Circuit for disturbance voltage measurements on mains supply (see 7.3.3)	35
Figure 2	Artificial hand, RC element (see 7.3.5)	36
Figure 3	Example for a typical cable arrangement for measurements of radiated disturbances in 3 m separation distance, Table-top EUT	38
Figure 4	Example for a typical test set up for measurement of conducted and/or radiated disturbances from a floor standing EUT, 3D view	39
Figure 5	Disposition of medical (capacitive type) and dummy load (see 7.6.2.1)	43
Figure 6	Typical arrangement for measurement of conducted disturbances at LV d.c. power ports with the DC-AN used as termination and decoupling unit to the laboratory d.c. power source	51
Figure 7	Typical arrangement for measurement of conducted disturbances at LV d.c. power ports with the DC-AN used as termination and voltage probe	51
Figure 8	Typical arrangement for measurement of conducted disturbances at LV d.c. power ports with the DC-AN used as voltage probe and with a current probe – 2D diagram	52
Figure 9	Typical arrangement for measurement of conducted disturbances at LV d.c. power ports with a DC-AN used as voltage probe and with a current probe – 3D diagram	53
Figure 10	Test site	54
Figure 11	Minimum size of metal ground plane	54
Figure 12	Decision tree for the measurement of emissions from 1 GHz to 18 GHz of class B , group 2 ISM equipment operating at frequencies above 400 MHz	57
Figure H.1	An example of possible difficulties	74
Figure I.1	Practical implementation of a 150 Ω DC-AN suitable for measurement of UM disturbances (Example)	78
Figure I.2	Practical implementation of a 150 Ω DC-AN suitable for measurement of CM and DM disturbances (Example, see also Figure A.2 in CISPR 16-1-2:2014)	79
Figure I.3	Practical implementation of a 150 Ω DC-AN suitable for measurement of UM, or CM and DM disturbances (Example 1)	79
Figure I.4	Practical implementation of a 150 Ω DC-AN suitable for measurement of UM, or CM and DM disturbances (Example 2)	80
Figure I.5	Practical implementation of a 150 Ω DC-AN suitable for measurement of UM, or CM and DM disturbances (Example 3)	80
Figure J.1	Setup of the test site (Case 1) – 2D diagram	81
Figure J.2	Setup of the test site (Case 1) – 3D diagram	82
Figure J.3	Setup of the test site (Case 2) – 2D diagram	83
Figure J.4	Setup of the test site (Case 2) – 3D diagram	84
Figure J.5	Setup of the test site (Case 3) – 2D diagram	85
Figure J.6	Setup of the test site (Case 3) – 3D diagram	85
Figure K.1	Flow of the common mode RF current at test site configuration level	88
Figure K.2	Blocking of flow of common mode RF current by insert of series inductors	89
Figure K.3	Blocking of flow of common mode RF current by employment of additional CM decoupling capacitors	89

Figure K.4 – CM termination impedance at the EUT port of a DC-AN – Magnitude-versus-frequency characteristic in the range 3 kHz to 30 MHz, Example 90

Figure K.5 – Prevention of saturation of mitigation filters by use of additional decoupling capacitors 91

Figure K.6 – Change in the resonant frequency caused by the increase and decrease in the decoupling capacitor's capacitance 91

Figure K.7 – DC-AN circuit example where capacitance of blocking capacitors of the LC decoupling circuit can be increased or decreased 91

Table 1 – Frequencies in the radio-frequency (RF) range designated by ITU for use as fundamental ISM frequencies 16

Table 2 – ~~Mains terminal~~ Disturbance voltage limits for class A group 1 equipment measured on a test site (a.c. mains power port) 19

Table 3 – Limits for conducted disturbances of class A group 1 equipment measured on a test site (d.c. power port) 20

Table 3 4 – ~~Mains terminal~~ Disturbance voltage limits for class B group 1 equipment measured on a test site (a.c. mains power port) 20

Table 5 – Disturbance voltage limits for class B group 1 equipment measured on a test site (d.c. power port) 20

Table 4 6 – Electromagnetic radiation disturbance limits for class A group 1 equipment measured on a test site 21

Table 5 7 – Electromagnetic radiation disturbance limits for class B group 1 equipment measured on a test site 22

Table 6 8 – ~~Mains terminal~~ Disturbance voltage limits for class A group 2 equipment measured on a test site (a.c. mains power port) 23

Table 7 9 – ~~Mains terminal~~ Disturbance voltage limits for class B group 2 equipment measured on a test site (a.c. mains power port) 23

~~Table 8 – Mains terminal disturbance voltage limits for induction cooking appliances 23~~

Table 9 10 – Electromagnetic radiation disturbance limits for class A group 2 equipment measured on a test site 26

Table 10 11 – Electromagnetic radiation disturbance limits for class A EDM and arc welding equipment measured on a test site 27

Table 11 12 – Electromagnetic radiation disturbance limits for class B group 2 equipment measured on a test site 27

~~Table 12 – Limits of the magnetic field strength for induction cooking appliances intended for commercial use 27~~

~~Table 13 – Limits of the magnetic field induced current in a 2 m loop antenna for induction cooking appliances for domestic use 27~~

Table 14 13 – Electromagnetic radiation disturbance peak limits for group 2 equipment producing CW type disturbances and operating at frequencies above 400 MHz 29

~~Table 15 – Electromagnetic radiation disturbance peak limits for class B group 2 equipment producing fluctuating disturbances other than CW and operating at frequencies above 400 MHz 29~~

Table 16 14 – Electromagnetic radiation disturbance weighted limits for class B group 2 equipment producing fluctuating disturbances other than CW and operating at frequencies above 400 MHz 29

Table 15 – Electromagnetic radiation disturbance APD level corresponding to 10⁻¹ limits for class B group 2 equipment operating at frequencies above 400 MHz 30

Table 17 16 – Electromagnetic radiation disturbance limits for class A group 1 equipment measured *in situ* 31

Table 18 17 – Electromagnetic radiation disturbance limits for class A group 2 equipment measured <i>in situ</i>	32
Table 18 – Frequency sub-ranges to be used for weighted measurements	59
Table E.1 – Limits for electromagnetic radiation disturbances for <i>in situ</i> measurements to protect specific safety-related radio services in particular areas	67
Table H.1 – General margin to the limit for statistical evaluation	71
Table H.2 – The non-central <i>t</i> -distribution factor <i>k</i> as a function of the sample size <i>n</i>	73
Table H.3 – Application of the binomial distribution	74
Table I.1 – Parameters and associated tolerances in the range 150 kHz to 30 MHz	77
Table I.2 – Parameters and associated tolerances in the range 9 kHz to 150 kHz	78

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

CISPR 11:2015

<https://standards.iteh.ai/catalog/standards/iec/64057157-34f6-4b65-aae3-b5661a0417a7/cispr-11-2015>

Withheld

INTERNATIONAL ELECTROTECHNICAL COMMISSION
INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

**INDUSTRIAL, SCIENTIFIC AND MEDICAL EQUIPMENT –
RADIO-FREQUENCY DISTURBANCE CHARACTERISTICS –
LIMITS AND METHODS OF MEASUREMENT**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard CISPR 11 has been prepared by CISPR Subcommittee B: Interference relating to industrial, scientific and medical radio-frequency apparatus, to other (heavy) industrial equipment, to overhead power lines, to high voltage equipment and to electric traction.

This sixth edition cancels and replaces the fifth edition published in 2009 and its Amendment 1 published in 2010. It constitutes a technical revision.

It introduces and permits type testing on components of power electronic equipment, systems and installations. Its emission limits apply now to low voltage (LV) a.c. and d.c. power ports, irrespective of the direction of power transmission. Several limits were adapted to the practical test conditions found at test sites. They are also applicable now to power electronic ISM RF equipment used for wireless power transfer (WPT), for instant power supply and charging purposes. The limits in the range 1 GHz to 18 GHz apply now to CW-type disturbances and to fluctuating disturbances in a similar, uniform and technology-neutral way. For these measurements, two alternative methods of measurement are available, the traditional log-AV method and the new APD method.

For measurements at LV d.c. power ports of power electronic equipment, a modern implementation of the 150 Ω Delta-network specified in CISPR 16-1-2 has been made available.

This International Standard CISPR 11 has the status of a Product Family EMC standard in accordance with IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic compatibility publications* (2014).

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

FDIS	Report on voting
CISPR/B/628/FDIS	CISPR/B/631/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.

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 the stability date indicated on the IEC website 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.

The main content of this standard is based on CISPR Recommendation No. 39/2 given below:

RECOMMENDATION No. 39/2

Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment

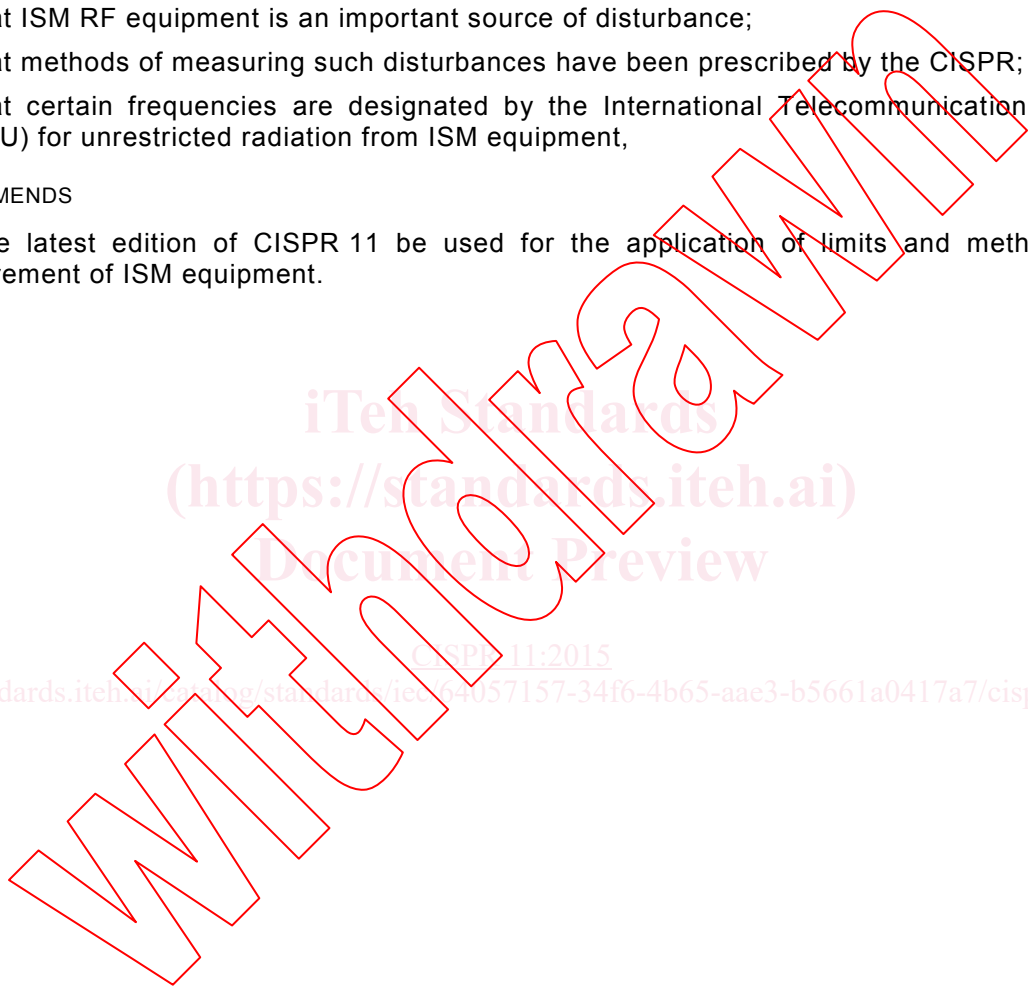
The CISPR

CONSIDERING

- a) that ISM RF equipment is an important source of disturbance;
- b) that methods of measuring such disturbances have been prescribed by the CISPR;
- c) that certain frequencies are designated by the International Telecommunication Union (ITU) for unrestricted radiation from ISM equipment,

RECOMMENDS

that the latest edition of CISPR 11 be used for the application of limits and methods of measurement of ISM equipment.



iTech Standards
(<https://standards.iteh.ai>)
Document Preview

<https://standards.iteh.ai/standards/iec/64057157-34f6-4b65-aae3-b5661a0417a7/cispr-11-2015>

INTRODUCTION

This CISPR publication contains, amongst common requirements for the control of RF disturbances from equipment intended for use in industrial, scientific, and medical ~~(ISM)~~ electrical applications, specific requirements for the control of RF disturbances caused by ISM RF applications in the meaning of the definition of the International Telecommunication Union (ITU), see also Definition 3.13 in this International Standard. CISPR and ITU share their responsibility for the protection of radio services in respect of the use of ISM RF applications.

The CISPR is concerned with the control of RF disturbances from ISM RF applications by means of an assessment of these disturbances either at a standardised test site or, for an individual ISM RF application which cannot be tested at such a site, at its place of operation. Consequently, this CISPR Publication covers requirements for conformity ~~(assessment of both,~~ equipment assessed by means of type tests at standardised test sites or of individual equipment under in situ conditions.

The ITU is concerned with the control of RF disturbances from ISM RF applications during normal operation and use of the respective equipment at its place of operation ~~(see~~ **Definition 1.15 in the ITU Radio Regulations**). There, use of radio-frequency energy decoupled from the ISM RF application by radiation, induction or capacitive coupling is restricted to the location of that individual application.

This CISPR publication contains, in 6.3, the essential emission requirements for an assessment of RF disturbances from ISM RF applications at standardised test sites. These requirements allow for type testing of ISM RF applications operated at frequencies up to 18 GHz. It further contains, in 6.4, the essential emission requirements for an in situ assessment of RF disturbances from individual ISM RF applications in the frequency range up to ~~18~~ **1** GHz. All requirements were established in close collaboration with the ITU and enjoy approval of the ITU.

However, for operation and use of several types of ISM RF applications the manufacturer, installer and/or customer should be aware of additional national provisions regarding possible licensing and particular protection needs of local radio services and applications. Depending on the country concerned, such additional provisions may apply to individual ISM RF applications operated at frequencies outside designated ISM bands (see Table 1). They also may apply to ISM RF applications operated at frequencies above 18 GHz. For the latter type of applications, local protection of radio services and appliances requires an accomplishment of the conformity assessment by application of the relevant national provisions in the frequency range above 18 GHz in accordance with vested interests of the ITU and national administrations. These additional national provisions may apply to spurious emissions, emissions appearing at harmonics of the operation frequency, and to wanted emissions at the operation frequency allocated outside a designated ISM band in the frequency range above 18 GHz.

Recommendations of CISPR for the protection of radio services in particular areas are found in Annex E of this International Standard.

Definition 1.15 of the ITU Radio Regulations reads as follows:

1.15 industrial, scientific and medical (ISM) applications (of radio frequency energy): Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications.

[ITU Radio Regulations Volume 1: 2012 – Chapter I, Definition 1.15]

INDUSTRIAL, SCIENTIFIC AND MEDICAL EQUIPMENT – RADIO-FREQUENCY DISTURBANCE CHARACTERISTICS – LIMITS AND METHODS OF MEASUREMENT

1 Scope

This International Standard applies to industrial, scientific and medical electrical equipment operating in the frequency range 0 Hz to 400 GHz and to domestic and similar appliances designed to generate and/or use locally radio-frequency energy.

This standard covers emission requirements related to radio-frequency (RF) disturbances in the frequency range of 9 kHz to 400 GHz. Measurements need only be performed in frequency ranges where limits are specified in Clause 6.

For ISM RF applications in the meaning of the definition found in the ITU Radio Regulations (see Definition 3.13), this standard covers emission requirements related to radio-frequency disturbances in the frequency range of 9 kHz to 18 GHz.

NOTE Emission requirements for induction cooking appliances are specified in CISPR 14-1 [1]¹.

Requirements for ISM RF lighting ~~apparatus~~ equipment and UV irradiators operating at frequencies within the ISM frequency bands defined by the ITU Radio Regulations are contained in this standard.

Equipment covered by other CISPR product and product family emission standards are excluded from the scope of this standard.

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 16-1-1:~~2006~~ 2010, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

CISPR 16-1-1:2010/AMD 1:~~2006~~ 2010

CISPR 16-1-1:2010/AMD 2:~~2007~~ 2014

CISPR 16-1-2:~~2003~~ 2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – ~~Ancillary equipment – Conducted disturbances~~ Coupling devices for conducted disturbance measurements*

~~Amendment 1 (2004)~~

~~Amendment 2 (2006)~~

CISPR 16-1-4:~~2007~~ 2010, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-4: Radio disturbance and immunity measuring apparatus –*

¹ Figures in square brackets refer to the Bibliography.