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Cable networks for television signals, sound signals and interactive services - Part 103: Active wideband equipment for cable networks with digital signals only

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Cable networks for television signals, sound signals and interactive services - Part 103: Active wideband equipment for cable networks with digital signals only

FOREWORD

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IEC 60728-103 has been prepared by IEC technical committee 100: Audio, video and multimedia systems and equipment. It is an International Standard.

IEC 60728-3:2017, fifth edition, has served as a basis for the development of this document.

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

Draft	Report on voting
100/4567/FDIS	100/4617/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.

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

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.

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– withdrawn, or
– revised.

INTRODUCTION

International Standards and other 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 considers coexistence with users of the radio frequency (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.

1 Scope

This part of IEC 60728 specifies the measuring methods, performance requirements and data publication requirements for active wideband equipment of cable networks for television signals, sound signals and interactive services with digital signals only.

This document:

– applies to all amplifiers used in cable networks;
– covers the frequency range 5 MHz to 3 000 MHz;

NOTE The upper limit of 3 000 MHz is an example, but not a strict value.

– applies to one-way and two-way equipment;
– specifies the basic methods of measurement of the operational characteristics of the active equipment in order to assess the performance of this equipment;
– identifies the performance specifications to be published by the manufacturers;
– states the minimum performance requirements of certain parameters.

While IEC 60728-3:2017 has served as a basis for its development, this document describes the methods of measurement for digital modulated signals only. It also covers the Data Over Cable Service Interface Specification (DOCSIS) 4.0 requirements with additional digital modulation schemes as well as for the extended frequency ranges:

– up to 1 794 MHz for the forward path;
– up to 684 MHz for the return path.

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 60068-1, *Environmental testing - Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing - Part 2-1: Tests - Tests A: Cold*

IEC 60068-2-2, *Environmental testing - Part 2-2: Tests - Tests B: Dry heat*

IEC 60068-2-6, *Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14, *Environmental testing - Part 2-14: Tests - Test N: Change of temperature*

IEC 60068-2-27, *Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock*

IEC 60068-2-30, *Environmental testing - Part 2-30: Tests - Test dB: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-31, *Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

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

IEC 60728-4, *Cable networks for television signals, sound signals and interactive services - Part 4: Passive wideband equipment for coaxial cable networks*

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

IEC 61000-4-5, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test*

IEC 61319-1, *Interconnections of satellite receiving equipment - Part 1: Europe*

IEC 61319-2, *Interconnections of satellite receiving equipment - Part 2: Japan*

IEC 62368-1, *Audio/video, information and communication technology equipment - Part 1: Safety requirements*

3 Terms, definitions, symbols and abbreviated terms

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

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

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

3.1 Terms and definitions

3.1.1
amplitude frequency response
gain or loss of equipment or system plotted against frequency

3.1.2
attenuation
ratio of the input power to the output power of equipment or system, usually expressed in decibels

3.1.3
carrier-to-noise ratio
difference in decibels between the vision or sound carrier level at a given point in equipment or system and the noise level at that point (measured within a bandwidth appropriate to the television or radio system in use)

3.1.4
CIN
composite intermodulation noise
sum of noise and intermodulation products from digital modulated signals

3.1.5
CINR
composite intermodulation and noise ratio
ratio of the signal level and the CIN level