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Utrustning för industriellt, vetenskapligt och medicinskt bruk (ISM-utrustning) – Radiostörningar – Gränsvärden och mätmetoder

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

Som svensk standard gäller europastandarden EN 55011:2025. Den svenska standarden innehåller den officiella engelska språkversionen av EN 55011:2025.

Nationellt förord

Europastandarden EN 55011:2025

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- **CISPR 11, Seventh edition, 2024 - Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement**

utarbetad inom International Electrotechnical Commission, IEC.

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English Version

Industrial, scientific and medical equipment - Radio-frequency
disturbance characteristics - Limits and methods of
measurement
(CISPR 11:2024)

Appareils industriels, scientifiques et médicaux -
Caractéristiques de perturbations radioélectriques - Limites
et méthodes de mesure
(CISPR 11:2024)

Industrielle, wissenschaftliche und medizinische Geräte -
Funkstörungen - Grenzwerte und Messverfahren
(CISPR 11:2024)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document CIS/B/831/FDIS, future edition 7 of CISPR 11, prepared by SC CISPR/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" of IEC/TC CISPR "International special committee on radio interference" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 55011:2025.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2026-07-31 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2028-07-31 document have to be withdrawn

This document supersedes EN 55011:2016 and all of its amendments and corrigenda (if any).

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The text of the International Standard CISPR 11:2024 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 standard indicated:

CISPR 14-1	NOTE	Approved as EN IEC 55014-1
IEC 62920:2017	NOTE	Approved as EN 62920:2017 (not modified) +A11:2020
IEC 62920:2017/A1:2021	NOTE	Approved as EN 62920:2017/A1:2021 (not modified)
IEC 61000-6-3:2020	NOTE	Approved as EN IEC 61000-6-3:2021 (not modified)
IEC 60364-1	NOTE	Approved as HD 60364-1
IEC 60601-1-2:2014	NOTE	Approved as EN 60601-1-2:2015 (not modified)
IEC 60601-1-2:2014/A1:2020	NOTE	Approved as EN 60601-1-2:2015/A1:2021 (not modified)
IEC 61922:2002	NOTE	Approved as EN 61922:2002 (not modified)
IEC 61308:2005	NOTE	Approved as EN 61308:2006 (not modified)
IEC 60705:2010	NOTE	Approved as EN 60705:2015 (not modified)
IEC 60974-10:2020	NOTE	Approved as EN IEC 60974-10:2021 (not modified)
CISPR 12	NOTE	Approved as EN 55012

CISPR 15:2018	NOTE	Approved as EN IEC 55015:2019 (not modified) +A11:2020
IEC 60364-5-51:2005	NOTE	Approved as HD 60364-5-51:2009 +A11:2013
IEC 61158-1:2023	NOTE	Approved as EN IEC 61158-1:2023 (not modified)
IEC 61689:2022	NOTE	Approved as EN IEC 61689:2022 (not modified)
IEC 62135-2:2020	NOTE	Approved as EN IEC 62135-2:2021 (not modified)

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 16-1-1	2019	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus	EN IEC 55016-1-1	2019
CISPR 16-1-2	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements	EN 55016-1-2	2014
+ A1	2017		+ A1	2018
CISPR 16-1-4	2019	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 IEC 55016-1-4	2019
+ A1	2020		+ A1	2020
+ A2	2023		+ A2	2023
CISPR 16-2-1	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-1: Methods of measurement of disturbances and immunity - Conducted disturbance measurements	EN 55016-2-1	2014
+ A1	2017		+ A1	2017

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 16-2-3	2016	Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements	EN 55016-2-3	2017
+ A1	2019		+ A1	2019
+ A2	2023		+ A2	2023
CISPR 16-4-2	2011	Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit modelling - Measurement instrumentation uncertainty	EN 55016-4-2	2011
+ A1	2014		+ A1	2014
+ A2	2018		+ A2	2018
CISPR 32	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements	EN 55032	2015
+ A1	2019		+ A1	2020
IEC 60050-161	1990	International Electrotechnical Vocabulary. Chapter 161: Electromagnetic compatibility	-	-
IEC 60601-2-2	2017	Medical electrical equipment - Part 2-2: Particular requirements for the basic safety and essential performance of high frequency surgical equipment and high frequency surgical accessories	EN IEC 60601-2-2	2018
IEC 61000-4-6	2023	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN IEC 61000-4-6	2023
IEC 61307	2011	Industrial microwave heating installations - Test methods for the determination of power output	EN 61307	2011
ITU Radio Regulations	2020	Radio Regulations	-	-

INTERNATIONAL STANDARD

NORME INTERNATIONALE



INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE
COMITÉ INTERNATIONAL SPÉCIAL DES PERTURBATIONS RADIOÉLECTRIQUES

PRODUCT FAMILY EMC STANDARD
NORME DE FAMILLE DE PRODUITS EN CEM

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

**Appareils industriels, scientifiques et médicaux – Caractéristiques de
perturbations radioélectriques – Limites et méthodes de mesure**

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CONTENTS

FOREWORD.....	7
INTRODUCTION.....	10
1 Scope.....	11
2 Normative references	11
3 Terms, definitions and abbreviated terms	13
3.1 Terms and definitions.....	13
3.2 Abbreviated terms.....	18
4 Frequencies designated for ISM use.....	19
5 Classification of equipment.....	20
5.1 Separation into groups.....	20
5.2 Division into classes	20
5.3 Documentation for the user	20
6 Limits of electromagnetic disturbances	21
6.1 General.....	21
6.2 Group 1 equipment measured on a test site	21
6.2.1 Limits for conducted disturbances.....	21
6.2.2 Limits of electromagnetic radiation disturbance.....	26
6.3 Group 2 equipment measured on a test site	29
6.3.1 Limits for conducted disturbances.....	29
6.3.2 Limits of electromagnetic radiation disturbance.....	30
6.4 Group 1 and group 2 class A equipment measured in situ	36
6.4.1 Limits for conducted disturbances.....	36
6.4.2 Limits of electromagnetic radiation disturbance.....	36
7 Measurement requirements	39
7.1 General.....	39
7.2 Ambient noise	39
7.3 Measuring equipment.....	40
7.3.1 Measuring instruments.....	40
7.3.2 Artificial network (AN)	40
7.3.3 Voltage probe	41
7.3.4 Antennas	41
7.3.5 Artificial hand	42
7.4 Frequency measurement.....	42
7.5 Configuration of equipment under test.....	42
7.5.1 General	42
7.5.2 EUT cables and components	45
7.5.3 Connection to the electricity supply network on a test site	46
7.5.4 Measurements of robots	49
7.6 Load conditions of the EUT	53
7.6.1 General	53
7.6.2 Medical equipment.....	53
7.6.3 Industrial equipment	55
7.6.4 Scientific, laboratory and measuring equipment.....	55
7.6.5 Microwave cooking appliances.....	55
7.6.6 Other equipment in the frequency range 1 GHz to 18 GHz.....	55
7.6.7 Electric welding equipment	56

7.6.8	ISM RF lighting equipment.....	56
7.6.9	Medium voltage (MV) and high voltage (HV) switchgear	56
7.6.10	Grid connected power converters	56
7.6.11	Robots.....	57
7.7	Recording of test-site measurement results	57
7.7.1	General	57
7.7.2	Conducted emissions.....	58
7.7.3	Radiated emissions	58
8	Special provisions for test site measurements (9 kHz to 1 GHz)	58
8.1	Ground planes	58
8.2	Measurement of conducted disturbances	58
8.2.1	General	58
8.2.2	Measurements on grid connected power converters.....	59
8.2.3	Handheld equipment which is normally operated without an earth connection	63
8.3	OATS and SAC for measurements in the range 9 kHz to 1 GHz	63
8.3.1	General	63
8.3.2	Validation of the radiation test site (9 kHz to 1 GHz).....	64
8.3.3	Disposition of equipment under test (9 kHz to 1 GHz).....	64
8.3.4	Radiation measurements (9 kHz to 1 GHz)	65
8.4	Alternative radiation test sites for the frequency range 30 MHz to 1 GHz	65
8.5	FAR for measurements in the range 30 MHz to 1 GHz	65
9	Radiation measurements: 1 GHz to 18 GHz.....	65
9.1	Test arrangement.....	65
9.2	Receiving antenna	66
9.3	Validation of test site	66
9.4	Measuring procedure	66
9.4.1	General	66
9.4.2	Operating conditions of the EUT (group 2 equipment only)	67
9.4.3	Peak measurements (group 2 equipment only)	67
9.4.4	Weighted measurements (group 2 equipment only).....	68
10	Measurement <i>in situ</i>	69
11	Safety precautions for emission measurements on ISM RF equipment	70
12	Measurement uncertainty	70
Annex A	(informative) Examples of equipment classification	71
A.1	General.....	71
A.2	Group 1 equipment	71
A.2.1	General Group 1 equipment.....	71
A.2.2	Detailed Group 1 equipment	71
A.3	Group 2 equipment	72
A.3.1	General Group 2 equipment.....	72
A.3.2	Detailed Group 2 equipment	72
Annex B	(normative) Measurement of electromagnetic radiation disturbance in the presence of signals from radio transmitters.....	73
Annex C	(informative) Recommendations of CISPR for protection of certain radio services in particular areas	74
C.1	General.....	74
C.2	Recommendations for protection of safety-related radio services	74

C.3	Recommendations for protection of specific sensitive radio services	76
Annex D (informative) Measurements on Grid Connected Power Converters (GCPC) –		
	Setups for an effective test site configuration.....	79
D.1	General information and purpose	79
D.2	Setup of the test site	79
D.2.1	Block diagram of test site	79
D.2.2	DC power supply	80
D.2.3	AC power source	80
D.2.4	Other components	81
D.3	Other test setups	81
D.3.1	Configuration comprising laboratory AC power source and resistive load	81
D.3.2	Configuration with reverse power flow into the AC mains	82
Annex E (informative) Guidance on prevention of saturation effects in mitigation filters		
	of transformer-less power converters during tests	84
E.1	General information and purpose	84
E.2	Recommendations for avoidance of saturation effects in the range 9 kHz to 150 kHz	85
E.3	Detailed advice	85
E.3.1	General	85
E.3.2	Insert of series inductors (or common mode chokes) in the laboratory's DC power supply chain	86
E.3.3	Employment of additional common mode decoupling capacitors at the interface between the AE port of the DC-AN and the laboratory DC power supply port allocated in the test environment.....	87
E.4	Background information	87
Annex F (normative) Additional requirements for equipment with radio functionality.....		
F.1	Configuration of the EUT during emission tests.....	90
F.2	Radiated emissions.....	90
F.3	Conducted emissions.....	90
Bibliography.....		92
Figure 1 – Circuit for disturbance voltage measurements on mains supply		41
Figure 2 – Artificial hand, RC element.....		42
Figure 3 – Example for a typical cable arrangement for measurements of radiated disturbances in 3 m separation distance, Table-top EUT		44
Figure 4 – Example for a typical test set up for measurement of conducted and/or radiated disturbances from a floor standing EUT, 3D view		45
Figure 5 – EUT boundary determination for radiated disturbance measurements of robots with extendable/moving arm		49
Figure 6 – Example of a typical test setup for conducted disturbance measurement on a floor-standing robot system.....		50
Figure 7 – Example of a typical test setup for radiated disturbance measurement on a floor-standing robot system.....		51
Figure 8 – Example of a typical test setup for conducted disturbance measurement on a combination robot system		52
Figure 9 – Example of a typical test setup for radiated disturbance measurement on a combination robot system		53
Figure 10 – Disposition of medical equipment (capacitive type) and dummy load		54

Figure 11 – Typical arrangement for measurement of conducted disturbances at LV DC power ports with the DC-AN used as termination and decoupling unit to the laboratory DC power source	60
Figure 12 – Typical arrangement for measurement of conducted disturbances at LV DC power ports with the DC-AN used as termination and voltage probe	61
Figure 13 – Typical arrangement for measurement of conducted disturbances at LV DC power ports with the DC-AN used as voltage probe and with a current probe – 2D diagram	62
Figure 14 – Typical arrangement for measurement of conducted disturbances at LV DC power ports with a DC-AN used as voltage probe and with a current probe – 3D diagram	62
Figure 15 – Radiation test site	64
Figure 16 – Minimum size of metal ground plane	64
Figure 17 – Decision tree for the measurement of emissions from 1 GHz to 18 GHz of group 2 equipment operating at frequencies above 400 MHz	67
Figure D.1 – Test setup for Case 1 (schematic)	79
Figure D.2 – Test setup for Case 1 (3D view).....	80
Figure D.3 – Test setup for Case 2 (schematic)	81
Figure D.4 – Test setup for Case 2 (3D view).....	82
Figure D.5 – Test setup for Case 3 (schematic)	83
Figure D.6 – Test setup for Case 3 (3D view).....	83
Figure E.1 – Flow of the common mode RF current at test site configuration level	86
Figure E.2 – Blocking of flow of common mode RF current by insert of series inductors.....	86
Figure E.3 – Blocking of flow of common mode RF current by employment of additional CM decoupling capacitors	87
Figure E.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	88
Figure E.5 – Prevention of saturation of mitigation filters by use of additional decoupling capacitors	88
Figure E.6 – Change in the resonant frequency caused by the increase and decrease in the decoupling capacitor's capacitance	89
Figure E.7 – DC-AN circuit example where capacitance of blocking capacitors of the LC decoupling circuit can be increased or decreased.....	89
Table 1 – Frequencies in the radio-frequency (RF) range designated by ITU for use as fundamental ISM frequencies.....	19
Table 2 – Disturbance voltage limits for class A group 1 equipment measured on a test site (AC mains power port).....	23
Table 3 – Limits for conducted disturbances of class A group 1 equipment measured on a test site (DC power port)	24
Table 4 – Disturbance voltage limits for class B group 1 equipment measured on a test site (AC mains power port).....	24
Table 5 – Disturbance voltage limits for class B group 1 equipment measured on a test site (DC power port).....	25
Table 6 – Applicability of measurements at DC power ports	25
Table 7 – Limits for conducted disturbances measured on a test site (wired network port).....	26
Table 8 – Electromagnetic radiation disturbance limits for class A group 1 equipment measured on a test site.....	27

Table 9 – Electromagnetic radiation disturbance limits for class B group 1 equipment measured on a test site.....	27
Table 10 – Required highest frequency for radiated measurements	28
Table 11 – Electromagnetic radiation disturbance limits for group 1 equipment measured on a test site.....	28
Table 12 – Disturbance voltage limits for class A group 2 equipment measured on a test site (AC mains power port).....	30
Table 13 – Disturbance voltage limits for class B group 2 equipment measured on a test site (AC mains power port).....	30
Table 14 – Electromagnetic radiation disturbance limits for class A group 2 equipment measured on a test site.....	32
Table 15 – Electromagnetic radiation disturbance limits for class A EDM and arc welding equipment measured on a test site.....	33
Table 16 – Electromagnetic radiation disturbance limits for class B group 2 equipment measured on a test site.....	33
Table 17 – Electromagnetic radiation disturbance peak limits for group 2 equipment operating at frequencies above 400 MHz	34
Table 18 – Electromagnetic radiation disturbance weighted limits for group 2 equipment operating at frequencies above 400 MHz	35
Table 19 – Electromagnetic radiation disturbance APD level corresponding to 10^{-1} limits for class B group 2 equipment operating at frequencies above 400 MHz.....	36
Table 20 – Electromagnetic radiation disturbance limits for class A group 1 equipment measured <i>in situ</i>	37
Table 21 – Electromagnetic radiation disturbance limits for class A group 2 equipment measured <i>in situ</i>	38
Table 22 – Operation modes for fixed robots.....	57
Table 23 – Operation modes for mobile robots.....	57
Table 24 – Frequency subranges to be used for weighted measurements.....	68
Table C.1 – Limits for electromagnetic radiation disturbances for <i>in situ</i> measurements to protect specific safety-related radio services in particular areas.....	74
Table C.2 – Frequency bands allocated for safety-related radio services	75
Table C.3 – Frequency bands allocated for sensitive radio services.....	77
Table F.1 – Disturbance voltage and current limits for group 1 and group 2 equipment measured on a test site (antenna port).....	91

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.
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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 seventh edition cancels and replaces the sixth edition published in 2015, Amendment 1:2016 and Amendment 2:2019. This edition constitutes a technical revision.

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

- a) introduction of limits for radiated disturbances in the frequency range above 1 GHz for group 1 equipment in line with the requirements given in the generic emission standards;
- b) introduction of limits for conducted disturbances on the wired network port in line with the requirements given in the generic emission standards;

- c) introduction of requirements for equipment which incorporates radio transmit/receive functions;
- d) introduction of definitions for various types of robots;
- e) consideration of some particular conditions when measuring robots, such as measurement setups and operating modes of robots.

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

Draft	Report on voting
CIS/B/831/FDIS	CIS/B/837/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This document 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 committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document 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 document 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.

INTRODUCTION

This CISPR publication contains, amongst common requirements for the control of RF disturbances from equipment intended for use in industrial, scientific, and medical 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 3.1.18 in this document. CISPR and ITU share their responsibilities 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 both, equipment assessed by means of 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(2020)). 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 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 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 can apply to individual ISM RF applications operated at frequencies outside designated ISM bands (see Table 1). They also can apply to ISM RF applications operated at frequencies above 18 GHz.

Recommendations of CISPR for the protection of radio services in particular areas are found in Annex C of this document.

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

1 Scope

This document 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 document covers emission requirements related to radio-frequency (RF) disturbances in the frequency range of 9 kHz to 400 GHz.

For ISM RF applications in the meaning of the definition found in the ITU Radio Regulations (2020) (see Definition 3.1.18), this document covers emission requirements related to radio-frequency disturbances in the frequency range of 9 kHz to 18 GHz.

ISM equipment which incorporates radio transmit/receive functions (host equipment with radio functionality) is included in the scope of this document, see Annex F. However, the emission requirements in this document are not intended to be applicable to the intentional transmissions from a radio transmitter as defined by the ITU including their spurious emissions.

NOTE 1 This exclusion only applies to emissions from the intentional radio transmitter. However, combination emissions, for example emissions resulting from intermodulation between the radio and the non-radio subassemblies of the ISM equipment, are not subject to this exclusion.

NOTE 2 Emission requirements for induction cooking appliances are specified in CISPR 14-1 [1]¹.

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

Robots used for industrial, scientific and medical applications are in the scope of this document.

EXAMPLE Welding robots, spraying robots, handling robots, processing robots, assembly robots, medical robots, education and experimental robots. A comprehensive list of robots in the scope of this document is given on the IEC EMC zone.

NOTE 3 Flying robots, domestic helper robots, toy robots and entertainment robots are examples of robots in the scope of other CISPR standards.

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 16-1-1:2019, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

¹ Figures in square brackets refer to the Bibliography.

CISPR 16-1-2:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Coupling devices for conducted disturbance measurements*
CISPR 16-1-2:2014/AMD1:2017

CISPR 16-1-4:2019, *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 16-1-4:2019/AMD1:2020
CISPR 16-1-4:2019/AMD2:2023

CISPR 16-2-1:2014, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-1: Methods of measurement of disturbances and immunity – Conducted disturbance measurements*
CISPR 16-2-1:2014/AMD1:2017

CISPR 16-2-3:2016, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 2-3: Methods of measurement of disturbances and immunity – Radiated disturbance measurements*
CISPR 16-2-3:2016/AMD1:2019
CISPR 16-2-3:2016/AMD2:2023

CISPR 16-4-2:2011, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Measuring instrumentation uncertainty*
CISPR 16-4-2:2011/AMD1:2014
CISPR 16-4-2:2011/AMD2:2018

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*
CISPR 32:2015/AMD1:2019

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

IEC 60601-2-2:2017, *Medical electrical equipment – Part 2-2: Particular requirements for the basic safety and essential performance of high frequency surgical equipment and high frequency surgical accessories*

IEC 61000-4-6:2023, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61307:2011², *Industrial microwave heating installations – Test methods for the determination of power output*

ITU Radio Regulations (2020), *Radio regulations* (available at <http://www.itu.int/en/myitu/Publications/2020/09/02/14/23/Radio-Regulations-2020>)

² This publication was withdrawn.