

SLOVENSKI STANDARD

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Nadomešča:

SIST EN 55103-1:1998

Elektromagnetna združljivost - Standard za družino izdelkov za regulacijo avdio, video, avdiovizualnih in osvetlitvenih zabaviščnih naprav za profesionalno uporabo - 1. del: Oddajanje

Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 1: Emissions

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Elektromagnetische Verträglichkeit - Produktfamilienorm für Audio-, Video- und audiovisuelle Einrichtungen sowie für Studio-Lichtsteuereinrichtungen für professionellen Einsatz - Teil 1: Störaussendungen

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Compatibilité électromagnétique - Norme de famille de produits pour les appareils à usage professionnel audio, vidéo, audiovisuels et de commande de lumière pour spectacles - Partie 1: Emissions

Ta slovenski standard je istoveten z: EN 55103-1:2009

ICS:

33.100.10	Emisija	Emission
33.160.01	Avdio, video in avdiovizualni sistemi na splošno	Audio, video and audiovisual systems in general

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 55103-1

July 2009

ICS 33.100.10

Supersedes EN 55103-1:1996

English version

**Electromagnetic compatibility -
Product family standard for audio, video, audio-visual
and entertainment lighting control apparatus for professional use -
Part 1: Emissions**

Compatibilité électromagnétique -
Norme de famille de produits
pour les appareils à usage professionnel
audio, vidéo, audiovisuels et de
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und audiovisuelle Einrichtungen sowie
für Studio-Lichtsteuereinrichtungen
für professionellen Einsatz -
Teil 1: Störaussendungen

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat 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 Central Secretariat has the same status as the official versions.

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CENELEC

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

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 210, Electromagnetic compatibility (EMC).

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 55103-1 on 2009-07-01.

This European Standard supersedes EN 55103-1:1996.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2010-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2012-07-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers protection requirements of EC Directive 2004/108/EC. See Annex ZZ.

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1 Scope

This European Standard for EMC emission requirements applies to professional audio, video, audio-visual and entertainment lighting control apparatus as defined in 3.6 intended for use in the environments described in Clause 4. This includes the digital apparatus defined in 3.5 and sub-assemblies, see 6.3.

Disturbances in the frequency range 0 Hz to 400 GHz are covered, but requirements are not set over the whole of that range. See Note 5.

NOTE 1 In Annex D, information is included on infra-red radiation in the wavelength range 0,7 μm to 1,6 μm .

Fault conditions of source or victim apparatus are not taken into account. Apparatus as defined in 3.4, 3.5 and 3.6 may be operated with any source of power.

NOTE 2 Sources of power may include, for example: the public low-voltage supply; private supplies with similar characteristics; a d.c. source provided specifically for the apparatus; batteries internal to the apparatus; stand-by generators. Some standards may not apply to private low-voltage supplies.

NOTE 3 In special cases, for instance when highly susceptible apparatus is being used in proximity, additional mitigation measures may have to be employed to reduce the electromagnetic emission further, below the specified levels.

NOTE 4 Professional-user receiving apparatus may be very sensitive to disturbance; see Annex E.

This European Standard does not apply to

- consumer apparatus,
- apparatus specifically designed for security systems, and
- apparatus designed to radiate electromagnetic energy for radio communications purposes.

NOTE 5 To ensure freedom from interference, manufacturers should consider the characteristics of other equipment likely to be in the same environment and thus determine whether limitation of emissions in additional frequency ranges is necessary.

The objective of this standard is to define limits and methods of measurement for apparatus defined in the scope, in relation to continuous and transient, conducted and radiated disturbances. These requirements represent essential electromagnetic compatibility requirements.

2 Normative references

The following referenced documents are indispensable for the application 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.

EN 55013	2001	<i>Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement (CISPR 13:2001, mod.)</i>
EN 55014-1	2000	<i>Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission (CISPR 14-1:2000 + A1:2001 + A2:2002)</i>
+ A1	2001	
+ A2	2002	
EN 55022	2006	<i>Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement (CISPR 22:2005, mod.)</i>
EN 60268-3	2000	<i>Sound system equipment - Part 3: Amplifiers (IEC 60268-3:2000)</i>

EN 60107-1	1997	<i>Methods of measurement on receivers for television broadcast transmissions - Part 1: General considerations - Measurements at radio and video frequencies (IEC 60107-1:1997)</i>
EN 61000-3-2	2006	<i>Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) (IEC 61000-3-2:2005)</i>
EN 61000-3-3	1995	<i>Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection (IEC 61000-3-3:1994)</i>
+ IS1	2005	<i>Interpretation of Clause 5 and Annex A of EN 61000-3-3:1995 + A1:2001</i>
EN 61000-3-11	2000	<i>Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current ≤ 75 A and subject to conditional connection (IEC 61000-3-11:2000)</i>
EN 61000-3-12	2005	<i>Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase (IEC 61000-3-12:2004)</i>

3 Definitions

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

Definitions related to EMC and to relevant phenomena may be found in the EU Directive on EMC (2004/108/EC), in IEC 60050-161 and in other IEC and CISPR Publications.

3.1

electromagnetic compatibility

the ability of a device, unit of equipment or system to function satisfactorily in its electromagnetic environment, without introducing intolerable disturbances to anything in that environment

3.2

port

particular interface of the specified apparatus with the electromagnetic environment (see Figure 1)

3.3

enclosure port

the physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

3.4

professional apparatus

apparatus for use in trades, professions or industries and which is not intended for sale to the general public

3.5

professional digital apparatus

professional apparatus designed for the purpose of controlling audio, video, audiovisual or entertainment lighting characteristics, by means of periodic pulsed electrical waveforms, or of processing audio, video or lighting control signals in digital form

3.6**professional entertainment lighting control apparatus**

professional apparatus producing electrical control signals for controlling the intensity, colour, nature or direction of the light from a luminaire, where the intention is to create artistic effects in theatrical, television or musical productions and visual presentations

3.7**test report**

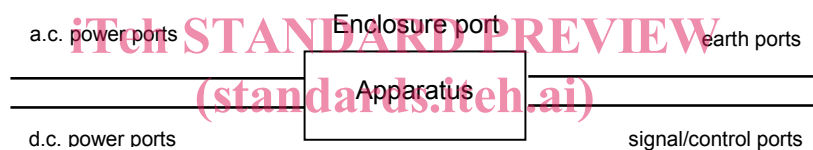
the documentation of the EMC tests performed, and their results, prepared by the persons who carried out the tests, for example the manufacturer or a test laboratory

3.8**telecommunications or network port**

port for data and signalling transfer, which is intended to interconnect widely-dispersed systems by such means as

- direct connection to *multi-user* telecommunications networks (such as public switched networks),
- local area, and similar, networks

NOTE Ports intended for local interconnection of the components of a single system (such as analogue and RS-232 ports) are not considered to be telecommunications or network ports for the purposes of this standard.



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Figure 1 - Examples of ports

4 Electromagnetic environment

Sets of limits are specified in Clause 8 for the following five environments. The apparatus shall conform to one or more of the sets of limits. It is the responsibility of the manufacturer to apply the appropriate set or sets of limits to his apparatus (see Table 1).

- E1** Residential (including both of the location types class 1 and 2 found in IEC 61000-2-5)
- E2** Commercial and light industrial (including, for example, theatres, and television studios which are not purpose-built studios)
- E3** Urban outdoors (based on the definition of location type class 6 in IEC 61000-2-5)
- E4** Controlled EMC environment (for example purpose built broadcasting or recording studio), and the rural outdoors environment (far away from railways, transmitters, overhead power lines, etc.)

NOTE A controlled EMC environment exists in a building where the installation has been designed having special regard to EMC, and where technical personnel are present with experience of EMC technology.

- E5** Heavy industrial (see EN 61000-6-4); and environments close to broadcast transmitters

5 Disturbance phenomena

This standard sets requirements for the following disturbance phenomena (see Table 1):

- a) enclosure port; r.f. electromagnetic fields, 30 MHz to 1 000 MHz;
- b) enclosure port; magnetic fields, 50 Hz to 50 kHz measured at 100 mm;

NOTE 1 The upper frequency limit is higher than that in the companion standard, EN 55103-2; the limit in that standard will be increased to 50 kHz in a later edition.

- c) enclosure port; magnetic fields, 50 Hz to 50 kHz measured at 1 m;

NOTE 2 The upper frequency limit is higher than that in the companion standard, EN 55103-2; the limit in that standard will be increased to 50 kHz in a later edition.

- d) a.c. power port; conducted emissions; harmonic currents 100 Hz to 2 kHz;
- e) a.c. power port; conducted emissions; voltage changes imposed by the apparatus upon the power supply, and inrush current;
- f) a.c. power port; conducted emissions; 0,15 MHz to 30 MHz;
- g) a.c. power port; conducted emissions; discontinuous interference, 'clicks'; 0,15 MHz to 30 MHz;
- h) telecommunications and network ports; conducted emissions; 0,15 MHz to 30 MHz;
- i) antenna terminals of broadcast radio and television receivers; conducted emissions; 30 MHz to 1 000 MHz.

6 Conditions during measurement

6.1 General

The apparatus shall be operated in accordance with the manufacturer's instructions. The measurements shall be made in the operating mode producing the largest emission of the type being measured, consistent with normal operation. An attempt shall be made to maximize the emission by varying the configuration of the test sample (see also 6.3).

The configuration and mode of operation during measurement shall be precisely noted in the test report. If the apparatus is part of a system, or can be connected to auxiliary apparatus, then the apparatus shall be tested while connected to the minimum configuration of auxiliary apparatus which is typical of normal use. Where an apparatus has more than one input or output of a particular type, the number of inputs and outputs connected to auxiliary apparatus during the measurements shall be the minimum which will enable the apparatus to perform its intended function.

Measurements shall be performed in well-defined and reproducible conditions for each type of disturbance. The measurements shall be carried out one by one in sequence, the sequence being optional. Each measurement, or series of associated measurements of one phenomenon, shall be carried out under a single set of environmental conditions within the specified operating environmental range of the apparatus and at its rated supply voltage, unless otherwise specified in this standard or the relevant Basic Standard.

NOTE The methods of measurement are given in the standards (Basic Standards, where they exist) which are referred to in Table 1. Any necessary modifications or additional information needed for the practical application of the measurements are specified in this standard.

6.2 Ports

Measurements shall be made on the relevant ports of the apparatus in accordance with Table 1. Measurements shall only be carried out if ports of the relevant type exist. Where the apparatus has one or more groups of similar ports (including different groups having the same port type as defined in this standard) then at least one example from each group shall be tested.

6.3 Sub-assemblies

If the apparatus contains sub-assemblies which are provided with connectors so that they can be moved about within it, an attempt shall be made to maximise the emission by moving the sub-assemblies, using only configurations specified (see 6.1), or not prohibited, by the manufacturer.

Sub-assemblies intended to be housed in a frame shall be measured while installed in a frame in the manner specified by the manufacturer. The frame shall be specified by the manufacturer and shall be populated with a typical collection of sub-assemblies.

A subassembly of the types described in the above paragraphs which has been measured in this way and has satisfied the relevant requirements of this standard, shall be deemed to conform to this standard when supplied separately, provided that the manufacturer's documentation states the conditions under which the sub-assembly conforms to this standard.

6.4 Racks and cabinets

The combining of items of apparatus individually conforming to this standard into a rack or cabinet does not give rise to additional requirements or a requirement for additional testing.

6.5 Special conditions of measurement for apparatus containing audio amplifiers

Except for phenomena 2 and 3, for which special conditions are specified (see Annex A), apparatus containing audio amplifiers which draw a supply current which varies by less than 15 % of the maximum current with input signals between no signal and rated source e.m.f. (as defined in EN 60268-3) shall be tested with no input signal. Other audio amplifiers shall be tested under the following conditions:

- rated supply voltage;
- normal position of the user controls;
- widest flat bandwidth response of audio signal path;
- input signals and rated load conditions as given in EN 60268-3.

7 Documentation for the purchaser/user

7.1 Documentation which shall be supplied to the purchaser/user

The manufacturer shall state the environments for which the apparatus has achieved conformity and in which it is intended to be used. In addition, the manufacturer shall state

- the average half-cycle r.m.s. inrush current, on initial switch-on,
- the average half-cycle r.m.s. inrush current after a supply interruption of 5 s.

These currents are determined in accordance with EN 61000-3-3 and Annex B. See also Annex F.

The manufacturer shall state any special measures that may have to be taken by the purchaser or user; for example:

- the use of screened or special cables;
- external measures to reduce the inrush current after the 5 s interruption.

7.2 Documentation which shall be available to the purchaser/user upon request

A list of auxiliary apparatus, connectors and cables which, when used in conjunction with the apparatus, conform to the emission requirements of this standard shall be made available.

8 Emission limits

Apparatus within the scope of this standard shall comply with the requirements of this standard independently of the nature of its source of power. Some example sources are listed in Clause 1. It may be determined from consideration of the electrical characteristics and usage of a particular apparatus that some of the measurements are inappropriate and therefore unnecessary. In such a case it is required that the decision not to measure be recorded in the test report. The emission limits established by this standard are shown in Table 1.

Table 1 - Emission

Port	Phenomenon	Frequency range	Limits, environments E1 to E3	Limits, environments E4 and E5	Applicable standard	Notes
Enclosure	1 Radiated electromagnetic field at 10 m	30 MHz to 230 MHz	30 dB ($\mu\text{V}/\text{m}$) quasi-peak	40 dB ($\mu\text{V}/\text{m}$) quasi-peak	EN 55022	1
		230 MHz to 1 GHz	37 dB ($\mu\text{V}/\text{m}$) quasi-peak	47 dB ($\mu\text{V}/\text{m}$) quasi-peak		
	2 Magnetic field, at 100 mm	50 Hz to 500 Hz	4 A/m to 0,4 A/m	E4 as E1: E5 no limits, no test	Annex A	2 & 3
		500 Hz to 50 kHz	0,4 A/m			
3 Magnetic field, at 1 m	50 Hz to 5 kHz	1 A/m to 0,01 A/m	E4 as E1: E5 no limits, no test	Annex A	2 & 4	
	5 kHz to 50 kHz	0,01 A/m				
AC mains input	4 Harmonic currents	See applicable standard	See applicable standard	See applicable standard	EN 61000-3-2 or EN 61000-3-12	5
	5 Voltage changes (and inrush current, see Annex B)	See applicable standard	See applicable standard	See applicable standard	EN 61000-3-3 or EN 61000-3-11 and Annex B	5 & 6
	6 Conducted radio-frequency emissions	0,15 MHz to 0,5 MHz	66 dB (μV) to 56 dB (μV) quasi-peak 56 dB (μV) to 46 dB (μV) average	79 dB (μV) quasi-peak 66 dB (μV) average	EN 55022	7
		0,5 MHz to 5 MHz	56 dB (μV) quasi-peak 46 dB (μV) average	73 dB (μV) quasi-peak 60 dB (μV) average		
		5 MHz to 30 MHz	60 dB (μV) quasi-peak 50 dB (μV) average	60 dB (μV) average		
	7 Discontinuous conducted radio-frequency emissions	0,15 MHz to 30 MHz	See applicable standard	See applicable standard	EN 55014-1	8