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Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

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ELECTROTECHNICAL
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ICS 33.100.10

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CISPR 15
Edition 9.0 2018-05

LIMITS AND METHODS OF MEASUREMENT OF RADIO DISTURBANCE CHARACTERISTICS OF ELECTRICAL LIGHTING AND SIMILAR EQUIPMENT

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by subcommittee CISPR F: Interference relating to household appliances tools, lighting equipment and similar apparatus, of IEC technical committee CISPR: International special committee on radio interference.

The text of this interpretation sheet is based on the following documents:

DISH	Report on voting
CIS/F/777/DISH	CIS/F/790/RVDISH

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

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CISPR 15 interpretation sheet on the worst-case mode of operation

Introduction

Subclause 7.5 specifies the operating modes of lighting equipment that must be considered during an emission test. A few examples are given to support the explanation of what ‘different operating modes’ means. The list of examples is of course not exhaustive. Apparently, the example of ‘colour shifting’ is not clear enough and it is sometimes interpreted as if any possible colour and/or correlated colour temperature (CCT) setting that lighting equipment may produce shall be assessed during measurements. Many types of LED lighting may be set in many different colours and CCTs. Compared to other operational-mode related influence quantities such as light level regulation, flashing or radio communication, the risk of not capturing the maximum level of electromagnetic (EM) disturbances due to different colour or CCT settings is very small, provided that all channels of a LED driver used to change colour or CCT are operative. The ‘colour shifting’-example was meant for example for a mode where the light output continuously switches from one colour to another with a certain repetition frequency (e.g. applied for entertainment, events etc.), instead of emitting a single stable colour and/or CCT.

CISPR 15:2018-05/ISH1:2019-11(en)

ICS 33.100.10

Question

What is the meaning of example ‘colour shifting’ as mode of operation to be considered during testing? What colour and/or colour temperature should be selected in case lighting equipment can be set in a wide range of colours and/or CCTs?

Interpretation

The example ‘colour shifting’ in the first paragraph of 7.5 of CISPR 15:2018 must not be interpreted as if any possible colour and/or CCT setting that lighting equipment may produce shall be assessed during measurements.

Generally, according to 7.5 the worst case shall be found by prescanning every mode of operation over at least one repetition interval of the specific mode.

Alternatively, measurements can be performed using the setting(s) that are expected to produce the highest amplitude emissions relative to the limit; and, the reasons for the selection shall be given in the test report.

A reason could be that highest level of electromagnetic (EM) disturbances will be captured if all channels of a LED driver used to create different colours and/or CCTs are operative. The number of channels applied depends on the LED-driver/LED-light-source architecture. Often, maximum EM disturbances can be achieved by selecting a white colour and/or a CCT setting in the middle of the specified CCT range.

EXAMPLE Colour variation and CCT variation may be achieved using a 5-channel LED driver powering three LED strings for colour (RGB) setting and two cool white and warm white LED strings for CCT setting. Hence, in case the lighting equipment under test is capable to operate at different colours and/or CCTs, a white colour and/or a single CCT in the middle of the specified CCT range may be selected[1].

1 7.4 of CISPR 15:2018, also still applies.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

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LIMITS AND METHODS OF MEASUREMENT OF RADIO DISTURBANCE CHARACTERISTICS OF ELECTRICAL LIGHTING AND SIMILAR EQUIPMENT

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

CISPR 15 edition 9.1 contains the ninth edition (2018-05) [documents CIS/F/733/FDIS and CIS/F/736/RVD], its interpretation sheet (2019-11), and its amendment 1 (2024-07) [documents CIS/F/851/FDIS and CIS/F/854/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough

red text. A separate Final version with all changes accepted is available in this publication.

International Standard CISPR 15 has been prepared by subcommittee CIS/F: Interference relating to household appliances tools, lighting equipment and similar apparatus, of IEC technical committee CISPR: International special committee on radio interference.

This ninth edition cancels and replaces the eighth edition published in 2013 and its Amendment 1:2015. This edition constitutes a technical revision.

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

a) full editorial revision and restructuring;
b) the restriction to mains and battery operation is deleted in the scope;
c) radiated disturbance limits in the frequency range 300 MHz to 1 GHz have been introduced;
d) the load terminals limits and the CDNE (alternative to radiated emissions) limits have changed;
e) deletion of the insertion-loss requirements and the associated Annex A;
f) introduction of three basic ports: wired network ports, local wired ports and the enclosure port;
g) introduction of a more technology-independent approach;
h) replacement of Annex B (CDNE) by appropriate references to CISPR 16-series of standards;
i) modified requirements for the metal holes of the conical housing;
j) new conducted disturbance measurement method for GU10 self-ballasted lamp;
k) addition of current probe measurement method and limits for various types of ports (in addition to voltage limits and measurement methods);
l) introduction of the term ‘module’ (instead of independent auxiliary) and requirements for measurement of modules using a host (reference) system;
m) modified specifications for stabilization times of EUTs;
n) for large EUT (> 1,6 m), addition of the magnetic field measurement method using a 60 cm loop antenna at 3 m distance (method from CISPR 14-1) as an alternative to the 3 m and 4 m LAS.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
CIS/F/733/FDIS	CIS/F/736/RVD

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document 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 to Amendment 1

This Amendment includes the following significant technical changes with respect to CISPR 15:2018.

a) The voltage probe method for the conducted disturbance measurement of local wired port other than the electrical power supply interface of ELV lamps has been deleted.

b) Limits and measurement methods have been introduced for radiated disturbance of the enclosure port in the frequency range 1 GHz to 6 GHz.

c) The test set-up for the conical metal housing for single capped lamps has been rotated.

d) The arrangement of cables connected to interfaces of wired network ports has been modified. Cable length has been extended to 1,0 m.

e) Measuring arrangements for conducted disturbances for very large EUTs have been clarified.

f) Annex E regarding statistical methods has been deleted.

LIMITS AND METHODS OF MEASUREMENT OF RADIO DISTURBANCE CHARACTERISTICS OF ELECTRICAL LIGHTING AND SIMILAR EQUIPMENT

1 Scope

This document ~~applies to~~ sets out requirements for controlling the emission (radiated and conducted) of radiofrequency disturbances from:

– lighting equipment (3.3.16) and modules, except for the types excluded in the second paragraph;

– the lighting part of multi-function equipment where this lighting part is a primary function;

NOTE 1 Examples are lighting equipment with visible-light communication~~, entertainment lighting~~.

– UV and IR radiation equipment for residential and non-industrial applications;

– simple advertising signs (see 3.3.1);

~~NOTE 2 Examples are neon tube advertising signs.~~

– decorative and entertainment lighting (see 3.3.6);

– emergency signs.

Excluded from the scope of this document are:

– components or modules intended to be built into lighting equipment and which are not user-replaceable;

~~NOTE 3 See CISPR 30 (all parts) for built-in controlgear.~~

~~– lighting equipment operating in the ISM frequency bands (as defined in Resolution 63 (1979) of the ITU Radio Regulation);~~

~~– lighting equipment for aircraft and airfield facilities (runways, service facilities, platforms);~~

~~– video signs;~~

– lighting equipment intended exclusively for aircraft or airfield facilities (runways, service facilities, platforms). However, general-purpose lighting that can be installed in many locations, including installations not related to aircraft or airfield, is not excluded from the scope of this document;

– installations;

– equipment for which the electromagnetic compatibility requirements in the radio-frequency range are explicitly formulated in other ~~CISPR~~ IEC standards, even if they incorporate a built-in lighting function.

NOTE ~~4~~2 Examples of exclusions are:

– equipment with built-in lighting devices for display back lighting, scale illumination and signalling;

~~– SSL-displays;~~

– video signs and dynamic displays (in scope of CISPR 32);

– range hoods, refrigerators, freezers (in scope of CISPR 14);

– photocopiers, projectors (in scope of CISPR 32);

– lighting equipment for road vehicles (in scope of CISPR 12);

– maritime equipment (in scope of IEC TC 18 and TC 80);

– lighting equipment operating in the ISM frequency bands (in scope of CISPR 11).

The frequency range covered is 9 kHz to 400 GHz. No measurements need to be performed at frequencies where no limits are specified in this document.

Multi-function equipment which is subjected simultaneously to different clauses of this document and/or other standards need to meet the provisions of each clause/standard with the relevant functions in operation.

For equipment outside the scope of this document and which includes lighting as a secondary function, there is no need to separately assess the lighting function against this document, provided that the lighting function was operative during the assessment in accordance with the applicable standard.

NOTE 5 Examples of equipment with a secondary lighting function can be range hoods, fans, refrigerators, freezers, ovens and TV with ambient lighting.

The ~~radiated~~ emission requirements in this document are not intended to be applicable to the intentional transmissions from a radio transmitter as defined by the ITU~~, nor to any spurious emissions related to these intentional transmissions~~ including their spurious emissions.

Within the remainder of this document, wherever the term "lighting equipment" or "EUT" is used, it is meant to be the electrical lighting and similar equipment falling in the scope of this document as specified in this clause.

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.

IEC 60038, *IEC standard voltages*

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

IEC 60050-845:1987, *International Electrotechnical Vocabulary – Chapter 845: Lighting*

IEC 60061-1, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 60081, *Double-capped fluorescent lamps – Performance specifications*

IEC 60598-1:2014, *Luminaires – Part 1: General requirements and tests*
IEC 60598-1:2014/AMD1:2017

IEC 60921, *Ballasts for tubular fluorescent lamps – Performance requirements*

IEC 61000-4-20:2010: *Electromagnetic compatibility (EMC) – Part 4-20: Testing and measurement techniques – Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

IEC 61195, *Double-capped fluorescent lamps – Safety specifications*

IEC 62504:2014, *General lighting – Light emitting diode (LED) products and related equipment – Terms and definitions*

CISPR 16-1-1:~~2015~~2019, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus*

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:~~2010~~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:~~2010~~2019/AMD1:~~2012~~2020
CISPR 16-1-4:~~2010~~2019/AMD2:~~2017~~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 – Measurement instrumentation uncertainty*
CISPR 16-4-2:2011/AMD1:2014
CISPR 16-4-2:2011/AMD2:2018

CISPR TR 30-1:2012, *Test method on electromagnetic emissions – Part 1: Electronic control gear for single- and double-capped fluorescent lamps*

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

ISO/IEC 17025:2005[1], *General requirements for the competence of testing and calibration laboratories*

[1] This edition was replaced by ISO/IEC 17025:2017 but the listed edition applies.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CISPR 15
Edition 9.0 2018-05

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CISPR 15 interpretation sheet on the worst-case mode of operation

Introduction

Subclause 7.5 specifies the operating modes of lighting equipment that must be considered during an emission test. A few examples are given to support the explanation of what ‘different operating modes’ means. The list of examples is of course not exhaustive. Apparently, the example of ‘colour shifting’ is not clear enough and it is sometimes interpreted as if any possible colour and/or correlated colour temperature (CCT) setting that lighting equipment may produce shall be assessed during measurements. Many types of LED lighting may be set in many different colours and CCTs. Compared to other operational-mode related influence quantities such as light level regulation, flashing or radio communication, the risk of not capturing the maximum level of electromagnetic (EM) disturbances due to different colour or CCT settings is very small, provided that all channels of a LED driver used to change colour or CCT are operative. The ‘colour shifting’-example was meant for example for a mode where the light output continuously switches from one colour to another with a certain repetition frequency (e.g. applied for entertainment, events etc.), instead of emitting a single stable colour and/or CCT.

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ICS 33.100.10

Question

What is the meaning of example ‘colour shifting’ as mode of operation to be considered during testing? What colour and/or colour temperature should be selected in case lighting equipment can be set in a wide range of colours and/or CCTs?

Interpretation

The example ‘colour shifting’ in the first paragraph of 7.5 of CISPR 15:2018 must not be interpreted as if any possible colour and/or CCT setting that lighting equipment may produce shall be assessed during measurements.

Generally, according to 7.5 the worst case shall be found by prescanning every mode of operation over at least one repetition interval of the specific mode.

Alternatively, measurements can be performed using the setting(s) that are expected to produce the highest amplitude emissions relative to the limit; and, the reasons for the selection shall be given in the test report.

A reason could be that highest level of electromagnetic (EM) disturbances will be captured if all channels of a LED driver used to create different colours and/or CCTs are operative. The number of channels applied depends on the LED-driver/LED-light-source architecture. Often, maximum EM disturbances can be achieved by selecting a white colour and/or a CCT setting in the middle of the specified CCT range.

EXAMPLE Colour variation and CCT variation may be achieved using a 5-channel LED driver powering three LED strings for colour (RGB) setting and two cool white and warm white LED strings for CCT setting. Hence, in case the lighting equipment under test is capable to operate at different colours and/or CCTs, a white colour and/or a single CCT in the middle of the specified CCT range may be selected[1].

1 7.4 of CISPR 15:2018, also still applies.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

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LIMITS AND METHODS OF MEASUREMENT OF RADIO DISTURBANCE CHARACTERISTICS OF ELECTRICAL LIGHTING AND SIMILAR EQUIPMENT

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

CISPR 15 edition 9.1 contains the ninth edition (2018-05) [documents CIS/F/733/FDIS and CIS/F/736/RVD], its interpretation sheet (2019-11), and its amendment 1 (2024-07) [documents CIS/F/851/FDIS and CIS/F/854/RVD].

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard CISPR 15 has been prepared by subcommittee CIS/F: Interference relating to household appliances tools, lighting equipment and similar apparatus, of IEC technical committee CISPR: International special committee on radio interference.

This ninth edition cancels and replaces the eighth edition published in 2013 and its Amendment 1:2015. This edition constitutes a technical revision.

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

a) full editorial revision and restructuring;
b) the restriction to mains and battery operation is deleted in the scope;
c) radiated disturbance limits in the frequency range 300 MHz to 1 GHz have been introduced;
d) the load terminals limits and the CDNE (alternative to radiated emissions) limits have changed;
e) deletion of the insertion-loss requirements and the associated Annex A;
f) introduction of three basic ports: wired network ports, local wired ports and the enclosure port;
g) introduction of a more technology-independent approach;
h) replacement of Annex B (CDNE) by appropriate references to CISPR 16-series of standards;
i) modified requirements for the metal holes of the conical housing;
j) new conducted disturbance measurement method for GU10 self-ballasted lamp;
k) addition of current probe measurement method and limits for various types of ports (in addition to voltage limits and measurement methods);
l) introduction of the term ‘module’ (instead of independent auxiliary) and requirements for measurement of modules using a host (reference) system;
m) modified specifications for stabilization times of EUTs;
n) for large EUT (> 1,6 m), addition of the magnetic field measurement method using a 60 cm loop antenna at 3 m distance (method from CISPR 14-1) as an alternative to the 3 m and 4 m LAS.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
CIS/F/733/FDIS	CIS/F/736/RVD

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document 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 to Amendment 1

This Amendment includes the following significant technical changes with respect to CISPR 15:2018.

a) The voltage probe method for the conducted disturbance measurement of local wired port other than the electrical power supply interface of ELV lamps has been deleted.

b) Limits and measurement methods have been introduced for radiated disturbance of the enclosure port in the frequency range 1 GHz to 6 GHz.

c) The test set-up for the conical metal housing for single capped lamps has been rotated.

d) The arrangement of cables connected to interfaces of wired network ports has been modified. Cable length has been extended to 1,0 m.

e) Measuring arrangements for conducted disturbances for very large EUTs have been clarified.

f) Annex E regarding statistical methods has been deleted.

LIMITS AND METHODS OF MEASUREMENT OF RADIO DISTURBANCE CHARACTERISTICS OF ELECTRICAL LIGHTING AND SIMILAR EQUIPMENT

1 Scope

This document sets out requirements for controlling the emission (radiated and conducted) of radiofrequency disturbances from:

– lighting equipment (3.3.16) and modules, except for the types excluded in the second paragraph;
– the lighting part of multi-function equipment where this lighting part is a primary function;

NOTE 1 Examples are lighting equipment with visible-light communication.

– UV and IR radiation equipment for residential and non-industrial applications;
– simple advertising signs (see 3.3.1);
– decorative and entertainment lighting (see 3.3.6);
– emergency signs.

Excluded from the scope of this document are:

– components or modules intended to be built into lighting equipment and which are not user-replaceable;
– lighting equipment intended exclusively for aircraft or airfield facilities (runways, service facilities, platforms). However, general-purpose lighting that can be installed in many locations, including installations not related to aircraft or airfield, is not excluded from the scope of this document;
– installations;
– equipment for which the electromagnetic compatibility requirements in the radio-frequency range are explicitly formulated in other IEC standards, even if they incorporate a built-in lighting function.

NOTE 2 Examples of exclusions are:

– equipment with built-in lighting devices for display back lighting, scale illumination and signalling;
– video signs and dynamic displays (in scope of CISPR 32);
– range hoods, refrigerators, freezers (in scope of CISPR 14);
– photocopiers, projectors (in scope of CISPR 32);
– lighting equipment for road vehicles (in scope of CISPR 12);
– maritime equipment (in scope of IEC TC 18 and TC 80);
– lighting equipment operating in the ISM frequency bands (in scope of CISPR 11).

The frequency range covered is 9 kHz to 400 GHz. No measurements need to be performed at frequencies where no limits are specified in this document.

Multi-function equipment which is subjected simultaneously to different clauses of this document and/or other standards need to meet the provisions of each clause/standard with the relevant functions in operation.

For equipment outside the scope of this document and which includes lighting as a secondary function, there is no need to separately assess the lighting function against this document, provided that the lighting function was operative during the assessment in accordance with the applicable standard.

NOTE 5 Examples of equipment with a secondary lighting function can be range hoods, fans, refrigerators, freezers, ovens and TV with ambient lighting.

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.

Within the remainder of this document, wherever the term "lighting equipment" or "EUT" is used, it is meant to be the electrical lighting and similar equipment falling in the scope of this document as specified in this clause.

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.

IEC 60038, *IEC standard voltages*

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

IEC 60050-845:1987, *International Electrotechnical Vocabulary – Chapter 845: Lighting*

IEC 60061-1, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 60081, *Double-capped fluorescent lamps – Performance specifications*

IEC 60598-1:2014, *Luminaires – Part 1: General requirements and tests*
IEC 60598-1:2014/AMD1:2017

IEC 60921, *Ballasts for tubular fluorescent lamps – Performance requirements*

IEC 61000-4-20:2010: *Electromagnetic compatibility (EMC) – Part 4-20: Testing and measurement techniques – Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

IEC 61195, *Double-capped fluorescent lamps – Safety specifications*

IEC 62504:2014, *General lighting – Light emitting diode (LED) products and related equipment – Terms and definitions*

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*

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 – Measurement instrumentation uncertainty*
CISPR 16-4-2:2011/AMD1:2014
CISPR 16-4-2:2011/AMD2:2018

CISPR TR 30-1:2012, *Test method on electromagnetic emissions – Part 1: Electronic control gear for single- and double-capped fluorescent lamps*

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

ISO/IEC 17025:2005[1], *General requirements for the competence of testing and calibration laboratories*

[1] This edition was replaced by ISO/IEC 17025:2017 but the listed edition applies.