



INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**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**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

XB

ICS 33.100.10

ISBN 978-2-83220-798-7

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CISPR/F/Publication CISPR 15 (2013), eighth edition/I-SH 01

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:

ISH	Report on voting
CISPR/F/583/ISH	CISPR/F/591/RVD

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.

CISPR 15 interpretation sheet on the assessment of retrofit Extra Low Voltage LED lamps

Introduction

During the CISPR meeting in Seoul 2011 the IARU reported that a number of LED lighting products are causing interference with amateur radio reception. See item 15 of the minutes CISPR/1218/RM.

In addition to this verbal report, the IARU submitted in January 2012 a detailed written report which was circulated as CISPR/F/565/INF. Major sources of interference are some types of Extra Low Voltage (e.g. 12 V) LED lamps for which the current CISPR 15 requirements are not clear. Additional clarification of the standard was requested urgently.

In response the CISPR F management committee issued document CISPR/F/568/INF setting out an action plan to resolve the issue at short notice.

Part of the solution is this Interpretation Sheet which details the assessment of retrofit ELV LED lamps.

Question: How are the requirements of CISPR 15 applied to retrofit Extra Low Voltage (ELV) LED lamps?

Interpretation: When assessing retrofit ELV LED lamps against the requirements of CISPR 15 the following procedure shall be applied.

ELV LED lamps without active switching electronic components are considered to fulfil the requirements of CISPR 15 without test.

All other types of retrofit ELV LED lamps shall be tested in conjunction with a wire wound 50 or 60 Hz ring-core transformer. The use of such a transformer is considered to be the worst-case condition and shall be used unless it is clearly stated in the manufacturer's instructions that the lamp is unsuitable for use with such a transformer. In this case measurements shall be performed in combination with a typical compliant electronic transformer for halogen lamps.

The combination of transformer and ELV LED lamp shall comply with the mains disturbance voltage limits of Table 2a and the radiated disturbance limits of Tables 3a and 3b.

During the disturbance voltage measurement, the ELV LED lamp is mounted in a conical metal housing as described in Figure 7. The ELV LED lamp is then connected to the transformer by a flexible 3-core cable consisting of two ELV supply conductors and the earth connection to the conical housing. The length of this cable shall be as short as possible. The metal conical housing shall be positioned with its cable entrance close to the transformer.

The combination of transformer and conical metal housing shall be tested as a luminaire in accordance with the requirements of 8.2.

When performing the radiated disturbance measurements in accordance with Clause 9, the conical metal housing shall not be used.

References are to CISPR 15:2013.

CISPR/F/Publication CISPR 15 (2013), eighth edition/I-SH 02

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

INTERPRETATION SHEET 2

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:

ISH	Report on voting
CISPR/F/584/ISH	CISPR/F/592/RVD

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.

CISPR 15 interpretation sheet on: Test conditions for wall dimmers

Introduction

More and more incandescent lamps are replaced by energy saving lamps (fluorescent and LED). Some types are dimmable by phase control of the supply voltage. New wall dimmers are developed to improve the dim performance when the dimmer is loaded with energy saving lamps. CISPR 15 is not clear on how to test these types of wall dimmers.

This interpretation sheet has been prepared by the Joint 17B-23B-34A-77A IEC Forum on the dimming of electronic self-ballasted lamps and was finalized during the CISPR/F/WG2 meeting in Bangkok.

Question: How to test a wall dimmer which is suitable for energy saving lamps?

Relevant text CISPR 15:

Clause 8 of CISPR 15 specifies the 'Method of measurement of disturbance voltages'.

8.3.1 '**Directly operating devices**' specifies the test arrangement of independent directly operating light regulating devices such as wall dimmers.

The second paragraph reads:

'Unless otherwise specified by the manufacturer, the regulating device shall be measured with the maximum allowed load consisting of incandescent lamps as specified by the manufacturer.'

Answer:

- 1) Independent directly operating light regulating devices (e.g. wall dimmers) which are suitable for incandescent lamps and other types of lighting equipment (e.g. self-ballasted lamps) shall be tested with incandescent lamps.
- 2) Independent directly operating light regulating devices which are only suitable for lighting equipment other than incandescent lamps shall be tested with the appropriate lighting equipment as provided by the manufacturer.

The above will be included in the full revision of CISPR 15, following the 8th edition.

STANDARDSISO.COM : Click to view the full PDF of CISPR 15 ed 8.0:2013

CONTENTS

FOREWORD.....	6
1 Scope.....	8
2 Normative references.....	9
3 Terms and definitions	9
4 Limits	10
4.1 Frequency ranges.....	10
4.2 Insertion loss.....	10
4.3 Disturbance voltages	10
4.3.1 Mains terminals	10
4.3.2 Load terminals	11
4.3.3 Control terminals	11
4.4 Radiated electromagnetic disturbances.....	11
4.4.1 Frequency range 9 kHz to 30 MHz.....	11
4.4.2 Frequency range 30 MHz to 300 MHz.....	12
5 Application of the limits.....	12
5.1 General	12
5.2 Indoor luminaires.....	13
5.2.1 General	13
5.2.2 Incandescent lamp luminaires	13
5.2.3 Fluorescent lamp luminaires	13
5.2.4 Other luminaires	13
5.3 Independent auxiliaries exclusively for use with lighting equipment.....	13
5.3.1 General	13
5.3.2 Independent light regulating devices	14
5.3.3 Independent transformers and convertors for incandescent lamps or LED light sources.....	14
5.3.4 Independent ballasts for fluorescent and other discharge lamps	15
5.3.5 Semi-luminaires.....	15
5.3.6 Independent starters and igniters	15
5.4 Self-ballasted lamps	15
5.5 Outdoor lighting appliances.....	15
5.5.1 General	15
5.5.2 Mounting system.....	16
5.5.3 Integrated switching devices	16
5.5.4 Incandescent lamp luminaires	16
5.5.5 Fluorescent lamp luminaires	16
5.5.6 Other luminaires	16
5.6 UV and IR radiation appliances	16
5.6.1 General	16
5.6.2 IR radiation appliances	16
5.6.3 UV fluorescent lamp appliances	17
5.6.4 Other UV and/or IR appliances.....	17
5.7 Transport lighting.....	17
5.7.1 General	17
5.7.2 External lighting and signalling	17
5.7.3 Lighting of on-board instruments	17
5.7.4 Lighting of interior cabins and rooms.....	17

5.8	Requirements for luminaires for cold cathode tubular discharge lamps (e.g. neon tubes) used, for example, for advertising purposes	17
5.9	Self-contained emergency lighting luminaires	18
5.9.1	General	18
5.9.2	Measurement in the mains on mode, i.e. operating condition prior to the disruption of the mains supply	18
5.9.3	Measurement in emergency mode, i.e. operating condition after disruption of the mains supply	18
5.10	Replaceable starters for fluorescent lamps	18
5.11	LED light sources and associated luminaires	19
6	Operating conditions for lighting equipment	19
6.1	General	19
6.2	Lighting equipment	19
6.3	Supply voltage and frequency	19
6.4	Ambient conditions	19
6.5	Lamps	19
6.5.1	Type of lamp used	19
6.5.2	Ageing time of lamps	19
6.5.3	Stabilization time of lamps	19
6.6	Replaceable starters	20
7	Method of insertion loss measurement	20
7.1	Circuits for the measurement of insertion loss	20
7.2	Measuring arrangement and procedure	20
7.2.1	Radiofrequency generator	20
7.2.2	Balance-to-unbalance transformer	21
7.2.3	Measuring receiver and network	21
7.2.4	Dummy lamps	21
7.2.5	Measuring arrangements	21
7.3	Luminaire	21
7.4	Measurement procedure	22
7.4.1	General	22
7.4.2	Voltage U_1	22
7.4.3	Voltage U_2	22
7.4.4	Calculation of insertion loss	22
7.4.5	Orientation of dummy lamps	22
8	Method of measurement of disturbance voltages	22
8.1	Measuring arrangement and procedure	22
8.1.1	Mains terminal voltage measurement	22
8.1.2	Load terminal voltage measurement	22
8.1.3	Control terminal voltage measurement	23
8.1.4	Light regulation	23
8.1.5	Measurements with an average detector	23
8.2	Indoor and outdoor luminaires	23
8.3	Independent light regulating devices	24
8.3.1	Directly operating devices	24
8.3.2	Devices having a remote control function	25
8.4	Independent transformers and convertors for incandescent lamps or LED light sources	25
8.5	Independent ballasts for fluorescent and other discharge lamps	25
8.6	Self-ballasted lamps and semi-luminaires	25

8.7	UV and IR radiation appliances	26
8.8	Self-contained emergency lighting luminaires	26
8.9	Independent starters and igniters for fluorescent and other discharge lamps	26
9	Method of measurement of radiated electromagnetic disturbances	27
9.1	Measuring arrangement and procedure related to Subclause 4.4.1	27
9.1.1	Measuring equipment.....	27
9.1.2	Measurements in three directions.....	27
9.1.3	Wiring instructions	27
9.1.4	Light regulation	27
9.2	Measuring arrangement and procedure related to Subclause 4.4.2	27
9.3	Indoor and outdoor luminaires.....	27
9.4	Independent convertors for incandescent lamps or LED light sources	27
9.5	Independent ballasts for fluorescent and other discharge lamps	27
9.6	Self-ballasted lamps and semi-luminaires	27
9.7	UV and IR radiation appliances	27
9.8	Self-contained emergency lighting luminaires	28
10	Interpretation of CISPR radio disturbance limits	28
10.1	Significance of a CISPR limit	28
10.2	Tests	28
10.3	Statistical method of evaluation.....	28
10.4	Non-compliance.....	29
11	Measurement uncertainty.....	29
	Annex A (normative) Electrical and constructional requirements for the low-capacitance balance-to-unbalance transformer	42
	Annex B (normative) Independent method of measurement of radiated disturbances	47
	Annex C (normative) Example test arrangements during CISPR 32 radiated disturbance measurement.....	50
	Annex D (informative) Applicability of methods and limits for different types of equipment.....	52
	Bibliography	58
	Figure 1 – Insertion loss measurement on linear and U-type fluorescent lamp luminaires	30
	Figure 2 – Insertion loss measurement on circular fluorescent lamp luminaires	31
	Figure 3 – Insertion loss measurement on luminaires for single-capped fluorescent lamps with integrated starter	32
	Figure 4a – Configuration of linear and U-type dummy lamps.....	33
	Figure 4b – Configuration of circular dummy lamps.....	34
	Figure 4c – Dummy lamp for 15 mm fluorescent lamps	35
	Figure 4d – Dummy lamp for 15 mm single-capped fluorescent lamps	36
	Figure 4e – Dummy lamp for single-capped fluorescent lamps, linear-shaped, twin tube, tube diameter 12 mm	37
	Figure 4f – Dummy lamp for single-capped fluorescent lamps, linear-shaped, quad tube, diameter 12 mm	38
	Figure 5 – Measuring arrangements for an independent light regulating device, transformer or convertor.....	39
	Figure 6 – Measuring arrangements for measuring a luminaire (Figure 6a), an independent ballast (Figure 6b) and a self-ballasted lamp (Figure 6c)	40

Figure 7 – Conical metal housing for self-ballasted lamps	41
Figure A.1 – Isolation test configuration	43
Figure A.2a – Balance-to-unbalance transformer circuit	44
Figure A.2b – Details of transformer core construction	45
Figure A.2c – Details of transformer core construction	45
Figure A.2d – Construction of transformer	46
Figure B.1 – Test set-up for CDN method	48
Figure B.2 – Calibration set-up for determining CDN voltage division factor	49
Table 1 – Minimum values of insertion loss	10
Table 2a – Disturbance voltage limits at mains terminals	10
Table 2b – Disturbance voltage limits at load terminals	11
Table 2c – Disturbance voltage limits at control terminals	11
Table 3a – Radiated disturbance limits in the frequency range 9 kHz to 30 MHz	12
Table 3b – Radiated disturbance limits in the frequency range 30 MHz to 300 MHz at a measuring distance of 10 m	12
Table 4 – Sample size and corresponding k factor in a non-central t-distribution	28
Table B.1 – Common mode terminal voltage limits, CDN method	48
Table C.1 – Arrangement of typical luminaires during the CISPR 32 radiated disturbance measurement	50
Table D.1 – Application of measurement methods and limits to lamps (references to Tables or Subclauses)	52
Table D.2 – Application of measurement methods and limits to luminaires (references to Tables or Subclauses)	53
Table D.3 – Application of measurement methods and limits to independent auxiliaries exclusively for use with lighting equipment (references to Tables or Subclauses)	56

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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 eighth edition cancels and replaces the seventh edition published in 2005, its Amendment 1 (2006) and Amendment 2 (2008). It is a technical revision.

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

- inclusion of LED light sources and luminaires, clarification of test supply voltage and frequency, and improvements to clause 5 relating to the application of limits to the various types of lighting equipment covered under the scope of CISPR 15;
- notes relating to Japan in Tables 2a and 3a have been removed;
- introduction of requirements for flashing type emergency lighting luminaires utilizing xenon lamps;
- introduction of requirements for neon and other advertising signs;

- clarification of the requirement for radiated disturbances between 30 MHz and 300 MHz in case the operating frequency of the light source is below 100 Hz.

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

FDIS	Report on voting
CIS/F/598/FDIS	CIS/F/602/RVD

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

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

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

STANDARDSISO.COM : Click to view the full PDF of CISPR 15 ed.8.0:2013

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

1 Scope

This standard applies to the emission (radiated and conducted) of radiofrequency disturbances from:

- all lighting equipment with a primary function of generating and/or distributing light intended for illumination purposes, and intended either for connection to the low voltage electricity supply or for battery operation;
- the lighting part of multi-function equipment where one of the primary functions of this is illumination;
- independent auxiliaries exclusively for use with lighting equipment;
- UV and IR radiation equipment;
- neon advertising signs;
- street/flood lighting intended for outdoor use;
- transport lighting (installed in buses and trains).

Excluded from the scope of this standard are:

- lighting equipment operating in the ISM frequency bands (as defined in Resolution 63 (1979) of the ITU Radio Regulation);
- lighting equipment for aircraft and airports;
- apparatus for which the electromagnetic compatibility requirements in the radio-frequency range are explicitly formulated in other CISPR standards.

NOTE Examples are:

- built-in lighting devices in other equipment, for example scale illumination or neon devices;
- photocopiers;
- slide projectors;
- lighting equipment for road vehicles.

The frequency range covered is 9 kHz to 400 GHz.

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

The limits in this standard have been determined on a probabilistic basis to keep the suppression of disturbances within economically reasonable limits while still achieving an adequate level of radio protection and electromagnetic compatibility. In exceptional cases, additional provisions may be required.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 60155, *Glow-starters for fluorescent lamps*

IEC 61000-4-6:2008, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

CISPR 11, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
Amendment 1:2010

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

CISPR 16-1-2:2003, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-2: Radio disturbance and immunity measuring apparatus – Ancillary equipment – Conducted disturbances*
Amendment 1:2004
Amendment 2:2006

CISPR 16-1-4:2010, *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*
Amendment 1:2012

CISPR 16-4-2:2011, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements*

CISPR 32:2012, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

CISPR/F/Publication CISPR 15 (2013), huitième édition/I-SH 01

LIMITES ET MÉTHODES DE MESURE DES PERTURBATIONS RADIOÉLECTRIQUES PRODUITES PAR LES APPAREILS ÉLECTRIQUES D'ÉCLAIRAGE ET LES APPAREILS ANALOGUES

FEUILLE D'INTERPRÉTATION 1

La présente feuille d'interprétation a été établie par le sous-comité CISPR F: Perturbations relatives aux appareils domestiques, aux outils, aux appareils d'éclairage et aux appareils analogues, du comité d'études CISPR de la CEI: Comité international spécial des perturbations radioélectriques.

Le texte de cette feuille d'interprétation est issue des documents suivants:

ISH	Rapport de vote
CISPR/F/583/FDIS	CISPR/F/591/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette feuille d'interprétation.

CISPR 15 feuille d'interprétation sur l'évaluation des lampes LED *retrofit* (ou améliorées) à très basse tension

Introduction

Au cours de la réunion CISPR de Séoul en 2011, l'Union internationale des radioamateurs (IARU) a signalé qu'un certain nombre de produits d'éclairage LED provoquaient des perturbations pour la réception radioamateur. Se reporter au point 15 du procès-verbal CISPR/1218/RM.

Outre ce rapport verbal, l'IARU a soumis en janvier 2012 un rapport écrit détaillé diffusé sous la désignation CISPR/F/565/INF. Des sources majeures de perturbations proviennent de certains types de lampes LED à Très Basse Tension (comme par ex. 12 V) pour lesquelles les exigences de la CISPR 15 actuelle ne sont pas claires. Il a été demandé en urgence un éclaircissement supplémentaire de la norme.

En réponse, le comité de gestion CISPR F a publié le document CISPR/F/568/INF établissant un plan d'action pour résoudre cette question à court terme.

Une partie de la solution figure dans la Feuille d'Interprétation précisant l'évaluation des lampes LED TBT de remplacement (installées à la place de lampes conventionnelles).

Question: Quelles sont les exigences de la CISPR 15 appliquées aux lampes LED de remplacement à très basse tension (TBT)?

Interprétation: Lors de l'évaluation des lampes LED de remplacement TBT selon les exigences de la CISPR 15 la procédure suivante doit être appliquée.

Les lampes TBT LED dénuées de composants électroniques de commutation actifs sont considérées comme remplissant les exigences de la CISPR 15 sans essai.

Tous les autres types de lampes TBT LED de remplacement doivent être soumis à essai conjointement à un transformateur toroïdal 50 ou 60 Hz bobiné. L'utilisation d'un tel transformateur est considérée comme étant la condition la plus défavorable et il doit être utilisé à moins qu'il ne soit clairement indiqué dans les instructions du fabricant que la lampe ne convient pas pour l'utilisation avec un tel transformateur. Dans ce cas les mesures doivent être réalisées en association avec un transformateur électronique conforme typique pour les lampes halogène.

La combinaison du transformateur et de la lampe LED TBT doit être conforme aux limites de la tension perturbatrice d'alimentation figurant au Tableau 2a et aux limites des perturbations rayonnées des Tableaux 3a et 3b.

Au cours de la mesure de la tension perturbatrice, la lampe LED TBT est montée dans un boîtier métallique conique décrit à la Figure 7. La lampe LED TBT est ensuite raccordée au transformateur par un câble souple à trois conducteurs constitué de deux conducteurs d'alimentation TBT et de la connexion de terre au boîtier conique. La longueur de ce câble doit être aussi courte que possible. Le boîtier conique en métal doit être mis en position de sorte que son entrée de câble soit à proximité du transformateur.

La combinaison du transformateur et du boîtier conique en métal doit être soumise à essai comme un luminaire conformément aux exigences du 8.2.

En réalisant les mesures des perturbations rayonnées selon l'Article 9, le boîtier conique en métal en doit pas être utilisé.

Les références figurent par rapport à la CISPR 15:2013.

CISPR/F/Publication CISPR 15 (2013), huitième édition/I-SH 02

LIMITES ET MÉTHODES DE MESURE DES PERTURBATIONS RADIOÉLECTRIQUES PRODUITES PAR LES APPAREILS ÉLECTRIQUES D'ÉCLAIRAGE ET LES APPAREILS ANALOGUES

FEUILLE D'INTERPRÉTATION 2

La présente feuille d'interprétation a été établie par le sous-comité CISPR F: Perturbations relatives aux appareils domestiques, aux outils, aux appareils d'éclairage et aux appareils analogues, du comité d'études CISPR de la CEI: Comité international spécial des perturbations radioélectriques.

Le texte de cette feuille d'interprétation est issue des documents suivants:

ISH	Rapport de vote
CISPR/F/584/FDIS	CISPR/F/592/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette feuille d'interprétation.

CISPR 15 feuille d'interprétation sur: Conditions d'essais pour les variateurs muraux

Introduction

De plus en plus de lampes à incandescence sont remplacées par des lampes à basse consommation d'énergie (fluorescentes et LED). Certains types permettent la gradation de lumière au moyen de la commande de phase de la tension d'alimentation. De nouveaux variateurs muraux sont mis au point, en vue d'améliorer la performance de la gradation de l'intensité lumineuse lorsque le variateur est chargé en lampes à basse consommation d'énergie. La CISPR 15 n'apporte pas d'éclaircissements quant à la façon de soumettre à essai ces types de variateurs muraux.

Cette feuille d'interprétation a été établie par le Forum CEI commun 17B-23B-34A-77A (*Joint 17B-23B-34A-77A IEC Forum*) sur le thème de la gradation des lampes électroniques à ballast intégré et il a été finalisé au cours de la réunion du CISPR/F/GT2 à Bangkok.

Question: Comment procéder aux essais d'un variateur mural qui convient aux lampes à basse consommation d'énergie?

Texte pertinent de la CISPR 15:

L'Article 8 de la CISPR 15 spécifie la 'Méthode de mesure des tensions perturbatrices'.

Le 8.3.1 'Dispositifs à action directe' spécifie le montage d'essai des dispositifs de régulation de lumière indépendants à action directe, tels que les variateurs muraux.

Le deuxième alinéa indique:

‘Sauf spécification contraire du fabricant, on doit mesurer le dispositif de régulation avec la charge maximale autorisée par le fabricant, cette charge étant constituée de lampes à incandescence.’

Réponse:

- 1) Les dispositifs de régulation de lumière indépendants à action directe (comme les variateurs muraux) qui conviennent pour les lampes à incandescence et autres types d'appareils d'éclairage (comme les lampes à ballast intégré) doivent être soumis à essai avec des lampes à incandescence.
- 2) Les dispositifs de régulation de lumière indépendants à action directe qui conviennent uniquement pour les appareils d'éclairage autres que les lampes à incandescence doivent être soumis à essai avec l'appareil d'éclairage approprié tel que fourni par le fabricant.

Le texte qui précède sera inclus dans la révision de la CISPR 15, à la suite de la 8^{ème} édition.

SOMMAIRE

AVANT-PROPOS	64
1 Domaine d'application	66
2 Références normatives	67
3 Termes et définitions	67
4 Limites	68
4.1 Bandes de fréquences	68
4.2 Affaiblissement d'insertion	68
4.3 Tensions perturbatrices	68
4.3.1 Bornes d'alimentation	68
4.3.2 Bornes de la charge	69
4.3.3 Bornes de commande	69
4.4 Perturbations électromagnétiques rayonnées	69
4.4.1 Plage de fréquences comprises entre 9 kHz et 30 MHz	69
4.4.2 Plage de fréquences comprises entre 30 MHz et 300 MHz	70
5 Application des limites	70
5.1 Généralités	70
5.2 Luminaires d'intérieur	71
5.2.1 Généralités	71
5.2.2 Luminaires à lampes à incandescence	71
5.2.3 Luminaires à lampes à fluorescence	71
5.2.4 Autres luminaires	71
5.3 Dispositifs auxiliaires indépendants utilisables exclusivement pour les appareils d'éclairage	72
5.3.1 Généralités	72
5.3.2 Dispositifs de régulation de lumière indépendants	72
5.3.3 Transformateurs et convertisseurs indépendants pour lampes à incandescence ou sources lumineuses LED	72
5.3.4 Ballasts indépendants pour lampes à fluorescence et autres lampes à décharge	73
5.3.5 Semi-luminaires	73
5.3.6 Starters et amorceurs indépendants	73
5.4 Lampes à ballast incorporé	74
5.5 Appareils d'éclairage pour extérieur	74
5.5.1 Généralités	74
5.5.2 Système de montage	74
5.5.3 Dispositifs de commutation incorporés	74
5.5.4 Luminaires à lampes à incandescence	74
5.5.5 Luminaires à lampes à fluorescence	75
5.5.6 Autres luminaires	75
5.6 Appareils à rayonnement UV et IR	75
5.6.1 Généralités	75
5.6.2 Appareils à rayonnement IR	75
5.6.3 Appareils UV à lampe à fluorescence	75
5.6.4 Autres appareils UV et/ou IR	75
5.7 Eclairage pour véhicules de transport	75
5.7.1 Généralités	75
5.7.2 Eclairage et signalisation extérieurs	76

5.7.3	Eclairage des instruments de bord	76
5.7.4	Eclairage des pièces et des cabines intérieures	76
5.8	Exigences relatives aux luminaires pour lampes à décharges tubulaires à cathode froide (par exemple des tubes néon) utilisées, par exemple, à des fins publicitaires.....	76
5.9	Blocs autonomes d'éclairage de secours.....	76
5.9.1	Généralités	76
5.9.2	Mesures en état de veille, c'est-à-dire dans les conditions de fonctionnement avant la coupure de l'alimentation par le réseau.....	77
5.9.3	Mesures en état de fonctionnement de secours, c'est-à-dire dans les conditions de fonctionnement après la coupure de l'alimentation par le réseau basse tension	77
5.10	Starters remplaçables pour lampes à fluorescence	77
5.11	Sources lumineuses LED et luminaires associés	77
6	Conditions de fonctionnement des appareils d'éclairage	78
6.1	Généralités	78
6.2	Appareils d'éclairage	78
6.3	Tension et fréquence d'alimentation.....	78
6.4	Conditions ambiantes	78
6.5	Lampes	78
6.5.1	Type de lampe utilisé	78
6.5.2	Vieillessement des lampes	78
6.5.3	Durée de stabilisation des lampes.....	78
6.6	Starters remplaçables.....	78
7	Méthode de mesure de l'affaiblissement d'insertion	79
7.1	Schémas de mesure de l'affaiblissement d'insertion	79
7.2	Montage et méthode de mesure	79
7.2.1	Générateur de r.f.	79
7.2.2	Transformateur de séparation asymétrique-symétrique.....	79
7.2.3	Récepteur et réseau de mesure	80
7.2.4	Lampes fictives.....	80
7.2.5	Montages de mesure	80
7.3	Luminaire	80
7.4	Méthode de mesure	80
7.4.1	Généralités	80
7.4.2	Tension U_1	81
7.4.3	Tension U_2	81
7.4.4	Calcul de l'affaiblissement d'insertion.....	81
7.4.5	Orientation des lampes fictives	81
8	Méthode de mesure des tensions perturbatrices.....	81
8.1	Montage et méthode de mesure.....	81
8.1.1	Mesure de la tension perturbatrice aux bornes d'alimentation	81
8.1.2	Mesure de la tension perturbatrice aux bornes de la charge	81
8.1.3	Mesure de la tension perturbatrice aux bornes de commande.....	82
8.1.4	Régulation de lumière	82
8.1.5	Mesures avec le détecteur de valeur moyenne	82
8.2	Luminaires d'intérieur et luminaires pour extérieur	83
8.3	Dispositifs de régulation de lumière indépendants	84
8.3.1	Dispositifs à action directe	84

8.3.2	Dispositifs avec commande à distance	84
8.4	Transformateurs et convertisseurs indépendants pour lampes à incandescence ou sources lumineuses LED	84
8.5	Ballasts indépendants pour lampes à fluorescence et autres lampes à décharge	84
8.6	Semi-luminaires et lampes à ballast incorporé	85
8.7	Appareils à rayonnement UV et IR	85
8.8	Blocs autonomes d'éclairage de secours	85
8.9	Starters et amorces indépendants pour les lampes fluorescentes et autres lampes à décharge	86
9	Méthode de mesure des perturbations électromagnétiques rayonnées	86
9.1	Montage et méthode de mesure liés au Paragraphe 4.4.1	86
9.1.1	Appareillage de mesure	86
9.1.2	Mesures dans les trois directions	86
9.1.3	Instructions de câblage	86
9.1.4	Régulation de lumière	86
9.2	Montage et méthode de mesure liés au Paragraphe 4.4.2	86
9.3	Luminaires d'intérieur et luminaires pour extérieur	86
9.4	Convertisseurs indépendants pour lampes à incandescence ou sources lumineuses LED	87
9.5	Ballasts indépendants pour lampes à fluorescence et autres lampes à décharge	87
9.6	Semi-luminaires et lampes à ballast incorporé	87
9.7	Appareils à rayonnement UV et IR	87
9.8	Blocs autonomes d'éclairage de secours	87
10	Interprétation des limites des perturbations radioélectriques spécifiées par le CISPR	87
10.1	Signification d'une limite spécifiée par le CISPR	87
10.2	Essais	87
10.3	Méthode statistique d'évaluation	87
10.4	Non-conformité	88
11	Incertitude de mesure	89
Annexe A (normative)	Exigences électriques et de construction applicables au transformateur asymétrique-symétrique à faible capacité	102
Annexe B (normative)	Méthode indépendante de mesure des perturbations rayonnées	107
Annexe C (normative)	Exemples de dispositions d'essai au cours de la mesure de la perturbation rayonnée de la CISPR 32	110
Annexe D (informative)	Applicabilité des méthodes et des limites pour différents types de matériels	112
Bibliographie		121
Figure 1	– Mesure de l'affaiblissement d'insertion des luminaires à lampes à fluorescence droites et de type U	90
Figure 2	– Mesure de l'affaiblissement d'insertion des luminaires à lampes à fluorescence circulaires	91
Figure 3	– Mesure de l'affaiblissement d'insertion de luminaires à lampes à fluorescence à culot unique avec starter incorporé	92
Figure 4a	– Schéma de la lampe fictive droite et de type U	93
Figure 4b	– Schéma de la lampe fictive circulaire	94
Figure 4c	– Lampe fictive pour lampes à fluorescence de 15 mm	95