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

**Part 1:
Systems**

**AMENDMENT 3: Transport of HEVC video
over MPEG-2 systems**

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

*Partie 1:
Systèmes*

AMENDEMENT 3: Transport de vidéo HEVC sur les systèmes MPEG-2



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INTERNATIONAL STANDARD
RECOMMENDATION ITU-TInformation technology – Generic coding of moving pictures
and associated audio information: Systems

Amendment 3

Transport of HEVC video over MPEG-2 systems

1) Clause 1.2.2

Add the following references:

- Recommendation ITU-T H.265 (2013), *High efficiency video coding*.
ISO/IEC 23008-2:2013, *Information technology – High efficiency coding and media delivery in heterogeneous environments – Part 2: High efficiency video coding*.

2) Clauses 2.1.95 to 2.1.109

Add the following definitions after clause 2.1.94:

2.1.95 HEVC video stream: A byte stream as specified in Rec. ITU-T H. 265 | ISO/IEC 23008-2 Annex B.

2.1.96 HEVC access unit: An access unit as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2 with the constraints specified in 2.17.1.

2.1.97 HEVC 24-hour picture (system): An *HEVC access unit* with a presentation time that is more than 24 hours in the future. For the purpose of this definition, *HEVC access unit* n has a presentation time that is more than 24 hours in the future if the difference between the initial arrival time $t_{ai}(n)$ and the DPB output time $t_{o,dpb}(n)$ is more than 24 hours.

2.1.98 HEVC slice: An *HEVC independent slice segment* and zero or more subsequent *HEVC dependent slice segments* preceding the next *HEVC independent slice segment* (if any) within the same *HEVC access unit*.

2.1.99 HEVC slice segment: A *byte_stream_nal_unit* with *nal_unit_type* in the range of 0 to 9 and 16 to 23, as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2.

2.1.100 HEVC dependent slice segment: An *HEVC slice segment* with the syntax element *dependent_slice_segment_flag* in the slice header set to a value equal to 1, as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2.

2.1.101 HEVC independent slice segment: An *HEVC slice segment* with the syntax element *dependent_slice_segment_flag* in the slice header set to a value 0 or inferred to be equal to 0, as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2.

2.1.102 HEVC tile of slices: One or more consecutive *HEVC slices* which form the coded representation of a tile, as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2.

2.1.103 HEVC still picture (system): An HEVC still picture consists of an *HEVC access unit* containing an IDR picture preceded by VPS, SPS and PPS NAL units, as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2, that carry sufficient information to correctly decode this IDR picture. Preceding an HEVC still picture, there shall be another HEVC still picture or an end of sequence NAL unit terminating a preceding coded video sequence, as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2.

2.1.104 HEVC video sequence (system): A coded video sequence as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2.

2.1.105 HEVC video sub-bitstream: A subset of the NAL units of an HEVC video stream in their original order.

2.1.106 HEVC temporal video sub-bitstream: An *HEVC video sub-bitstream* that contains all VCL NAL units and associated non-VCL NAL units of the temporal sub-layer, as specified in Rec. ITU-T H.265 | ISO/IEC 23008-2, associated with TemporalId equal to 0 and which may additionally contain all VCL NAL units and associated non-VCL NAL units of all temporal sub-layers associated with a contiguous range of TemporalId from 1 to a value equal to or smaller than $\text{sps_max_sub_layers_minus1}$ included in the active sequence parameter set, as specified in Rec. ITU-T H.265 | ISO/IEC 23008-2.

2.1.107 HEVC temporal video subset: An *HEVC video sub-bitstream* that contains all VCL NAL units and the associated non-VCL NAL units of one or more temporal sub-layers, as specified in Rec. ITU-T H.265 | ISO/IEC 23008-2, with each temporal sub-layer not being present in the corresponding *HEVC temporal video sub-bitstream* and TemporalId associated with each temporal sub-layer forming a contiguous range of values.

NOTE – According to the constraints for the transport of HEVC specified in 2.17.1, each temporal sub-layer of an *HEVC video stream* is present either in the *HEVC temporal video sub-bitstream* or in exactly one *HEVC temporal video subset* which is carried in a set of elementary streams that are associated by hierarchy descriptors. This prevents the multiple inclusion of the same temporal sub-layer and allows aggregation of the *HEVC temporal video sub-bitstream* with associated *HEVC temporal video subsets* according to the hierarchy descriptors, as specified in 2.17.3.

2.1.108 HEVC highest temporal sub-layer representation: The sub-layer representation of the temporal sub-layer with the highest value of TemporalId, as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2, in the associated *HEVC temporal video sub-bitstream* or *HEVC temporal video subset*.

2.1.109 HEVC complete temporal representation: A sub-layer representation as defined in Rec. ITU-T H.265 | ISO/IEC 23008-2 that contains all temporal sub-layers up to the temporal sub-layer with TemporalId equal to $\text{sps_max_sub_layers_minus1}+1$ as included in the active sequence parameter set, as specified in Rec. ITU-T H.265 | ISO/IEC 23008-2.

3) Clause 2.4.2.6

Replace the following two paragraphs:

Replace:

The delay of any data through the system target decoder buffers shall be less than or equal to one second except for still picture video data and ISO/IEC 14496 streams. Specifically: $\text{td}_n(j) - t(i) \leq 1$ second for all j , and all bytes i in access unit $A_n(j)$.

with:

The delay of any data through the system target decoder buffers shall be less than or equal to one second except for still picture video data, ISO/IEC 14496 and ISO/IEC 23008-2 streams. Specifically: $\text{td}_n(j) - t(i) \leq 1$ second for all j , and all bytes i in access unit $A_n(j)$.

Replace:

For ISO/IEC 14496 streams, the delay is constrained by $\text{td}_n(j) - t(i) \leq 10$ seconds for all j , and all bytes i in access unit $A_n(j)$.

with:

For ISO/IEC 14496 and ISO/IEC 23008-2 streams, the delay is constrained by $\text{td}_n(j) - t(i) \leq 10$ seconds for all j , and all bytes i in access unit $A_n(j)$.

4) Clause 2.4.2.11

Add the following new clause immediately after clause 2.4.2.10:

2.4.2.11 T-STD extensions for carriage of HEVC

T-STD extensions and T-STD parameters for the decoding of HEVC video streams are defined in 2.17.2 and 2.17.3. Program stream support including P-STD extensions and P-STD parameters are not specified for HEVC video streams.