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Digitalna videoradiodifuzija (DVB) – Specifikacija za prenos teleteksta po standardu ITU-R sistem B v bitnih tokih digitalne videoradiodifuzije

Digital Video Broadcasting (DVB); Specification for conveying ITU-R System B Teletext in DVB bitstreams

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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:	23 May 2003
Date of latest announcement of this EN (doa):	31 August 2003
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	29 February 2004
Date of withdrawal of any conflicting National Standard (dow):	29 February 2004

1   Scope

The present document specifies the method by which ITU-R System B Teletext (ITU-R Recommendation BT.653 [3]), also known as EBU Teletext (see EN 300 706 [4]), may be carried in DVB bitstreams. This transport mechanism is intended to satisfy the following requirements:

-        to support the transcoding of the Teletext data into the Vertical Blanking Interval (VBI) of analogue video. The transcoded signal should be compatible with existing TV receivers with Teletext decoders;

-        the maximum data rate for each Teletext service is equivalent to 16 lines per field so that the service is always suitable for transcoding into the VBI;

-        the transmission mechanism should be capable of transmitting subtitles with accurate timing with respect to the video (i.e. to within or near frame accuracy).

A more general data transport mechanism for conveying new types of data services is outside the scope of the present document, but the transport syntax specified here can also be adapted for other data.

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]   ISO/IEC 13818-1: "Information technology - Generic coding of moving pictures and associated audio information: Systems".

[2]   ETSI EN 300 468: "Digital Video Broadcasting (DVB); Specification for Service Information (SI) in DVB systems".

[3]   ITU-R Recommendation BT.653: "Teletext systems".

[4]   ETSI EN 300 706: "Enhanced Teletext specification".

3   Definitions and abbreviations

3.1   Definitions

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

MPEG-2: Refers to the standard ISO/IEC 13818. Systems coding is defined in part 1 [1]. Video coding is defined in part 2. Audio coding is defined in part 3 of ISO/IEC 13818.

section: syntactic structure used for mapping all service information defined in EN 300 468 into ISO/IEC 13818-1 Transport Stream (TS) packets

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

Teletext descriptor: See EN 300 468 [2], it is used in the Program Specific Information (PSI) Program Map Table (PMT) to identify streams which carry EBU data. The descriptor is located in a program map section following the relevant ES_info_length field.

3.2 Abbreviations

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

DVB	Digital Video Broadcasting
MPEG	Moving Pictures Expert group
PES	Packetized Elementary Stream
PID	Packet IDentifier
PMT	Program Map Table
PSI	Program Specific Information
PTS	Presentation Time Stamp
SI	Service Information
TS	Transport Stream
TV	TeleVision
VBI	Vertical Blanking Interval

4 Insertion of Teletext into MPEG-2 transport multiplex

Teletext data are conveyed in Packetized Elementary Stream (PES) packets which are carried by Transport Stream (TS) packets as defined in ISO/IEC 13818-1 [1].

The Packet Identifier (PID) of a Teletext stream associated with a service is identified in the Program Map Table (PMT) of the Program Specific Information (PSI) for that service.

The Teletext data stream is given stream_type value 0x06 (which indicates a PES stream carrying private data).

The appropriate ES_info field of the program map section describing Teletext data streams shall contain a Teletext descriptor as defined in EN 300 468 [2].

A service may include more than one Teletext data stream, provided that each stream has a different value of data_identifier, and that the streams are distinguishable by their respective Teletext descriptors in the PSI.

4.1 Transport Stream (TS) packet format

The standard TS packet syntax and semantics are followed, noting the following constraint:

adaptation_field_control only the values "01" and "10" are permitted.

4.2 PES packet format

The standard PES packet syntax and semantics are followed noting the following constraints:

stream_id set to "1011 1101" meaning "private_stream_1".

PES_packet_length set to the value (N × 184)-6, where N is an integer, so that the PES packet finishes at the end of a Transport packet.

Data_alignment_indicator set to "1" indicating that the Teletext access units are aligned with the PES packets.

PES_header_data_length set to "0x24".

stuffing_byte the PES header is followed by as many stuffing bytes as are required to make up the header data length, so that the entire PES header is 45 bytes long.

PES_packet_data_byte   these bytes are coded in accordance with the PES_data_field syntax specified below.

PTS and other optional fields may be present in the PES header, but the header length is always fixed for streams identified in the Program Specific Information (PSI) by the DVB Teletext descriptor (see EN 300 468 [2]).

NOTE: See annex A.

4.3   Syntax for PES data field

Table 1: Syntax for PES data field

Syntax	No. of bits	Identifier
PES_data_field(){		
data_identifier	8	uimsbf
for(i=0;i<N;i++){		
data_unit_id	8	uimsbf
data_unit_length	8	uimsbf
data_field()		
}		
}		

Data_field for EBU Teletext

Table 2: Syntax for Data_field for EBU Teletext

Syntax	No. of bits	Identifier
data_field(){		
reserved_future_use	2	bslbf
field_parity	1	bslbf
line_offset	5	uimsbf
framing_code	8	bslbf
magazine_and_packet_address	16	bslbf
data_block	320	bslbf
}		

4.4   Semantics for PES data field

data_identifier: this 8-bit field identifies the type of data carried in the PES packet. It is coded as in table 3:

Table 3: data_identifier

data_identifier	value
0x00 to 0x0F	reserved for future use
0x10 to 0x1F	EBU data
0x02 to 0x7F	reserved for future use
0x80 to 0xFF	user defined

The data_identifier shall be set to the same value for each PES packet conveying data in the same Teletext data stream.