

© Copyright SEK. Reproduction in any form without permission is prohibited.

Multimediautrustning – EMC-fordringar – Immunitet

*Electromagnetic compatibility of multimedia equipment –
Immunity requirements*

Som svensk standard gäller europastandarden EN 55035:2017. Den svenska standarden innehåller den officiella engelska språkversionen av EN 55035:2017.

Nationellt förord

Europastandarden EN 55035:2017

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **CISPR 35, First edition, 2016 - Electromagnetic compatibility of multimedia equipment - Immunity requirements**

utarbetad inom International Electrotechnical Commission, IEC.

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English Version

**Electromagnetic compatibility of multimedia equipment -
Immunity requirements
(CISPR 35:2016 , modified)**

Compatibilité électromagnétique des équipements
multimédia - Exigences d'immunité
(CISPR 35:2016 , modifiée)

Elektromagnetische Verträglichkeit von Multimediageräten -
Anforderungen zur Störfestigkeit
(CISPR 35:2016 , modifiziert)

This European Standard was approved by CENELEC on 2016-09-26. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword.....	3
Endorsement notice	4
1 Modification to Clause 1 "Scope"	4
2 Modification to Clause A.4 "Modified test levels and performance criteria"	4
3 Modification to Annexes	4
Annex ZA (normative) Normative references to international publications with their corresponding European publications	5
Annex ZZA (informative) Relationship between this European Standard and the essential requirements of Directive 2014/30/EU [2014 OJ L96] aimed to be covered	7
Annex ZZB (informative) Relationship between this European Standard and the essential requirements of Directive 2014/53/EU [2014 OJ L153] aimed to be covered	8
4 Modifications to Bibliography.....	9

European foreword

The text of document CISPR/I/522/FDIS, future edition 1 of CISPR 35:2016, prepared by CISPR SC I "Electromagnetic compatibility of information technology equipment, multimedia equipment and receivers" of CISPR "International special committee on radio interference" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 55035:2017.

A draft amendment, which covers common modifications to CISPR 35:2016 (CISPR/I/522/FDIS), was prepared by CLC/TC 210 "Electromagnetic Compatibility (EMC)" and approved by CENELEC.

The following dates are fixed:

- latest date by which the document has to be implemented at (dop) 2018-01-28
national level by publication of an identical national
standard or by endorsement
- latest date by which the national standards conflicting with (dow) 2022-07-28
the document have to be withdrawn

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in CISPR 35:2016 are prefixed "Z".

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under mandate(s) given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) and the standardization request(s), see informative Annexes ZZA and ZZB, which are integral parts of this document.

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
CISPR 16-1-2	2014	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Coupling devices for conducted disturbance measurements	EN 55016-1-2	2014
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
+ A1	2007		+ A1	2008
+ A2	2010		+ A2	2010
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2012
IEC 61000-4-5	2005	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2006 ¹⁾
IEC 61000-4-6	2008	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2009 ²⁾

1) EN 61000-4-5:2006 is replaced by EN 61000-4-5:2014, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test* (IEC 61000-4-5:2014).

2) EN 61000-4-6:2009 is replaced by EN 61000-4-6:2014, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields* (IEC 61000-4-6:2013).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	2010
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
IEC 61000-4-20	2010	Electromagnetic compatibility (EMC) - Part 4-20: Testing and measurement techniques - Emission and immunity testing in transverse electromagnetic (TEM) waveguides	EN 61000-4-20	2010
IEC 61000-4-21	2011	Electromagnetic compatibility (EMC) - Part 4-21: Testing and measurement techniques - Reverberation chamber test methods	EN 61000-4-21	2011
ISO 9241-3	1992	Ergonomic requirements for office work with visual display terminals (VDTs) - Part 3: Visual display requirements	EN 29241-3	1993 ³⁾
IEEE Standard 802.3	-	IEEE Standard for Ethernet, Section Three	-	-

3) EN 29241-3:1992 is withdrawn and replaced by EN ISO 9241-302:2008, *Ergonomics of human-system interaction - Part 302: Terminology for electronic visual displays* (ISO 9241-302:2008).

CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references.....	9
3 Terms, definitions and abbreviations	10
3.1 Terms and definitions	10
3.2 Abbreviations	15
4 Requirements	18
4.1 General requirements	18
4.2 Particular requirements	19
4.2.1 Electrostatic discharges (ESD)	19
4.2.2 Continuous RF disturbances.....	19
4.2.3 Power frequency magnetic field.....	21
4.2.4 Electrical fast transients/burst (EFT/B).....	21
4.2.5 Surges.....	21
4.2.6 Voltage dips and interruptions	21
4.2.7 Broadband impulsive conducted disturbances	21
5 Immunity requirements	23
6 Documentation	28
6.1 Test report	28
6.2 Advice to end-users	28
7 Test configuration	28
8 General performance criteria.....	29
8.1 General.....	29
8.2 Performance criterion A.....	29
8.3 Performance criterion B.....	30
8.4 Performance criterion C.....	30
9 Compliance with this document.....	30
10 Test uncertainty.....	30
Annex A (normative) Broadcast reception function.....	31
A.1 General.....	31
A.2 Applicability	31
A.3 Mode of operation	31
A.4 Modified test levels and performance criteria	33
Annex B (normative) Print function	35
B.1 Applicability	35
B.2 Mode of operation	35
B.3 Performance criteria.....	35
B.3.1 Performance criterion A.....	35
B.3.2 Performance criterion B.....	36
B.3.3 Performance criterion C	36
Annex C (normative) Scan function	37
C.1 Applicability	37
C.2 Mode of operation	37
C.3 Performance criteria.....	37

C.3.1	Performance criterion A.....	37
C.3.2	Performance criterion B.....	37
C.3.3	Performance criterion C	38
Annex D (normative)	Display and display output functions	39
D.1	Applicability	39
D.2	Mode of operation	39
D.2.1	Test signals and conditions	39
D.2.2	Display evaluation, for continuous disturbances	41
D.2.3	Display evaluation for power frequency magnetic field testing	43
D.3	Performance criteria.....	44
D.3.1	Performance criterion A for continuous radiated and conducted disturbances tests.....	44
D.3.2	Performance criterion A for the power frequency magnetic field tests	44
D.3.3	Performance criterion B.....	44
D.3.4	Performance criterion C	44
Annex E (normative)	Musical tone generating function.....	45
E.1	Applicability	45
E.2	Mode of operation	45
E.3	Performance criteria.....	45
E.3.1	General	45
E.3.2	Performance criterion A.....	45
E.3.3	Performance criterion B.....	46
E.3.4	Performance criterion C	46
Annex F (normative)	Networking functions.....	47
F.1	Applicability	47
F.1.1	General	47
F.1.2	Switching and routing function.....	47
F.1.3	Data transmission function	47
F.1.4	Supervisory function	47
F.2	Specific terminology for use within Annex F	47
F.3	General requirements for network functions	48
F.3.1	General	48
F.3.2	Configuration	48
F.3.3	Performance criteria.....	48
F.4	Requirements for CPE containing xDSL ports	50
F.4.1	Configuration and mode of operation	50
F.4.2	Performance criterion A.....	51
F.4.3	Performance criterion B.....	52
F.4.4	Performance criterion C	53
Annex G (normative)	Audio output function.....	54
G.1	Applicability	54
G.2	Specific terminology for use within this annex	54
G.2.1	acoustic interference ratio	54
G.2.2	acoustic reference level	54
G.2.3	audio output port.....	54
G.2.4	dBm0.....	54
G.2.5	demodulated audio level.....	54
G.2.6	electrical interference ratio	55
G.2.7	electrical reference level	55

G.2.8	loudspeaker	55
G.2.9	on-ear device	55
G.3	Overview	55
G.3.1	General	55
G.3.2	Ports to be tested	55
G.4	Reference level	56
G.5	Mode of operation	57
G.5.1	General	57
G.5.2	Gain setting	57
G.5.3	Audio frequency-response adjustments	57
G.5.4	Non-linear processing	57
G.6	Method of measurement	57
G.6.1	General	57
G.6.2	Electrical measurements	58
G.6.3	Acoustic measurements	58
G.6.4	Processes (not applicable to direct measurements)	59
G.7	Performance criteria	60
G.7.1	Performance criterion A	60
G.7.2	Performance criterion B	60
G.7.3	Performance criterion C	61
G.8	Test setup examples	61
Annex H (normative)	Telephony function	65
H.1	Applicability	65
H.2	General	65
H.3	Mode of operation	65
H.4	Performance criteria	66
Annex I (informative)	Immunity to specific radio technologies operating at frequencies of 800 MHz and above	67
Annex J (informative)	Examples of how to apply this document	69
J.1	Purpose	69
J.2	Developing the test plan	69
J.3	Specific examples	70
J.3.1	General	70
J.3.2	Example 1: A multifunction printer	70
J.3.3	Example 2: Flat panel television	72
J.3.4	Example 3: Notebook computer	74
J.3.5	Example 4: Small key telephone systems or PABXs	76
Bibliography		79
Figure 1	– Examples of ports	14
Figure 2	– Example schematic of the broadband impulsive conducted disturbances test setup	21
Figure 3	– Graphical representation of the continuous induced RF disturbances levels defined in table clause 2.1	23
Figure D.1	– Example colour bar image	41
Figure D.2	– Example test setup with a video camera system for use with a display	42
Figure D.3	– Example test setup for capturing the image directly from a display port	43
Figure F.1	– xDSL access system configuration	50

Figure G.1 – Example basic test setup for electrical measurements (direct connection to EUT).....	61
Figure G.2 – Example basic test setup for acoustic measurements	61
Figure G.3 – Example test setup for acoustic measurements on loudspeakers	61
Figure G.4 – Example test setup for on-ear acoustic measurements.....	62
Figure G.5 – Example test setup for on-ear acoustic measurements, microphone located away from earpiece transducer	62
Figure G.6 – Example test setup for measuring the sound pressure level from the acoustic output device of a telephone handset.....	63
Figure G.7 – Example test setups for measuring the demodulation on analogue wired network lines	64
Figure J.1 – Examples of different types of functions	70
Figure J.2 – Example of a typical small key telephone system or PABX.....	77
Table 1 – Immunity requirements for enclosure ports	24
Table 2 – Immunity requirements for analogue/digital data ports	25
Table 3 – Immunity requirements for DC network power ports	26
Table 4 – Immunity requirements for AC mains power ports	27
Table 5 – Test arrangements of EUT	29
Table A.1 – Examples of specifications of digital broadcast signals.....	32
Table A.2 – Modified test levels for performance criterion A for the broadcast reception function	34
Table D.1 – Prioritised list of display images	40
Table D.2 – Characteristics of a measurement video camera monitor system	43
Table E.1 – Subgroups and performance criteria A for the musical tone generating function	45
Table E.2 – Performance criteria for different subgroups given in Table E.1	46
Table F.1 – ITU-T recommendations for xDSL systems.....	51
Table F.2 – Attenuation values representing cable lengths.....	51
Table F.3 – Performance criteria against impulse duration	52
Table G.1 – Test requirements for various MME	56
Table G.2 – Measurement method and reference level setting	56
Table G.3 – Performance criterion A – Limits for devices supporting telephony	60
Table H.1 – Telephony functions, performance criteria.....	66
Table I.1 – Guidance on the selection of immunity levels to common wireless communication devices	68
Table J.1 – Test requirements for example 1: a multifunction printer	71
Table J.2 – Test details for example 1: a multifunction printer	72
Table J.3 – Test requirements for example 2: flat panel television.....	73
Table J.4 – Test details for example 2: flat panel television.....	74
Table J.5 – Test requirements for example 3: notebook computer	75
Table J.6 – Test details for example 3: notebook computer	76
Table J.7 – Example test configurations and performance assessment methods applicable to a PABX and associated terminals for continuous induced RF disturbance tests	78

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INTERNATIONAL SPECIAL COMMITTEE ON RADIO INTERFERENCE

ELECTROMAGNETIC COMPATIBILITY OF MULTIMEDIA EQUIPMENT – IMMUNITY REQUIREMENTS

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 35 has been prepared by CISPR subcommittee 1: Electromagnetic compatibility of information technology equipment, multimedia equipment and receivers.

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

FDIS	Report on voting
CISPR/II/522/FDIS	CISPR/II/527/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 website 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.

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

This CISPR document establishes uniform requirements for the electromagnetic immunity of multimedia equipment. The test methods are given within this document or in referenced basic EMC immunity standards. This document specifies applicable tests, test levels, product operating conditions and assessment criteria.

ELECTROMAGNETIC COMPATIBILITY OF MULTIMEDIA EQUIPMENT – IMMUNITY REQUIREMENTS

1 Scope

NOTE Blue coloured text within this document indicates text aligned with CISPR 32. CISPR 32 contains the appropriate emission requirements above 150 kHz for the equipment within the scope of this document.

This document applies to multimedia equipment (MME) as defined in 3.1.24 and having a rated AC or DC supply voltage not exceeding 600 V.

MME within the scope of CISPR 20 or CISPR 24 is within the scope of this document.

MME with a broadcast reception function is within the scope of this document, see Annex A. MME with non-broadcast wireless interfaces is also within the scope of this document, however, compliance with this document does not require the assessment of the performance of these interfaces.

MME intended primarily for professional use is within the scope of this document.

MME for which immunity requirements in the frequency range covered by this document are explicitly formulated in other CISPR documents (except CISPR 20 and CISPR 24) are excluded from the scope of this document.

The objectives of this document are:

- to establish requirements which provide an adequate level of intrinsic immunity so that the MME will operate as intended in its environment in the frequency range 0 kHz to 400 GHz;
- to specify procedures to ensure the reproducibility of tests and the repeatability of results.

Due to technology convergence of the functions of MME, the performance criteria have been determined on a function-orientated basis rather than on an equipment-orientated basis.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CISPR 16-1-2:2014, *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*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-3:2006/AMD 1:2007

IEC 61000-4-3:2006/AMD 2:2010

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*¹

IEC 61000-4-6:2008, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*²

IEC 61000-4-8:2009, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

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 61000-4-21:2011, *Electromagnetic compatibility (EMC) – Part 4-21: Testing and measurement techniques – Reverberation chamber test methods*

ISO 9241-3:1992, *Ergonomic requirements for office work with visual display terminals (VDTs) – Part 3: Visual display requirements*

IEEE Standard 802.3, *IEEE Standard for Ethernet, Section Three*

¹ 2nd edition (2005). This 2nd edition has been replaced in 2014 by a 3rd Edition IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*.

² 3rd edition (2008). This 3rd edition has been replaced in 2013 by a 4th Edition IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*.