ICS 33.040.20, 33.160.01 SLOVENSKÁ TECHNICKÁ NORMA Október 2023

STN	**Káblové siete pre televízne signály, rozhlasové signály a interaktívne služby Časť 101-2: Požadované parametre pre signály dodávané na výstupe systému v prevádzke so zaťažením všetkých digitálnych signálov**	**STN EN IEC 60728-101-2** 36 7211

Cable networks for television signals, sound signals and interactive services - Part 101-2: Performance requirements for signals delivered at the system outlet in operation with all-digital channels load

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/23

Obsahuje: EN IEC 60728-101-2:2023, IEC 60728-101-2:2023

137474

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60728-101-2

July 2023

ICS 33.040.20; 33.160.01

English Version

Cable networks for television signals, sound signals and interactive services - Part 101-2: Performance requirements for signals delivered at the system outlet in operation with all-digital channels load (IEC 60728-101-2:2023)

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs - Partie 101-2: Exigences de performance relatives aux signaux délivrés à la prise d'abonné en fonctionnement sous une charge de porteuses exclusivement numériques (IEC 60728-101-2:2023)

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste - Teil 101-2: Anforderungen für Signale an der Teilnehmeranschlussdose im Betrieb mit rein digitaler Kanallast (IEC 60728-101-2:2023)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 100/3903/FDIS, future edition 1 of IEC 60728-101-2, prepared by IEC/TC 100 "Audio, video and multimedia systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60728-101-2:2023.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2024-04-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2026-07-12

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

This document is read in conjunction with EN 60728-101:2017.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60728-101-2:2023 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60728-1-2 NOTE Approved as EN 60728-1-2

IEC 60728-10 NOTE Approved as EN 60728-10

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60728-101	2016	Cable networks for television signals, sound signals and interactive services - Part 101: System performance of forward paths loaded with digital channels only	EN 60728-101	2017
-	-		AC	2017-07
IEC 60728-101-1	2023	Cable networks for television signals, sound signals and interactive services - Part 101-1: RF cabling for two-way home networks with all-digital channels load	EN IEC 60728-101-1	2023
IEC 60728-3	2017	Cable networks for television signals, sound signals and interactive services - Part 3: Active wideband equipment for cable networks	EN IEC 60728-3	2018
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	EN 60966-2-4	-
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	EN 60966-2-5	-
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	EN 60966-2-6	-

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Cable networks for television signals, sound signals and interactive services – Part 101-2: Performance requirements for signals delivered at the system outlet in operation with all-digital channels load

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs – Partie 101-2: Exigences de performance relatives aux signaux délivrés à la prise d'abonné en fonctionnement sous une charge de porteuses exclusivement numériques

IEC 60728-101-2:2023-06(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 101-2: Performance requirements for signals delivered at the system outlet in operation with all-digital channels load

FOREWORD

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IEC 60728-101-2 has been prepared by technical area 5: Cable networks for television signals, sound signals and interactive services, of IEC technical committee 100: Audio, video and multimedia systems and equipment. It is an International Standard.

This International Standard is to be used in conjunction with IEC 60728-101:2016.

The text of this International Standard is based on the following documents:

Draft	Report on voting
100/3903/FDIS	100/3944/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 60728 series, under the general title *Cable networks for television signals, sound signals and interactive services*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

Standards and deliverables of the IEC 60728 series deal with cable networks including equipment and associated methods of measurement for headend reception, processing and distribution of television and sound signals and for processing, interfacing and transmitting all kinds of data signals for interactive services using all applicable transmission media. These signals are typically transmitted in networks by frequency-multiplexing techniques.

This includes for instance

- regional and local broadband cable networks,
- extended satellite and terrestrial television distribution systems,
- individual satellite and terrestrial television receiving systems,

and all kinds of equipment, systems and installations used in such cable networks, distribution and receiving systems.

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 of the customer premises equipment.

The standardization work will consider coexistence with users of the RF spectrum in wired and wireless transmission systems.

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 are to 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 IEC 60728-101:2016, Clause 6) 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 60728-101 and IEC 60728-101-1 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 IEC 60728-101 and IEC 60728-101-1.

This document considers digital signals only and is based on IEC 60728-101 dealing with system performance of forward paths loaded with digital channels only. For performance requirements for analogue signals delivered at the system outlet in operation, refer to IEC 60728-1-2.

Although the upper frequency range of terrestrial broadcast signals depends on the allocation frequency plan of each region (e.g. in Europe it is 694 MHz, the 700 MHz and 800 MHz bands being assigned to telecommunication services), the upper frequency range into the cable networks can be maintained at 862 MHz in order to maximise the number of channels distributed in the cable networks, assuming that sufficient immunity (screening efficiency) to signals radiated in the 700 MHz and 800 MHz bands is provided.

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

Part 101-2: Performance requirements for signals delivered at the system outlet in operation with all-digital channels load

1 Scope

This part of IEC 60728-101 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 6).

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 limited to downstream TV broadcast signals received from antennas and is applicable to cable networks intended for television signals, sound signals and interactive services operating between about 5 MHz and 3 300 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 60728-101 series documents where the relevant performance requirements are indicated.

- The requirements for the signals received at the headend are given in IEC 60728-101:2016, Clause 6.
- 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 60728-101:2016, Clause 5.
- The requirements for the CATV/MATV/SMATV cable network up to the home network interface (HNI) are given in IEC 60728-101:2016, 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 60728-101-1:2023, Clause 5, assuming an unimpaired input signal at the HNI.
- The requirements at the system outlet in operation are given in Clause 6 of this document.

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 digital to digital (e.g. from QPSK to QAM) (e.g. as in ETSI EN 300 473) or from digital to analogue (e.g. from DVB-S/S2 to AM-VSB or DVB-T/T2 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.

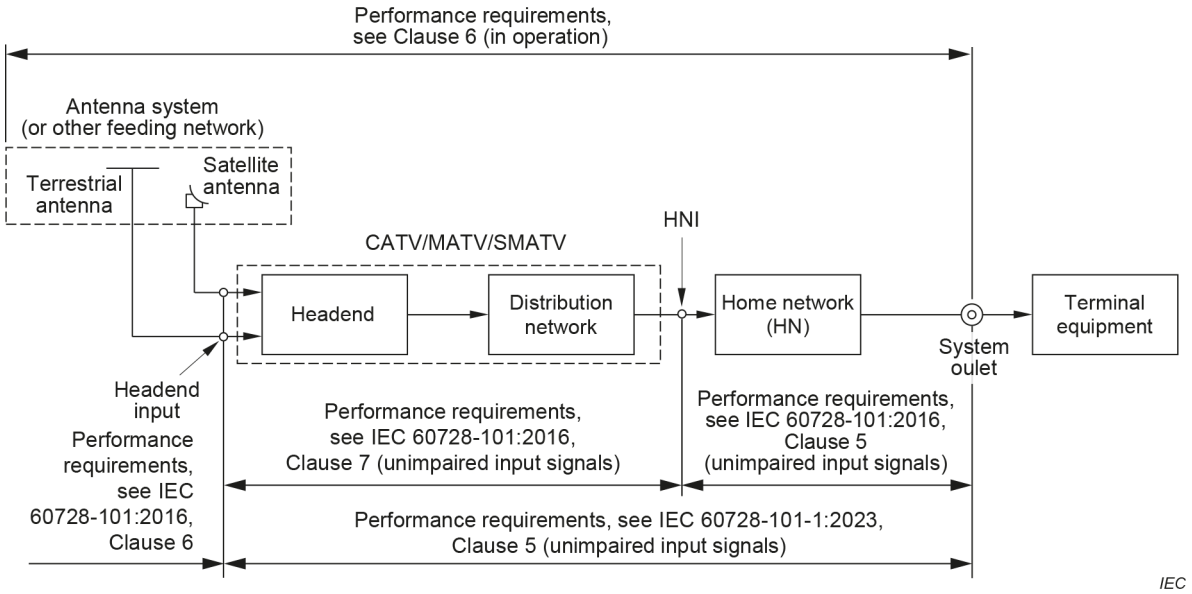

Diagram of the main sections of a CATV/MATV/SMATV cable network and the relevant parts of the IEC 60728-101 series where the requirements are indicated.

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

This document 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.

The present document also provides limits for the accumulation of degradations 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).

NOTE 2 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 documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60728-101:2016, *Cable networks for television signals, sound signals and interactive services – Part 101: System performance of forward paths loaded with digital channels only*

IEC 60728-101-1:2023, *Cable networks for television signals, sound signals and interactive services – Part 101-1: RF cabling for two-way home networks with all-digital channels load*

IEC 60728-3:2017, *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*