



SLOVENSKI STANDARD

SIST EN 50083-8:2003

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Cable networks for television signals, sound signals and interactive services - Part 8: Electromagnetic compatibility for networks

Cable networks for television signals, sound signals and interactive services -- Part 8: Electromagnetic compatibility for networks

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste -- Teil 8: Elektromagnetische Verträglichkeit von Kabelnetzen

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs -- Partie 8: Compatibilité électromagnétique des réseaux

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EUROPEAN STANDARD

EN 50083-8

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2002

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Supersedes EN 50083-8:2000

English version

**Cable networks for television signals, sound signals
and interactive services
Part 8: Electromagnetic compatibility for networks**

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

Partie 8: Compatibilité électromagnétique
des réseaux

Kabelnetze für Fernsehsignale,
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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 50083-8:2000 and the first amendment to EN 50083-8.

The text of this first amendment was submitted to the Unique Acceptance Procedure and was approved by CENELEC on 2001-12-01 to be published as part of a second edition of EN 50083-8.

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) 2002-12-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2004-12-01

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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 sound and television 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- 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 this 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.

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.

1.2 Specific scope of this part 8

This standard applies to the radiation characteristics and immunity to electromagnetic disturbance of cable networks for television signals, sound signals and interactive services and covers the frequency range 0,15 MHz to 3,0 GHz.

This standard specifies EMC performance requirements and lays down the methods of measurement.

Cable networks beyond the system outlets (e.g. the receiver lead, in simplest terms) which begin at the system outlet and end at the subscriber's terminal equipment shall comply with these recommendations provided that no other specific provisions apply.

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.

To minimise the risk of interference to other radio services caused by possible radiation from a cable network and to limit the possible penetration of external signals which may interfere with the operation of a network, it is necessary not only to use equipment which satisfies the requirements of EN 50083-2 regarding limits of radiation and of immunity to external fields but also to ensure the integrity of all cable connections on each item of active or passive cable network equipment.

Cable networks employing coaxial cables can be a source of interference to a wide range of services that utilise the radio frequency spectrum. These include not only the emergency services, safety of life, broadcasting, aeronautical and radio navigation services but also land mobile, amateur and cellular radio services.

As existing and planned radio services need to be protected, radiation limits specified for cable networks should be complied with.

Additional protection for certain services may be required by national regulations.

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 50083		Cable networks for television signals, sound signals and interactive services
EN 50083-2	2001	Part 2: Electromagnetic compatibility for equipment
EN 50083-3	2002	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	2000	Part 5: Headend equipment (to be published)
EN 50083-6	1997	Part 6: Optical equipment
EN 50083-7 + A1	1996 2000	Part 7: System performance
EN 50117	Series	Coaxial cables used in cable networks
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 3 000 MHz, IEC 60169-2 connectors
EN 60966-2-5	1998	Radio frequency and coaxial cable assemblies - Part 2-5: Detail specification for cable assemblies for radio and TV receivers - Frequency range 0 to 1 000 MHz, IEC 60169-2 connectors
EN 60966-2-6	1998	Radio frequency and coaxial cable assemblies - Part 2-6: : Detail specification for cable assemblies for radio and TV receivers - Frequency range 0 to 3 000 MHz, IEC 60169-24 connectors
IEC 60050(161)		International Electrotechnical Vocabulary 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 IEV-numbering given in brackets. In addition some more specific definitions, used in this standard, are listed.

3.1.1

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

1. 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

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.

3.1.4

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

3.1.5

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.

3.1.6

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

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

3.1.7

operating frequency range

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

3.1.8

carrier-to-interference ratio

minimum level difference measured at the output of an active equipment or at any other interface within the network 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)

3.1.9

headend

equipment which is connected between receiving antennas or other signal sources and the remainder of the cable network, to process the signals to be distributed

NOTE The headend may, for example, comprise antenna amplifiers, frequency converters, combiners, separators and generators.

3.1.10

system outlet

device for interconnecting a subscriber feeder and a receiver lead

3.1.11

spur network

cable network normally laid out inside buildings to which splitters, subscriber taps or looped system outlets are connected

3.1.12

ignition noise

unwanted emission of electromagnetic energy, predominantly impulsive in content, arising from the ignition system within a vehicle or device

3.1.13

building penetration loss

ability of buildings, in which networks for distribution of television and sound are located, to attenuate the influence of electromagnetic fields from outside the buildings or to suppress the radiation of electromagnetic fields from inside the buildings

3.1.14

disturbance level

level of an electromagnetic disturbance at a given location, which results from all contributing (interference) sources

3.1.15

degradation (of performance) [IEV 161-01-19]

undesired departure in the operational performance of any device, equipment or system from its intended performance

NOTE The term "degradation" can apply to temporary or permanent failure.

3.1.16

subscriber's feeder

feeder connecting a subscriber tap to a system outlet or, where the latter is not used, directly to the subscriber equipment

NOTE A subscriber feeder may include filters and balun transformer.

3.1.17**receiver lead**

lead which connect the system outlet to the subscriber equipment

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

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

3.2 Symbols**3.2.1 Symbols used in equations**

A_C	cable loss between antenna and spectrum analyser
A_T	attenuator loss
E_L	field strength limit for the considered frequency
G	gain of the low-noise amplifier
G_A	gain of the transmitting antenna related to a half-wave dipole
k_A	antenna factor
P	radiated power of the network related to a half-wave dipole
P_{SG}	available output power of the signal generator
U_L	level corresponding to the permitted limit

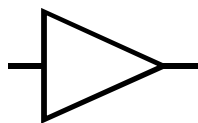
3.2.2 Symbols used in figures

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tuneable bandpass filter



pre-amplifier

3.3 Abbreviations

AM	Amplitude Modulation
CATV	Community Antenna Television (network)
DSC	Distress, Safety and Calling
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EPIRB	Emergency Position Indicating Radiobeacons
FM	Frequency Modulation
ILS	Instrument Landing System
ITU-R	International Telecommunication Union - Radiocommunication
MATV	Master Antenna Television (network)

RF	Radio Frequency
SMATV	Satellite Master Antenna Television (network)
TV	Television
VOR	VHF Omnidirectional Range
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 versions for details.

4 Methods of measurement

These methods of measurement describe the procedures for the testing of cable networks. The purpose of the measurements is to determine:

- the level of radiation generated by cable networks and
- the immunity of cable networks to external field strengths (e.g. those radiated by other radiocommunication services and RF applications).

The measurements cover the essential parameters and environmental conditions in order to assess:

- cases of electromagnetic incompatibility between cable networks and other electrical or electronic equipment, networks, installations or other cabled networks with respect to the intended operation of such cable networks.

During the test the cable network shall operate with normal signal levels at the subscriber outlets. If the stream is interactive, typical levels of the return path signals shall be maintained during the test.

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NOTE Methods of measurement for digitally modulated signals are under consideration.

4.1 Radiation from cable networks

The methods described hereafter are applicable to the measurement of radiation from cable networks (combination of cables, equipment and networks).

Testing of the cable networks for compliance with the relevant limits may be initially carried out with the terminal equipment connected. Where limits are exceeded, individual sections of the network (e.g. headend, satellite receiving outdoor unit, cable network, distribution installation beyond the system outlets and terminal equipment) may be tested in succession to determine beyond any doubt which section of the network does not comply with the limits.

The number of test frequencies shall be selected to give a realistic representation of the radiation pattern throughout the operating frequency range and to enable the maximum level of radiation to be recorded and the results interpreted accurately.

The field strength measurement procedure is used in order to achieve results which are sufficiently accurate and do not require excessive technical effort.

The substitution measurement technique is applied to carry out more accurate measurements of the radiated disturbance power level generated by any part of the network.

If discussions arise about the actual radiation from a cable network, the substitution method according to 4.1.2 has to be applied.