

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

COMITÉ INTERNATIONAL SPÉCIAL DES PERTURBATIONS RADIOÉLECTRIQUES

AMENDMENT 1  
AMENDEMENT 1

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

Limites et méthodes de mesure des perturbations radioélectriques produites par  
les appareils électriques d'éclairage et les appareils analogues



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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

## INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

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

#### **AMENDMENT 1**

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Amendment 1 to CISPR 15:2018 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.

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

Draft	Report on voting
CIS/F/851/FDIS	CIS/F/854/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 Amendment is English.

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CISPR 15:2018/AMD1:2024

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## INTRODUCTION

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

- 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.
- Limits and measurement methods have been introduced for radiated disturbance of the enclosure port in the frequency range 1 GHz to 6 GHz.
- The test set-up for the conical metal housing for single capped lamps has been rotated.
- The arrangement of cables connected to interfaces of wired network ports has been modified. Cable length has been extended to 1,0 m.
- Measuring arrangements for conducted disturbances for very large EUTs have been clarified.
- Annex E regarding statistical methods has been deleted.

## 1 Scope

*Replace the first and second paragraphs with the following text:*

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).

*Replace the sixth paragraph with the following text:*

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.

## 2 Normative references

*Replace the reference to CISPR 16-1-1 with the following new reference:*

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*

*Add the following text below the CISPR 16-1-2 reference:*

CISPR 16-1-2:2014/AMD1:2017

*Replace the reference to CISPR 16-1-4 with the following new reference:*

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

*Add the following text below the CISPR 16-2-3 reference:*

CISPR 16-2-3:2016/AMD1:2019

CISPR 16-2-3:2016/AMD2:2023

*Add the following text below the CISPR 16-4-2:2011/AMD1:2014 reference:*

CISPR 16-4-2:2011/AMD2:2018

*Add the following text below the CISPR 32 reference:*

CISPR 15:2018/AMD1:2024

CISPR 32:2015/AMD1:2019

## 3.2 General terms and definitions

*Replace terminology entries 3.2.6 and 3.2.7 with the following:*

### 3.2.6

#### **primary function**

function of an equipment as specified in the instructions for use

### 3.2.7

#### **secondary function**

any function of an equipment not being essential for fulfilling the primary function as specified in the instructions for use



### 3.3 Terms and definitions related to equipment

*Replace terminology entries 3.3.1 and 3.3.2 with the following:*

#### 3.3.1

##### **simple advertising sign**

unit which makes use of lighting for advertising, traffic signage, road signs or the like

EXAMPLE Neon tube advertising signs, emergency signs, inner-illuminated signs.

#### 3.3.2

##### **ancillary equipment**

transducers (e.g. current probes and artificial networks) and other equipment (e.g. cables, preamplifiers, attenuators, filters, adapters) connected to a measuring receiver or the EUT and used in the disturbance signal transfer between the EUT and the measuring receiver

*In 3.3.3, add the following note to entry below Note 1 to entry:*

Note 2 to entry: The emission from the associated equipment should not influence the emission of the EUT.

*In 3.3.3, SOURCE, replace "Note 1" with "Notes".*

*Replace terminology entry 3.3.6 with the following new entry:*

#### 3.3.6

##### **decorative and entertainment lighting**

equipment that emits light for atmospheric, artistic or ambiance purposes

Note 1 to entry: Examples of decorative lighting include LED strip lights, rope lights, and projectors for illuminating building walls or statues in coloured and/or patterned light. Usually, these types of lighting equipment are static, but they can shift through various colours or patterns.

Note 2 to entry: Examples of entertainment lighting include stage, theatre and sky beam lights. Usually, these types of lighting equipment also include some movement, such as dynamically changing the direction of the projected light.

*Replace the definition in 3.3.16 with the following (keeping the existing Note 1 to entry):*

#### 3.3.16

##### **lighting equipment**

device that can be used as an independent unit to illuminate a scene, objects or their surroundings so that they can be seen, and components and modules designed to be used in or with such a device or assembly of devices

*Replace definition 3.3.20 with the following (keeping the existing Note 1 to entry):*

#### 3.3.20

##### **restricted ELV lamp**

ELV lamp with specific restrictions on the type of power supply and/or the cable length that can be applied to it, as specified in the instructions for use

*Add, after the existing terminology entry 3.3.23, the following new entry:*

#### 3.3.24

##### **user-replaceable**

components or modules which can be replaced by the end-user



### 3.5 Abbreviated terms

*Replace the term AAN with the following:*

AAN            asymmetric artificial network

*Add the following terms below "FE    functional earth":*

FSOATS       free space open area test site

Fx              clock frequency

*Delete the following term:*

ISN            impedance stabilization network

*Add the following term below "UV    ultraviolet":*

VBW           video bandwidth

#### 4.3.1 Electric power supply interface

*Add the following note below Table 1:*

NOTE In the US, lighting devices are classified as either a non-consumer (Class A) or consumer (Class B) device. These classification limits are similar to the Class A and Class B equipment categories in CISPR 32:2015 and CISPR 32:2015/AMD1:2019.

#### 4.3.2 Wired network interfaces other than power supply

*In Table 2, NOTE 2, replace the term "artificial asymmetrical network" with "asymmetric artificial network".*

### 4.4 Limits and methods for the assessment of local wired ports

*Add the following sentence after the second paragraph:*

Interfaces that are not connected to a network and having a length less than 3 m shall not be assessed for conducted disturbances.

*Delete the existing third paragraph.*

*Replace the existing fifth paragraph with the following:*

The limits and methods given in Table 6 shall apply to local wired ports other than electrical power supply interface of ELV lamps.

*Delete Table 5.*

*In Table 6, replace "NOTE 1" with "NOTE" and delete the existing NOTE 2.*

#### 4.5.2 Frequency range 9 kHz to 30 MHz

*Replace the fifth paragraph with the following text:*

The limits in Table 8 and Table 9 provide different options. The test report shall state which method was used and which limits were applied.

*Replace Table 7 with the following:*

**Table 7 – Maximum EUT dimension that can be used for testing using LLAS with different diameters**

Maximum dimension of the EUT, $D$ m	Loop antenna diameter m
$D \leq 1,6$	2
$D \leq 2,4$	3
$D \leq 3,2$	4
<p>No minimum EUT dimensions are given for the 3 m and 4 m LLAS. However, it is recommended to apply the smallest size of LLAS that is appropriate for the size of the EUT.</p> <p>If a small EUT is tested in a large LLAS (i.e. EUT smaller than 1,6 m tested in a 3 m or 4 m LLAS, or EUT smaller than 2,4 m tested in a 4 m LLAS), it shall be confirmed that the LLAS is able to detect EUT generated emissions with at least 10 dB of margin above the measuring instrument's noise floor.</p>	

#### 4.5.3 Frequency range 30 MHz to 1 GHz

*Replace the second paragraph with the following text:*

Table 10 provides different options. The test report shall state which method was used and which limits were applied.

*In Table 10, add the following sentence at the end of table footnote b:*

The results taken in a TEM waveguide are converted to field strength for comparison with OATS-based limits at 10 m distance.

*Add the following note below Table 10:*

NOTE In the US, lighting devices are classified as either a non-consumer (Class A) or consumer (Class B) device. These classification limits are similar to the Class A and Class B equipment categories in CISPR 32:2015 and CISPR 32:2015/AMD1:2019.

*Add, after the existing text of 4.5.3, the following new subclause:*

#### 4.5.4 Frequency range 1 GHz to 6 GHz

Radiated disturbance measurements in this frequency range shall be performed up to the frequency determined in accordance with Table 13, based on the highest clock frequency of the EUT. However, if the clock frequencies of the EUT are not known, radiated disturbance measurements shall be performed up to 6 GHz.

**Table 13 – Radiated measurement highest frequency**

Highest clock frequency F <sub>x</sub>	Highest measurement frequency
F <sub>x</sub> ≤ 108 MHz	1 GHz
108 MHz < F <sub>x</sub> ≤ 500 MHz	2 GHz
500 MHz < F <sub>x</sub> ≤ 1 GHz	5 GHz
F <sub>x</sub> > 1 GHz	5 × F <sub>x</sub> up to a maximum of 6 GHz

Radiated disturbance limits and measurement methods in the frequency range of 1 GHz to 6 GHz are given in Table 14 in terms of peak and average values of the electric field component.

**Table 14 – Radiated disturbance requirements at frequencies above 1 GHz**

Frequency range MHz	Testing method	Testing distance m	Detector type / bandwidth	Limits dB(µV/m)
1 000 to 3 000	FSOATS	3	Average / 1 MHz	50
3 000 to 6 000				54
1 000 to 3 000			Peak / 1 MHz	70
3 000 to 6 000				74

Apply across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 13.

Allowed measurement distances: 1 m, 3 m, 5 m, or 10 m.

Where a different measurement distance is chosen, other than the reference testing distance defined (3 m), the limit is offset based upon the following formula:

$$L_{\text{new}} = L_{\text{def}} - 20 \log(d_{\text{meas}}/d_{\text{ref}})$$

where

$L_{\text{new}}$  is the new limit at the reference distance in dB(µV/m);

$L_{\text{def}}$  is the defined limit at the measurement distance in dB(µV/m);

$d_{\text{meas}}$  is the measurement distance in metres;

$d_{\text{ref}}$  is the reference distance in metres.

An FSOATS may be a SAC/OATS with RF absorber on the RGP or a FAR, see specific details in CISPR 16-2-3:2016, CISPR 16-2-3:2016/AMD1:2019 and CISPR 16-2-3:2016/AMD2:2023.

NOTE In the US, lighting devices are classified as either a non-consumer (Class A) or consumer (Class B) device. These classification limits are similar to the Class A and Class B equipment categories in CISPR 32:2015 and CISPR 32:2015/AMD1:2019.

### 5.3.2.2 Conducted disturbance requirements for wired network interfaces other than power supply

*In the second paragraph, replace the term "artificial asymmetrical network" with "asymmetric artificial network".*

### 5.3.3 Conducted disturbance requirements for local wired ports

*Replace the existing second paragraph with the following:*

For local wired ports other than power supply interface of ELV lamp, the disturbance current limits given in Table 6 shall be applied using the measurement method given in 8.5.2.3. The method of measurement and the applicable limits for the power supply interface of ELV lamp are described in 6.4.7.

#### 5.3.4.1 Frequency range 9 kHz to 30 MHz

*Replace the first bullet under the first paragraph with the following:*

- the instructions for use allow external wired interfaces connected to the EUT by single-conductor cables;

*Add, after the existing text of 5.3.4.2, the following new subclause:*

#### 5.3.4.3 Frequency range 1 GHz to 6 GHz

The EUT shall be tested for radiated disturbance in the range 1 GHz to 6 GHz in accordance with Table 14.

### 5.3.6 Interfaces that can be categorised as multiple types of ports

*Replace the example with the following:*

EXAMPLE A power-over-Ethernet can be identified as both a wired network port (Ethernet-connection) and a local-wired port (DC power supply). For the wired network port (Ethernet-connection), the limits in either Table 2 or Table 3 would apply. For the local-wired port (DC power supply) the limits in Table 6 apply. In this case, the disturbance current limits of Table 3 and Table 6 are the same. In this example, the limits for either type of port are basically the same. Broadband over power and powerline communication are other examples where the interface in question can be categorized as different kinds of wired network ports (4.3).

### 6.3.2 Requirements for rope lights

*Add "and Table 14 if applicable" at the end of the existing first paragraph.*

## 6.4 Modules

*Replace the title of the subclause with:*

### 6.4 Components and modules

#### 6.4.1 General

*Replace "module" with "component or module" in the first sentence of the first paragraph.*

*Replace "modules" with "components or modules" in the first sentence of the second paragraph.*

*Replace "module" with "component or module" in the first bullet point of the second paragraph.*

*Replace "module" with "component or module" in the second bullet point of the second paragraph.*

*Replace "module" with "component or module" in the third bullet point of the second paragraph.*

*Replace "module" with "component or module" in the fourth bullet point of the second paragraph.*

*Replace "modules" with "components or modules" in the third paragraph.*

*Replace "module" with "component or module" in the first sentence of the fourth paragraph.*

*Replace "module" with "component or module" in the second sentence of the fourth paragraph.*

*Replace "Modules" with "Components or modules" in the third sentence of the fourth paragraph.*

*Replace "modules" with "components or modules" in the fourth sentence of the fourth paragraph.*

*Replace the fifth paragraph with the following text:*

The host or the type of luminaire and associated circuits shall be suitable and representative for use with the component or module as specified in the instructions for use. This shall be based on analysing various possible typical applications for the specific component or module such that the selected host is representative of typical use in terms of mitigation of disturbances from the component or module in question.

*Replace "modules" with "components or modules" in the seventh paragraph.*

#### 6.4.3 Internal modules

*Replace the second paragraph with the following text:*

The host, that includes the module as EUT, is tested as a luminaire in accordance with Clause B.6 (Figure B.1b) and Clause C.4 (Figure C.4) or CDNE setup according to CISPR 16-2-1:2014 and CISPR 16-2-1:2014/AMD1:2017. Examples of the host (reference luminaire) are given in CISPR TR 30-1:2012 and CISPR TR 30-2:2012.

NOTE The host or reference luminaire is considered as the EUT and therefore the limitation of the CDNE method to EUTs having not more than two cables (CISPR 16-2-1:2014, 9.1 c) is applicable to the host and not to the internal module.

*Replace 6.4.5 with the following:*

#### **6.4.5 Single capped self-ballasted lamps**

Single capped self-ballasted lamps shall comply with the disturbance voltage limits at electric power supply interface given in Table 1 with the radiated disturbance limits shown in Table 8 or Table 9 if applicable, and in Table 10 and Table 14 if applicable.

The setup and test arrangements for single capped self-ballasted lamps are specified in Clause A.1.

#### **6.4.6 Double-capped self-ballasted lamps, double-capped lamp adapters, double-capped semi-luminaires and double-capped retrofit lamps used in fluorescent lamp luminaires**

*Add "and Table 14 if applicable" at the end of the existing first paragraph*

#### **6.4.7 ELV lamps**

*Add "and Table 14 if applicable" after "Table 10" in item a).*

*Add "and Table 14 if applicable" after "Table 10" in item b).*

#### **6.4.10 Replaceable starters for fluorescent lamps**

*Replace the second sentence in the first paragraph with the following:*

The instructions for use shall specify the type of luminaire and associated circuit(s), which are suitable for use with the starter.

### **7.1 General**

*Replace the second paragraph with the following:*

The EUT is to be tested under normal operating conditions, for example, as given in IEC 60598-1 for luminaires.

### **7.3 Supply voltage and frequency**

*Replace the text of the subclause with the following:*

During the tests, the EUT shall be operated at the rated voltage specified for the equipment. The supply voltage shall be within  $\pm 2$  % of the selected nominal test voltage.