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## Foreword

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INTERNATIONAL STANDARD  
RECOMMENDATION ITU-T**Information technology – Generic coding of moving pictures and  
associated audio information: Systems****Amendment 5****Transport of JPEG 2000 Part 1 (ITU-T T.800 | ISO/IEC 15444-1)  
video over ITU-T H.222.0 | ISO/IEC 13818-1****1) Clause 1.2.3**

In 1.2.3, *Additional References*, add the following reference:

- Recommendation ITU-T T.800 (2002) | ISO/IEC 15444-1:2004, *Information technology – JPEG 2000 image coding system: Core coding system*.

**2) New clauses 2.1.89 to 2.1.92**

After 2.1.88, add 2.1.89 to 2.1.92:

**2.1.89 JPEG 2000 (J2K) video access unit:** An access unit defined in Rec. ITU-T T.800 (2002)/Amd.3 (2010) | ISO/IEC 15444-1:2004/Amd.3:2010 which includes all the parameters required to decode the access unit and display the decoded data.

**2.1.90 J2K video elementary stream:** Video elementary stream consisting of a succession of J2K video access units.

**2.1.91 J2K video sequence:** J2K video elementary stream where all the access units have the same profile/level, J2K video access unit coding parameters and video parameters.

**2.1.92 J2K still picture (system):** J2K video access unit as defined in 2.1.89 with constraints as specified in S.2.

**3) New clause 2.4.2.10**

After 2.4.2.9, add 2.4.2.10:

**2.4.2.10 T-STD extensions for carriage of J2K 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 2000 part 1 video are defined in S.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 2000 Part 1 video are defined in S.5.

To define the decoding of J2K 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 J2K video elementary streams conforming to one or more profiles defined in Rec. ITU-T T.800 (2002) | ISO/IEC 15444-1:2004 are defined in S.6.

NOTE – No extensions are specified for P-STD model, as carriage of J2K video elementary streams in program streams is not supported.

4) Clause 2.4.3.7

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

Table 2-22 – Stream\_id assignments

| stream_id | Notes   | Stream coding  |
|-----------|---------|--|
| 1011 1100 | 1       | program_stream_map   |
| 1011 1101 | 2 and 9 | 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 audio stream number x xxxx                                      |
| 1110 xxxx |         | Rec. ITU-T H.262   ISO/IEC 13818-2 or ISO/IEC 11172-2 or ISO/IEC 14496-2 or Rec. ITU-T H.264   ISO/IEC 14496-10 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/IEC14496-1_SL-packetized_stream  |
| 1111 1011 |         | ISO/IEC14496-1_FlexMux_stream  |
| 1111 1100 |         | ISO/IEC14496-1_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 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 2-29.

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 200 video streams (stream\_type = 0x21) are carried using the same PES packet syntax as private\_stream\_1.

## 5) Clause 2.4.4.9

In 2.4.4.9, Semantic definition of fields in Transport Stream program map section, replace Table 2-34 with the following:

Table 2-34 – Stream type assignments

| Value     | Description   |
|-----------|---|
| 0x00      | ITU-T   ISO/IEC Reserved  |
| 0x01      | ISO/IEC 11172-2 Video   |
| 0x02      | Rec. ITU-T H.262   ISO/IEC 13818-2 Video or ISO/IEC 11172-2 constrained parameter video stream  |
| 0x03      | ISO/IEC 11172-3 Audio   |
| 0x04      | ISO/IEC 13818-3 Audio   |
| 0x05      | Rec. ITU-T H.222.0   ISO/IEC 13818-1 private_sections   |
| 0x06      | Rec. ITU-T H.222.0   ISO/IEC 13818-1 PES packets containing private data  |
| 0x07      | ISO/IEC 13522 MHEG  |
| 0x08      | Rec. ITU-T H.222.0   ISO/IEC 13818-1 Annex A DSM-CC   |
| 0x09      | Rec. ITU-T H.222.1  |
| 0x0A      | ISO/IEC 13818-6 type A  |
| 0x0B      | ISO/IEC 13818-6 type B  |
| 0x0C      | ISO/IEC 13818-6 type C  |
| 0x0D      | ISO/IEC 13818-6 type D  |
| 0x0E      | Rec. ITU-T H.222.0   ISO/IEC 13818-1 auxiliary  |
| 0x0F      | ISO/IEC 13818-7 Audio with ADTS transport syntax  |
| 0x10      | ISO/IEC 14496-2 Visual  |
| 0x11      | ISO/IEC 14496-3 Audio with the LATM transport syntax as defined in ISO/IEC 14496-3  |
| 0x12      | ISO/IEC 14496-1 SL-packetized stream or FlexMux stream carried in PES packets   |
| 0x13      | ISO/IEC 14496-1 SL-packetized stream or FlexMux stream carried in ISO/IEC 14496_sections  |
| 0x14      | ISO/IEC 13818-6 Synchronized Download Protocol  |
| 0x15      | Metadata carried in PES packets   |
| 0x16      | Metadata carried in metadata_sections   |
| 0x17      | Metadata carried in ISO/IEC 13818-6 Data Carousel   |
| 0x18      | Metadata carried in ISO/IEC 13818-6 Object Carousel   |
| 0x19      | Metadata carried in ISO/IEC 13818-6 Synchronized Download Protocol  |
| 0x1A      | IPMP stream (defined in ISO/IEC 13818-11, MPEG-2 IPMP)  |
| 0x1B      | AVC video stream conforming to one or more profiles defined in Annex A of Rec. ITU-T H.264   ISO/IEC 14496-10 or AVC video sub-bitstream, as defined in 2.1.78, or MVC base view sub-bitstream, as defined in 2.1.85, or AVC video sub-bitstream of MVC, as defined in 2.1.88 |
| 0x1C      | ISO/IEC 14496-3 Audio, without using any additional transport syntax, such as DST, ALS and SLS  |
| 0x1D      | ISO/IEC 14496-17 Text   |
| 0x1E      | Auxiliary video stream as defined in ISO/IEC 23002-3  |
| 0x1F      | SVC video sub-bitstream of an AVC video stream conforming to one or more profiles defined in Annex G of Rec. ITU-T H.264   ISO/IEC 14496-10   |
| 0x20      | MVC video sub-bitstream of an AVC video stream conforming to one or more profiles defined in Annex H of Rec. ITU-T H.264   ISO/IEC 14496-10   |
| 0x21      | Video stream conforming to one or more profiles as defined in Rec. ITU-T T.800   ISO/IEC 15444-1  |
| 0x22-0x7E | Rec. ITU-T H.222.0   ISO/IEC 13818-1 Reserved   |
| 0x7F      | IPMP stream   |
| 0x80-0xFF | User Private  |

## 6) Clause 2.6.1

In 2.6.1, Semantic definition of fields in program and program element descriptors, replace Table 2-45 with:

Table 2-45 – Program and program element descriptors

| descriptor_tag | TS  | PS  | Identification   |
|----------------|-----|-----|--|
| 0              | N/A | N/A | Reserved   |
| 1              | N/A | X   | Forbidden  |
| 2              | X   | X   | video_stream_descriptor                                    |
| 3              | X   | X   | audio_stream_descriptor                                    |
| 4              | X   | X   | hierarchy_descriptor                                       |
| 5              | X   | X   | registration_descriptor                                    |
| 6              | X   | X   | data_stream_alignment_descriptor                           |
| 7              | X   | X   | target_background_grid_descriptor                          |
| 8              | X   | X   | video_window_descriptor                                    |
| 9              | X   | X   | CA_descriptor  |
| 10             | X   | X   | ISO_639_language_descriptor                                |
| 11             | X   | X   | system_clock_descriptor                                    |
| 12             | X   | X   | multiplex_buffer_utilization_descriptor                    |
| 13             | X   | X   | copyright_descriptor                                       |
| 14             | X   |     | maximum_bitrate_descriptor                                 |
| 15             | X   | X   | private_data_indicator_descriptor                          |
| 16             | X   | X   | smoothing_buffer_descriptor                                |
| 17             | X   |     | STD_descriptor   |
| 18             | X   | X   | IBP_descriptor   |
| 19-26          | X   |     | Defined in ISO/IEC 13818-6                                 |
| 27             | X   | X   | MPEG-4_video_descriptor                                    |
| 28             | X   | X   | MPEG-4_audio_descriptor                                    |
| 29             | X   | X   | IOD_descriptor   |
| 30             | X   |     | SL_descriptor  |
| 31             | X   | X   | FMC_descriptor   |
| 32             | X   | X   | external_ES_ID_descriptor                                  |
| 33             | X   | X   | MuxCode_descriptor   |
| 34             | X   | X   | FmxBufferSize_descriptor                                   |
| 35             | X   |     | multiplexBuffer_descriptor                                 |
| 36             | X   | X   | content_labeling_descriptor                                |
| 37             | X   | X   | metadata_pointer_descriptor                                |
| 38             | X   | X   | metadata_descriptor  |
| 39             | X   | X   | metadata_STD_descriptor                                    |
| 40             | X   | X   | AVC video descriptor                                       |
| 41             | X   | X   | IPMP_descriptor (defined in ISO/IEC 13818-11, MPEG-2 IPMP) |
| 42             | X   | X   | AVC timing and HRD descriptor                              |
| 43             | X   | X   | MPEG-2_AAC_audio_descriptor                                |
| 44             | X   | X   | FlexMuxTiming_descriptor                                   |
| 45             | X   | X   | MPEG-4_text_descriptor                                     |
| 46             | X   | X   | MPEG-4_audio_extension_descriptor                          |
| 47             | X   | X   | Auxiliary_video_stream_descriptor                          |
| 48             | X   | X   | SVC extension descriptor                                   |
| 49             | X   | X   | MVC extension descriptor                                   |



Table 2-45 – Program and program element descriptors

| descriptor_tag | TS  | PS  | Identification                                |
|----------------|-----|-----|---|
| 50             | X   | n/a | J2K video descriptor                          |
| 51-63          | n/a | n/a | Rec. ITU-T H.222.0   ISO/IEC 13818-1 Reserved |
| 64-255         | n/a | n/a | User Private                                  |

## 7) New clauses 2.6.80 and 2.6.81

After 2.6.79, add 2.6.80 and 2.6.81:

### 2.6.80 J2K video descriptor

For J2K video elementary streams conforming to one or more profiles defined in Rec. ITU-T T.800 | ISO/IEC 15444-1, the J2K video descriptor provides information that may be present in each J2K access unit as well as for the J2K video sequence. In addition, it provides information to signal J2K still pictures. This descriptor shall be included for each J2K video elementary stream component in the PMT with stream\_type equal to 0x21.

Table AMD5-1 – J2K video descriptor

| Syntax                   | No. of bits | Mnemonic |
|--------------------------|-------------|----------|
| J2K_video_descriptor() { |             |          |
| descriptor_tag           | 8           | uimsbf   |
| descriptor_length        | 8           | uimsbf   |
| profile_and_level        | 16          | uimsbf   |
| horizontal_size          | 32          | uimsbf   |
| vertical_size            | 32          | uimsbf   |
| max_bit_rate             | 32          | uimsbf   |
| max_buffer_size          | 32          | uimsbf   |
| DEN_frame_rate           | 16          | uimsbf   |
| NUM_frame_rate           | 16          | uimsbf   |
| color_specification      | 8           | bslbf    |
| still_mode               | 1           | bslbf    |
| interlaced_video         | 1           | bslbf    |
| reserved                 | 6           | bslbf    |
| for (i=0; i<N; i++) {    |             |          |
| private_data_byte        | 8           | bslbf    |
| }                        |             |          |
| }                        |             |          |

### 2.6.81 Semantics of fields in J2K video descriptor

**profile\_and\_level** – This field shall be in the range 0x0101-0x04ff and coded as defined in Table A.10 of Rec. ITU-T T.800 | ISO/IEC 15444-1 and indicates broadcast profile and level values.

**horizontal\_size** – This field shall be coded the same as Xsiz parameter found in the J2K codestream main header, as defined in Annex A of Rec. ITU-T T.800 | ISO/IEC 15444-1.

**vertical\_size** – This field shall be coded the same as Ysiz parameter found in the J2K codestream main header, as defined in Annex A of Rec. ITU-T T.800 | ISO/IEC 15444-1.

**max\_bit\_rate** – This field may be coded the same as the Maxbr value in the j2k\_brat field box specified in Table S.1 and shall not exceed the maximum compressed bit rate value for the profile and level specified in Table S.2. This field shall be set appropriately and signalled when profile\_and\_level = 0x0307, where no maximum bit rate is specified.

**max\_buffer\_size** – This field shall not exceed the Maximum buffer size value for the profile and level specified in the j2k\_brat box in Table S.2. When profile\_and\_level = 0x0307, the max\_buffer\_size shall be set appropriately and shall not exceed (max\_bit\_rate/1.60E5), where max\_bit\_rate is expressed in bit/s.

**DEN\_frame\_rate** – This field shall be coded the same as frat\_denominator field in the j2k\_frat box specified in Table S.1 (see Annex S).