ICS 33.060.40 SLOVENSKÁ TECHNICKÁ NORMA Október 2016

STN	**Káblové siete pre televízne signály, rozhlasové signály a interaktívne služby. Časť 5: Zariadenia hlavnej stanice.**	**STN EN 60728-5** 36 7211

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

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. 09/16

Obsahuje: EN 60728-5:2016, IEC 60728-5:2015

Oznámením tejto normy sa od 22.04.2019 ruší
STN EN 60728-5 (36 7211) z januára 2009

123440

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60728-5

April 2016

ICS 33.060.40

Supersedes EN 60728-5:2008

English Version

Cable networks for television signals, sound signals and interactive services - Part 5: Headend equipment (IEC 60728-5:2015)

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs - Partie 5: Équipements de tête de réseau (IEC 60728-5:2015)

Kabelnetze für Fernsehsignale, Tonsignale und interaktive Dienste - Teil 5: Geräte für Kopfstellen (IEC 60728-5:2015)

This European Standard was approved by CENELEC on 2016-01-13. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 60728-5:2016

European foreword

The text of document 100/2555/FDIS, future edition 3 of IEC 60728-5, 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 approved by CENELEC as EN 60728-5:2016.

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)	2016-10-22
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2019-04-22

This document supersedes EN 60728-5:2008.

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

Endorsement notice

The text of the International Standard IEC 60728-5:2015 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 standards indicated:

IEC 60050 (series)	NOTE	Harmonized as EN 60050 (series).
IEC 60130-9	NOTE	Harmonized as EN 60130-9.
IEC 61169-2:2001	NOTE	Harmonized as EN 61169-2:2001.
IEC 61169-8	NOTE	Harmonized as EN 61169-8.

Annex ZA
(normative)
Normative references to international publications with their corresponding European publications

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.

NOTE 1 When 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.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60068-2-1	-	Environmental testing -- Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing -- Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-14	-	Environmental testing -- Part 2-14: Tests - Test N: Change of temperature	EN 60068-2-14	-
IEC 60068-2-27	-	Environmental testing -- Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-30	-	Environmental testing -- Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	-
IEC 60068-2-31	-	Environmental testing -- Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	-
IEC 60068-2-40	-	Basic environmental testing procedures - Part 2: Tests. Test Z/AM: Combined cold/low air pressure tests	EN 60068-2-40	-
IEC 60244-5	-	Methods of measurement for radio transmitters -- Part 5: Performance characteristics for television transmitters	EN 60244-5	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	-
IEC 60728-1	-	Cable networks for television signals, sound signals and interactive services -- Part 1: System performance of forward paths	EN 60728-1	-
IEC 60728-2	-	Cable networks for television signals, sound signals and interactive services - Part 2: Electromagnetic compatibility for equipment	EN 50083-2	-
IEC 60728-3	2010	Cable networks for television signals, sound signals and interactive services -- Part 3: Active wideband equipment for cable networks	EN 60728-3	2011
IEC 60728-11	-	Cable networks for television signals, sound signals and interactive services -- Part 11: Safety	EN 60728-11	-
IEC 61319-1	-	Interconnections of satellite receiving equipment -- Part 1: Europe	EN 61319-1	-
ISO/IEC 13818-1	-	Information technology - Generic coding of moving pictures and associated audio information - Part 1: Systems	-	-
ISO/IEC 13818-2	-	Information technology - Generic coding of moving pictures and associated audio information - Part 2: Video	-	-

ISO/IEC 13818-3	-	Information technology - Generic coding of moving pictures and associated audio information - Part 3: Audio	-	-
ISO/IEC 13818-4	-	Information technology - Generic coding of moving pictures and associated audio information - Part 4: Conformance testing	-	-
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	-	Digital Video Broadcasting (DVB);Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2)	-	-
ETSI EN 302 755	-	Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)	-	-
ETSI ETS 300 163	-	Television systems; NICAM 728: transmission of two-channel digital sound with terrestrial television systems B, G, H, I, K1 and L	-	-
ETSI TR 101 211	-	Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)	-	-
ITU-R Recommendation BS 468-4	-	Measurement of audio-frequency noise voltage level in sound broadcasting (Vol. X-1)	-	-
ITU-R Report 624-4	-	Characteristics of television systems	-	-
ITU-T Recommendation J.61	-	Transmission performance of television circuits designed for use in international connections	-	-
ITU-T Recommendation J.101	-	Measurement methods and test procedures for teletext signals	-	-

Annex ZB
(normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.

NOTE If it affects harmonization, it forms part of the European Standard / Harmonization Document.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

Clause	Special national condition
5.3	**Finland, Sweden**
	All equipment installed in locations that are not temperature controlled shall meet the requirements within the temperature range -40 °C to +55 °C.

IEC 60728-5

Edition 3.0 2015-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Réseaux de distribution par câbles pour signaux de télévision, signaux de radiodiffusion sonore et services interactifs – Partie 5: Équipements de tête de réseau

IEC 60728-5:2015-12(en-fr)

IEC 60728-5

Edition 3.0 2015-12

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CONTENTS

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

Part 5: Headend equipment

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60728-5 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 third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

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

- new text for the introduction, following the scope of IEC TC 100/TA 5;
- introduction of IPTV to the scope;
- headend specification for digital terrestrial TV signals according to the DVB-T2 standard;

- headend specification for digital TV signals in cable networks according to the DVB-S2 standard.

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

FDIS	Report on voting
100/2555/FDIS	100/2602/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 special national conditions existing in some countries, see Annex D.

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

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

INTRODUCTION

The IEC 60728 series deals 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 networks or systems,
- individual satellite and terrestrial television receiving networks or 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.

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

Part 5: Headend equipment

1 Scope

This part of IEC 60728 specifies the characteristics of equipment used in the headends of terrestrial broadcast and satellite receiving systems (without satellite outdoor units and without those broadband amplifiers in the headend as described in IEC 60728-3). The satellite outdoor units for fixed satellite systems (FSS) are described in ETSI ETS 300 158, and for broadcast satellite systems (BSS) in ETSI ETS 300 249. Test methods for both types (FSS and BSS) of satellite outdoor units are laid down in ETSI ETS 300 457.

This part of IEC 60728

a) covers the frequency range 5 MHz to 3 000 MHz;

b) identifies performance requirements for certain parameters;

c) lays down data publication requirements for certain parameters;

d) stipulates methods of measurements;

e) introduces minimum requirements defining quality grades (Q-grades).

This part of IEC 60728 specifies the overall characteristics for upstream/downstream signals between external sources/sinks (for example, antennas, cable modem termination systems, etc.) and the system interface to the cable network. In the case of modular headend systems, single equipment items such as modulators, converters, etc. are also described. Cable modem termination systems, encrypters, decrypters, etc. are not described in this part of IEC 60728. If such equipment is used in headends, the relevant parameters for RF, video, audio and data interfaces should be met.

According to the definitions in 3.1, the headends are divided into the following three quality grades:

- Grade 1: central headend;
- Grade 2: hub headend or hubsite;
- Grade 3: MATV headend/individual reception headend.

Figure 1 shows the block diagram of a headend consisting of typical processing units with the corresponding interfaces at the input and output.

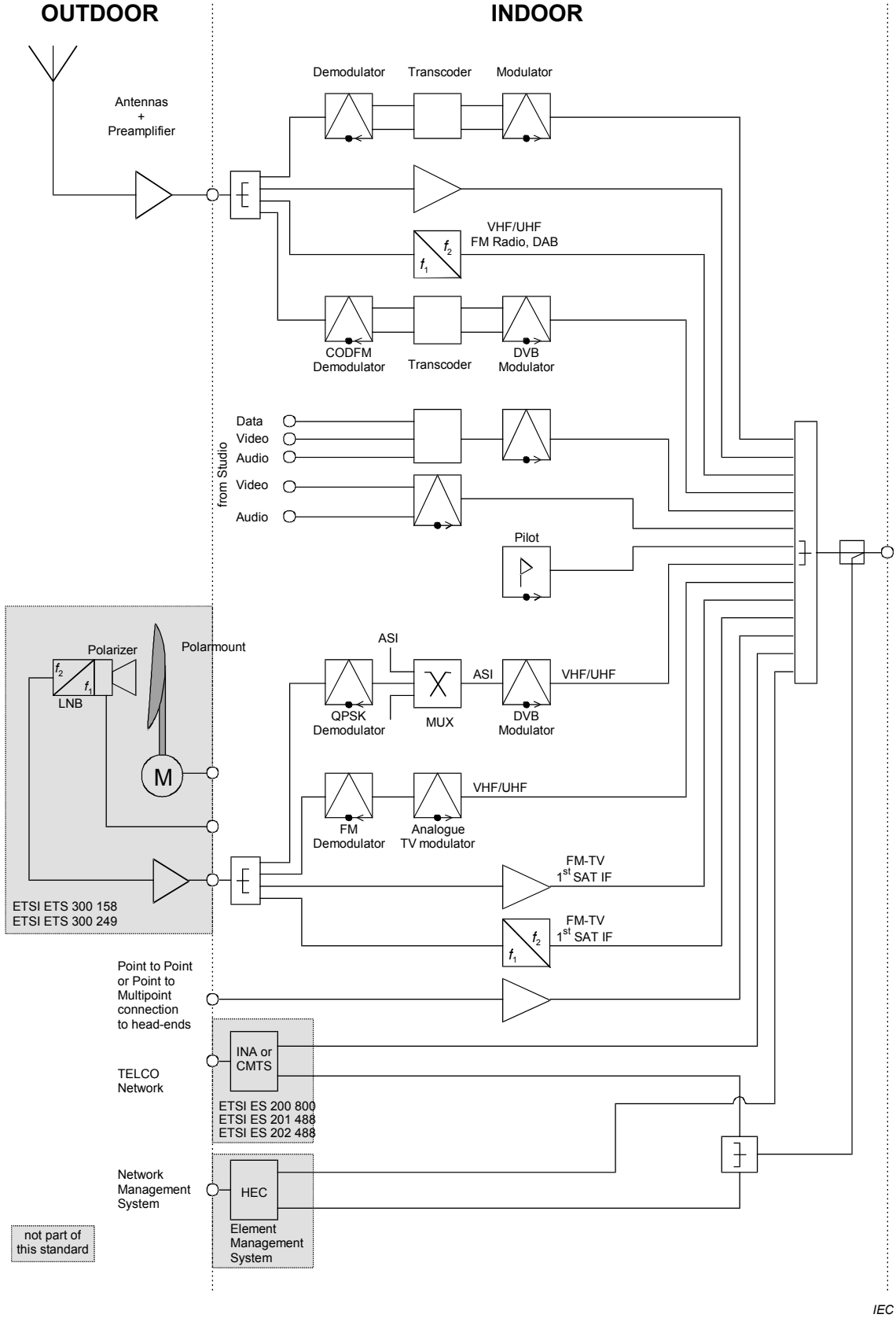

Figure 1 – Example of headend

For IP interfaces, specifications from the transmission standard ETSI TS 102 034 are taken into account where applicable. The content of the data streams can be digital video, audio or other digital data.

The necessary characteristics and parameters of equipment such as IP gateways or IP interfaces on equipment at the input of headends (Figure 2) as well as at the output of headends (Figure 3) are described in CLC/TR 50083-5-1.

Equipment at the input of headends can be either IP gateways which enable the connection to a Digital Video Broadcasting-Asynchronous Serial Interface (DVB-ASI) headend infrastructure according to EN 50083-9 or, in the case of modular headend systems, can also be single equipment with IP interfaces such as DVB modulators, transcoders, multiplexers and FM radio processors as shown in Figure 2. Edge devices are also covered by CLC/TR 50083-5-1.

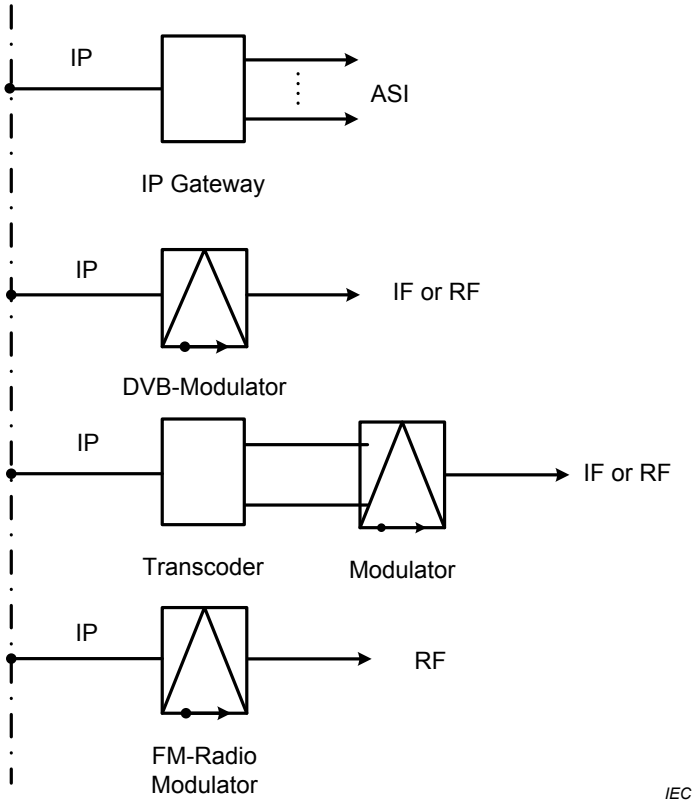

Figure 2 – Examples of IP gateways/interfaces at the input of headends

Equipment at the output of headends can be either IP gateways which enable the connection from DVB-ASI interfaces according to EN 50083-9 to IP based networks or, in the case of modular headend systems, can also be single equipment with IP interfaces such as encoders, multiplexers and switches as shown in Figure 3.

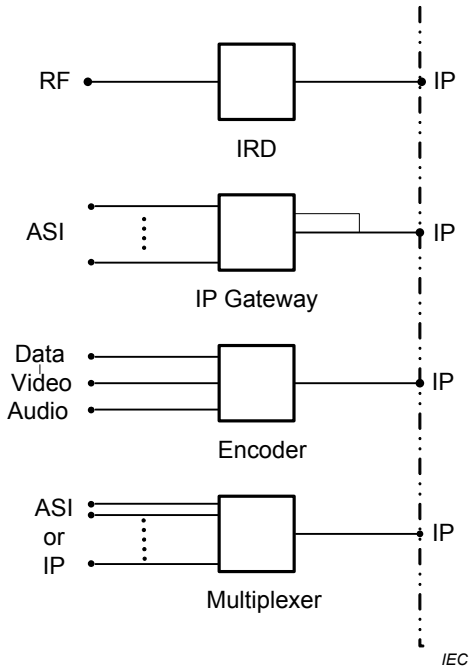

Figure 3 – Examples of IP gateways and interfaces at the output of central headends

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

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

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 60068-2-40, *Basic environmental testing procedures – Part 2-40: Tests – Test Z/AM: Combined cold/low air pressure tests*

IEC 60244-5, *Methods of measurement for radio transmitters – Part 5: Performance characteristics of television transmitters*

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

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

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

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

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

ISO/IEC 13818-2, *Information technology – Generic coding of moving pictures and associated audio information – Part 2: Video*

ISO/IEC 13818-3, *Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio*

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

ITU-R Recommendation BS.468-4, *Measurement of audio-frequency noise voltage level in sound broadcasting*

ITU-R Report BT.624-4, *Characteristics of television systems*

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

ITU-T Recommendation J.101, *Measurement methods and test procedures for teletext 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 300 468, *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, *Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2)*

ETSI EN 302 755, *Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)*

ETSI ETS 300 163, *Television systems; NICAM 728: Specification for transmission of two-channel digital sound with terrestrial television systems B, G, H, I and L*

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