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GB 4824-2019 / CISPR 11:2016

Replacing GB 4824-2013

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

工业、科学和医疗设备 射频骚扰特性 限值 and 测量方法

(CISPR 11:2016, IDT)

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Foreword

All technical contents of this Standard are mandatory.

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB 4824-2013 “Industrial, Scientific and Medical Equipment - Radio-frequency Disturbance Characteristics - Limits and Methods of Measurement”. Compared with GB 4824-2013, the main technical changes in this Standard are as follows:

- changed the standard name to “Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement”;
- further clarified the scope of application of the standard in Clause 1 (see Clause 1 of this Edition);
- modified “Clause 2 Normative references” (see Clause 2 of this Edition);
- in “Clause 3 Terms and definitions”, added 12 terms and definitions: a.c. mains power port, artificial mains network, component, d.c. artificial network, d.c. power port, grid connected power converter, high power electronic system and equipment, photovoltaic power generating system, type test, fully-anechoic room, open-area test site and semi-anechoic chamber (see Clause 3 of this Edition);
- added “5.3 Documentation for the user” (see 5.3 of this Edition);
- in “6.2 Group 1 equipment measured on a test site”, added limits for conducted disturbances with power greater than 75kVA, at DC power ports (see 6.2 of this Edition);
- the main changes in “6.3 Group 2 equipment measured on a test site” were summarized as:
 - When measuring at a test site, the 3m distance limit in the electromagnetic radiation disturbance limit of class A group 2 equipment was revised (see Table 10 of Edition 2013);
 - in “the peak limit of electromagnetic radiation harassment for 2 groups of equipment that has a working frequency above 400MHz and produces continuous harassment”, added the limits for 11.7GHz~12.7GHz (see Table 13 of Edition 2013);
 - deleted “Table 15 -- Peak limit of electromagnetic radiation disturbance

for class B group 2 equipment that has a working frequency above 400MHz and produces fluctuating disturbances other than continuous waves” (see Table 15 of Edition 2013);

- added “Table 15 -- Electromagnetic radiation disturbance APD level corresponding to 10^{-1} limits for class B group 2 equipment operating at frequencies above 400 MHz” (see Table 15 of Edition 2013);
- added “Figure 3 -- Example for a typical cable arrangement for measurements of radiated disturbances in 3 m separation distance, Table-top EUT” (see Table 3 of this Edition);
- added “Figure 4 -- Example for a typical test set up for measurement of conducted and/or radiated disturbances from a floor standing EUT, 3D view” (see Figure 4 of this Edition);
- added “7.5.3.1.3 Connection to the laboratory a.c. mains network for measurement of radiated disturbances in the range 30 MHz to 18 GHz” (see 7.5.3.1.3 of this Edition);
- in “7.6 Load conditions of equipment under test”, added the requirements for “ISM radio frequency lighting equipment, medium voltage (MV) and high voltage (HV) switch cabinets, grid connected power converter” (see 7.6 of this Edition);
- added “8.2.2 Measurements on grid connected power converters” (see 8.2.2 of this Edition);
- added “9.4.2 Operating conditions of the EUT” (see 9.4.2 of this Edition);
- added “9.4.3 Preliminary measurement” (see 9.4.3 of this Edition);
- added “9.4.4 Final measurement” (see 9.4.4 of this Edition);
- modified “12 Equipment conformity assessment” to “12 Measurement uncertainty” (see Clause 12 of Edition 2013);
- deleted “13 Charts and flowcharts” (see Clause 13 of Edition 2013);
- added “Annex H (informative) Statistical assessment of series produced equipment against the requirements of CISPR standards” (see Annex H of this Edition);
- added “Annex I (normative) Artificial Network (AN) for the assessment of disturbance voltages at d.c. power ports of semiconductor power converters” (see Annex I);
- added “Annex J (informative) Measurements on Grid Connected Power

Converters (GCPC) - Setups for an effective test site configuration” (see Annex J of this Edition);

- added “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” (see Annex K of this Edition).

This Standard uses translation method to identically adopt CISPR 11:2016 “Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement (E6.1).

The Chinese documents which have consistency with the international normative references in this Standard are as follows:

- GB/T 6113.101-2016, Specification for radio disturbance and immunity measuring apparatus and methods of measurement - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring equipment (CISPR 16-1-1:2010, IDT);
- GB/T 6113.203-2016, Specification for radio disturbance and immunity measuring apparatus and methods of measurement - Part 2-3: Methods of measurement of radio disturbance and immunity - Radiated disturbance measurements (CISPR 16-2-3:2010, IDT);
- GB 9706.4-2009, Medical electrical equipment - Part 2-2: Particular requirements for the safety Of high frequency surgical equipment (IEC 60601-2-2:2006, IDT);
- GB/T 10066.6-2018, Test methods for electro-heating and electromagnetic processing installations - Part 6: Test methods for the determination of power output of industrial microwave heating installations (IEC 61307:2011, MOD);
- GB/T 15579.10-2008, Arc welding equipment. Part 10: Electromagnetic compatibility (EMC) requirements (IEC 60974-10:2007, IDT);
- YY 0505-2005, Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standards: Electromagnetic compatibility - Requirements and tests (IEC 60601-1-2:2001, IDT).

This Standard made the following editorial modification:

- according to “Regulations of the People's Republic of China on Radio Frequency Division (Order No. 46 of the Ministry of Industry and Information Technology)”, modified the informative Annex G: Frequency bands allocated for sensitive radio services, so as to make it more suitable

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

1 Scope

This 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 GB 4343.1-2018.

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 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 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.

GB/T 4365-2003, *Electrotechnical terminology - Electromagnetic compatibility* (IEC 60050-161:1990, IDT)

GB/T 6113.102-2018, *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, IDT)

GB/T 6113.104-2016, Radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Radiated disturbance measuring antenna and test site (CISPR 16-1-4:2012, IDT)

GB/T 6113.201-2018, 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, IDT)

GB/T 6113.402-2018, Specification for radio disturbance and immunity measuring apparatus and methods - Part 4-2: Uncertainties, statistics and limit modelling - Measurement instrumentation uncertainty (CISPR 16-4-2:2014, IDT)

GB/T 31251.2-2014, Resistance welding equipment - Part 2: Electromagnetic compatibility (EMC) requirements (IEC 62135-2:2007, IDT)

CISPR 16-1-1:2010+A1:2010+A2:2014, Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus

CISPR 16-2-3:2010+A1:2010+A2:2014, Specification for radio disturbance and immunity measuring apparatus and methods - Part 2-3: Methods of measurement of disturbances and immunity - Radiated disturbance measurements

IEC 60601-1-2:2014, Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral standard: Electromagnetic disturbance - Requirements and tests

IEC 60601-2-2:2009, 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 60974-10:2014, Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements

IEC 61307:2011, Industrial microwave heating installations - Test methods for the determination of power output

ITU Radio Regulations (2012), Radio regulations, Volume 3 - Resolutions and recommendations, Resolution No. 63 (can be found at

<http://www.itu.int/pub/R-REG-RR-2012>)

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in GB/T 4365-2003 as well as the followings apply.

3.1 a.c. mains power port

port used to connect to a public low voltage a.c. mains power distribution network or other low voltage a.c. mains installation

3.2 arc welding equipment

equipment for applying current and voltage and having the required characteristics suitable for arc welding and allied processes

3.3 artificial mains network; AMN

network that provides a defined impedance to the EUT at radio frequencies, couples the disturbance voltage to the measuring receiver and decouples the test circuit from the supply mains

NOTE 1: There are two basic types of AMN, the V-network (V-AMN) which couples the unsymmetrical voltages, and the Delta-network which couples the symmetric and the asymmetric voltages separately.

NOTE 2: The terms line impedance stabilization network (LISN) and V-AMN are used interchangeably.

3.4 boundary of the equipment under test

imaginary straight-line periphery describing a simple geometric configuration encompassing the equipment under test

NOTE: All interconnecting cables are included within this boundary.

3.5 component

product which serves a specific function or functions and which is intended for use in a higher order assembled equipment or system

3.6 d.c. artificial network; artificial d.c. network; DC-AN

artificial network that provides defined termination to the EUT's d.c. power port under test while also providing the necessary decoupling from conducted disturbances originating from the laboratory d.c. power source or from the load

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