

Cable networks for television signals, sound signals and interactive services - Part 1-2: Performance requirements for signals delivered at the system outlet in operation

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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**Cable networks for television signals,
sound signals and interactive services -
Part 1-2: Performance requirements
for signals delivered at the system outlet in operation
(IEC 60728-1-2:2009)**

Réseaux de distribution par câbles
pour signaux de télévision,
signaux de radiodiffusion sonore
et services interactifs -
Partie 1-2: Exigences de performance
relatives aux signaux délivrés
à la prise terminale en fonctionnement
(CEI 60728-1-2:2009)

Kabelnetze für Fernsehsignale,
Tonsignale und interaktive Dienste -
Teil 1-2: Leistungsanforderungen
an Signale der Teilnehmeranschlussdose
im realen Betrieb
(IEC 60728-1-2:2009)

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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

The text of document 100/1531/FDIS, future edition 1 of IEC 60728-1-2, prepared by technical area 5: Cable networks for television signals, sound signals and interactive services, of IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60728-1-2 on 2009-07-01.

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) | 2010-04-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2012-07-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60728-1-2:2009 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60728-10	NOTE	Harmonized as EN 60728-10:2006 (not modified).
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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-705	- ¹⁾	International Electrotechnical Vocabulary (IEV) - Chapter 705: Radio wave propagation	-	-
IEC 60050-712	- ¹⁾	International Electrotechnical Vocabulary (IEV) - Chapter 712: Antennas	-	-
IEC 60050-725	- ¹⁾	International Electrotechnical Vocabulary (IEV) - Chapter 725: Space radiocommunications	-	-
IEC 60728-1	2007	Cable networks for television signals, sound signals and interactive services - Part 1: System performance of forward paths	EN 60728-1	2008
IEC 60728-1-1	- ²⁾	Cable networks for television signals, sound signals and interactive services - Part 1-1: RF cabling for two way home networks	EN 60728-1-1	- ²⁾
IEC 60728-3	- ¹⁾	Cable networks for television signals, sound signals and interactive services - Part 3: Active wideband equipment for coaxial cable networks	EN 60728-3	2006 ³⁾
IEC 60966-2-4	- ¹⁾	Radio frequency and coaxial cable assemblies - Part 2-4: Detail specification for cable assemblies for radio and TV receivers - Frequency range 0 MHz to 3 000 MHz, IEC 61169-2 connectors	EN 60966-2-4	2009 ³⁾
IEC 60966-2-5	- ¹⁾	Radio frequency and coaxial cable assemblies - Part 2-5: Detail specification for cable assemblies for radio and TV receivers - Frequency range 0 MHz to 1 000 MHz, IEC 61169-2 connectors	EN 60966-2-5	2009 ³⁾
IEC 60966-2-6	- ¹⁾	Radio frequency and coaxial cable assemblies - Part 2-6: Detail specification for cable assemblies for radio and TV receivers - Frequency range 0 MHz to 3 000 MHz, IEC 61169-24 connectors	EN 60966-2-6	2009 ³⁾

¹⁾ Undated reference.

²⁾ At draft stage.

³⁾ Valid edition at date of issue

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ITU-R Recommendation BT.500-7	- ¹⁾	Methodology for the subjective assessment of the quality of television pictures	-	-
ITU-R Recommendation B.654	- ¹⁾	Subjective quality of television pictures in relation to the main impairments of the analogue composite television signal	-	-
ITU-R Recommendation B.655	- ¹⁾	Radio-frequency protection ratios for AM vestigial sideband terrestrial television systems interfered with by unwanted analogue vision signals and their associated sound signals	-	-
ITU-T Recommendation J.61	- ¹⁾	Transmission performance of television circuits designed for use in international connections	-	-
ITU-T Recommendation J.63	- ¹⁾	Insertion of test signals in the field-blanking interval of monochrome and colour television signals	-	-
-	-	Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for 11/12 GHz satellite services	ETSI EN 300 421	- ¹⁾
-	-	Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems	ETSI EN 300 429	- ¹⁾
-	-	Digital Video Broadcasting (DVB); Satellite Master Antenna Television (SMATV) distribution systems	ETSI EN 300 473	- ¹⁾
-	-	Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television	ETSI EN 300 744	- ¹⁾
-	-	Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications	ETSI EN 302 307	- ¹⁾

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INTRODUCTION

Standards of the IEC 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

- CATV¹-networks,
- MATV-networks and SMATV-networks,
- individual receiving networks

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

The extent of this standardization 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 standardization 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.

The reception of television signals inside a building requires an outdoor antenna and a distribution network to convey the signal to the TV receivers.

This part of IEC 60728 deals with the requirements that must be fulfilled at the system outlet or terminal input, when the CATV/MATV/SMATV system is in operation.

These performance requirements for signals at the system outlet or terminal input in operation are derived from considerations of the characteristics of the received signals at the input of the headend (see Clause 6 of IEC 60728-1) and the summation of the impairments produced by the headend, the CATV/MATV/SMATV network and the home network, when the requirements given in IEC 60728-1 and IEC 60728-1-1 are fulfilled.

This document gives the guidelines for calculation of the operational characteristics at system outlet, taking into account the performance requirements of the CATV/MATV/SMATV network, of the home networks and of the received signals, given in the International Standards IEC 60728-1 and 60728-1-1 prepared by TA 5: Cable networks for television signals, sound signals and interactive services, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

¹ This word encompasses the Hybrid Fibre Coaxial (HFC) networks used nowadays to provide telecommunications services, voice, data, audio and video both broadcast and narrowcast.

CABLE NETWORKS FOR TELEVISION SIGNALS, SOUND SIGNALS AND INTERACTIVE SERVICES –

Part 1-2: Performance requirements for signals delivered at the system outlet in operation

1 Scope

This part of IEC 60728 provides the minimum performance requirements to be fulfilled in operation at the system outlet or terminal input and describes the summation criteria for the impairments present in the received signals and those produced by the CATV/MATV/SMATV cable network, including individual receiving systems.

NOTE 1 When a change of signal format is made at the headend, the summation of the impairments does not apply (see also Clause 7).

In a building divided into apartment blocks, the signals received by the antennas are distributed by the MATV/SMATV cable network up to the home network interface (HNI); the television signals are then distributed (inside the home) by home networks (HN) of various types up to the system outlet or terminal input. The cable network can support two way operation, from the system outlet (or terminal input) towards the headend.

The home network can use coaxial cables, balanced pair cables, fibre optic cables (glass or plastic) and also wireless links inside a room (or a small number of adjacent rooms) to replace wired cords.

This part of IEC 60728 is applicable to cable networks intended for television signals, sound signals and interactive services operating between about 5 MHz and 3 000 MHz. The frequency range is extended to 6 000 MHz for home distribution techniques that replace wired cords with a wireless two way communication inside a room (or a small number of adjacent rooms) that uses the 5 GHz to 6 GHz frequency band.

Figure 1 shows the main sections of a general CATV/MATV/SMATV system, indicating the parts of the IEC 60728-1 series documents where the relevant performance requirements are indicated.

- The requirements for the signals received at the headend are given in Clause 6 of IEC 60728-1.
- The requirements for the CATV/MATV/SMATV cable network, assuming an unimpaired input signal at the input of the headend, up to the system outlet are given in IEC 60728-1, Clause 5.
- The requirements for the CATV/MATV/SMATV cable network up to the home network interface (HNI) are given in IEC 60728-1, Clause 7, assuming an unimpaired input signal at the input of the headend.
- The specific requirements from HNI to the system outlet or terminal input are given in IEC 60728-1-1, Clause 5, assuming an unimpaired input signal at the HNI.
- The requirements at the system outlet in operation are given in Clause 7 of this standard.

The expression “in operation” means that the received signals, with their impairments, are applied to the headend input of the CATV/MATV/SMATV cable network. The requirements at the system outlet “in operation” are derived, therefore, by summing the impairments of the various cascaded parts of the system and of the input signal.

When a change of signal format from analogue to analogue (e.g. from FM to AM-VSB) or from digital to digital (e.g. from QPSK to QAM) or from digital to analogue (e.g. from DVB-S/S2 to AM-VSB or DVB-T to AM-VSB) is made at the headend, the summation of the impairments that produce a relaxation of requirements at system outlet does not apply. Such a case will be the equivalence of unimpaired signals applied at the headend input. Therefore the requirements at system outlet given in IEC 60728-1 apply.

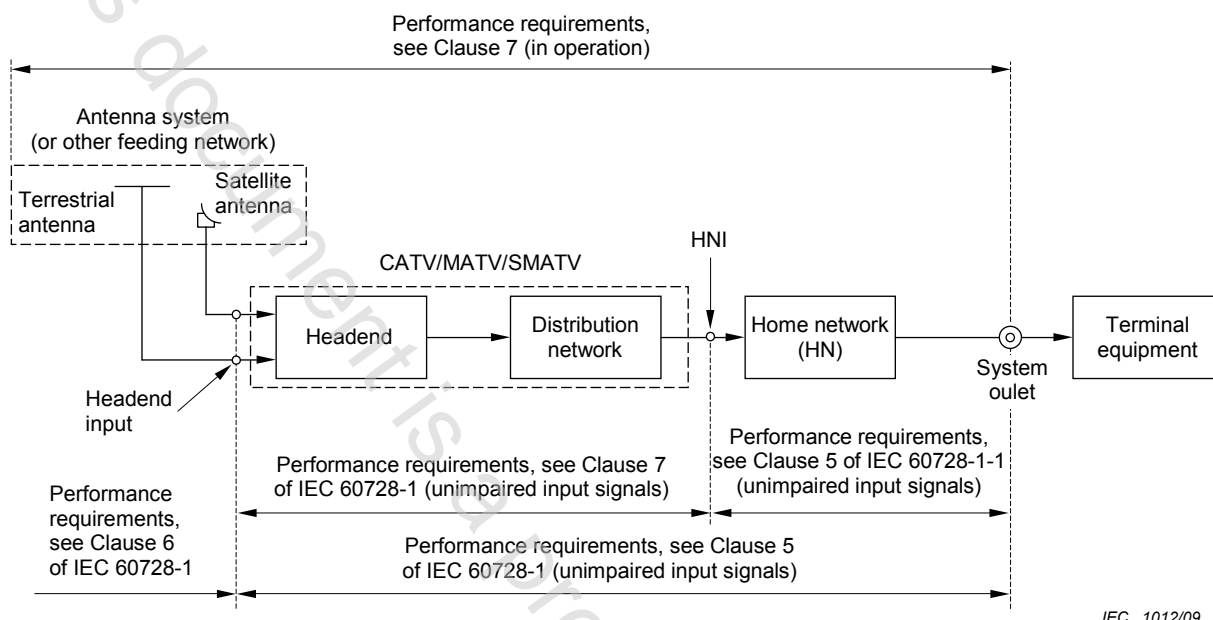


Diagram of the main sections of a CATV/MATV/SMATV cable network and the relevant parts of the IEC 60728-1 series where the requirements are indicated.

Figure 1 – CATV/MATV/SMATV cable network – Performance requirements

This standard also provides references for the basic methods of measurement of the operational characteristics of the downstream cable network in order to assess its performance.

All requirements refer to the performance limits to be achieved in operation at any system outlet when terminated in a resistance equal to the nominal load impedance of the system, unless otherwise specified. Where system outlets are not used, the above applies to the terminal input.

NOTE 2 If the home network is subdivided into a number of parts, using different transmission media (e.g. coaxial cabling, balanced cabling, optical cabling, wireless links) the accumulation of degradations should not exceed the figures given below.

NOTE 3 Performance requirements of return paths as well as special methods of measurement for the use of the return paths in cable networks are described in IEC 60728-10.

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.

IEC 60050-705, *International Electrotechnical Vocabulary (IEV) – Chapter 705: Radio wave propagation*

IEC 60050-712, *International Electrotechnical Vocabulary (IEV) – Chapter 712: Antennas*

IEC 60050-725, *International Electrotechnical Vocabulary (IEV) – Chapter 725: Space radiocommunications*

IEC 60728-1:2007, *Cable networks for television signals, sound signals and interactive services – Part 1: System performance of forward paths*

IEC 60728-1-1, – *Cable networks for television signals, sound signals and interactive services – Part 1-1: RF cabling for two way home networks (to be published)*

IEC 60728-3, *Cable networks for television signals sound signals and interactive services – Part 3: Active wideband equipment for coaxial cable networks*

IEC 60966-2-4, *Radio frequency and coaxial cable assemblies – Part 2-4: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 MHz to 3 000 MHz, IEC 61169-2 connectors*

IEC 60966-2-5, *Radio frequency and coaxial cable assemblies – Part 2-5: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 MHz to 1 000 MHz, IEC 61169-2 connectors*

IEC 60966-2-6, *Radio frequency and coaxial cable assemblies – Part 2-6: Detail specification for cable assemblies for radio and TV receivers – Frequency range 0 MHz to 3 000 MHz, IEC 61169-24 connectors*

ITU-R Recommendation BT.500-7, *Methodology for the subjective assessment of the quality of television pictures*

ITU-R Recommendation BT.654, *Subjective quality of television pictures in relation to the main impairments of the analogue composite television signal*

ITU-R Recommendation BT.655, *Radio-frequency protection ratios for AM vestigial sideband terrestrial television systems interfered with by unwanted analogue vision signals and their associated sound signals*

ITU-T Recommendation J.61, *Transmission performance of television circuits designed for use in international connections*

ITU-T Recommendation J.63, *Insertion of test signals in the field-blanking interval of monochrome and colour television signals*

ETSI EN 300 421, *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for 11/12 GHz satellite services*

ETSI EN 300 429, *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for cable systems*

ETSI EN 300 473, *Digital Video Broadcasting (DVB); Satellite Master Antenna Television (SMATV) distribution systems*

ETSI EN 300 744, *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television*