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AMENDMENT 30
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Information technology — Coding of audio-visual objects —

Part 4: Conformance testing

AMENDMENT 30: Conformance testing for new profiles for professional applications

Technologies de l'information — Codage des objets audiovisuels —

Partie 4: Essai de conformité

AMENDEMENT 30: Essai de conformité pour nouveaux profils pour applications professionnelles

Reference number
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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Amendment 30 to ISO/IEC 14496-4:2004 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This Amendment establishes conformance test requirements for conformance to ISO/IEC 14496-10.

In this Amendment, additional text to ISO/IEC 14496-10 is specified for testing the conformance of ISO/IEC 14496-10 video decoders including in particular the AVC Professional Profiles, which consist of the High 10 Intra, High 4:2:2 Intra, High 4:4:4 Intra, CAVLC 4:4:4 Intra, and High 4:4:4 Predictive profiles.

The following subclauses specify the normative tests for verifying conformance of ISO/IEC 14496-10 video bitstreams and decoders. These normative tests make use of test data (bitstream test suites) provided as an electronic annex to this document, and of the reference software decoder specified in ISO/IEC 14496-5 with source code available in electronic format.

The numbering in this Amendment is relative to the text of ISO/IEC 14496-4. When a numbered item (i.e. a clause, subclause, figure, table, or equation) or associated content is being replaced or modified, the same number is used for the modified numbered item. When a numbered item is inserted between prior numbered items, the number of the corresponding numbered item immediately preceding it is used and the letter 'a' is appended to this number. When, after this one such inserted numbered item, another numbered item is inserted, the letter 'a' is replaced by the letter 'b' to indicate their relative order, and so on, following ordinary English alphabetical order. If text integrating this Amendment with ISO/IEC 14496-4 is produced, the inserted numbered items with appended letters are to be assigned to corresponding numbers in their numerical order without any such letters, and any subsequent numbered items are to be assigned later numbers to avoid conflicts. The purpose of the numbering convention in this Amendment text is to avoid the renumbering of existing numbered items in ISO/IEC 14496-4 while drafting this Amendment. Therefore, if the addition of a numbered item does not require renumbering of numbered items in ISO/IEC 14496-4, the final number is assigned to the numbered item herein.

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Information technology — Coding of audio-visual objects —

Part 4: Conformance testing

AMENDMENT 30: Conformance testing for new profiles for professional applications

Replace 10.6.5.7 with the following:

10.6.5.7 Decoder conformance test of a particular profile-and-level

In order for a decoder of a particular profile-and-level to claim output order conformance to ITU-T Rec. H.264 | ISO/IEC 14496-10 as described by this Recommendation | International Standard, the decoder shall successfully pass the static test defined in subclause 10.6.5.5 with all the bitstreams of the normative test suite specified for testing decoders of this particular profile-and-level.

In order for a decoder of a particular profile and level to claim output timing conformance to ITU-T Rec. H.264 | ISO/IEC 14496-10 as described by this Recommendation | International Standard, the decoder shall successfully pass both the static test defined in subclause 10.6.5.5 and the dynamic test defined in subclause 10.6.5.6 with all the bitstreams of the normative test suite specified for testing decoders of this particular profile-and-level. Tables 1 and 2 define the normative test suites for each profile-and-level combination. The test suite for a particular profile-and-level combination is the list of bitstreams that are marked with an 'X' in the column corresponding to that profile-and-level combination.

'X' indicates that the bitstream is designed to test both the dynamic and static conformance of the decoder.

The bitstream column specifies the bitstream used for each test.

A decoder that conforms to the High, High 10, High 4:2:2, or High 4:4:4 Predictive profile shall be capable of decoding Main profile bitstreams of the same level and lower levels. In addition to the bitstreams specified in Table AMD9-2, a decoder that conforms to the High, High 10, or High 4:2:2 profile shall be capable of decoding Main profile bitstreams in Table AMD6-1. In addition to the bitstreams specified in Table AMD30.1, a decoder that conforms to the High 4:4:4 Predictive profile shall be capable of decoding the Main profile bitstreams specified in Table AMD6-1.

A decoder that conforms to the High 10 profile shall be capable of decoding High 10 Intra profile bitstreams of the same level and lower levels. A decoder that conforms to the High 4:2:2 profile shall be capable of decoding High 10 Intra and High 4:2:2 Intra profile bitstreams. In addition to the bitstreams in Table AMD9-2, a decoder that conforms to the High 10 or High 4:2:2 profile shall be capable of decoding the corresponding bitstreams in Table AMD30.1.

Add the following sentence immediately before 10.6.6.1:

In Table AMD30.1, the value “59.94” shall be interpreted as an approximation of an exact value of 60000 ÷ 1001.

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Add the following subclauses after 10.6.6.24.1:

10.6.6.25 Test bitstreams – Professional Profiles: High 4:4:4 Predictive Profile

10.6.6.25.1 Test bitstream #PPH444P-1

Specification: All slices are coded as I or P slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I and P slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 0, using CAVLC.

Purpose: Check that a decoder can properly decode I and P slices of 4:4:4 14 bit coded frames with separate_colour_plane_flag equal to 0, using CAVLC.

10.6.6.25.2 Test bitstream #PPH444P-2

Specification: All slices are coded as I or P slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I and P slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 0, using CABAC.

Purpose: Check that a decoder can properly decode I and P slices of 4:4:4 14 bit coded frames with separate_colour_plane_flag equal to 0, using CABAC.

10.6.6.25.3 Test bitstream #PPH444P-3

Specification: All slices are coded as I, P or B slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I, P and B slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 0, using CAVLC.

Purpose: Check that a decoder can properly decode I, P and B slices of 4:4:4 14 bit coded frames with separate_colour_plane_flag equal to 0, using CAVLC.

10.6.6.25.4 Test bitstream #PPH444P-4

Specification: All slices are coded as I, P or B slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

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Functional stage: Decoding of I, P and B slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 0, using CABAC.

Purpose: Check that a decoder can properly decode I, P and B slices of 4:4:4 14 bit coded frames with separate_colour_plane_flag equal to 0, using CABAC.

10.6.6.25.5 Test bitstream #PPH444P-5

Specification: All slices are coded as I, P or B slices. Each picture contains more than one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I, P and B slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 0, without deblocking filter.

Purpose: Check that a decoder can properly decode I, P and B slices of 4:4:4 14 bit coded frames with separate_colour_plane_flag equal to 0, without deblocking filter.

10.6.6.25.6 Test bitstream #PPH444P-6

Specification: All slices are coded as I or P slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 1. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I and P slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 1, using CAVLC.

Purpose: Check that a decoder can properly decode I and P slices of coded frames for 14 bit 4:4:4 coded frames with separate_colour_plane_flag equal to 1, using CAVLC.

10.6.6.25.7 Test bitstream #PPH444P-7

Specification: All slices are coded as I or P slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 1. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I and P slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 1, using CABAC.

Purpose: Check that a decoder can properly decode I and P slices of 4:4:4 14 bit coded frames with separate_colour_plane_flag equal to 1, using CABAC.

10.6.6.25.8 Test bitstream #PPH444P-8

Specification: All slices are coded as I, P or B slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 1. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

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Functional stage: Decoding of I, P and B slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 1, using CAVLC.

Purpose: Check that a decoder can properly decode I, P and B slices of 4:4:4 14 bit coded frames with separate_colour_plane_flag equal to 1, using CAVLC.

10.6.6.25.9 Test bitstream #PPH444P-9

Specification: All slices are coded as I, P or B slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. separate_colour_plane_flag is equal to 1. pic_order_cnt_type is equal to 0. direct_8x8_inference_flag is equal to 1. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I, P and B slices for 4:4:4 14 bit frames with separate_colour_plane_flag equal to 1, using CABAC.

Purpose: Check that a decoder can properly decode I, P and B slices of 4:4:4 14 bit coded frames with separate_colour_plane_flag equal to 1, using CABAC.

10.6.6.25.10 Test bitstream #PPH444P-10

Specification: All slices are coded as I, P or B slices. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma sample bit depths. qpprime_y_zero_transform_bypass_flag is equal to 1, specifying lossless coding. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I, P and B slices for 4:4:4 14 bit frames with qpprime_y_zero_transform_bypass_flag equal to 1.

Purpose: Check that a decoder can properly decode I, P and B slices of 4:4:4 14 bit coded frames with qpprime_y_zero_transform_bypass_flag equal to 1.

10.6.6.26 Test bitstreams – Professional Profiles: High 10 Intra Profile

10.6.6.26.1 Test bitstream #PPH10I-1

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 1, specifying the 4:2:0 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:0 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CAVLC.

Purpose: Check that a decoder can properly decode 4:2:0 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CAVLC.

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10.6.6.26.2 Test bitstream #PPH10I-2

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 1, specifying the 4:2:0 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:0 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CABAC.

Purpose: Check that a decoder can properly decode 4:2:0 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CABAC.

10.6.6.26.3 Test bitstream #PPH10I-3

Specification: All pictures are IDR pictures. deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 1, specifying the 4:2:0 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:0 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CABAC.

Purpose: Check that a decoder can properly decode 4:2:0 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CABAC.

10.6.6.26.4 Test bitstream #PPH10I-4

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 1, specifying the 4:2:0 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Some pictures are coded frames and some are coded fields. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:0 10 bit IDR frames and fields with separate_colour_plane_flag equal to 0, using CAVLC.

Purpose: Check that a decoder can properly decode 4:2:0 10 bit IDR frames and fields with separate_colour_plane_flag equal to 0, using CAVLC.

10.6.6.26.5 Test bitstream #PPH10I-5

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 1, specifying the 4:2:0 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Some pictures are coded frames and some are coded fields. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:0 10 bit IDR frames and fields with separate_colour_plane_flag equal to 0, using CABAC.

Purpose: Check that a decoder can properly decode 4:2:0 10 bit IDR frames and fields with separate_colour_plane_flag equal to 0, using CABAC.

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10.6.6.26.6 Test bitstream #PPH10I-6

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 1, specifying the 4:2:0 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame with mb_adaptive_frame_field_flag equal to 1. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:0 10 bit IDR frames with macroblock adaptive frame/field coding.

Purpose: Check that a decoder can properly decode 4:2:0 10 bit IDR frames with macroblock adaptive frame/field coding.

10.6.6.26.7 Test bitstream #PPH10I-7

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 1, specifying the 4:2:0 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame with mb_adaptive_frame_field_flag equal to 1. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:0 10 bit IDR frames with macroblock adaptive frame/field coding.

Purpose: Check that a decoder can properly decode 4:2:0 10 bit IDR frames with macroblock adaptive frame/field coding.

10.6.6.27 Test bitstreams – Professional Profiles: High 4:2:2 Intra Profile

10.6.6.27.1 Test bitstream #PPH422I-1

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 2, specifying the 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:2 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CAVLC.

Purpose: Check that a decoder can properly decode 4:2:2 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CAVLC.

10.6.6.27.2 Test bitstream #PPH422I-2

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 2, specifying the 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:2 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CABAC.

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Purpose: Check that a decoder can properly decode 4:2:2 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CABAC.

10.6.6.27.3 Test bitstream #PPH422I-3

Specification: All pictures are IDR pictures. deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 2, specifying the 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:2 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CABAC.

Purpose: Check that a decoder can properly decode 4:2:2 10 bit IDR frames with separate_colour_plane_flag equal to 0, using CABAC.

10.6.6.27.4 Test bitstream #PPH422I-4

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 2, specifying the 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Some pictures are coded frames and some are coded fields. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:2 10 bit IDR frames and fields with separate_colour_plane_flag equal to 0, using CAVLC.

Purpose: Check that a decoder can properly decode 4:2:2 10 bit IDR frames and fields with separate_colour_plane_flag equal to 0, using CAVLC.

10.6.6.27.5 Test bitstream #PPH422I-5

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 2, specifying the 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Some pictures are coded frames and some are coded fields. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:2 10 bit IDR frames and fields with separate_colour_plane_flag equal to 0, using CABAC.

Purpose: Check that a decoder can properly decode 4:2:2 10 bit IDR frames and fields with separate_colour_plane_flag equal to 0, using CABAC.

10.6.6.27.6 Test bitstream #PPH422I-6

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 2, specifying the 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame with mb_adaptive_frame_field_flag equal to 1. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:2 10 bit IDR frames with macroblock adaptive frame/field coding.

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Purpose: Check that a decoder can properly decode 4:2:2 10 bit IDR frames with macroblock adaptive frame/field coding.

10.6.6.27.7 Test bitstream #PPH422I-7

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 2, specifying the 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 2, specifying 10 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame with mb_adaptive_frame_field_flag equal to 1. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:2:2 10 bit IDR frames with macroblock adaptive frame/field coding.

Purpose: Check that a decoder can properly decode 4:2:2 10 bit IDR frames with macroblock adaptive frame/field coding.

10.6.6.28 Test bitstreams – Professional Profiles: High 4:4:4 Intra Profile

10.6.6.28.1 Test bitstream #PPH444I-1

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0.

10.6.6.28.2 Test bitstream #PPH444I-2

Specification: All pictures are IDR pictures. deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0, without deblocking filter.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0, without deblocking filter.

10.6.6.28.3 Test bitstream #PPH444I-3

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_present_flag are equal to 1. A different scaling matrix is applied to each colour plane. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

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Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0, applying a different scaling matrix for each colour plane.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0,applying a different scaling matrix for each colour plane.

10.6.6.28.4 Test bitstream #PPH444I-4

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 1. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1.

10.6.6.28.5 Test bitstream #PPH444I-5

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 1. seq_scaling_matrix_present_flag is equal to 1 and pic_scaling_matrix_present_flag is equal to 0. A different scaling matrix is applied to each colour plane. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, applying a different scaling matrix for each colour plane.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, applying a different scaling matrix for each colour plane.

10.6.6.28.6 Test bitstream #PPH444I-6

Specification: All pictures are IDR pictures. Each picture contains more than one slice. Slices having different values of colour_plane_id are interleaved with each other. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 1. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, using slice-level interleaving of colour_plane_id values within an access unit.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, using slice-level interleaving of colour_plane_id values within an access unit.

10.6.6.28.7 Test bitstream #PPH444I-7

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. qpprime_y_zero_transform_bypass_flag is equal to 1, specifying lossless coding. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

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Functional stage: Decoding of 4:4:4 14 bit IDR frames with qpprime_y_zero_transform_bypass_flag equal to 1.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with qpprime_y_zero_transform_bypass_flag equal to 1.

10.6.6.29 Test bitstreams – Professional Profiles: CAVLC 4:4:4 Intra Profile

10.6.6.29.1 Test bitstream #PPCV444I-1

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0, using CAVLC.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0, using CAVLC.

10.6.6.29.2 Test bitstream #PPCV444I-2

Specification: All pictures are IDR pictures. deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0, without deblocking filter, using CAVLC.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0, without deblocking filter, using CAVLC.

10.6.6.29.3 Test bitstream #PPCV444I-3

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 0. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_present_flag are equal to 1. A different scaling matrix is applied to each colour plane. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0, applying a different scaling matrix for each colour plane, using CAVLC.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 0,applying a different scaling matrix for each colour plane, using CAVLC.

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10.6.6.29.4 Test bitstream #PPCV444I-4

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 1. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, using CAVLC.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, using CAVLC.

10.6.6.29.5 Test bitstream #PPCV444I-5

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 1. seq_scaling_matrix_present_flag is equal to 1 and pic_scaling_matrix_present_flag is equal to 0. A different scaling matrix is applied to each colour plane. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, applying a different scaling matrix for each colour plane, using CAVLC.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, applying a different scaling matrix for each colour plane, using CAVLC.

10.6.6.29.6 Test bitstream #PPCV444I-6

Specification: All pictures are IDR pictures. Each picture contains more than one slice. Slices having different values of colour_plane_id are interleaved with each other. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. separate_colour_plane_flag is equal to 1. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, using slice-level interleaving of colour_plane_id values within an access unit, using CAVLC.

Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with separate_colour_plane_flag equal to 1, using slice-level interleaving of colour_plane_id values within an access unit, using CAVLC.

10.6.6.29.7 Test bitstream #PPCV444I-7

Specification: All pictures are IDR pictures. Each picture contains more than one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. chroma_format_idc is equal to 3, specifying the 4:4:4 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are equal to 6, specifying 14 bit luma and chroma bit depths. qpprime_y_zero_transform_bypass_flag is equal to 1, specifying transform-bypass coding for macroblocks having QP'_Y equal to 0. Each picture is a coded frame. The NAL units are encapsulated in the byte stream format specified in Annex B of ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of 4:4:4 14 bit IDR frames with qpprime_y_zero_transform_bypass_flag equal to 1, using CAVLC.

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Purpose: Check that a decoder can properly decode 4:4:4 14 bit IDR frames with qpprime_y_zero_transform_bypass_flag equal to 1, using CAVLC.

Add the following table after Table AMD9-2:

Table AMD30.1 — Bitstreams for High 4:4:4 Predictive, High 10 Intra, High 4:2:2 Intra, High 4:4:4 Intra, and CAVLC 4:4:4 Intra profiles

Categories	Bitstream	Donated by	File name	High 10 Intra	High 4:2:2 Intra	High 4:4:4 Intra	High 4:4:4 Predictive	CAVLC 4:4:4 Intra	Level	Frame rate (Frames/sec)
4:4:4 14 bit Predictive	PPH444-1	Thomson	PPH444P1_2008				X		4.1 and higher	29.97
	PPH444-2	Thomson	PPH444P2_2008				X		4.1 and higher	29.97
	PPH444-3	Thomson	PPH444P3_2008				X		4.1 and higher	29.97
	PPH444-4	Thomson	PPH444P4_2008				X		3.2 and higher	59.94
	PPH444-5	Thomson	PPH444P5_2008				X		3.2 and higher	59.94
	PPH444-6	Mitsubishi	PPH444P6_Mitsubishi_A				X		4.1 and higher	29.97
	PPH444-7	Mitsubishi	PPH444P7_Mitsubishi_A				X		4.1 and higher	29.97
	PPH444-8	Mitsubishi	PPH444P8_Mitsubishi_A				X		4.1 and higher	29.97
	PPH444-9	Mitsubishi	PPH444P9_Mitsubishi_A				X		4.1 and higher	59.94
	PPH444-10	Sejong Univ	PPH444P10_SejongUniv_A				X		3.2 and higher	59.94
4:2:0 10 bit Intra	PPH10-1	Panasonic	PPH10I1_Panasonic_A	X	X	X	X	X	3.2 and higher	59.94
	PPH10-2	Panasonic	PPH10I2_Panasonic_A	X	X	X	X		3.2 and higher	59.94
	PPH10-3	Panasonic	PPH10I3_Panasonic_A	X	X	X	X		3.2 and higher	59.94
	PPH10-4	Panasonic	PPH10I4_Panasonic_A	X	X	X	X	X	4.1 and higher	29.97
	PPH10-5	Panasonic	PPH10I5_Panasonic_A	X	X	X	X		4.1 and higher	29.97
	PPH10-6	Panasonic	PPH10I6_Panasonic_A	X	X	X	X	X	4.1 and higher	29.97
	PPH10-7	Panasonic	PPH10I7_Panasonic_A	X	X	X	X		4.1 and higher	29.97
4:2:2 10 bit Intra	PPH422I-1	Panasonic	PPH422I1_Panasonic_A		X	X	X	X	3.2 and higher	59.94
	PPH422I-2	Panasonic	PPH422I2_Panasonic_A		X	X	X		3.2 and higher	59.94

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Categories	Bitstream	Donated by	File name	High 10 Intra	High 4:2:2 Intra	High 4:4:4 Intra	High 4:4:4 Predictive	CAVLC 4:4:4 Intra	Level	Frame rate (Frames/sec)
	PPH422I-3	Panasonic	PPH422I3_Panasonic_A		X	X	X		3.2 and higher	59.94
	PPH422I-4	Panasonic	PPH422I4_Panasonic_A		X	X	X	X	4.1 and higher	29.97
	PPH422I-5	Panasonic	PPH422I5_Panasonic_A		X	X	X		4.1 and higher	29.97
	PPH422I-6	Panasonic	PPH422I6_Panasonic_A		X	X	X	X	4.1 and higher	29.97
	PPH422I-7	Panasonic	PPH422I7_Panasonic_A		X	X	X		4.1 and higher	29.97
4:4:4 14 bit Intra	PPH444I-1	Thomson	PPH444I1_2008			X	X		3.2 and higher	59.94
	PPH444I-2	Thomson	PPH444I2_2008			X	X		3.2 and higher	59.94
	PPH444I-3	Thomson	PPH444I3_2008			X	X		3.2 and higher	59.94
	PPH444I-4	Mitsubishi	PPH444I4_Mitsubishi_A			X	X		4.1 and higher	29.97
	PPH444I-5	Mitsubishi	PPH444I5_Mitsubishi_A			X	X		4.1 and higher	29.97
	PPH444I-6	Mitsubishi	PPH444I6_Mitsubishi_A			X	X		4.1 and higher	29.97
	PPH444I-7	Sejong Univ	PPH444I7_SejongUniv_A			X	X		3.2 and higher	59.94
CAVLC 4:4:4 14 bit Intra	PPCV444I-1	Thomson	PPCV444I1_2008				X	X	3.2 and higher	59.94
	PPCV444I-2	Thomson	PPCV444I2_2008				X	X	3.2 and higher	59.94
	PPCV444I-3	Thomson	PPCV444I3_2008				X	X	3.2 and higher	59.94
	PPCV444I-4	Mitsubishi	PPCV444I4_Mitsubishi_A				X	X	4.1 and higher	29.97
	PPCV444I-5	Mitsubishi	PPCV444I5_Mitsubishi_A				X	X	4.1 and higher	29.97
	PPCV444I-6	Mitsubishi	PPCV444I6_Mitsubishi_A				X	X	4.1 and higher	29.97
	PPCV444I-7	Sejong Univ	PPCV444I7_SejongUniv_A				X	X	3.2 and higher	59.94

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