





**MULTIMEEDIASEADMETE ELEKTROMAGNETILINE
ÜHILDUVUS. IMMUUNSUSNÕUDED**

**Electromagnetic Compatibility of Multimedia equipment
- Immunity Requirements**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 55035:2017 +A11:2020 sisaldab Euroopa standardi EN 55035:2017 ja selle muudatuse A11:2020 ja paranduse AC:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 55035:2017 +A11:2020 consists of the English text of the European standard EN 55035:2017 and its amendment A11:2020 and its corrigendum AC:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 28.07.2017, muudatus A11 22.05.2020.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation. Date of Availability of the European standard is 28.07.2017, for A11 22.05.2020.
Parandusega AC lisatud või muudetud teksti algus ja lõpp on tekstis ära märgitud märgenditega   . Sellesse standardisse on muudatus A11 sisse viidud ja tehtud muudatused tähistatud topeltpüstkriipsuga lehe välisveerisel. Selles standardis on rahvusvahelise standardi ühismuudatused tähistatud püstkriipsuga teksti välimisel veerisel. Standard on kättesaadav Eesti Standardikeskusest.	The start and finish of text introduced or altered by corrigendum AC is indicated in the text by symbols   . The amendment A11 has been incorporated into this standard and changes have been marked by a double vertical line on the outer row of the page. Common modifications have been incorporated into this international standard and changes have been marked by a vertical line on the outer row of the page. The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 33.100.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

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. Amendment A11 was approved by CENELEC on 2020-03-04. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard and its amendment 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 and its Amendment A11 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, 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: Rue de la Science 23, B-1040 Brussels

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 (dop) 2018-01-28
at 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

This document supersedes EN 55020:2007, EN 55024:2010 and EN 55103-2:2009 and all of their amendments and corrigenda (if any).

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.

Endorsement notice

The text of the International Standard CISPR 35:2016 was approved by CENELEC as a European Standard with agreed common modifications.

Amendment A11 European foreword

This document (EN 55035/A11:2020) has been prepared by CLC/TC 210 "Electromagnetic Compatibility (EMC)".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-03-04
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2022-07-28

This document amends EN 55035:2017.

This document has been prepared under a mandate 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) see informative Annexes ZZA and ZZB, which are an integral part of EN 55035:2017.

CONTENTS

FOREWORD.....	7
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	10
3 Terms, definitions and abbreviations	11
3.1 Terms and definitions.....	11
3.2 Abbreviations	16
4 Requirements	19
4.1 General requirements	19
4.2 Particular requirements	20
4.2.1 Electrostatic discharges (ESD)	20
4.2.2 Continuous RF disturbances	20
4.2.3 Power frequency magnetic field	22
4.2.4 Electrical fast transients/burst (EFT/B).....	22
4.2.5 Surges.....	22
4.2.6 Voltage dips and interruptions	22
4.2.7 Broadband impulsive conducted disturbances.....	22
5 Immunity requirements	24
6 Documentation	29
6.1 Test report	29
6.2 Advice to end-users	29
7 Test configuration	29
8 General performance criteria	30
8.1 General.....	30
8.2 Performance criterion A	30
8.3 Performance criterion B	30
8.4 Performance criterion C	30
9 Compliance with this document	31
10 Test uncertainty.....	31
Annex A (normative) Broadcast reception function	32
A.1 General.....	32
A.2 Applicability	32
A.3 Mode of operation	32
A.4 Modified test levels and performance criteria	34
Annex B (normative) Print function.....	36
B.1 Applicability	36
B.2 Mode of operation	36
B.3 Performance criteria	36
B.3.1 Performance criterion A	36
B.3.2 Performance criterion B	37
B.3.3 Performance criterion C	37
Annex C (normative) Scan function	38
C.1 Applicability	38
C.2 Mode of operation	38
C.3 Performance criteria	38

C.3.1	Performance criterion A	38
C.3.2	Performance criterion B	38
C.3.3	Performance criterion C	39
Annex D (normative)	Display and display output functions	40
D.1	Applicability	40
D.2	Mode of operation	40
D.2.1	Test signals and conditions	40
D.2.2	Display evaluation, for continuous disturbances	42
D.2.3	Display evaluation for power frequency magnetic field testing	44
D.3	Performance criteria	45
D.3.1	Performance criterion A for continuous radiated and conducted disturbances tests	45
D.3.2	Performance criterion A for the power frequency magnetic field tests	45
D.3.3	Performance criterion B	45
D.3.4	Performance criterion C	45
Annex E (normative)	Musical tone generating function	46
E.1	Applicability	46
E.2	Mode of operation	46
E.3	Performance criteria	46
E.3.1	General	46
E.3.2	Performance criterion A	46
E.3.3	Performance criterion B	47
E.3.4	Performance criterion C	47
Annex F (normative)	Networking functions	48
F.1	Applicability	48
F.1.1	General	48
F.1.2	Switching and routing function	48
F.1.3	Data transmission function	48
F.1.4	Supervisory function	48
F.2	Specific terminology for use within Annex F	48
F.3	General requirements for network functions	49
F.3.1	General	49
F.3.2	Configuration	49
F.3.3	Performance criteria	49
F.4	Requirements for CPE containing xDSL ports	51
F.4.1	Configuration and mode of operation	51
F.4.2	Performance criterion A	52
F.4.3	Performance criterion B	53
F.4.4	Performance criterion C	54
Annex G (normative)	Audio output function	55
G.1	Applicability	55
G.2	Specific terminology for use within this annex	55
G.2.1	acoustic interference ratio	55
G.2.2	acoustic reference level	55
G.2.3	audio output port	55
G.2.4	dBm0	55
G.2.5	demodulated audio level	55
G.2.6	electrical interference ratio	56

G.2.7	electrical reference level	56
G.2.8	loudspeaker	56
G.2.9	on-ear device	56
G.3	Overview	56
G.3.1	General	56
G.3.2	Ports to be tested	56
G.4	Reference level	57
G.5	Mode of operation	58
G.5.1	General	58
G.5.2	Gain setting	58
G.5.3	Audio frequency-response adjustments	58
G.5.4	Non-linear processing	58
G.6	Method of measurement	58
G.6.1	General	58
G.6.2	Electrical measurements	59
G.6.3	Acoustic measurements	59
G.6.4	Processes (not applicable to direct measurements)	60
G.7	Performance criteria	61
G.7.1	Performance criterion A	61
G.7.2	Performance criterion B	61
G.7.3	Performance criterion C	62
G.8	Test setup examples	62
Annex H (normative)	Telephony function	66
H.1	Applicability	66
H.2	General	66
H.3	Mode of operation	67
H.4	Performance criteria	67
Annex I (informative)	Immunity to specific radio technologies operating at frequencies of 800 MHz and above	68
Annex J (informative)	Examples of how to apply this document	70
J.1	Purpose	70
J.2	Developing the test plan	70
J.3	Specific examples	71
J.3.1	General	71
J.3.2	Example 1: A multifunction printer	71
J.3.3	Example 2: Flat panel television	73
J.3.4	Example 3: Notebook computer	75
J.3.5	Example 4: Small key telephone systems or PABXs	77
Annex ZA (normative)	Normative references to international publications with their corresponding European publications	80
Annex ZZA (informative)	Relationship between this European Standard and the essential requirements of Directive 2014/30/EU [2014 OJ L96] aimed to be covered	82
Annex ZZB (informative)	Relationship between this European Standard and the essential requirements of Directive 2014/53/EU [2014 OJ L153] aimed to be covered	83
Bibliography	84
Figure 1 – Examples of ports	15

Figure 2 – Example schematic of the broadband impulsive conducted disturbances test setup	22
Figure 3 – Graphical representation of the continuous induced RF disturbances levels defined in table clause 2.1	24
Figure D.1 – Example colour bar image	42
Figure D.2 – Example test setup with a video camera system for use with a display	43
Figure D.3 – Example test setup for capturing the image directly from a display port	44
Figure F.1 – xDSL access system configuration	51
Figure G.1 – Example basic test setup for electrical measurements (direct connection to EUT)	62
Figure G.2 – Example basic test setup for acoustic measurements	62
Figure G.3 – Example test setup for acoustic measurements on loudspeakers	62
Figure G.4 – Example test setup for on-ear acoustic measurements	63
Figure G.5 – Example test setup for on-ear acoustic measurements, microphone located away from earpiece transducer	63
Figure G.6 – Example test setup for measuring the sound pressure level from the acoustic output device of a telephone handset	64
Figure G.7 – Example test setups for measuring the demodulation on analogue wired network lines	65
Figure J.1 – Examples of different types of functions	71
Figure J.2 – Example of a typical small key telephone system or PABX	78
Table 1 – Immunity requirements for enclosure ports	25
Table 2 – Immunity requirements for analogue/digital data ports	26
Table 3 – Immunity requirements for DC network power ports	27
Table 4 – Immunity requirements for AC mains power ports	28
Table 5 – Test arrangements of EUT	29
Table A.1 – Examples of specifications of digital broadcast signals	33
Table A.2 – Modified test levels for performance criterion A for the broadcast reception function	35
Table D.1 – Prioritised list of display images	41
Table D.2 – Characteristics of a measurement video camera monitor system	44
Table E.1 – Subgroups and performance criteria A for the musical tone generating function	46
Table E.2 – Performance criteria for different subgroups given in Table E.1	47
Table F.1 – ITU-T recommendations for xDSL systems	52
Table F.2 – Attenuation values representing cable lengths	52
Table F.3 – Performance criteria against impulse duration	53
Table G.1 – Test requirements for various MME	57
Table G.2 – Measurement method and reference level setting	57
Table G.3 – Performance criterion A – Limits for devices supporting telephony	61
Table H.1 – Telephony functions, performance criteria	67
Table I.1 – Guidance on the selection of immunity levels to common wireless communication devices	69
Table J.1 – Test requirements for example 1: a multifunction printer	72

Table J.2 – Test details for example 1: a multifunction printer	73
Table J.3 – Test requirements for example 2: flat panel television	74
Table J.4 – Test details for example 2: flat panel television	75
Table J.5 – Test requirements for example 3: notebook computer	76
Table J.6 – Test details for example 3: notebook computer	77
Table J.7 – Example test configurations and performance assessment methods applicable to a PABX and associated terminals for continuous induced RF disturbance tests	79
Table ZZA.1 – Correspondence between this European Standard and the Essential Requirements set out in Directive 2014/30/EU [2014 OJ L96]	82
Table ZZB.1 – Correspondence between this European Standard and Article 3 of Directive 2014/53/EU [2014 OJ L153]	83

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/1/522/FDIS	CISPR/1/527/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.

For MME that falls within the scope of EN 300 386 or any part(s) of EN 301 489 series, the requirements within these product specific/product family standards take precedence over the requirements within 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*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

NOTE Terms and definitions related to EMC and to relevant phenomena are given in IEC 60050-161. Attention is drawn to the fact that a common set of definitions has been written for both CISPR 32 and CISPR 35. It is noted that some terms and definitions will only be used in one of these two documents but for purposes of consistency they are intentionally included in both.

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*.