

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Réseaux de distribution par câbles pour signaux de télévision, signaux de
radiodiffusion sonore et services interactifs –
Partie 1: Performance des systèmes de voie directe**





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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CABLE NETWORKS FOR TELEVISION SIGNALS,
SOUND SIGNALS AND INTERACTIVE SERVICES –****Part 1: System performance of forward paths**

FOREWORD

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International Standard IEC 60728-1 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.

This fifth edition cancels and replaces the fourth edition published in 2007 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- redrafting of measurement procedure to include DVB-T2 signals;
- updating of performance requirements in Clause 5 to include those for DVB-T2 signals;
- updating of performance requirements in Clause 6 to include those for DVB-T2 signals;
- updating of performance requirements in Clause 7 to include those for DVB-T2 signals;

- reference to IEC 60728-1-1 for home networks;
- reference to IEC 60728-1-2 for performance requirements at system outlet in operation.

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

FDIS	Report on voting
100/2269/FDIS	100/2335/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The list of all the 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.

For the differences in some countries, see Annex K.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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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.

IEC 60728-1 includes the following clauses.

Clause 5 defines the system performance limits which will, with an unimpaired input, (headend input signal), produce picture and sound signals (at system outlets) where the impairment to any single parameter will not be worse, in normal operating conditions for any analogue channel, than grade four on the five-grade impairment scale contained in ITU- R Recommendation BT.500-10. For digitally modulated signals, the quality requirement is a quasi-error-free (QEF) reception.

Appropriate performance requirements for the signals at the receiving antennas site are given in Clause 6 in order to provide at the input of the headend of the cable network both analogue and digital television signals with suitable quality.

Clause 7 is applicable to home networks (including those of individual receiving systems) using coaxial cables, balanced cables or optical cables and primarily intended for television signals, sound signals and interactive services, operating between about 30 MHz and 3 000 MHz.

This clause (Clause 7), considering the basic operational characteristics of a home network, specifies the requirements with respect to the home network interface (HNI) taking into account the performance requirements given at the system outlet or at the terminal input.

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

Part 1: System performance of forward paths

1 Scope

This part of IEC 60728 is applicable to any cable network (including individual receiving systems) having in the forward path a coaxial cable output and primarily intended for television and sound signals operating between about 30 MHz and 3 000 MHz.

This part of IEC 60728 specifies the basic methods of measurement of the operational characteristics of cable network having coaxial cable outputs in order to assess the performance of these systems and their performance limits.

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.

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

[IEC 60728-1:2014](https://standards.iteh.ai/catalog/standards/sist/09c49128-aa36-4a2f-a31b-1e4e4e4e4e4e/iec-60050-705-2014)

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IEC 60050-712:1992, *International Electrotechnical Vocabulary – Chapter 712: Antennas*

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

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

IEC 60728-1-2, *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 60728-2, *Cable networks for television signals, sound signals and interactive services – Part 2: Electromagnetic compatibility for equipment*

IEC 60728-3:2010, *Cable networks for television signals, sound signals and interactive services – Part 3: Active wideband equipment for cable networks*

IEC 60728-5, *Cable networks for television signals, sound signals and interactive services – Part 5: Headend equipment*

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

IEC 60728-11, *Cable networks for television signals, sound signals and interactive services – Part 11: Safety*

IEC 60728-12, *Cabled distribution systems for television and sound signals – Part 12: Electromagnetic compatibility of systems*

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*

ISO/IEC 13818-1:2007, *Information technology – Generic coding of moving pictures and associated audio information: Systems*

ISO/IEC 13818-4, *Information technology – Generic coding of moving pictures and associated audio information – Part 4: Conformance testing*

ISO/IEC 14496-1, *Information technology – Coding of audio-visual objects – Part 1: Systems*

ITU-R Recommendation BS.412-9, *Planning standards for terrestrial FM sound broadcasting at VHF*

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ITU-R Recommendation BT.417-4, *Minimum field strengths for which protection may be sought in planning an analogue terrestrial television service*

<https://standards.iteh.ai/catalog/standards/sist/09c49128-aa36-4a2f-a31b->

ITU-R Recommendation BT.470-7, *Conventional analogue television systems*

ITU-R Recommendation BT.500-11, *Methodology for the subjective assessment of the quality of television pictures*

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

EN 50248, *Characteristics of DAB receivers*

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 300 468, *Digital Video Broadcasting (DVB) – Specification for Service Information (SI) in DVB 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*

ETSI EN 302 307/V1.3.1:2012, *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 ETS 300 784, *Satellite Earth Stations and Systems (SES) – TeleVision Receive-Only (TVRO) satellite earth stations operating in the 11/12 GHz frequency bands*

ETSI TR 101 211, *Digital Video Broadcasting (DVB) – Guidelines on implementation and usage of Service Information (SI)*

ETSI TS 102 831/V1.2.1:2012, *Digital Video Broadcasting (DVB) – Implementation guidelines for a second generation digital terrestrial television broadcasting system (DVB-T2)*

3 Terms, definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-705, IEC 60050-712 and IEC 60050-725, as well as the following apply.

NOTE The most important definitions are repeated below.

3.1.1

active antenna

antenna incorporating active devices

[SOURCE: IEC 60050-712:1992, 712-03-29]

<https://standards.iteh.ai/catalog/standards/sist/09c49128-aa36-4a2f-a31b-914dfd1b9105/iec-60728-1-2014>

3.1.2

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

3.1.3

antenna

part of a radio transmitting or receiving system which is designed to provide the required coupling between a transmitter or a receiver and the medium in which the radio wave propagates

Note 1 to entry: In practice, the terminals of the antenna or the points to be considered as the interface between the antenna and the transmitter or receiver should be specified.

Note 2 to entry: If the transmitter or receiver is connected to its antenna by a feeder line, the antenna may be considered to be a transducer between the guided radio waves of the feeder line and the radiated waves in space.

[SOURCE: IEC 60050-712:1992, 712-01-01, modified – The term feeder line instead of feed line has been used.]

3.1.4

antenna amplifier

amplifier (often a low-noise type) associated with an antenna

3.1.5

attenuation

ratio of the input power to the output power of an equipment or system

Note 1 to entry: The ratio is expressed in decibels.