

ETSI EN 300 468 V1.11.1 (2010-04)

European Standard (Telecommunications series)

Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems



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DVB
Digital Video
Broadcasting

The DVB logo consists of the letters "DVB" in a large, bold, blue font, with "Digital Video Broadcasting" written in a smaller blue font below it.

Reference

REN/JTC-DVB-266

Keywordsbroadcasting, digital, DVB, MPEG, service, TV,
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Foreword

This European Standard (Telecommunications series) has been produced by Joint Technical Committee (JTC) Broadcast of the European Broadcasting Union (EBU), Comité Européen de Normalisation ELECtrotechnique (CENELEC) and the European Telecommunications Standards Institute (ETSI).

NOTE: The EBU/ETSI JTC Broadcast was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC Broadcast became a tripartite body by including in the Memorandum of Understanding also CENELEC, which is responsible for the standardization of radio and television receivers. The EBU is a professional association of broadcasting organizations whose work includes the co-ordination of its members' activities in the technical, legal, programme-making and programme-exchange domains. The EBU has active members in about 60 countries in the European broadcasting area, its headquarters is in Geneva.

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Founded in September 1993, the DVB Project is a market-led consortium of public and private sector organizations in the television industry. Its aim is to establish the framework for the introduction of MPEG-2 based digital television services. Now comprising over 200 organizations from more than 25 countries around the world, DVB fosters market-led systems, which meet the real needs, and economic circumstances, of the consumer electronics and the broadcast industry.

National transposition dates

Date of adoption of this EN:	31 March 2010
Date of latest announcement of this EN (doa):	30 June 2010
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2010
Date of withdrawal of any conflicting National Standard (dow):	31 December 2010

1 Scope

The present document specifies the Service Information (SI) data which forms a part of DVB bitstreams, in order that the user can be provided with information to assist in selection of services and/or events within the bitstream, and so that the Integrated Receiver Decoder (IRD) can automatically configure itself for the selected service. SI data for automatic configuration is mostly specified within ISO/IEC 13818-1 [18] as Program Specific Information (PSI).

The present document specifies additional data which complements the PSI by providing data to aid automatic tuning of IRDs, and additional information intended for display to the user. The manner of presentation of the information is not specified in the present document, and IRD manufacturers have freedom to choose appropriate presentation methods.

It is expected that Electronic Programme Guides (EPGs) will be a feature of Digital TV transmissions.

The definition of an EPG is outside the scope of the present document (i.e. the SI specification), but the data contained within the SI specified in the present document may be used as the basis for an EPG.

Rules of operation for the implementation of the present document are specified in TR 101 211 [i.2].

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

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2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI EN 300 231: "Television systems; Specification of the domestic video Programme Delivery Control system (PDC)".
- [2] ETSI EN 300 401: "Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers".
- [3] ETSI EN 300 706: "Enhanced Teletext specification".
- [4] ETSI EN 301 192: "Digital Video Broadcasting (DVB); DVB specification for data broadcasting".
- [5] ETSI EN 301 210: "Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for Digital Satellite News Gathering (DSNG) and other contribution applications by satellite".

- [6] ETSI EN 301 775: "Digital Video Broadcasting (DVB); Specification for the carriage of Vertical Blanking Information (VBI) data in DVB bitstreams".
- [7] ETSI EN 301 790: "Digital Video Broadcasting (DVB); Interaction channel for satellite distribution systems".
- [8] 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)".
- [9] ETSI TS 101 154: "Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream".
- [10] ETSI TS 102 005: "Digital Video Broadcasting (DVB); Specification for the use of Video and Audio Coding in DVB services delivered directly over IP protocols".
- [11] ETSI TS 102 006: "Digital Video Broadcasting (DVB); Specification for System Software Update in DVB Systems".
- [12] ETSI TS 102 114: "DTS Coherent Acoustics; Core and Extensions".
- [13] ETSI TS 102 323: "Digital Video Broadcasting (DVB); Carriage and signalling of TV-Anytime information in DVB transport streams".
- [14] ETSI TS 102 366: "Digital Audio Compression (AC-3, Enhanced AC-3) Standard".
- [15] ETSI TS 102 812: "Digital Video Broadcasting (DVB); Multimedia Home Platform (MHP) Specification 1.1.1".
- [16] ISO/IEC 10646 (2003): "Information technology - Universal Multiple-Octet Coded Character Set (UCS)".
- [17] ISO/IEC 11172-3: "Information technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s - Part 3: Audio".
- [18] ISO/IEC 13818-1: "Information technology - Generic coding of moving pictures and associated audio information: Systems".
- [19] ISO/IEC 13818-2: "Information technology - Generic coding of moving pictures and associated audio information: Video".
- [20] ISO/IEC 13818-3: "Information technology - Generic coding of moving pictures and associated audio information - Part 3: Audio".
- [21] ISO/IEC 14496-3 (2005): "Information technology - Coding of audio- visual objects - Part 3: Audio".
- [22] ISO/IEC 6937: "Information technology - Coded graphic character set for text communication - Latin alphabet".
- [23] ISO/IEC 8859-1: "Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1".
- [24] ISO/IEC 8859-2: "Information technology - 8-bit single-byte coded graphic character sets - Part 2: Latin alphabet No. 2".
- [25] ISO/IEC 8859-3: "Information technology - 8-bit single-byte coded graphic character sets - Part 3: Latin alphabet No. 3".
- [26] ISO/IEC 8859-4: "Information technology - 8-bit single-byte coded graphic character sets - Part 4: Latin alphabet No. 4".
- [27] ISO/IEC 8859-5: "Information technology - 8-bit single-byte coded graphic character sets - Part 5: Latin/Cyrillic alphabet".

- [28] ISO/IEC 8859-6: "Information technology - 8-bit single-byte coded graphic character sets - Part 6: Latin/Arabic alphabet".
- [29] ISO/IEC 8859-7: "Information technology - 8-bit single-byte coded graphic character sets - Part 7: Latin/Greek alphabet".
- [30] ISO/IEC 8859-8: "Information technology - 8-bit single-byte coded graphic character sets - Part 8: Latin/Hebrew alphabet".
- [31] ISO/IEC 8859-9: "Information technology - 8-bit single-byte coded graphic character sets - Part 9: Latin alphabet No. 5".
- [32] ISO/IEC 8859-10: "Information technology - 8-bit single-byte coded graphic character sets - Part 10: Latin alphabet No. 6".
- [33] ISO/IEC 8859-11: "Information technology - 8-bit single-byte coded graphic character sets - Part 11: Latin/Thai alphabet".
- [34] ISO/IEC 8859-13: "Information technology - 8-bit single-byte coded graphic character sets - Part 13: Latin alphabet No. 7".
- [35] ISO/IEC 8859-14: "Information technology - 8-bit single-byte coded graphic character sets - Part 14: Latin alphabet No. 8 (Celtic)".
- [36] ISO/IEC 8859-15: "Information technology - 8-bit single-byte coded graphic character sets - Part 15: Latin alphabet No. 9".
- [37] CENELEC EN 50221: "Common interface specification for conditional access and other digital video broadcasting decoder applications".
- [38] IEC 61883 (parts 1 and 4): "Consumer audio/video equipment - Digital interface".
- [39] IEEE 1394.1: "IEEE Standard for High Performance Serial Bus Bridges".
- [40] ISO 8601: "Data elements and interchange formats - Information interchange - Representation of dates and times".
- [41] ISO 3166 (all parts): "Codes for the representation of names of countries and their subdivisions".
- [42] ISO 639-2: "Codes for the representation of names of languages - Part 2: Alpha-3 code".
- [43] ITU-R Recommendation BS.1196-1 (annex 2): "Audio coding for digital terrestrial television broadcasting".

NOTE: Annex 2 contains additional information on the AC-3 audio encoding algorithm and decoding requirements, relevant to the present document. Appendix 1 to annex 2 of this Recommendation should be disregarded as it is not applicable to the present document.

- [44] KSX1001: "Code for Information Interchange (Hangeul and Hanja)", Korean Agency for Technology and Standards, Ref. No. KSX 1001-2004.

NOTE: Available at <http://unicode.org/Public/MAPPINGS/OBSOLETE/EASTASIA/KSC/KSX1001.TXT>.

- [45] ETSI ES 201 812: "Digital Video Broadcasting (DVB); Multimedia Home Platform (MHP) Specification 1.0.3".
- [46] ETSI TS 102 825 (parts 1 to 5, 7, 9 and 10): "Digital Video Broadcasting (DVB); Content Protection and Copy Management (DVB-CPCM)".
- [47] 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)".
- [48] ETSI TS 102 770: "Digital Video Broadcasting (DVB); System Renewability Messages (SRM) in DVB Systems".
- [49] ETSI EN 302 583: "Digital Video Broadcasting (DVB); Framing Structure, channel coding and modulation for Satellite Services to Handheld devices (SH) below 3 GHz".

- [50] ETSI TS 102 772: "Digital Video Broadcasting (DVB); Specification of Multi-Protocol Encapsulation - inter-burst Forward Error Correction".
- [51] IETF RFC 2045: "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] ETSI TS 101 162: "Digital Video Broadcasting (DVB); Allocation of Service Information (SI) and Data Broadcasting Codes for Digital Video Broadcasting (DVB) systems".
- [i.2] ETSI TR 101 211: "Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)".
- [i.3] ETSI TS 102 590: "Digital Video Broadcasting (DVB); Multimedia Home Platform 1.2".
- [i.4] ETSI TR 102 825 (parts 6, 8, 11 to 13): "Digital Video Broadcasting (DVB); Content Protection and Copy Management (DVB-CPCM)".
- [i.5] Void.
- [i.6] ETSI TS 102 201: "Digital Video Broadcasting (DVB); Interfaces for DVB Integrated Receiver Decoder (DVB-IRD)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

AC-3: refers to the coding of audio using the Dolby AC-3 method

NOTE: The Service Information requirements for AC-3 streams carried in DVB systems are described in annex D. The carriage of AC-3 elementary streams as private data within MPEG systems is described in annex C of TS 101 154 [9].

bouquet: collection of services marketed as a single entity

broadcaster (SERVICE Provider): organization which assembles a sequence of events or programmes to be delivered to the viewer based upon a schedule

cell: geographical area that is covered with DVB-T signals delivering one or more particular transport streams throughout the area by means of one or more transmitters

NOTE: The cell may in addition contain repeaters. Two neighbouring cells may be intersecting or fully overlapping. The cell_id that is used to uniquely identify a cell is unique within each original_network_id. For hand-over purposes it is more convenient if the transport streams associated with the cell cover exactly the same area, or only one transport stream per cell is used.

component (ELEMENTARY Stream): one or more entities which together make up an event

EXAMPLE: Video, audio, teletext.

Conditional Access (CA) system: system to control subscriber access to services, programmes and events

EXAMPLE: Videoguard, Eurocrypt.

delivery system: physical medium by which one or more multiplexes are transmitted

EXAMPLE: Satellite system, wide-band coaxial cable, fibre optics, terrestrial channel of one emitting point.

Entitlement Management Messages (EMM): private Conditional Access information which specify the authorization levels or the services of specific decoders

NOTE: They may be addressed to individual decoder or groups of decoders.

event: grouping of elementary broadcast data streams with a defined start and end time belonging to a common service

EXAMPLE: First half of a football match, News Flash, first part of an entertainment show.

forbidden: when used in the clauses defining the coded bit stream, indicates that the value shall never be used

MPEG-2: See ISO/IEC 13818.

NOTE: Systems coding is defined in part 1 [18]. Video coding is defined in part 2 [19]. Audio coding is defined in part 3 [20].

multiplex: stream of all the digital data carrying one or more services within a single physical channel

network: collection of MPEG-2 Transport Stream (TS) multiplexes transmitted on a single delivery system

EXAMPLE: All digital channels on a specific cable system.

n PSK: n-valued Phase Shift Keying (other than quaternary)

original_network_id: unique identifier of a network

programme: concatenation of one or more events under the control of a broadcaster e.g. news show, entertainment show

repeater: equipment which receives and re-transmits a DVB-T signal

NOTE: It can not change the TPS bits and thus the cell_id.

reserved: when used in the clause defining the coded bit stream, indicates that the value may be used in the future for ISO defined extensions

NOTE: Unless otherwise specified within the present document all "reserved" bits is set to "1".

reserved_future_use: when used in the clause defining the coded bit stream, indicates that the value may be used in the future for ETSI defined extensions

NOTE: Unless otherwise specified within the present document all "reserved_future_use" bits is set to "1".

section: syntactic structure used for mapping all service information defined in EN 300 468 into ISO/IEC 13818-1 [18] TS packets

service: sequence of programmes under the control of a broadcaster which can be broadcast as part of a schedule

service_id: unique identifier of a service within a TS

Service Information (SI): digital data describing the delivery system, content and scheduling/timing of broadcast data streams, etc.

NOTE: It includes MPEG-2 PSI together with independently defined extensions.

subcell: geographical area that is part of the cells coverage area and that is covered with DVB-T signals by means of a transposer

NOTE: In conjunction with the cell_id the cell_id_extension is used to uniquely identify a subcell.

sub_table: collection of sections with the same value of table_id and:

for a NIT: the same table_id_extension (network_id) and version_number;

for a BAT: the same table_id_extension (bouquet_id) and version_number;

for a SDT: the same table_id_extension (transport_stream_id), the same original_network_id and version_number;

for a EIT: the same table_id_extension (service_id), the same transport_stream_id, the same original_network_id and version_number.

NOTE: The table_id_extension field is equivalent to the fourth and fifth byte of a section when the section_syntax_indicator is set to a value of "1".

table: comprised of a number of sub_tables with the same value of table_id

transmitter: equipment, that allows to modulate a baseband transport stream and to broadcast it on one frequency

Transport Stream (TS): data structure defined in ISO/IEC 13818-1 [18]

NOTE: It is the basis of the DVB standards.

transport_stream_id: unique identifier of a TS within an original network

transposer: type of repeater which receives a DVB-T signal and re-transmits it on a different frequency

The relationships of some of these definitions are illustrated in the service delivery model in figure 1.

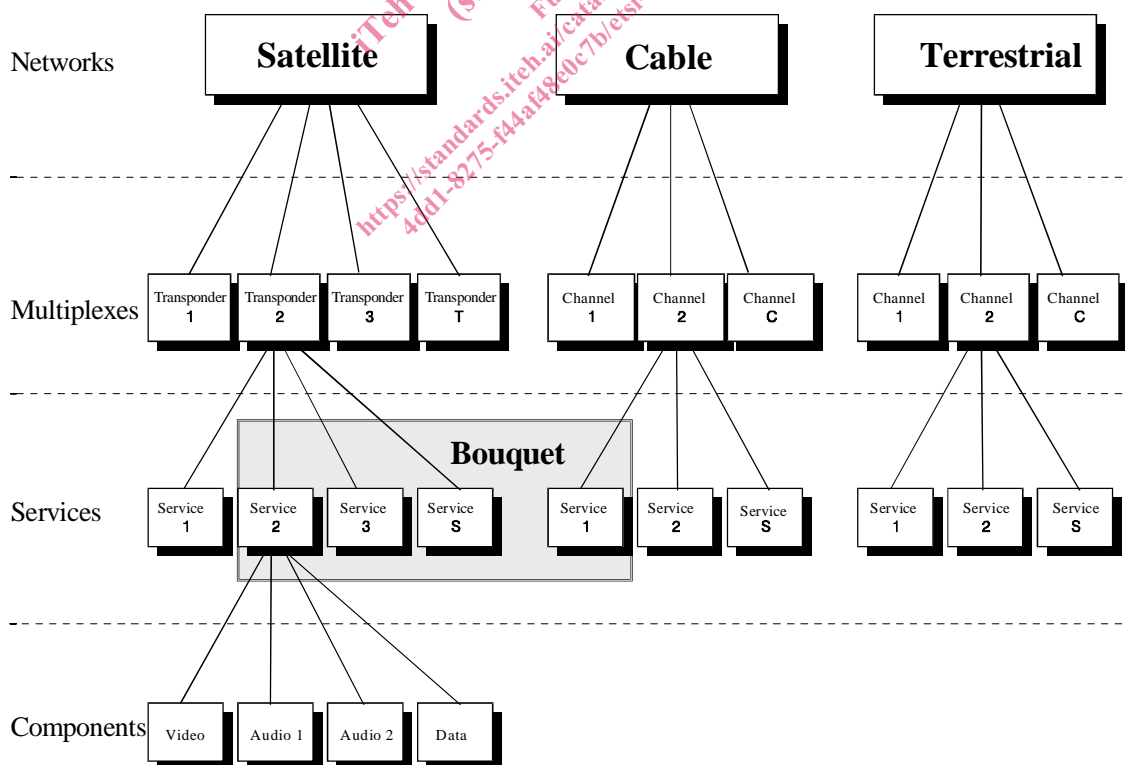


Figure 1: Digital broadcasting, service delivery model

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AAC Advanced Audio Coding

NOTE: See TS 101 154 [9].

AC-3 Dolby AC-3 audio coding

NOTE: See ITU-R Recommendation BS.1196-1 [43].

ASCII American Standard Code for Information Interchange

BAT Bouquet Association Table

BCD Binary Coded Decimal

bslbf bit string, left bit first

CA Conditional Access

CAT Conditional Access Table

CLUT Colour Look-Up Table

CPCM Content Protection Copy Management

CRC Cyclic Redundancy Check

CSA Common Scrambling Algorithm

DAB Digital Audio Broadcasting

DIT Discontinuity Information Table

DSNG Digital Satellite News Gathering

DTS Digital Theater Systems

NOTE: See TS 102 114 [12].

DVB Digital Video Broadcasting

DVD Digital Versatile Disc

EBU European Broadcasting Union

ECM Entitlement Control Message

EIT Event Information Table

EMM Entitlement Management Message

EPG Electronic Programme Guide

ES Elementary Stream

FEC Forward Error Correction

FTA Free-To-Air

HD High Definition (video)

HE-AAC High Efficiency AAC

HP High Priority

IEC International Electrotechnical Commission

INT IP Notification Table

NOTE: See EN 301 192 [4].

IP Internet Protocol

IRD Integrated Receiver Decoder

ISO International Organization for Standardization

LP Low Priority

LSB Least Significant Bit

MJD Modified Julian Date

MPE MultiProtocol Encapsulation

MPEG Moving Pictures Expert Group

MSB Most Significant Bit

NBC-BS Non Backwards Compatible Broadcast Services (DVB-S2)

NDA Non Disclosure Agreement

NIT Network Information Table

NVOD Near Video On Demand

OFDM Orthogonal Frequency Division Multiplex

PAT Program Association Table

paTS partially available Transport Stream (DVB-SH)