

ISO/IEC JTC 1

Secretariat: ANSI

Voting begins on:
2014-07-18

Voting terminates on:
2014-09-18

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

**Part 1:
Systems**

**AMENDMENT 5 Transport of MVC depth
video sub-bitstream and extensions to
support HEVC low delay coding mode**

[ISO/IEC 13818-1:2013/FDAMd 5](https://standards.iso.org/iso/13818-1:2013/fdams/5)

<https://standards.iteh.ai/catalog/standards/sist/1f833479-9d05-448c-8722-637a815074280-2013-13818-1-2013-fdams-5>

*Technologies de l'information — Codage générique des images
animées et du son associé — Partie 1: Systèmes*

*AMENDEMENT 5 : Transport de sous-flux de données binaires vidéo
de MVC de profondeur et extensions pour la prise en charge du mode
de codage à délai court en HEVC*

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Reference number
ISO/IEC 13818-1:2013/FDAM 5:2014(E)

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Published in Switzerland

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Amendment 5 to ISO/IEC 13818-1:2013 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*, in collaboration with ITU-T. The identical text is published as Rec. ITU-T H.222.0 (2012)/Amd.5.

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Information technology – Generic coding of moving pictures and
 associated audio information: Systems

Amendment 5

Transport of MVC depth video sub-bitstream and support for HEVC low delay coding mode

1) **Replace subclause 1.2.2**

from

- Recommendation ITU-T H.264 (2010), *Advanced video coding for generic audiovisual services*.
 ISO/IEC 14496-10:2010, *Information technology – Coding of audio-visual objects – Part 10: Advanced video coding*.

by

- Recommendation ITU-T H.264 (2013), *Advanced video coding for generic audiovisual services*.
 ISO/IEC 14496-10:2013, *Information technology – Coding of audio-visual objects – Part 10: Advanced video coding*.

2) **Subclause 2.1.82 - 2.1.115**

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Replace subclause 2.1.82 by the following:

2.1.82 view order index: An index that indicates the decoding order of MVC view components in an AVC access unit as defined in Annex H of Rec. ITU-T H.264 | ISO/IEC 14496-10 or MVCD view components in an AVC access unit as defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10. The association of view order index values to the NAL unit header syntax element `view_id` is indicated for an AVC video sequence in the sequence parameter set MVC extension as defined in Annex H of Rec. ITU-T H.264 | ISO/IEC 14496-10 or in the sequence parameter set MVCD extension as defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10.

Add after subclause 2.1.109:

2.1.110 MVCD view_id subset: A set of one or more `view_id` values, as defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10 in the NAL unit header syntax element, associated with one set of consecutive view order index values.

NOTE – An MVCD video sub-bitstream or MVCD base view sub-bitstream based on a specific MVCD `view_id` subset may not include view components for all `view_id` values included in that MVCD `view_id` subset. One or more view order index values may be skipped if the view associated with a missing view order index value is not required for decoding the transmitted views.

2.1.111 MVCD video sub-bitstream: The MVCD video sub-bitstream is defined to be all VCL NAL units with `nal_unit_type` equal to 21 associated with the same MVCD `view_id` subset of an AVC video stream and associated non-VCL NAL units which conform to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10.

NOTE – In contrast to a sub-bitstream as specified in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10, an MVCD video sub-bitstream according to this Specification is not necessarily a decodable MVCD video sub-bitstream. The one exception is when an MVCD video sub-bitstream is also an MVCD base view sub-bitstream. Re-assembling MVCD video sub-bitstreams in an increasing order of view order index, starting from the lowest value of view order index up to any value of view order index, results in a decodable AVC video stream.

2.1.112 MVCD base view sub-bitstream: The MVCD base view sub-bitstream is defined to contain the AVC video sub-bitstream of MVCD conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10 and one additional MVCD video sub-bitstream associated with an MVCD `view_id` subset including the view order index that immediately follows the view order index associated with the base view.

NOTE – The MVCD base view sub-bitstream is also an AVC video stream where no re-assembly is required before decoding.

2.1.113 MVCD view-component subset: The VCL NAL units of an AVC access unit associated with the same MVCD view_id subset and associated non-VCL NAL units.

NOTE – Re-assembling MVCD view-component subsets ordered according to the view order index, starting from the minimum view order index up to the highest view order index present in the access unit, while reordering the non-VCL NAL units conforming to the order of NAL units within an access unit, as defined in Rec. ITU-T H.264 | ISO/IEC 14496-10, results in an AVC access unit.

2.1.114 MVCD slice (system): A byte_stream_nal_unit with nal_unit_type syntax element equal to 21 of an AVC video stream which conforms to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10.

2.1.115 AVC video sub-bitstream of MVCD: The video sub-bitstream that contains the base view as defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10, containing all VCL NAL units associated with the minimum value of view order index present in each AVC video sequence of the AVC video stream. The AVC video sub-bitstream of MVCD may additionally contain the associated NAL units with nal_unit_type syntax element equal to 14 (prefix NAL units), as defined for MVC in Annex H of Rec. ITU-T H.264 | ISO/IEC 14496-10.

3) Clause 2.4.2

Add the following immediately after 2.4.2.11 as a new subclause:

2.4.2.12 T-STD extensions for carriage of MVCD video sub-bitstream:

T-STD extensions and T-STD parameters for decoding of MVCD video sub-bitstreams are defined in 2.14.1 and 2.14.3.7.

Note : Program stream extensions are not specified for MVCD video sub-bitstreams.

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4) Clause 2.4.3.5

In the section specifying the discontinuity_indicator, add at the end of the bulleted list introduced by “For the purpose of this clause, an elementary stream access point is defined as follows”:

MVCD video sub-bitstreams of AVC video streams conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10 – The first byte of an MVCD view-component subset is an elementary stream access point if the following two conditions are met:

- The subset sequence parameter sets and picture parameter sets referenced in this and all subsequent MVCD view-component subsets in the MVCD video sub-bitstream shall be provided after this access point in the byte stream and prior to their activation.
- If this MVCD video sub-bitstream access point requires the elementary stream access point of the same AVC access unit, if any, contained in the corresponding elementary stream that needs to be present in decoding order before decoding the elementary stream associated with this elementary stream access point, then the corresponding elementary stream shall also include an elementary stream access point.

NOTE x – If the hierarchy descriptor is present for this MVCD video sub-bitstream, then the MVCD video sub-bitstream of which the hierarchy_layer_index equals the hierarchy_embedded_layer_index of this MVCD sub-bitstream should have an elementary stream access point in this same access unit.

In the section specifying the elementary_stream_priority_indicator, add at the end of the paragraph introduced by “For MVC video sub-bitstreams”:

For MVCD video sub-bitstreams or MVCD base view sub-bitstreams of AVC video streams conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10, this field may be set to '1' only if the payload contains one or more bytes from an anchor picture, indicated by the slice_type equal to 2, 4, 7, or 9 and the anchor_pic_flag syntax element equal to 1 for all prefix NAL units and slice extension NAL units.

5) Clause 2.4.3.7

In the section specifying the stream_id, add at the end of the paragraph:

For AVC video streams conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10, all MVCD video sub-bitstreams of the same AVC video stream shall have the same stream_id value.

In the section specifying the PTS (presentation time stamp), add:

For MVCD video sub-bitstreams, MVCD base view sub-bitstream or AVC video sub-bitstream of MVCD of AVC video streams conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10, if a PTS is present in the PES packet header, it shall refer to the first MVCD view-component subset that commences in this PES packet. An MVCD view-component subset commences in a PES packet if the first byte of the MVCD view-component subset is present in the PES packet. To achieve consistency between the STD model and the HRD model defined in Annex C of Rec. ITU-T H.264 | ISO/IEC 14496-10, for each re-assembled and decoded AVC access unit, the PTS value in the STD shall, within the accuracy of their respective clocks, indicate the same instant in time as the nominal DPB output time in the HRD, defined herein as $t_{o,n,dpb}(n) = t_{r,n}(n) + t_c * dpb_output_delay(n)$, where $t_{r,n}(n)$, t_c , and $dpb_output_delay(n)$ are defined as in Annex C of Rec. ITU-T H.264 | ISO/IEC 14496-10.

In the section specifying the DTS (decoding time stamp), add:

For MVCD video sub-bitstreams of AVC video streams conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10, if a DTS is present in the PES packet header, it shall refer to the first MVCD view-component subset that commences in this PES packet. An MVCD view-component subset commences in a PES packet if the first byte of the MVCD view-component subset is present in the PES packet. To achieve consistency between the STD model and the HRD model defined in Annex C of Rec. ITU-T H.264 | ISO/IEC 14496-10, for each re-assembled AVC access unit the DTS value in the STD shall, within the accuracy of their respective clocks, indicate the same instant in time as the nominal CPB removal time $t_{r,n}(n)$ in the HRD, as defined in Annex C of Rec. ITU-T H.264 | ISO/IEC 14496-10.

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6) Table 2-34

Replace the Table 2-34 with following table:

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<https://standards.iteh.ai/catalog/standards/sist/448c-8722-637a8150f942/iso-iec-13818-1-2013-fdamd-5>
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 (see note 2)
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

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Value	Description
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 of SVC 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 or MVCD base view sub-bitstream, as defined in 2.1.97, or AVC video sub-bitstream of MVCD, as defined in 2.1.100
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	<u>Auxiliary video stream as defined in ISO/IEC 23002-3</u>
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	Additional view Rec. ITU-T H.262 ISO/IEC 13818-2 video stream for service-compatible stereoscopic 3D services (see note 3 and 4)
0x23	Additional view Rec. ITU-T H.264 ISO/IEC 14496-10 video stream conforming to one or more profiles defined in Annex A for service-compatible stereoscopic 3D services (see note 3 and 4)
0x24	ITU-T Rec H.265 ISO/IEC 23008-2 video stream or an HEVC temporal video sub-bitstream
0x25	HEVC temporal video subset of an HEVC video stream conforming to one or more profiles defined in Annex A of ITU-T Rec. H.265 ISO/IEC 23008-2
0x26	MVCD video sub-bitstream of an AVC video stream conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 ISO/IEC 14496-10
0x27-0x7E	Rec. ITU-T H.222.0 ISO/IEC 13818-1 Reserved
0x7F	IPMP stream
0x80-0xFF	User Private

7) Subclause 2.6.7

In the section specifying the hierarchy_type, add at the end of the paragraph:

For MVCD video sub-bitstreams, this field shall be set to the value of '9' ("MVCD video sub-bitstream") and the flags temporal_scalability_flag, spatial_scalability_flag and quality_scalability_flag shall be set to '1'. For MVCD base view sub-bitstreams, this field shall be set to the value of '15' and the flags temporal_scalability_flag, spatial_scalability_flag and quality_scalability_flag shall be set to '1'.

In the section specifying the hierarchy_layer_index, add at the end of the paragraph:

For MVCD video sub-bitstreams of AVC video streams conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10, this is the program element index, which is assigned in a way that the bitstream order will be correct if associated MVCD view-component subsets of the MVCD video sub-bitstreams of the same access unit are re-assembled in increasing order of hierarchy_layer_index.

Replace Table 2-50 by the following table:

Table 2-50 – Hierarchy_type field values

Value	Description
0	Reserved
1	Spatial Scalability
2	SNR Scalability
3	Temporal Scalability
4	Data partitioning
5	Extension bitstream
6	Private Stream
7	Multi-view Profile
8	Combined Scalability
9	MVC video sub-bitstream or MVCD video sub-bitstream
10-14	Reserved
15	Base layer or MVC base view sub-bitstream, AVC video sub-bitstream of MVC, Base layer of MVCD base view sub-bitstream or AVC video sub-bitstream of MVCD

8) Subclause 2.6.11

In the section specifying the alignment_type, add at the end of the bulleted list introduced by “Table 2-54 describes the alignment type for Rec. ITU-T H.264 | ISO/IEC 14496-10 video when the data_alignment_indicator in the PES packet header has a value of '1'. In this case:”:

- For MVCD video sub-bitstreams of AVC video streams conforming to one or more profiles defined in Annex I of Rec. ITU-T H.264 | ISO/IEC 14496-10, the first PES_packet_data_byte following the PES header shall be the first byte of an MVCD view-component subset, the first byte of an MVC slice or the first byte of MVCD slice, as signalled by the alignment_type value.

Replace Table 2-54 by the following table:

Table 2-54 – AVC video stream alignment values

Alignment type	Description
00	Reserved
01	AVC slice or AVC access unit
02	AVC access unit
03	SVC slice or SVC dependency representation
04	SVC dependency representation
05	MVC slice or MVC view-component subset
06	MVC view-component subset
07	MVCD slice or MVCD view-component subset
08	MVCD view-component subset
07-FF	Reserved

9) Subclause 2.6.64

Replace the paragraph starting with “For AVC video streams conforming to one or more profiles defined in Annex G or” with following: