

Teleweb application —

Part 2: Delivery methods

The European Standard EN 62298-2:2005 has the status of a British Standard

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National foreword

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Foreword

The text of document 100/923/FDIS, future edition 1 of IEC 62298-2, prepared by IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62298-2 on 2005-06-01.

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Endorsement notice

The text of the International Standard IEC 62298-2:2005 was approved by CENELEC as a European Standard without any modification.

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INTRODUCTION

The aim of TeleWeb is to deliver World Wide Web-style content to the living-room TV to give the viewer an enhanced television experience. A TeleWeb service broadcasts data files containing text and high-definition graphics to suitable decoders. The data transmitted can be closely linked to events within the accompanying TV programmes or can be more general in nature to emulate a traditional, but higher definition, superteletext service. Different profiles are defined.

It is intended that TV-based decoders be implemented in a cost-effective manner without recourse to the technology normally associated with personal computers. In part, this is achieved by limiting the number of different types of multimedia data that can be used within a service. By careful design of the user interface, decoder manufacturers will be able to offer easy-to-use equipment for accessing TeleWeb services without requiring the consumer to be computer-literate. In addition, they will be able to customize their products to differentiate them from those of their competitors.

This standard focuses on the transmission layer.

TELEWEB APPLICATION –

Part 2: Delivery methods

1 Scope

This part of IEC 62298 specifies the transmission layer of TeleWeb.

TeleWeb services can be broadcast in a number of different ways, for example, VBI, DVB, DAB, etc., and to a variety of decoder types, for example, TVs, portable decoders, PCs, etc. This standard specifies the transmission layer for VBI and DVB broadcasts.

2 Normative references

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

IEC 62298-1: *TeleWeb application – Part 1: General description*

IEC 62298-3: *TeleWeb application – Part 3: Superteletext profile*

IEC 62298-4: *TeleWeb application – Part 4: Hyperteletext profile*¹

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

ISO/IEC 13818-6, *Information technology – Generic coding of moving pictures and associated audio information – Part 6: Extension for DSM-CC*

ISO 639-2, *Codes for the representation of names of languages – Part 2: Alpha-3 code*

ISO 8859-1, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No. 1*

ETSI TR 101 154: V1.4.1, *Digital Video Broadcasting (DVB); Implementation guidelines for the use of MPEG-2 Systems, Video and Audio in satellite, cable and terrestrial broadcasting applications*

ETSI TR 101 202, *Implementation guidelines for data broadcasting, V1.1.1*

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*

¹ To be published.

ETSI EN 300 706, *Enhanced Teletext Specification*

ETSI EN 300 708, *Television Systems; Data Transmission within Teletext*

ETSI EN 300 744, *Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television*

ETSI EN 301 192, *Digital Video Broadcasting (DVB); DVB specification for data broadcasting, V1.2.1*

ETSI ETS 300 472, *Digital Video Broadcasting (DVB); Specification for conveying ITU-R System B Teletext in DVB bit streams*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

bit ordering

in all schematics, numeric values ordered with the most significant bit at the left-hand side and the least significant bit at the right-hand side

3.1.2

conditional access (CA)

mechanism by which user access to service components can be restricted

3.1.3

Independent Data Line (IDL)

stand-alone Teletext packet containing both control and application data. It does not form part of a Teletext page. The packet address is either 30 or 31

3.1.4

module

when broadcast within a DSM-CC data carousel, the contents of a file and its attributes (for example, file type, creation date, etc.) are transmitted separately. The file itself is carried by a number of DDB messages and its attributes appear as descriptors within its module loop within a DII control message

3.1.5

signed integer

positive or negative integer value, in decimal notation. The first digit is preceded by a mandatory plus (+) or minus (–) symbol with no white space between the symbol and the first digit

3.1.6

text string

sequence of displayable Latin-1 characters

3.1.7

unsigned integer

integer value, in decimal notation, not preceded by a plus (+) or minus (–) symbol

3.2 Abbreviations

BSLBF	Bit String, Left Bit First
CA	Conditional Access
CRC	Cyclic Redundancy Check
DAB	Digital Audio Broadcasting
DDB	Download Data Block message
DII	Download Info Indication message
DSI	Download Server Initiate message
DSM-CC	Digital Storage Media Command and Control
DVB	Digital Video Broadcasting
ETS	European Telecommunication Standard
HTML	Hyper Text Mark-up Language
IDL	Independent Data Line
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardization
LSB	Least Significant Bit
MJD	Modified Julian Date
MPEG	Moving Picture Experts Group
MSB	Most Significant Bit
OSI	Open Systems Interconnection
PES	Packetized Elementary Stream
PID	Packet Identifier
PMT	Program Map Table
RFC	Internet Requests for Comments
RPCHOF	Remainder Polynomial Coefficient, Higher Order First
SDT	Service Description Table
TS	Transport Stream
UIMSBF	Unsigned Integer Most Significant Bit First
URL	Uniform Resource Locator
UTC	Universal Time Coordinated
VBI	Vertical Blanking Interval

4 Delivery profiles

There are several ways in which a TeleWeb application can be delivered (see Figure 1 in IEC 62298-1). For the purposes of this document, a delivery profile specifies layers 1 to 4 of the OSI seven-layer model.

4.1 TeleWeb delivered via Teletext packets in VBI lines

Figure 1 shows layers 1 to 4 of the OSI seven-layer model for delivering a TeleWeb service via Teletext packets. The application files are formed into a DSM-CC data carousel at the transport layer, as defined in 5.1. The components of the carousel are then encapsulated in independent Teletext data packets (see 6.3). These are transmitted in the VBI lines of an analog TV signal as described in ETSI EN 300 708.

Layer	Generic content	TeleWeb specific content
Layer 4: Transport	Arranging the data in a suitable way for transport	DSM-CC data carousel: Blocks and modules Descriptors Groups and supergroups Delimiting between messages Forward error correction
Layer 3: Network	Logical functions related to the multiplexing and demultiplexing of data packets belonging to different communications flows: Data channel addressing Data packet sequencing	Format B independent data line as defined in ETSI EN 300 708 ("Packet 31")
Layer 2: Link	Logical functions related to data transmission: Byte synchronization Error control (framing, misdirection and false detection) Data formatting	Normal Teletext packet format as defined in ETSI EN 300 706
Layer 1: Physical	Electrical transmission of the data signal	Normal Teletext parameters as defined in ETSI EN 300 706

Figure 1 – Delivery method for TeleWeb using Teletext packets in VBI lines

IEC 679/05

4.2 TeleWeb delivered via PES packets in an MPEG-2 TS

Figure 2 shows layers 1 to 4 of the OSI seven-layer model for delivering a TeleWeb service via Teletext packets. The application files are formed into a DSM-CC data carousel at the transport layer, as defined in 5.1. The components of the carousel are then encapsulated in independent Teletext data packets (see 6.3). These are transmitted in an MPEG-2 transport stream using PES packets as described in ETSI ETS 300 472.

NOTE The data is prepared as it would be for transmitting in 4.1, added to a transport stream and treated as an analog Teletext service.

Layer	Generic content	TeleWeb specific content
Layer 4: Transport	Arranging the data in a suitable way for transport	Embedding in DSM-CC data carousel as specified in this standard
Layer 3: Network	Logical functions related to the multiplexing and demultiplexing of data packets belonging to different communications flows: Data channel addressing Data packet sequencing	Embedding in Format B independent data line as defined in ETSI EN 300 708 ("Packet 31")
Layer 2: Link	Logical functions related to the data transmission: Byte synchronization Error control (framing, misdirection and false detection) Data formatting	Embedding in an MPEG-2 transport stream using PES packets ETSI ETS 300 472
Layer 1: Physical	Electrical transmission of the data signal	Multiplexing and transmission according to DVB-T ETSI EN 300 744, DVB-C ETSI EN 300 429 or DVB-S ETSI EN 300 421

Figure 2 – Delivery method for TeleWeb using PES packets in an MPEG-2 TS

IEC 680/05

4.3 TeleWeb delivered via DSM-CC sections in an MPEG-2 TS

Figure 3 shows layers 1 to 4 of the OSI seven-layer model for delivering a TeleWeb service via DSM-CC sections. The application files are formed into a DSM-CC data carousel at the transport layer, as defined in 5.1. The components of the carousel are then encapsulated in DSM-CC sections in an MPEG-2 transport stream as described in ISO/IEC 13818-6.

Layer	Generic content	TeleWeb specific content
Layer 4: Transport	Arranging the data in a suitable way for transport	Embedding in DSM-CC data carousel as specified in this standard
Layer 3: Network	Logical functions related to the multiplexing and demultiplexing of data packets belonging to different communications flows: Data channel addressing Data packet sequencing	Embedding in DSM-CC sections as specified in this standard
Layer 2: Link	Logical functions related to the data transmission: Byte synchronization Error control (framing, misdirection and false detection) Data formatting	Embedding in TS packets as specified in ISO/IEC 13818-6
Layer 1: Physical	Electrical transmission of the data signal	Multiplexing and transmission according to DVB-T ETSI EN 300 744, DVB-C ETSI EN 300 429 or DVB-S ETSI EN 300 421

IEC 681/05

Figure 3 – Delivery method for TeleWeb using DSM-CC sections in an MPEG-2 TS

4.4 TeleWeb delivered via other methods

This standard will be amended when necessary with other transport methods.

5 Transport layer protocols

This clause defines protocols for implementing the transport layer.

5.1 DSM-CC data carousel

5.1.1 Overview

The files of a TeleWeb service are organized in DSM-CC data carousels according to the general principles defined in ISO/IEC 13818-6 and adapted for DVB applications as described in ETSI EN 301 192 and ETSI TR 101 202. The DSM-CC data carousel specification embodies the cyclic transmission of data to receivers. The data transmitted within a carousel is first organized into “modules”, which are then subdivided into “blocks”. All the blocks of all modules within the data carousel are of the same size, except for the last block of each module, which may be of a smaller size. Each individual file in a TeleWeb service is treated as a module. Modules can be clustered together to form a “group”. Likewise, groups can be clustered to form “supergroups”.

The data carousel specification defined here uses three messages from the full data carousel specification defined in ISO/IEC 13818-6. The data blocks are carried in DownloadDataBlock (DDB) messages, while control over the modules is provided by DownloadInfoIndication (DII) and DownloadServerInitiate (DSI) messages. Other DSM-CC messages listed in ISO/IEC 13818-6 are not used in the TeleWeb application and should be ignored by receivers designed to this edition. All messages begin with the generic DSM-CC Message Header.²

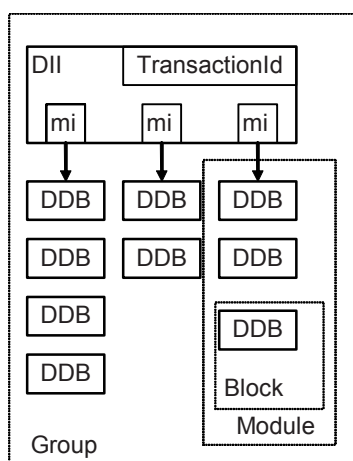
² ISO/IEC 13818-6, Clause 2.

This header contains information about the type and size of the message. The maximum size of any DII, DSI or DDB message shall be 4 084 bytes (including the message header).

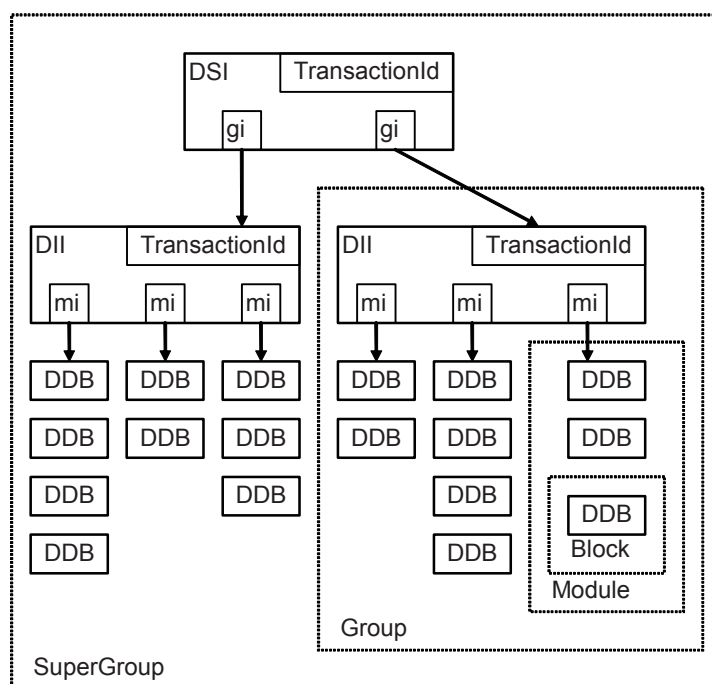
A receiver shall ignore message fields marked “reserved” (ISO-designated) or “reserved for future use” (ETSI-designated), noting that such fields may be variable in size.

A data carousel can have one or two layers of control information as shown in Figure 4. The service provider is free to choose the most appropriate type. A receiver shall be able to work with both types.

One-layer data carousel



Two-layer data carousel



DSI: DownloadServerInitiate message
 DII: DownloadInfoIndication message
 DDB: DownloadDataBlock message
 gi: Group Information bytes
 mi: Module Information bytes

IEC 682/05

Figure 4 – Structure of one-layer and two-layer data carousels

A one-layer carousel defines a single group. The top-level control message is a DII message. This describes all the modules in the carousel. The module description includes a descriptor loop that carries the attributes (for example, type, theme) of each module.

A two-layer carousel comprises a number of one-layer carousels. The top-level control message is a DownloadServerInitiate message (DSI), 5.1.2.2. This describes the different groups in the supergroup. Each group is described by a DII message as for a one-layer carousel.

A TeleWeb service may be implemented across a number of carousels. The need for multiple carousels arises because of the significant overhead associated with updating the contents of control messages when transmitting real-time information. This can be minimized by limiting the amount of data in a carousel that contains information that changes very frequently. The maximum number of carousels may be limited by the transmission method.

5.1.2 DSM-CC messages

5.1.2.1 DownloadInfoIndication message

A DownloadInfoIndication message contains the description of the modules within a group as well as some general parameters of the data carousel such as block size. Each module within the group can be described by a number of descriptors. These carry the TeleWeb-specific attributes.

The syntax of a DII message is shown in Table 1. The final column indicates if a field has a fixed or variable value in the TeleWeb application.

Table 1 – Syntax of the DownloadInfoIndication message

Syntax	No. of bytes	TeleWeb use
DownloadInfoIndication() {		
protocolDiscriminator	1	Fixed at 0x11
dsmccType	1	Fixed at 0x03
messageId	2	Fixed at 0x1002
transactionId	4	Variable
reserved	1	Fixed at 0xFF
adaptationLength	1	Variable
messageLength	2	Variable
dsmccAdaptationHeader()	adaptationLength	Reserved for future use
downloadId	4	Variable
blockSize	2	Variable
windowSize	1	Fixed at 0x00
ackPeriod	1	Fixed at 0x00
tCDownloadWindow	4	Fixed at 0x00 throughout
tCDownloadScenario	4	Variable
compatibilityDescriptorLength	2	Fixed at 0x0000 (no compatibilityDescriptor)
numberOfModules	2	Variable
for(i=0; i< numberOfModules; i++) {		
moduleId	2	Variable
moduleSize	4	Variable
moduleVersion	1	Variable
moduleInfoLength	1	Variable
for(j=0; j< moduleInfoLength; j++) {		
moduleInfoByte	1	Variable
}		
}		
privateDataLength	2	Variable
for(i=0; i< privateDataLength; i++) {		
privateDataByte	1	Reserved for future use
}		
}		