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

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EBU
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Foreword

This version, previously as an ETS now an EN, contains changes of an entirely editorial nature as follows:

1) add the DVB logo to the front page of the deliverable;

2) change the title from: "Digital broadcasting systems for television, sound and data services; etc." to "Digital Video Broadcast (DVB); etc.";

3) add in the foreword the DVB acknowledgement.

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

NOTE: The EBU/ETSI JTC was established in 1990 to co-ordinate the drafting of standards in the specific field of broadcasting and related fields. Since 1995 the JTC 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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Digital Video Broadcasting (DVB) Project

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.

Proposed national transposition dates	
Date of adoption of ETS 300 472:	18 October 1996
Date of latest announcement of ETS 300 472 (doa):	31 August 1995
Date of latest publication of new National Standard or endorsement of ETS 300 472 (dop/e):	29 February 1996
Date of withdrawal of any conflicting National Standard (dow):	29 February 1996

1   Scope

The present document specifies the method by which ITU-R System B Teletext (ITU-R Recommendation 653 [3]), also known as EBU Teletext (see EBU SPB 492 [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   Normative references

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

[1]   ISO/IEC 13818-1 (1994): "Information Technology - Generic Coding of Moving Pictures and Associated Audio Recommendation H.222.0 (systems)".

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

[3]   ITU-R Recommendation 653: "System B, 625/50 television systems".

[4]   EBU SPB 492 (1992): "Teletext specification (625-line television systems)".

3   Definitions and abbreviations

3.1   Definitions

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

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

section: A section is a syntactic structure used for mapping all service information defined in EN 300 468 [2] into ISO/IEC 13818-1 [1] Transport Stream (TS) packets.

service: A 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 $(N \times 184)$-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]).

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.