



SLOVENSKI STANDARD

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Digitalna videoradiodifuzija (DVB) – Specifikacija za servisne informacije (SI) v sistemih DVB

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

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video**ETSI**

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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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.

European Broadcasting Union
 CH-1218 GRAND SACONNEX (Geneva)
 Switzerland
 Tel: +41 22 717 21 11
 Fax: +41 22 717 24 81

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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:	28 April 2006
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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 [20] 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 [11].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [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".
- [9] ETSI ETR 162: "Digital Video Broadcasting (DVB); Allocation of Service Information (SI) codes for DVB systems".
- [10] ETSI TR 101 154: "Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in satellite, cable and terrestrial broadcasting applications".

- [11] ETSI TR 101 211: "Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)".
- [12] 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".
- [13] ETSI TS 102 006: "Digital Video Broadcasting (DVB); Specification for System Software Update in DVB Systems".
- [14] ETSI TS 102 114: "DTS Coherent Acoustics; Core and Extensions".
- [15] ETSI TS 102 323: "Digital Video Broadcasting (DVB); Carriage and signalling of TV-Anytime information in DVB transport streams".
- [16] ETSI TS 102 366: "Digital Audio Compression (AC-3, Enhanced AC-3) Standard".
- [17] ETSI TS 102 812: "Digital Video Broadcasting (DVB); Multimedia Home Platform (MHP) Specification 1.1.1".
- [18] ISO/IEC 10646-1: "Information technology - Universal Multiple-Octet Coded Character Set (UCS) - Part 1: Architecture and Basic Multilingual Plane".
- [19] 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".
- [20] ISO/IEC 13818-1: "Information technology - Generic coding of moving pictures and associated audio information: Systems".
- [21] ISO/IEC 13818-2: "Information technology - Generic coding of moving pictures and associated audio information: Video".
- [22] ISO/IEC 13818-3: "Information technology - Generic coding of moving pictures and associated audio information - Part 3: Audio".
- [23] ISO/IEC 14496-3 / Amendment 1: "Information technology - Coding of audio-visual objects - Part 3: Audio / Bandwidth extension".
- [24] ISO/IEC 6937: "Information technology - Coded graphic character set for text communication - Latin alphabet".
- [25] ISO/IEC 8859-1: "Information technology - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1".
- [26] ISO/IEC 8859-2: "Information technology - 8-bit single-byte coded graphic character sets - Part 2: Latin alphabet No. 2".
- [27] ISO/IEC 8859-3: "Information technology - 8-bit single-byte coded graphic character sets - Part 3: Latin alphabet No. 3".
- [28] ISO/IEC 8859-4: "Information technology - 8-bit single-byte coded graphic character sets - Part 4: Latin alphabet No. 4".
- [29] ISO/IEC 8859-5: "Information technology - 8-bit single-byte coded graphic character sets - Part 5: Latin/Cyrillic alphabet".
- [30] ISO/IEC 8859-6: "Information technology - 8-bit single-byte coded graphic character sets - Part 6: Latin/Arabic alphabet".
- [31] ISO/IEC 8859-7: "Information technology - 8-bit single-byte coded graphic character sets - Part 7: Latin/Greek alphabet".
- [32] ISO/IEC 8859-8: "Information technology - 8-bit single-byte coded graphic character sets - Part 8: Latin/Hebrew alphabet".
- [33] ISO/IEC 8859-9: "Information technology - 8-bit single-byte coded graphic character sets - Part 9: Latin alphabet No. 5".

- [34] ISO/IEC 8859-10: "Information technology - 8-bit single-byte coded graphic character sets - Part 10: Latin alphabet No. 6".
- [35] ISO/IEC 8859-11: "Information technology - 8-bit single-byte coded graphic character sets - Part 11: Latin/Thai alphabet".
- [36] ISO/IEC 8859-13: "Information technology - 8-bit single-byte coded graphic character sets - Part 13: Latin alphabet No. 7".
- [37] ISO/IEC 8859-14: "Information technology - 8-bit single-byte coded graphic character sets - Part 14: Latin alphabet No. 8 (Celtic)".
- [38] ISO/IEC 8859-15: "Information technology - 8-bit single-byte coded graphic character sets - Part 15: Latin alphabet No. 9".
- [39] CENELEC EN 50221: "Common interface specification for conditional access and other digital video broadcasting decoder applications".
- [40] IEC 61883 (parts 1 and 4): "Consumer audio/video equipment - Digital interface".
- [41] IEEE 1394.1: "IEEE Standard for High Performance Serial Bus Bridges".
- [42] ISO 2015: "Numbering of weeks".
- [43] ISO 3166 (all parts): "Codes for the representation of names of countries and their subdivisions".
- [44] ISO 639-2: "Codes for the representation of names of languages - Part 2: Alpha-3 code".
- [45] 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.
- [46] KSC5601: Code for Information Interchange (Hangul and Hanja) Korea Industrial Standards Association, Ref. No. KSC 5601-1987.

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 is described in annex D. The carriage of AC-3 elementary streams as private data within MPEG systems is described in annex C of TR 101 154 [10].

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 shall be 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 [20]. Video coding is defined in part 2 [21]. Audio coding is defined in part 3 [22].

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 shall be 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 shall be set to "1".

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

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.

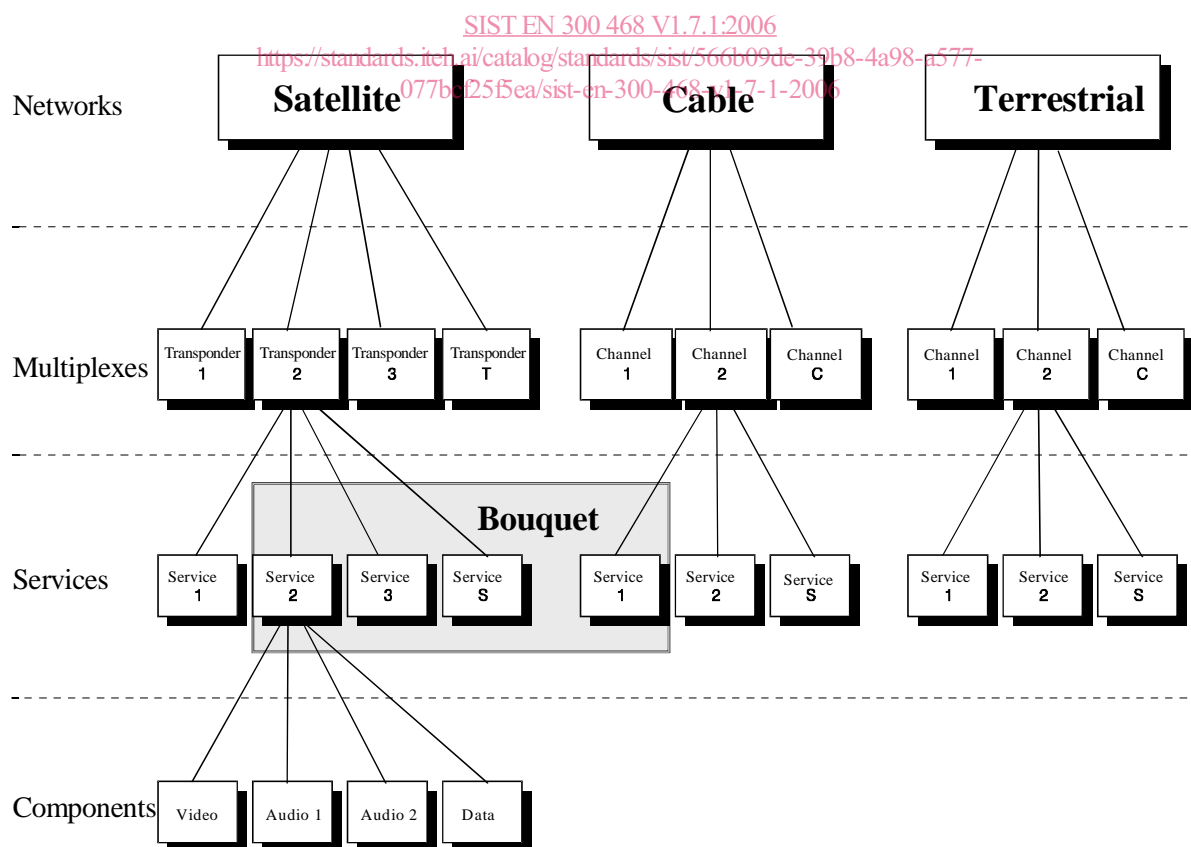


Figure 1: Digital broadcasting, service delivery model

3.2 Abbreviations

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

AC-3	Dolby AC-3 audio coding (ITU-R Recommendation BS.1196.1 [45])
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
CRC	Cyclic Redundancy Check
DAB	Digital Audio Broadcasting
DIT	Discontinuity Information Table
DSNG	Digital Satellite News Gathering
DVB	Digital Video Broadcasting
DVD	Digital Versatile Disc
EBU	European Broadcasting Union
EIT	Event Information Table
EMM	Entitlement Management Message
EPG	Electronic Programme Guide
ES	Elementary Stream
FEC	Forward Error Correction
HD	High Definition (Video)
HP	High Priority
IEC	International Electrotechnical Commission
IRD	Integrated Receiver Decoder
ISO	International Organization for Standardization
LP	Low Priority
LSB	Least Significant Bit
MJD	Modified Julian Date
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
PDC	Programme Delivery Control
PID	Packet Identifier
PIL	Programme Identification Label
PMT	Program Map Table
PSI	Program Specific Information
PSTN	Public Switched Telephone Network
QAM	Quadrature Amplitude Modulation
QPSK	Quaternary Phase Shift Keying
rpchof	remainder polynomial coefficients, highest order first
RDS	Radio Data System
RS	Reed-Solomon
RST	Running Status Table
ScF	Scale Factor
SD	Standard Definition (Video)
SDT	Service Description Table
SI	Service Information
SIT	Selection Information Table
SMI	Storage Media Interoperability
ST	Stuffing Table
TDT	Time and Date Table
TOT	Time Offset Table
TPS	Transmission Parameter Signalling

TS	Transport Stream
TSDT	Transport Stream Description Table
UECP	Universal Encoder Communication Protocol (RDS)
uimsbf	unsigned integer most significant bit first
UTC	Universal Time, Co-ordinated
VBI	Vertical Blanking Interval
VPS	Video Programme System
WSS	Wide Screen Signalling

4 Service Information (SI) description

ISO/IEC 13818-1 [20] specifies SI which is referred to as PSI. The PSI data provides information to enable automatic configuration of the receiver to demultiplex and decode the various streams of programs within the multiplex.

The PSI data is structured as four types of table. The tables are transmitted in sections.

- 1) Program Association Table (PAT):
 - for each service in the multiplex, the PAT indicates the location (the Packet Identifier (PID) values of the Transport Stream (TS) packets) of the corresponding Program Map Table (PMT). It also gives the location of the Network Information Table (NIT).
- 2) Conditional Access Table (CAT):
 - the CAT provides information on the CA systems used in the multiplex; the information is private (not defined within the present document) and dependent on the CA system, but includes the location of the EMM stream, when applicable.
- 3) Program Map Table (PMT):
 - the PMT identifies and indicates the locations of the streams that make up each service, and the location of the Program Clock Reference fields for a service.
- 4) Network Information Table (NIT):
 - the location of the NIT is defined in the present document in compliance with ISO/IEC 13818-1 [20] specification, but the data format is outside the scope of ISO/IEC 13818-1 [20]. It is intended to provide information about the physical network. The syntax and semantics of the NIT are defined in the present document.

In addition to the PSI, data is needed to provide identification of services and events for the user. The coding of this data is defined in the present document. In contrast with the PAT, CAT, and PMT of the PSI, which give information only for the multiplex in which they are contained (the actual multiplex), the additional information defined within the present document can also provide information on services and events carried by different multiplexes, and even on other networks. This data is structured as nine tables:

- 1) Bouquet Association Table (BAT):
 - the BAT provides information regarding bouquets. As well as giving the name of the bouquet, it provides a list of services for each bouquet.
- 2) Service Description Table (SDT):
 - the SDT contains data describing the services in the system e.g. names of services, the service provider, etc.
- 3) Event Information Table (EIT):
 - the EIT contains data concerning events or programmes such as event name, start time, duration, etc.;
 - the use of different descriptors allows the transmission of different kinds of event information e.g. for different service types.