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INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

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

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs – Partie 101-1: Câblage RF pour réseaux domestiques bidirectionnels soumis à une charge de porteuses exclusivement numériques



IEC 60728-101-1:2023-06(en-fr)



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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

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

The text of this standard is based on the following documents:

Draft	Report on voting
100/3904/FDIS	100/3945/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 reader's attention is drawn to the fact that Annex F lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

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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 the IEC 60728 deals with the requirements and implementation guidelines for a home network that can be realised with different techniques. The following types of home networks (HN) are possible:

- passive coaxial home network;
- active coaxial home network;
- different home network types (cases A to D shown in Figure 1).

Figure 1 shows typical situations that are possible when considering RF home networks.

The RF home network can be realised using coaxial cables, balanced cables, optical cables or radio links.

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 RF cable systems loaded with analogue and digital signals, refer to IEC 60728-1-1 ED2.

Figure 4 to Figure 9 have been amended to take into account the level requirement for digital signals only.

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 to be distributed in the cable networks, assuming that sufficient immunity (screening efficiency) to signals radiated in the 700 MHz and 800 MHz bands is provided.

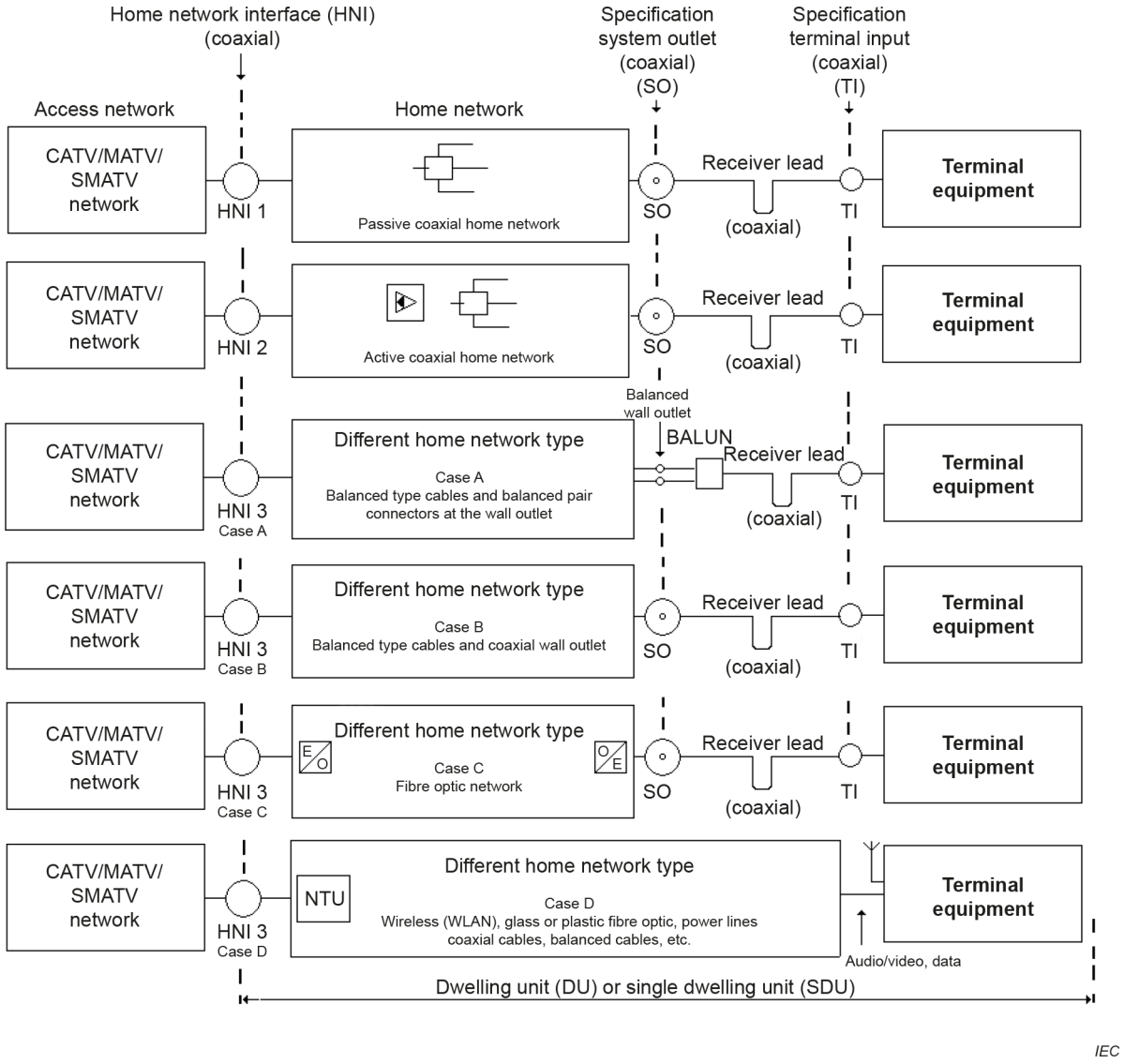


Figure 1 – Examples of RF home network types

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

1 Scope

This part of IEC 60728-101 provides the requirements and describes the implementation guidelines of RF cabling for two-way home networks; it is applicable to any home network that distributes signals provided by CATV/MATV/SMATV cable networks (including individual receiving systems) having a coaxial cable output. It is also applicable to home networks where some part of the distribution network uses wireless links, for example in place of the receiver cord.

This part of IEC 60728 is therefore applicable to RF cabling for two-way home networks with wired cords or wireless links inside a room and primarily intended for television and sound signals operating between about 5 MHz and 3 300 MHz. The frequency range is extended to 6 000 MHz for 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 band.

In a building divided into apartment blocks, the distribution of the signals inside the home starts from the home network interface (HNI) up to the system outlet or terminal input. The requirements at the system outlet are given in IEC 60728-101:2016, Clause 5 and the requirements at the HNI are given in IEC 60728-101:2016, Clause 7. In Clause 5 of this document, additional requirements are given.

This document deals with various possibilities to distribute signals in a home network, using 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 document gives references to basic methods of measurement of the operational characteristics of the home cable network in order to assess its performance.

All requirements refer to the performance limits, which are obtained between the input(s) at the home network interface (HNI) and the output 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 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.

Clause 5 defines the performance limits measured at system outlet or terminal input for an unimpaired (ideal) test signal applied at the HNI. Under normal operating conditions for any digital channel and meeting these limits, the cumulative effect of the impairment of any single parameter at the HNI and that due to the home network produces signals not worse than the requirements given in IEC 60728-101-2. For digitally modulated signals, the quality requirement is a QEF (quasi error-free) reception.

This document describes the physical layer connection for home networks. Description of protocols required for layer 2 and higher layers is out of the scope of this document. Logical connections between devices within the home network are therefore not always guaranteed.

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 60728-1:2014, *Cable networks for television signals, sound signals and interactive services – Part 1: System performance of forward paths*

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 60728-3:2017, *Cable networks for television signals sound signals and interactive services – Part 3: Active wideband equipment for coaxial cable networks*

IEC 60728-10, *Cable networks for television signals, sound signals and interactive services – Part 10: System performance of return paths*

IEC 60966 (all parts), *Radio frequency and coaxial cable assemblies*

ISO/IEC/IEEE 8802-11, *Information technology – Telecommunications and exchange between information technology systems – Requirements for local and metropolitan area networks – Part 11: Wireless LAN medium access control (MAC) and physical layer (PHY) specifications*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1.1
active home network
home network that uses active equipment (for example, amplifiers) in addition to passive equipment like splitters, taps, system outlets, cables and connectors up to the coaxial RF interface (input and/or output) of the terminal equipment for distributing and combining RF signals

[SOURCE: IEC 60728-1:2014, 3.1.2]