

# **SLOVENSKI STANDARD**

## **SIST EN 55103-1:1998**

**01-september-1998**

---

### **Electromagnetic compatiblty (EMC) - Product family standard for audio, video, audio-visual and entertainment ligthing control apparatus for professional use - Part 1: Emission**

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

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

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 55103-1:1996**

---

#### **ICS:**

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

**SIST EN 55103-1:1998**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 55103-1:1998](https://standards.iteh.ai/catalog/standards/sist/df06daeb-2aa4-4122-8c9e-45918177302e/sist-en-55103-1-1998)

<https://standards.iteh.ai/catalog/standards/sist/df06daeb-2aa4-4122-8c9e-45918177302e/sist-en-55103-1-1998>

EUROPEAN STANDARD

EN 55103-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 1996

ICS 29.020

Descriptors: Electromagnetic compatibility, video equipment, radio equipment, control equipment, lighting, theatres, specifications, emission, electromagnetic interference, measurements, limits

English version

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

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

Elektromagnetische Verträglichkeit  
Produktfamiliennorm für Audio-, Video-  
und audiovisuelle Einrichtungen sowie  
für Studio-Lichtsteuereinrichtungen für  
den professionellen Einsatz  
Teil 1: Grenzwerte und Meßverfahren  
für Störaussendungen

<https://standards.iteh.ai/catalog/standards/sist/df06daeb-2aa4-4122-8c9e-45918177302e/sist-en-55103-1-1998>

This European Standard was approved by CENELEC on 1996-07-02. 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 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

## Foreword

This European Standard was prepared by SC 210A, EMC products, of Technical Committee CENELEC TC 210, EMC.

Compliance with this standard may be used to demonstrate presumption of compliance with the protection requirements in the EMC Directive (89/336/EEC).

The text of the draft was submitted to a formal vote and was approved by CENELEC as EN 55103-1 on 1996-07-02.

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) 1997-03-01

- latest date by which the national standards conflicting with the EN have to be withdrawn

(dow) 1999-09-01

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 55103-1:1998

<https://standards.iteh.ai/catalog/standards/sist/d106daeb-2aa4-4122-8c9e-45918177302e/sist-en-55103-1-1998>

## Contents

Foreword	2
Contents	3
1 Scope	4
2 Normative references	4
3 Objective	6
4 Definitions	6
5 Electromagnetic environment	7
6 Disturbance phenomena	7
7 Conditions during measurement	8
8 Documentation for the purchaser/user	9
9 Emission limits	9
Annex A (normative) Method of measurement of radiated magnetic fields, 50 Hz to 50 kHz	12
Annex B (normative) Method of measurement of inrush current	14
Annex C (informative) Apparatus using infra-red radiation for signal transmission or control purposes	14
Annex D (informative) Use of apparatus near wireless microphone receivers and receiving antennas.	14
Annex E (informative) An alternative method of measurement of conducted emissions from signal, control and d.c. power ports, 0,15 to 30 MHz	16
Annex F (informative) Limitation of 'Hot switching' Inrush Current (under consideration)	16
Annex G (informative) Background to the standard and justification of adopted methods and limits for this standard and for its companion on immunity (EN 55103-2).	17

## 1 Scope

This standard for EMC emission requirements applies to professional audio, video, audio-visual and entertainment lighting control apparatus as defined in clause 4 intended for use in the environments described in clause 5. This includes the digital apparatus defined in 4.5 and sub-assemblies, see 7.3.

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

NOTE 1: In annex C, information is included on infra-red radiation in the wavelength range 0,7  $\mu\text{m}$  to 1,6  $\mu\text{m}$ .

Fault conditions of source or victim apparatus are not taken into account.

Apparatus as defined in 4.4, 4.5 and 4.6 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.

NOTE 3: In special cases, for instance when highly susceptible apparatus is being used in proximity, additional mitigative 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 D.

This standard does not apply to:

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

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of the publications apply to the European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

The information in the forewords of the European Standards below concerning application and withdrawal with respect to both dates and equipment, replaces the corresponding information in the foreword of this standard.

International Standard	Year	Title	European Standard	Year
—		Electromagnetic compatibility – Generic emission standard. Part 1: Residential, commercial and light industrial environment.	EN 50081-1	
—		Part 2: industrial environment.	EN 50081-2	
CISPR 13 with A1 (mod)	1975 1983	Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment.	EN 55013	
CISPR 14	1993	Limits and methods of measurement of radio disturbance characteristics of electrical motor-operated and thermal appliances for household and similar products, electrical tools and similar electrical apparatus.	EN 55014	1993
CISPR 22 (mod)	1985	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.	EN 55022	1987
IEC 50(161)	1990	International Electrotechnical Vocabulary. Chapter 161: Electromagnetic compatibility.	—	
IEC 65	1985	Safety requirements for mains operated electronic and related apparatus for household and similar general use.	EN 60065:	1994
IEC 268-3		Sound system equipment. Part 3: amplifiers.	HD 483.3	
IEC 1000-2-5		Electromagnetic compatibility Part 2: Environment – Section 5: Classification of electromagnetic environments.	—	
IEC 1000-3-2		Part 3: Limits – Section 2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase).	EN 61000-3-2	
IEC 1000-3-3		Section 3: Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current up to and including 16 A.	EN 61000-3-3	
IEC 1000-3-4 (draft)		Section 4: Limits for harmonic current emissions (equipment input current greater than 16 A per phase).	—	
IEC 1000-3-5		Section 5: Limitation of voltage fluctuations and flicker in low voltage supply systems for equipment with rated current greater than 16 A per phase.	—	
IEC 1000-4-11		Part 4: Testing and measuring techniques Section 11: Voltage dips, short interruptions and voltage variations – immunity tests.	EN 61000-4-11	
—		EMC Standard for wireless microphones and similar r.f. audio link equipment	ETS 300 445	

### 3 Objective

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.

### 4 Definitions

Definitions related to EMC and to relevant phenomena may be found in the EU Directive on EMC (89/336/EEC), in Chapter 161 of IEC 50 and in other IEC and CISPR Publications.

The following particular definitions are used in this standard.

- 4.1 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.
- 4.2 port:** Particular interface of the specified apparatus with the external electromagnetic environment (see figure 1).
- 4.3 enclosure port:** The physical boundary of the apparatus through which the electromagnetic fields may radiate or impinge.
- 4.4 professional apparatus:** Apparatus for use in trades, professions or industries and which is not intended for sale to the general public.
- 4.5 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.
- 4.6 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, televisual or musical productions and visual presentations.
- 4.7 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.

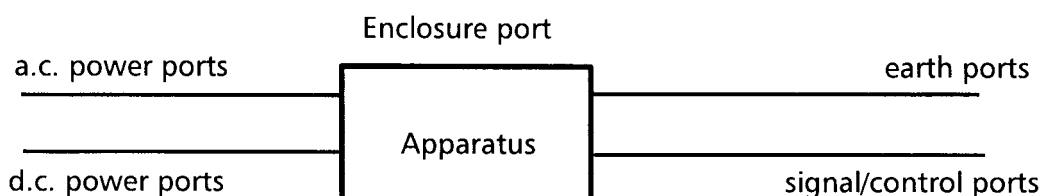


Figure 1: Examples of ports



## 5 Electromagnetic environment

Sets of limits are specified in clause 9 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 8.1).

- E1** residential (including both of the location types class 1 and 2 found in IEC 1000-2-5)
- E2** commercial and light industrial (including, for example, theatres)
- E3** urban outdoors (based on the definition of location type class 6 in IEC 1000-2-5)
- 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: Some studio environments correspond to E2.
- E5** heavy industrial (see EN 50081-2); and environments close to broadcast transmitters

(standards.iteh.ai)

## 6 Disturbance phenomena

This standard sets requirements for the following disturbance phenomena (see tables 1 and 2).

- 1 enclosure port; r.f. electromagnetic fields, 30 MHz to 1 000 MHz;
- 2 enclosure port; magnetic fields, 50 Hz to 50 kHz measured at 10 cm;  
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.
- 3 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.
- 4 a.c. power port; conducted emissions; harmonic currents 0 to 2 kHz;
- 5 a.c. power port; conducted emissions; voltage fluctuations imposed by the apparatus upon the power supply;
- 6 a.c. power port; conducted emissions; 0,15 MHz to 30 MHz;
- 7 a.c. power port; conducted emissions; discontinuous interference, 'clicks' 0,15 MHz to 30 MHz;
- 8 a.c. power port; conducted emissions; inrush currents;
- 9 antenna terminals of broadcast radio and television receivers; conducted emissions; 30 MHz to 1 000 MHz;
- 10 signal and control ports, d.c. power ports; conducted emissions; 0,15 MHz to 30 MHz.

## 7 Conditions during measurement

### 7.1 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 7.3). 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.

It may be necessary for some special EMC requirements (not mentioned in this standard), imposed by the intended environment in which the apparatus is to be installed, to be established by contractual agreement between supplier and purchaser. Such agreement should take into account the Basic Standard IEC 1000-2-5.

### 7.2 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.

### 7.3 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 7.1), 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 sub-assembly 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.

#### 7.4 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.

#### 7.5 Special conditions of measurement for apparatus containing audio amplifiers

Except for phenomena 2 and 3, for which special conditions are specified, 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 emf (as defined in HD 483.3) 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 load conditions as given in 4.2.6 b) of EN 60065:1994.

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

### 8 Documentation for the purchaser/user

#### 8.1 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. Also see table 2 phenomenon 8.

The purchaser/user shall be informed of any special measures which have to be taken to achieve conformance to this standard; for example the use of screened or special cables.

If, in future, a requirement is introduced to label the apparatus itself as conforming to this standard, the number of the standard shall be suffixed with the identification codes of those environments whose sets of requirements are conformed to.

#### 8.2 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.

### 9 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 2.