SLOVENSKI STANDARD
SIST EN 50083-2:2012

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Nadomešča:
SIST EN 50083-2:2006

Kabelska omrežja za televizijske signale, zvokovne signale in interaktivne storitve - 2. del: Elektromagnetna združljivost opreme

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

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

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 50083-2:2012

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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English version

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

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CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

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Foreword

This document (EN 50083-2:2012) has been prepared by CLC/TC 209 "Cable networks for television signals, sound signals and interactive services".

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)	2012-12-21
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2013-06-21

This document supersedes EN 50083-2:2006.

EN 50083-2:2012 includes the following significant technical changes with respect to EN 50083-2:2006:

1. .Frequency extensions

1.1. The upper frequency limit of conventional cable network equipment was extended from 862 MHz to 1 000 MHz due to market demands.

1.2. The first intermediate frequency range (1st IF range) for satellite signal transmission was extended to cover now frequencies from 950 MHz up to 3 500 MHz.

1.3. The methods of measurement and the EMC requirements in the overlapping frequency range from 950 MHz to 1 000 MHz were allocated in relation to the upper frequency limit, 1 000 MHz, respectively the lower frequency limit, 950 MHz, of the relevant equipment under test.

2. New EMC environment in the 800 MHz band

2.1. The European Commission has requested CENELEC and ETSI to draft immunity requirements for equipment, to protect against disturbance from the new wireless service in the 790-862 MHz band.

2.2. A CENELEC/ETSI Joint Working Group “Digital Dividend” was formed to describe the new EMC environment and to advise on appropriate test methods and limits.

2.3. EN 50083-2 is the standard specifying immunity requirements for active and passive cable network equipment.

2.4. The method of measurement and the requirements for in-band immunity were extended taking into account this new EMC environment due to the allocation of broadband wireless services in the frequency band 790 MHz to 862 MHz. As a consequence, the limits of in-band immunity were specified for analogue and additionally for digital signals in this frequency range.

2.5. Consequently it is recommended, that, where cable networks and wireless networks coexist, only the transmission of digitally modulated signals should be used in the frequency range 790 MHz to 862 MHz.

2.6. For passive equipment, Class A and Class B specifications were kept in the standard but a note was added recommending that only Class A equipment should be used in the planning and implementation of new networks.

3. Indoor antennas

The methods of measurement for all kinds of indoor antennas were combined in the new 4.9.

4. Bibliography

A Bibliography was added at the end of the document referencing i.a. to CEPT Report 30 on "*The identification of common and minimal (least restrictive) technical conditions for 790-862 MHz for the digital dividend in the European Union*".

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

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 Annex ZZ, which is an integral part of this document

1 Scope

1.1 General

Standards of the EN 50083 and EN 60728 series deal with cable networks including equipment and associated methods of measurement for headend reception, processing and distribution of television signals, 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.

This includes

- CATV-networks [1)],
- MATV-networks and SMATV-networks,
- individual receiving networks

and all kinds of equipment, systems and installations installed in such networks.

The extent of this standardisation work is from the antennas and/or special signal source inputs to the headend or other interface points to the network up to the terminal input.

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

1.2 Specific scope of EN 50083-2

This European Standard

- applies to the radiation characteristics and immunity to electromagnetic disturbance of EM-active equipment (active and passive equipment) for the reception, processing and distribution of television, sound and interactive multimedia signals as dealt with in the following parts of EN 50083 or EN 60728 series:
  - EN 60728-3 "Active wideband equipment for cable networks";
  - EN 60728-4 "Passive wideband equipment for coaxial cable networks";
  - EN 60728-5 "Headend equipment";
  - EN 60728-6 "Optical equipment";
- covers the following frequency ranges:

disturbance voltage injected into the mains	150 kHz to 30 MHz;	
radiation from active equipment	5 MHz to 25 GHz;	
immunity of active equipment	150 kHz to 25 GHz [2)];	
screening effectiveness of passive equipment	5 MHz to 3,5 GHz	(25 GHz) [3)];

1) 'CATV-networks' encompasses the HFC networks used nowadays to provide telecommunications services, voice, data, audio and video both broadcast and narrowcast.

2) For „Inband immunity of active equipment“ and „Out-of-band immunity of active equipment, no requirements apply at present for the frequency range 3,5 GHz to 25 GHz. Methods of measurement and limits are investigated for inclusion in a future amendment or revised edition.

3) For "Screening effectiveness of passive equipment", no requirements apply at present for the frequency range 3,5 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.

No measurement needs to be performed at frequencies where no requirement is specified.

Due to the fact that cable networks, the former cabled distribution systems for television and sound signals are more and more used for interactive services, these networks may incorporate also equipment that carry besides the cable network equipment ports also one or more telecom signal port(s). This equipment shall be named as "multimedia network equipment".

The EMC behaviour of cable network equipment, telecommunication network equipment and multimedia network equipment may be described by the following port structure (Table 1):

Table 1 - Port structure of different network equipment

Port name	Cable network equipment	Telecommunication network equipment	Multimedia network equipment
Enclosure	X	X	X
Earth	X	X	X
AC/DC power supply	X	X	X
Control (e.g. alarm)	X	X	X
Antenna input port	X		X
RF network port	X		X
Telecom signal port		X	X

Table 1 shows that cable network equipment and telecommunication network equipment have four common ports and, respectively, two and one individual ports. Multimedia network equipment carry besides the common ports an antenna input port and/or a RF network port as well as a telecom signal port.

The electromagnetic compatibility requirements for "telecommunication network equipment only" are standardised in ETSI EN 300 386 (mainly) and in ETSI EN 301 489-4, those for "cable network equipment only" are given in this EN 50083-2.

Equipment for multimedia networks of the above-mentioned type has to work under the same EMC conditions as equipment that is falling under the cable network and the telecommunication network EMC-standards. Due to the fact, that this equipment has to work in close proximity, e.g. in the same operating room, the EMC environmental conditions for all three types of equipment are the same.

This means that multimedia network equipment has to fulfil the EMC requirements of one of the above mentioned standards and in addition the EMC requirements, laid down in the other EMC standard, for the additional port, by which it is connected to the other network.

By this procedure it is ensured that multimedia network equipment fulfils the EMC conditions of one of the above mentioned networks and will neither disturb the respective other system nor will be disturbed by the respective other system via the connecting port.

Coaxial cables for cable networks do not fall under the scope of this standard; reference is made to EN 50117 series. Coaxial cable assemblies for radio and TV receivers (receiver leads) do not fall under the scope of this standard; reference is made to EN 60966 series. 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.

This European Standard also covers indoor receiving antennas for broadcast signals for which the requirements and the applicable methods of measurement are limited to the emission and the electrostatic discharge phenomena.

Standardisation in the field of "Electromagnetic compatibility" for any broadcast terminals (e.g. tuners, receivers, decoders, etc.) is covered by EN 55013 and EN 55020 and for multimedia terminals by EN 55022 and EN 55024.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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	Sound and television broadcast receivers and associated equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 13:2001+A1:2003+A2:2006)
+A1	2003	
+A2	2006	
+IS1	2009	
EN 55016-1-1	2010	Specification for radio disturbance and immunity measuring apparatus and methods – Part 1-1: Radio disturbance and immunity measuring apparatus – Measuring apparatus (CISPR 16-1-1:2010 + corrigendum 2011 + A1:2010)
+A1	2010	
EN 55020	2007	Sound and television broadcast receivers and associated equipment – Immunity characteristics – Limits and methods of measurement (CISPR 20:2006)
+IS1	2009	
+IS2	2010	
+A11	2011	
EN 60728-3	2011	Cable networks for television signals, sound signals and interactive services – Part 3: Active wideband equipment for cable networks (IEC 60728-3: 2010)
EN 61000-3-2	2006	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) (IEC 61000-3-2:2005 + A1:2008 + A2:2009)
+A1	2009	
+A2	2009	
EN 61000-4-2	2009	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test (IEC 61000-4-2:2008)
EN 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 +A1:2007 + A2:2010)
+A1	2008	
+A2	2010	
+IS1	2009	
EN 61000-4-4	2004	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test (IEC 61000-4-4:2004 + A1:2010)
+A1	2010	
EN 61000-4-6	2009	Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:2008)
EN 61000-6-1	2007	Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments (IEC 61000-6-1:2005)
EN 61079-1	1993	Methods of measurement on receivers for satellite broadcast transmissions in the 12 GHz band – Part 1: Radiofrequency measurements on outdoor units (IEC 61079-1:1992)

ETSI EN 300 386 V1.5.1	2010	Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements
IEC 60050-161	1990	International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility
+A1	1997	
+A2	1998	

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-161:1990 and the following apply.

Note 1 to entry: The most important definitions of IEC 60050-161:1990 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
AC power port
point at which a cable for the AC power supply is connected to the equipment

3.1.2
active equipment
equipment (e.g. amplifiers, converters, etc.), performing signal processing by means of external or internal power supply in a certain frequency range

3.1.3
antenna input port
point at which the equipment under test is directly connected to the receiving antenna(s)

3.1.4
band
nominal operating frequency range of the equipment

3.1.5
burst (of pulses or oscillations)
sequence of a limited number of distinct pulses or an oscillation of limited duration

[SOURCE: IEV 161-02-07]

3.1.6
cable network equipment
equipment from which cable networks for television signals, sound signals and interactive services are built

Note 1 to entry: Examples of typical cable network equipment could be found in EN 60728-3, EN 60728-4, EN 60728-5, EN 60728-6 and EN 60728-10.

3.1.7
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)

3.1.8
control port
point at which a cable for the control signal is connected to the equipment

3.1.9
DC power port
point at which a cable for the DC power supply is connected to the equipment

3.1.10
DOCSIS
Data-Over-Cable Service Interface Specification
standard defining interface specifications for cable modems and cable modem termination systems for high-speed data communication over cable networks

Note 1 to entry: DOCSIS contains a European technology option commonly known as EuroDOCSIS that accommodates the cable spectrum planning practices and channel plans mainly deployed in European cable networks.

3.1.11
electromagnetic-active equipment
passive and active equipment carrying RF signals that are considered as electromagnetic-active equipment because they are liable to cause electromagnetic disturbances or the performance of them is liable to be affected by such disturbances

3.1.12
electromagnetic disturbance
electromagnetic phenomenon which may degrade the performance of a device, equipment or system, or adversely affect living or inert matter

Note 1 to entry: An electromagnetic disturbance may be an electromagnetic noise, an unwanted signal or a change in the propagation medium itself.

Source: 702-08-04

[SOURCE: IEV 161-01-05]

3.1.13
electromagnetic interference
EMI
degradation of the performance of an equipment, transmission channel or system caused by an electromagnetic disturbance

Note 1 to entry: In French, the terms "perturbation électromagnétique" and "brouillage électromagnétique" designate respectively the cause and the effect, and should not be used indiscriminately.

Note 2 to entry: In English, the terms "electromagnetic disturbance" and "electromagnetic interference" designate respectively the cause and the effect, but they are often used indiscriminately.

Source: 702-08-29

[SOURCE: IEV 161-01-06]

3.1.14
electrostatic discharge
ESD
transfer of electric charge between bodies of different electrostatic potential in proximity or through direct contact

[SOURCE: IEV 161-01-22]

3.1.15
enclosure port
physical boundary of the equipment through which electromagnetic fields may be transmitted

3.1.16
equipment directly connected to receiving antennas
equipment of which the input terminal can have a connection to a receiving antenna at least via a cable

Note 1 to entry: That means that the input of the equipment is supplied with the original frequencies as they were received by the antenna.

3.1.17
external immunity
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 antennas

[SOURCE: IEV 161-03-07]

3.1.18
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 3,5 GHz or parts thereof

3.1.19
immunity (to a disturbance)
ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance

[SOURCE: IEV 161-01-20]

3.1.20
immunity level
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

[SOURCE: IEV 161-03-14]

3.1.21
immunity limit
specified minimum immunity level

[SOURCE: IEV 161-03-15]

3.1.22
immunity margin
ratio of the immunity limit to the electromagnetic compatibility level

[SOURCE: IEV 161-03-16]

3.1.23
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.)

3.1.24
individual receiving system
system designed to provide television and sound signals to an individual household

3.1.25
indoor signal lines
lines which do not leave the building and which are protected by other equipment against outdoor interference (e.g. connections from switching to transmission equipment in the same building)

3.1.26
internal immunity
ability of a device, equipment or system to perform without degradation in the presence of electromagnetic disturbances appearing at its normal input terminals or antennas

[SOURCE: IEV 161-03-06]

3.1.27
mains immunity
immunity from mains-borne disturbance

[SOURCE: IEV 161-03-03]

3.1.28
mains powered equipment
active equipment directly connected to the mains via a separate mains line and fed with the mains voltage

3.1.29
multimedia network equipment
equipment containing broadcast and telecommunication functions

3.1.30
operating frequency range
passband for the wanted signals for which the equipment has been designed

3.1.31
outdoor signal lines
lines leaving the building and being subjected to outdoor interference

3.1.32
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.)

3.1.33
passive equipment
equipment (e.g. splitters, tap-offs, system outlets, etc.) not requiring a power supply in order to operate and/or not carrying out signal processing in a certain frequency range

3.1.34
port
particular interface of the specific equipment with the external electromagnetic environment: