
**Information technology — Generic
coding of moving pictures and
associated audio information —**

**Part 1:
Systems**

**AMENDMENT 1: Carriage of JPEG XS in
MPEG-2 TS**

*Technologies de l'information — Codage générique des images
animées et du son associé —*

Partie 1: Systèmes

AMENDEMENT 1: Transfert de JPEG XS en MPEG-2 TS



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This document was prepared by ITU-T as ITU-T H.222.0 (08/2018) and drafted in accordance with its editorial rules. It was assigned to Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

Information technology – Generic coding of moving pictures and associated audio information: Systems**Amendment 1****Carriage of JPEG XS in MPEG-2 TS****1) Clause 1.2.3**

In clause 1.2.3, Additional References, add the following references:

- ISO/IEC 21122-1:2019, *JPEG XS low-latency lightweight image coding system – Part 1: Core coding system*.
- ISO/IEC 21122-2:2019, *JPEG XS low-latency lightweight image coding system – Part 2: Profiles and buffer models*.
- ISO/IEC 21122-3:2019, *JPEG XS low-latency lightweight image coding system – Part 3: Transport and container formats*.
- ISO/IEC 23091-2:2019, *Coding-independent code points – Part 2: Video*.

2) Clauses 2.1.77bis to 2.1.77sexies

After clause 2.1.77, add the following clauses 2.1.77bis to 2.1.77sexies:

2.1.77bis JPEG XS elementary stream header (jxes header): All parameters required to decode a JPEG XS video access unit and display the decoded data.

2.1.77ter JPEG XS still picture (system): JPEG XS video access unit as defined in 2.1.77quater with constraints as specified in W.2.

2.1.77quater JPEG XS video access unit: The JPEG XS codestream or multiple JPEG XS codestreams, as defined in ISO/IEC 21122-1, comprising a decodable and randomly accessible image, preceded by a JPEG XS elementary stream header.

2.1.77quinquies JPEG XS video elementary stream: Video elementary stream consisting of a succession of JPEG XS video access units.

2.1.77sexies JPEG XS video sequence: JPEG XS video elementary stream where all the access units have the same profile, level and sublevel (as defined in ISO/IEC 21122-2), JPEG XS video access unit coding parameters, and video parameters.

3) Clause 2.4.2.15

After clause 2.4.2.14, add the following clause 2.4.2.15:

2.4.2.15 T-STD extensions for carriage of JPEG XS video elementary streams

The interpretation, extensions, use and constraints for syntax elements in the adaptation header (2.4.3.4 and 2.4.3.5) for JPEG XS Part-1 video are defined in W.5.

The interpretation, extensions, use and constraints for syntax elements in the PES header (2.4.3.6 and 2.4.3.7) for JPEG XS Part-1 video are defined in W.5.

To define the decoding of JPEG XS video elementary streams carried in a Transport Stream, the T-STD model needs to be extended. The T-STD extensions and T-STD parameters for decoding of JPEG XS video elementary streams conforming to one or more profiles defined in ISO/IEC 21122-2 are defined in W.6.

NOTE – No extensions are specified for P-STD model, as carriage of JPEG XS video elementary streams in program streams is not supported.

4) Clause 2.4.3.7

In clause 2.4.3.7, replace Table 2-22 with the following:

Table 2-22 – Stream_id assignments

Stream_id	Note	stream coding
'1011 1100'	1	program_stream_map
'1011 1101'	2,9,10,11	private_stream_1
'1011 1110'		padding_stream
'1011 1111'	3	private_stream_2
'110x xxxx'		ISO/IEC 13818-3 or ISO/IEC 11172-3 or ISO/IEC 13818-7 or ISO/IEC 14496-3 or ISO/IEC 23008-3 audio stream number 'x xxxx'
'1110 xxxx'		Rec. ITU-T H.262 ISO/IEC 13818-2, ISO/IEC 11172-2, ISO/IEC 14496-2, Rec. ITU-T H.264 ISO/IEC 14496-10 or Rec. ITU-T H.265 ISO/IEC 23008-2 video stream number 'xxxx'
'1111 0000'	3	ECM_stream
'1111 0001'	3	EMM_stream
'1111 0010'	5	Rec. ITU-T H.222.0 ISO/IEC 13818-1 Annex A or ISO/IEC 13818-6_DSMCC_stream
'1111 0011'	2	ISO/IEC_13522_stream
'1111 0100'	6	Rec. ITU-T H.222.1 type A
'1111 0101'	6	Rec. ITU-T H.222.1 type B
'1111 0110'	6	Rec. ITU-T H.222.1 type C
'1111 0111'	6	Rec. ITU-T H.222.1 type D
'1111 1000'	6	Rec. ITU-T H.222.1 type E
'1111 1001'	7	ancillary_stream
'1111 1010'		ISO/IEC 14496-1_SL-packetized_stream
'1111 1011'		ISO/IEC 14496-1_FlexMux_stream
'1111 1100'		metadata stream
'1111 1101'	8	extended_stream_id
'1111 1110'		reserved data stream
'1111 1111'	4	program_stream_directory

The notation x means that the values '0' or '1' are both permitted and results in the same stream type. The stream number is given by the values taken by the x's.

NOTE 1 – PES packets of type program_stream_map have unique syntax specified in 2.5.4.1.

NOTE 2 – PES packets of type private_stream_1 and ISO/IEC_13522_stream follow the same PES packet syntax as those for Rec. ITU-T H.262 | ISO/IEC 13818-2 video and ISO/IEC 13818-3 audio streams.

NOTE 3 – PES packets of type private_stream_2, ECM_stream and EMM_stream are similar to private_stream_1 except that no syntax is specified after PES_packet_length field.

NOTE 4 – PES packets of type program_stream_directory have a unique syntax specified in 2.5.5.

NOTE 5 – PES packets of type DSM-CC_stream have a unique syntax specified in ISO/IEC 13818-6.

NOTE 6 – This stream_id is associated with stream_type 0x09 in Table 2-34.

NOTE 7 – This stream_id is only used in PES packets, which carry data from a program stream or an ISO/IEC 11172-1 System Stream, in a transport stream (refer to 2.4.3.8).

NOTE 8 – The use of stream_id 0xFD (extended_stream_id) identifies that this PES packet employs an extended syntax to permit additional stream types to be identified.

NOTE 9 – JPEG 2000 video streams (stream_type = 0x21) are carried using the same PES packet syntax as private_stream_1.

NOTE 10 – Timeline and External Media Information streams (stream_type = 0x27) are carried using the same PES packet syntax as private_stream_1.

NOTE 11 – JPEG XS video streams (stream_type = 0x32) are carried using the same PES packet syntax as private_stream_1.

5) Clause 2.4.4.10, Table 2-34

In clause 2.4.4.10, Semantic definition of fields in Transport Stream program map section, replace Table 2-34 with the following: