



SLOVENSKI STANDARD

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Cable networks for television signals, sound signals and interactive services - Part 2: Electromagnetic compatibility for equipment

Cable networks for television signals, sound signals and interactive services -- Part 2:
Electromagnetic compatibility for equipment

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Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste -- Teil 2:
Elektromagnetische Verträglichkeit von Geräten

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Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion
sonore et services interactifs -- Partie 2: Compatibilité électromagnétique pour les
matériels

Ta slovenski standard je istoveten z: EN 50083-2:2001

ICS:

33.060.40	Kabelski razdelilni sistemi	Cabled distribution systems
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

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EUROPEAN STANDARD

EN 50083-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2001

ICS 29.020; 33.060.40

Supersedes EN 50083-2:1995 + A1:1997

English version

**Cable networks for television signals,
sound signals and interactive services
Part 2: Electromagnetic compatibility for equipment**

Réseaux de distribution par câbles pour
signaux de télévision, signaux de
radiodiffusion sonore et services
interactifs
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pour les matériels

Kabelnetze für Fernsehsignale,
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Teil 2: Elektromagnetische Verträglichkeit
von Geräten

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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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, 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 CENELEC Technical Committee TC 209, "Cable networks for television signals, sound signals and interactive services" on the basis of EN 50083-2:1995, its amendment A1:1997 and a second amendment to EN 50083-2.

The text of this second amendment was submitted to the Unique Acceptance Procedure and was approved by CENELEC on 2001-01-01 to be published as part of a second edition of EN 50083-2.

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) 2002-06-01
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with the EN have to be withdrawn (dow) 2004-01-01
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1 Scope

1.1 General

Standards of EN 50083 series deal with cable networks for television signals, sound signals and interactive services including equipment, systems and installations

- for headend-reception, processing and distribution of television and sound signals and their associated data signals and
- for processing, interfacing and transmitting all kinds of signals for interactive services

using all applicable transmission media.

All kinds of networks like

- CATV-networks
- MATV-networks and SMATV-networks
- individual receiving networks

and all kinds of equipment, systems and installations installed in such networks, are within this scope.

The extent of these standardisation work is from the antennas, special signal source inputs to the headend or other interface points to the network up to the system outlet or the terminal input, where no system outlet exists.

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The standardisation of any user terminals (i.e. tuners, receivers, decoders, multimedia terminals etc.) as well as of any coaxial and optical cables and accessories therefor is excluded.

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1.2 Specific scope of this part 2

This standard

- applies to the radiation characteristics and immunity to electromagnetic disturbances of active and passive equipment for the reception, processing and distribution of television, sound and interactive services signals, as dealt with in the following parts of EN 50083 series:
 - EN 50083-3 "Active wideband equipment for coaxial cable networks"
 - EN 50083-4 "Passive wideband equipment for coaxial cable networks"
 - EN 50083-5 "Headend equipment"
 - EN 50083-6 "Optical equipment"
- covers the following frequency ranges:

Disturbance voltage injected into the mains	9 kHz to 30 MHz
Radiation from active equipment	5 MHz to 25 GHz
Immunity of active equipment	150 kHz to 25 GHz
Screening effectiveness of passive equipment	5 MHz to 3 GHz (25 GHz) ¹⁾

¹⁾ For "Screening effectiveness of passive equipment" no requirements apply at present for the frequency range 3 GHz to 25 GHz. Methods of measurement and limits are investigated for inclusion in a future amendment or revised edition.

- specifies requirements for maximum allowed radiation, minimum immunity and minimum screening effectiveness;
- describes test methods for conformance testing.

Coaxial cables for cable networks do not fall under the scope of this standard. Reference is made to the European Standard series EN 50117 "Coaxial cables used in cabled distribution networks".

Standardisation in the field of „Electromagnetic compatibility“ for any user terminals (e.g. tuners, receivers, decoders, multimedia terminals etc.) is covered by the European Standards EN 55013 and EN 55020.

Requirements for the electromagnetic compatibility of receiver leads are laid down in EN 60966-2-4, EN 60966-2-5 and EN 60966-2-6.

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 these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 50082-1	1997	Electromagnetic compatibility (EMC) Generic immunity standard Part 1: Residential, commercial and light industry
EN 50083	series	Cable networks for television signals, sound signals and interactive services
EN 50083-3	1998	Part 3: Active wideband equipment for coaxial cable networks
EN 50083-4	1998	Part 4: Passive wideband equipment for coaxial cable networks
EN 50083-5	2001	Part 5: Headend equipment
EN 50083-6	1997	Part 6: Optical equipment
EN 50083-8	2000	Part 8: Electromagnetic compatibility for networks
EN 50117	series	Coaxial cables used in cabled distribution networks
EN 55013	1990	Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment (CISPR 13:1975 + A1:1983, modified)
EN 55020	1994	Electromagnetic immunity of broadcast receivers and associated equipment
EN 60966-2-4	1997	Radio frequency and coaxial cable assemblies; Part 2-4: Detail specification for cable assemblies for radio and TV receivers (Frequency range 0 to 3000 MHz, IEC 60169-2 connectors) (IEC 60966-2-4:1997)
EN 60966-2-5	1999	Radio frequency and coaxial cable assemblies; Part 2-5: Detail specification for cable assemblies for radio and TV receivers (Frequency range 0 to 1000 MHz, IEC 60169-2 connectors) (IEC 60966-2-5:1998)

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EN 60966-2-6	1999	Radio frequency and coaxial cable assemblies; Part 2-6: Detail specification for cable assemblies for radio and TV receivers (Frequency range 0 to 3000 MHz, IEC 60169-24 connectors) (IEC 60966-2-6:1998)
EN 61000-3-2	1995	Electromagnetic compatibility (EMC) Part 3: Limits - Section 2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase) (IEC 61000-3-2:1995)
EN 61000-4-2	1996	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 2: Electrostatic discharge immunity test (IEC 61000-4-2:1995)
EN 61000-4-3	1996	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 3: Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:1995)
EN 61000-4-4	1995	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 4: Electrical fast transient/burst immunity test (IEC 61000-4-4:1995)
EN 61000-4-6	1996	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 6: Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:1996)
EN 61079-1	1993	Methods of measurement on receivers for satellite broadcast transmissions in the 12 GHz band - Part 1: Radio-frequency measurements on outdoor units (IEC 61079-1:1992)
IEC 60050(161)	1990	International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility
CISPR 16-1	1993	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1: Radio disturbance and immunity measuring apparatus

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this standard, the definitions contained in IEC 60050(161) "Electromagnetic compatibility" apply. The most important definitions of IEC 60050(161) are repeated hereafter with the IEC-numbering given in brackets. In addition some more specific definitions, used in this standard, are listed.

3.1.1

radiation (electromagnetic) [IEV 161-01-10]

1. the phenomenon by which energy in the form of electromagnetic waves emanates from a source into space
2. energy transferred through space in the form of electromagnetic waves

NOTE By extension, the term "electromagnetic radiation" sometimes also covers induction phenomena.

3.1.2**immunity (to a disturbance)** [IEV 161-01-20]

ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance

3.1.3**internal immunity** [IEV 161-03-06]

ability of a device, equipment or system to perform without degradation in the presence of electromagnetic disturbances appearing at its normal input terminals or antenna

3.1.4**external immunity** [IEV 161-03-07]

ability of a device, equipment or system to perform without degradation in the presence of electromagnetic disturbances entering other than via its normal input terminals or antenna

3.1.5**mains immunity** [IEV 161-03-03]

immunity to mains-borne disturbance

3.1.6**immunity level** [IEV 161-03-14]

maximum level of a given electromagnetic disturbance incident on a particular device, equipment or system for which it remains capable of operating at a required degree of performance

3.1.7**immunity limit** [IEV 161-03-15]

specified minimum immunity level

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3.1.8**immunity margin** [IEV 161-03-16]

the ratio of the immunity limit to the electromagnetic compatibility level

3.1.9**electromagnetic disturbance** [IEV 161-01-05]

any electromagnetic phenomenon which may degrade the performance of a device, equipment or system, or adversely affect living or inert matter

NOTE An electromagnetic disturbance may be an electromagnetic noise, an unwanted signal or a change in the propagation medium itself.

3.1.10**screening effectiveness**

ability of an equipment or system to attenuate the influence of electromagnetic fields from outside the equipment or system or to suppress the radiation of electromagnetic fields from inside the equipment or system

3.1.11**well-matched**

matching condition when the return loss of the equipment complies with the requirements of EN 50083-3, Table 1

3.1.12**well-screened**

a test set-up can be considered "well-screened" if its radiation level, when terminated with a matched load, is at least 20 dB below the expected radiation level of the equipment under test, the test set-up and the equipment being supplied with the same input signal level

3.1.13**electromagnetic interference (EMI)** [IEV 161-01-06]

degradation of the performance of an equipment, transmission channel or system caused by an electromagnetic disturbance

NOTE 1 In English, the terms "electromagnetic disturbance" and "electromagnetic interference" designate respectively the cause and the effect, but they are often used indiscriminately.

NOTE 2 In French, the terms "perturbation électromagnétique" and "brouillage électromagnétique" designate respectively the cause and the effect, and should not be used indiscriminately.

3.1.14**operating frequency range**

the passband for the wanted signals for which the equipment has been designed

3.1.15**wanted signal**

during measurements, the wanted signal shall be simulated using a sinewave test signal having the frequency within the operating frequency range and the appropriate level

3.1.16**unwanted signal**

signals inside and outside of the operating frequency range that are not considered as wanted signals

When measuring immunity (to unwanted signals), the unwanted signal shall be simulated using two sine-wave test signals.

3.1.17**first satellite intermediate frequency range**

output frequency range of the outdoor unit which is comprised of the frequency band between 950 MHz and at least 3 GHz or parts thereof

3.1.18**carrier-to-interference ratio**

minimum level difference measured at the output of an active equipment between the wanted signal and

- intermodulation products of the wanted signal and/or unwanted signals generated due to non-linearities;
- harmonics generated by an unwanted signal;
- unwanted signals that have penetrated into the operating frequency range;
- unwanted signals that have been converted to the frequency range to be protected (operating frequency range).

3.1.19**individual receiving system**

system designed to provide television and sound signals to an individual household

3.1.20**spurious signals**

all unwanted signals in the frequency range of interest

3.1.21**band**

nominal operating frequency range of the equipment

3.1.22**electrostatic discharge (ESD)** [IEV 161-01-22]

a transfer of electric charge between bodies of different electrostatic potential in proximity or through direct contact

3.1.23**transient (adjective and noun)** [IEV 161-02-01]

pertaining to or designating a phenomenon or a quantity which varies between two consecutive steady states during a time interval short compared with the time-scale of interest

3.1.24**burst** [IEV 161-02-07]

sequence of a limited number of distinct pulses or an oscillation of limited duration

3.1.25**test levels**

preferential range of test level for ESD or fast transient test

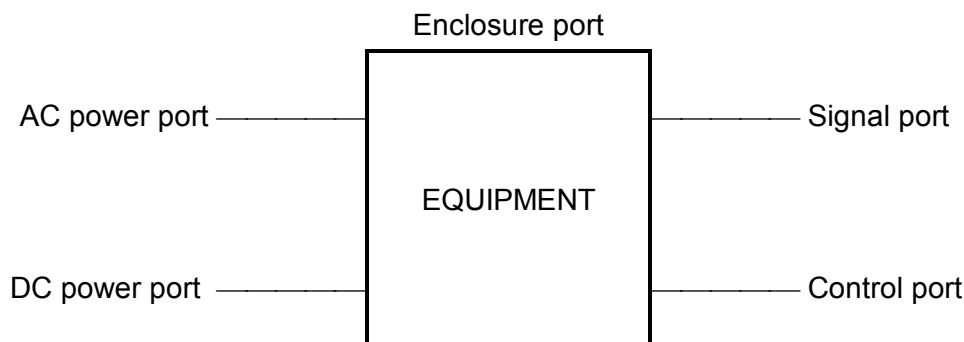
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3.1.26**port**

particular interface of the specific equipment with the external electromagnetic environment:

**3.1.27****enclosure port**

physical boundary of the equipment through which electromagnetic fields may be transmitted

3.1.28**signal port**

point at which a cable for the wanted signal is connected to the equipment

3.1.29**control port**

point at which a cable for the control signal is connected to the equipment

3.1.30**AC power port**

point at which a cable for the AC power supply is connected to the equipment

3.1.31**DC power port**

point at which a cable for the DC power supply is connected to the equipment

3.1.32**in-band immunity**

immunity against disturbance at any frequency of the wanted signals carried at the interfaces and used internally within the equipment under test (e.g. input/output frequencies, IF, video band, etc.)

3.1.33**out-of-band immunity**

immunity against disturbance from signals outside the frequency band(s) of the wanted signal carried at the interfaces and used internally within the equipment under test (e.g. input/output frequencies, IF, video band, etc.)

3.1.34**RF signal port**

antenna input port or RF network port

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3.1.35**antenna input port**

input terminal of the equipment (e.g channel converter, DBS tuner,...) under test

3.1.36**RF network port**

point at which a coaxial cable for the wanted RF signal is connected to the equipment but excluding direct connection to the antenna

3.2 Symbols

Under consideration

3.3 Abbreviations

AC	alternating current
ALC	automatic level control
AM	amplitude modulation
BSS	broadcast satellite services
CATV	Community Antenna Television (system)
COFDM	Coded Orthogonal Frequency Division Multiplex
CW	continuous wave
DBS	direct broadcast satellite

DSR	digital satellite radio
EMC	electromagnetic compatibility
emf	electromotive force
EMI	electromagnetic interference
EUT	equipment under test
FM	frequency modulation
FSS	fixed satellite services
IF	intermediate frequency
LNB	low noise broadband-converter
MATV	Master Antenna Television (system)
QAM	quadrature amplitude modulation
QPSK	quadrature phase shift keying
RF	radio frequency
SAT	satellite
S-channel	special channel
SMATV	Satellite Master Antenna Television (system)
TV	television
VHF	very high frequency
VSB	vestigial side band

NOTE Only the abbreviations used in the English version of this part of EN 50083 are mentioned in this subclause. The German and the French versions of this part may use other abbreviations. Refer to 3.3 of each language version for details.

4 Methods of measurements SIST EN 50083-2:2003

General operating conditions

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Measurements shall be, unless otherwise specified, carried out with the rated performance of the equipment under test and at a standard room temperature. If required, additional measurements shall be carried out at the highest and lowest rated ambient temperatures.

The equipment shall be tested including all those sub-assemblies with which it would normally be used.

4.1 Disturbance voltages from equipment

4.1.1 Disturbance voltages from equipment in the frequency range from 9 kHz to 30 MHz

Introduction

The method described is applicable to the measurement of disturbance voltages from equipment in the frequency range of 9 kHz to 30 MHz on the mains line.

The measured voltage includes narrowband interference and broadband interference such as that produced by semiconductor rectifiers.

4.1.1.1 General measurement requirements

Disturbance voltage measurements should be carried out in a screened room according to the method described in EN 55013, with the exception that the wanted signal is a sinusoidal carrier. At all frequencies in the range of interest the disturbance voltage injected into the mains by the equipment under test shall be measured by means of a specified artificial mains network with a measuring receiver having a quasi-peak detector for broadband measurements and an average detector for narrowband measurements.