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AMENDMENT 9
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Information technology — Coding of audio-visual objects —

Part 4: Conformance testing

AMENDMENT 9: AVC fidelity range extensions conformance

Technologies de l'information — Codage des objets audiovisuels —

Partie 4: Essai de conformité

AMENDEMENT 9: Conformité des extensions de plage de fidélité AVC

Reference number
ISO/IEC 14496-4:2004/Amd.9:2006(E)

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Foreword

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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 6 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*.

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Introduction

This Recommendation | International Standard establishes conformance test requirements for conformance to ITU-T Rec. H.264 | ISO/IEC 14496-10.

In this document, the additional text to ITU-T Rec. H.264.1 | ISO/IEC 14496-4 is specified for the conformance test of ITU-T Rec. H.264 | ISO/IEC 14496-10 video decoders. This specification is specifically applied to ITU-T Rec. H.264 | ISO/IEC 14496-10, AVC Fidelity Range Extensions.

The following subclauses specify the normative tests for verifying conformance of ITU-T Rec. H.264 | 14496-10 video bitstreams and video decoders. Those 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 ITU-T Rec. H.264.2 | ISO/IEC 14496-5 with source code available in electronic format.

The numbering in this fidelity range extensions conformance amendment text is relative to the text of ITU-T Rec. H.264.1 | 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 ITU-T Rec. H.264.1 | ISO/IEC 14496-4 is produced, the inserted numbered items are to be assigned the corresponding number 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 renumbering of numbered items in ITU-T Rec. H.264 | ISO/IEC 14496-4 while drafting this amendment. Therefore, if the addition of a numbered item does not require renumbering of numbered items in ITU-T Rec. H.264 | 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 9: AVC fidelity range extensions conformance

Replace subclause 10.6.5.2 with:

10.6.5.2 Contents of bitstream file

The conformance bitstreams are included in this specification as an electronic attachment. The following information is included in a single zipped file for each such bitstream.

- ITU-T Rec. H.264 | ISO/IEC 14496-10 video bitstream;
- Reconstructed pictures or hashes of decoded pictures (may not be present);
- Short description of the bitstream;
- Trace file (the bitstream in ASCII format).

In cases where the reconstructed pictures or hashes of decoded pictures are not available, the reference software of ITU-T Rec. H.264.2 | ISO/IEC 14496-5 shall be used to generate the necessary reference reconstructed pictures from the bitstream.

Replace subclause 10.6.5.5 with:

10.6.5.5 Static tests for output order conformance

Static tests of a video decoder require testing of the reconstructed samples. This subclause will explain how this test can be accomplished when the reconstructed samples at the output of the decoding process are available. It may not be possible to perform this type of test with a production decoder (due to the lack of an appropriate accessible interface in the design at which to perform the test). In that case this test should be performed by the manufacturer during the design and development phase. Static tests are used for testing the decoding process. The test will check that the values of the samples reconstructed by the decoder under test shall be identical to the values of the samples reconstructed by the reference decoder. When a hash of the values of the samples of the decoded pictures is attached to the bitstream file, a corresponding hash operation performed on the values of the samples of the decoded pictures produced by the decoder under test shall produce the same results.

Replace subclause 10.6.5.7 with:

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 the standard as described by this Specification, 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.

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In order for a decoder of a particular profile and level to claim output timing conformance to the standard as described by this Specification, 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. Table 1 and Table 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 specification indicates the test bitstream specification used for each bitstream.

A decoder compliant with High, High 10, High 4:2:2, or High 4:4:4 shall be capable of decoding Main profile bitstreams. In addition to the streams defined in Table AMD9-2, a compliant decoder shall decode Main profile streams in Table AMD9-1.

Replace the following sentence in 10.6.6:

Some characteristics of each bitstream listed in Table AMD9-1 are described in the subclauses of this subclause. In Table AMD9-1, the value "29.97" shall be interpreted as an approximation of an exact value of 30000 ÷ 1001.

with:

Some characteristics of each bitstream listed in Table AMD9-1 and Table AMD9-2 are described in the subclauses of this subclause. In Table AMD9-1 and Table AMD9-2, the value "29.97" shall be interpreted as an approximation of an exact value of 30000 ÷ 1001.

Add the following after subclause 10.6.6.3.7:

10.6.6.3.8 Test bitstream #AVCMR-8, #AVCMR-9

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. pic_order_cnt_type is equal to 1. Reference picture list reordering and memory management control operations are used. direct_8x8_inference_flag is equal to 1. Each slice is a coded field. VUI is included in the bitstream. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Reference picture list reordering and memory management control operations.

Purpose: Check that decoder handles reference picture list reordering and memory management control operations.

10.6.6.3.9 Test bitstream #AVCMR-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 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 1. Reference picture list reordering and memory management control operations are used. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. Each slice is a coded field. VUI is included in the bitstream. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

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Functional stage: Reference picture list reordering and memory management control operations.

Purpose: Check that decoder handles reference picture list reordering and memory management control operations.

10.6.6.3.10 Test bitstream #AVCMR-11, #AVCMR-12

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. pic_order_cnt_type is equal to 0. Reference picture list reordering and memory management control operations are used. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Reference picture list reordering and memory management control operations.

Purpose: Check that decoder handles reference picture list reordering and memory management control operations.

Add the following after subclause 10.6.6.15.3:

10.6.6.16 Test Bitstreams – CABAC: Memory management control operation

10.6.6.16.1 Test bitstream #AVCCAMR-1

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. pic_order_cnt_type is equal to 1. Reference picture list reordering and memory management control operations are used. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. Each slice is a coded frame. mb_adaptive_frame_field_coding is equal to 1. VUI is included in the bitstream. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Reference picture list reordering and memory management control operations.

Purpose: Check that decoder handles reference picture list reordering and memory management control operations.

10.6.6.16.2 Test bitstream #AVCCAMR-2

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. pic_order_cnt_type is equal to 0. Reference picture list reordering and memory management control operations are used. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Reference picture list reordering and memory management control operations.

Purpose: Check that decoder handles reference picture list reordering and memory management control operations.

Numbers of subclause after 6.6.16 are incremented according to this addition of new subclause.

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Add the following new subclauses 10.6.6.21, 10.6.6.22, 10.6.6.23, and 10.6.6.24 after subclause 10.6.6.20.18:

10.6.6.21 Test Bitstreams – Fidelity Range Extensions: 4:2:0 8 bit

10.6.6.21.1 Test bitstream #FREH-1, #FREH-28

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. Transform mode is set to 8x8 block size only. seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests loading of scaling list in the sequence parameter set and the picture parameter set. Tests 8x8 block size transform mode. Tests decoding of level prefix more than 16 bits in CAVLC entropy coding. Tests deblocking for 8x8 transform.

Purpose: Check that a decoder can properly decode slices of coded frames with 8x8 block size transform for CAVLC and check that scaling list is implemented correctly for frame only coding.

10.6.6.21.2 Test bitstream #FREH-2, #FREH-29

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 0. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding. Tests loading of scaling list in the sequence parameter set and the picture parameter set. Tests deblocking for 4x4 and 8x8 transform.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes and check that scaling list is implemented correctly for CABAC entropy coding for frame only coding.

10.6.6.21.3 Test bitstream #FREH-3, #FREH-30

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. The value of cabac_init_idc is adaptively changed in slice header. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames and fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.4 Test bitstream #FREH-4, #FREH-31

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. The value of cabac_init_idc is adaptively changed in slice header. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for

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direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. Each slice is either a coded frame or a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames and fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.5 Test bitstream #FREH-5, #FREH-32

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. The value of cabac_init_idc is adaptively changed in slice header. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. Each slice is a coded frame. mb_adaptive_frame_field_coding is equal to 1. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Macroblock adaptive frame field decoding and slices of a coded frame with both 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with mb_adaptive_frame_field_flag=1 and with both 4x4 and 8x8 block size transform modes.

10.6.6.21.6 Test bitstream #FREH-6, #FREH-33

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. Transform mode is set to 8x8 block size only. seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is either a coded frame or a coded field. mb_adaptive_frame_field_coding is equal to 1 in coded frames. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests loading of scaling list in the sequence parameter set and the picture parameter set. Tests 8x8 block size transform mode. Tests decoding of level prefix more than 16 bits in CAVLC entropy coding. Tests deblocking for 8x8 transform.

Purpose: Check that a decoder can properly decode slices of coded frames with 8x8 block size transform for CAVLC and check that scaling list is implemented correctly for both slices of a coded frame with mb_adaptive_frame_field_flag=1 and slices of a coded field.

10.6.6.21.7 Test bitstream #FREH-7, #FREH-34

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is either a coded frame or a coded field. mb_adaptive_frame_field_coding is equal to 1 in coded frames. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding. Tests loading of scaling list in the sequence parameter set and the picture parameter set. Tests deblocking for 4x4 and 8x8 transform.

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Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes and check that scaling list is implemented correctly for CABAC entropy coding for both slices of a coded frame with mb_adaptive_frame_field_flag=1 and slices of a coded field.

10.6.6.21.8 Test bitstream #FREH-8

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix is set to 0. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.9 Test bitstream #FREH-9

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix is set to 0. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.10 Test bitstream #FREH-10

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix is set to 0. Each slice is a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.11 Test bitstream #FREH-11

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix is set to 0. Each slice is a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

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Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.12 Test bitstream #FREH-12, #FREH-39

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 0. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.13 Test bitstream #FREH-13, #FREH-14, #FRE-15

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.14 Test bitstream #FREH-16

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1. Scaling lists are included in the sequence parameter set. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests loading of scaling list in the sequence parameter set. Tests 8x8 block size transform mode.

Purpose: Check that a decoder can properly decode slices of a coded frame with 8x8 block size transform for CABAC. Check that scaling list is implemented correctly for frame only coding. Check that a decoder can handle temporal direct mode with direct_inference_flag=1 for coded frames with 8x8 block size transform.

10.6.6.21.15 Test bitstream #FREH-17

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1. Scaling lists are included in the sequence parameter set. Each slice is either a coded frame or a coded field. mb_adaptive_frame_field_coding is equal to 1 in coded frames. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests loading of scaling list in the sequence parameter set. Tests 8x8 block size transform mode.

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Purpose: Check that a decoder can properly decode slices of a coded frame with 8x8 block size transform for CABAC. Check that scaling list is implemented correctly for field coding and MBAFF. Check that a decoder can handle temporal direct mode with direct_inference_flag=1 for coded frames with 8x8 block size transform.

10.6.6.21.16 Test bitstream #FREH-18

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix is set to 0. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CAVLC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.17 Test bitstream #FREH-19

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix is set to 0. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CAVLC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.18 Test bitstream #FREH-20

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix is set to 0. Each slice is a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CAVLC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.19 Test bitstream #FREH-21

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix is set to 0. Each slice is a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CAVLC entropy coding.

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Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.20 Test bitstream #FREH-22

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. Each slice is a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CAVLC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.21 Test bitstream #FREH-23

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. Each slice is either a coded frame or a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CAVLC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.22 Test bitstream #FREH-24

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. mb_adaptive_frame_field_coding is equal to 1. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CAVLC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.23 Test bitstream #FREH-25

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1. Scaling lists are included in the sequence parameter set. Each slice is a coded frame. chroma_format_idc is equal to 0, specifying monochrome chroma format. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests monochrome chroma format in CAVLC entropy coding.

Purpose: Check that a decoder can properly decode slices of a coded frame for monochrome chroma format.

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10.6.6.21.24 Test bitstream #FREH-26

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 0. Scaling lists are included in the sequence parameter set. Each slice is a coded frame. chroma_format_idc is equal to 1, specifying monochrome chroma format. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests monochrome chroma format in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of a coded frame for monochrome chroma format.

10.6.6.21.25 Test bitstream #FREH-27

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1. Scaling lists are included in the sequence parameter set. Each slice is a coded frame. second_chroma_qp_index_offset is equal to 2. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests second_chroma_qp_index_offset.

Purpose: Check that a decoder can properly decode slices of a coded frame with second_chroma_qp_index_offset.

10.6.6.21.26 Test bitstream #FREH-35

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.27 Test bitstream #FREH-36

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

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10.6.6.21.28 Test bitstream #FREH-37

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.29 Test bitstream #FREH-38

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded fields with both 4x4 and 8x8 block size transform modes.

10.6.6.21.30 Test bitstream #FREH-40, #FREH-41

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 0. Reference picture list reordering and memory management control operations are used. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Reference picture list reordering and memory management control operations.

Purpose: Check that decoder handles reference picture list reordering and memory management control operations.

10.6.6.21.31 Test bitstream #FREH-42

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 0. Reference picture list reordering and memory management control operations are used. mb_adaptive_frame_field_coding is equal to 1. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Reference picture list reordering and memory management control operations.

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Purpose: Check that decoder handles reference picture list reordering and memory management control operations.

10.6.6.21.32 Test bitstream #FREH-43

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 0. mb_adaptive_frame_field_coding is equal to 1. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CABAC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.33 Test bitstream #FREH-44

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. Both seq_scaling_matrix_present_flag and pic_scaling_matrix_flag are set to 0. mb_adaptive_frame_field_coding is equal to 1. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Tests 4x4 and 8x8 block size transform modes in CAVLC entropy coding.

Purpose: Check that a decoder can properly decode slices of coded frames with both 4x4 and 8x8 block size transform modes.

10.6.6.21.34 Test bitstream #FREH-45

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is set equal to 1. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and pic_scaling_matrix_flag is set to 0. Memory management control operations are used. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Reference picture list reordering and memory management control operations.

Purpose: Check that decoder handles reference picture list reordering and memory management control operations.

10.6.6.22 Test bitstreams – Fidelity Range Extensions: 4:2:0 10 bit

10.6.6.22.1 Test bitstream #FREH10-1

Specification: All slices are coded as I slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. frame_mbs_only_flag is equal to 1. chroma_format_idc is equal to 1. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

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Functional stage: Decoding of I slices for 4:2:0 10-bit.

Purpose: Check that a decoder can properly decode I slices for 4:2:0 10-bit.

10.6.6.22.2 Test bitstream #FREH10-2

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. frame_mbs_only_flag is equal to 1. chroma_format_idc is equal to 1. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I, P, and B slices for 4:2:0 10-bit.

Purpose: Check that a decoder can properly decode I, P and B slices for 4:2:0 10-bit.

10.6.6.23 Test bitstreams – Fidelity Range Extensions: 4:2:2 10 bit

10.6.6.23.1 Test bitstream #FREH422-1

Specification: All slices are coded as I or P slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of P slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode P slices for 4:2:2 8 bit.

10.6.6.23.2 Test bitstream #FREH422-2

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Direct prediction is not used in this bitstream. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode B slices for 4:2:2 8 bit.

10.6.6.23.3 Test bitstream #FREH422-3

Specification: All slices are coded as I or P slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of P slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode P slices with deblocking filter for 4:2:2 8 bit.

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10.6.6.23.4 Test bitstream #FREH422-4

Specification: All slices are coded as I slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode I slices for 4:2:2 8 bit without deblocking filter.

10.6.6.23.5 Test bitstream #FREH422-5

Specification: All slices are coded as I or P slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of P slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode P slices for 4:2:2 8 bit without deblocking filter.

10.6.6.23.6 Test bitstream #FREH422-6

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode B slices for 4:2:2 8 bit without deblocking filter.

10.6.6.23.7 Test bitstream #FREH422-7

Specification: All slices are coded as I or P slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of P slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode P slices for 4:2:2 8 bit with deblocking filter.

10.6.6.23.8 Test bitstream #FREH422-8

Specification: All slices are coded as I slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and

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bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode I slices for 4:2:2 10 bit without deblocking filter.

10.6.6.23.9 Test bitstream #FREH422-9

Specification: All slices are coded as I or P slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of P slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode P slices for 4:2:2 10 bit without deblocking filter.

10.6.6.23.10 Test bitstream #FREH422-10

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode B slices for 4:2:2 10 bit without deblocking filter.

10.6.6.23.11 Test bitstream #FREH422-11

Specification: All slices are coded as I or P slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of P slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode P slices for 4:2:2 10 bit with deblocking filter.

10.6.6.23.12 Test bitstream #FREH422-12

Specification: All slices are coded as I slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode I slices for 4:2:2 8 bit without deblocking filter.

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10.6.6.23.13 Test bitstream #FREH422-13

Specification: All slices are coded as I or P slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of P slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode P slices for 4:2:2 8 bit without deblocking filter.

10.6.6.23.14 Test bitstream #FREH422-14

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 0. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 8 bit.

Purpose: Check that a decoder can properly decode B slices for 4:2:2 8 bit without deblocking filter.

10.6.6.23.15 Test bitstream #FREH422-15

Specification: All slices are coded as I slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode I slices for 4:2:2 10 bit without deblocking filter.

10.6.6.23.16 Test bitstream #FREH422-13

Specification: All slices are coded as I or P slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of P slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode P slices for 4:2:2 10 bit without deblocking filter.

10.6.6.23.17 Test bitstream #FREH422-14

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and

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bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1 and default scaling lists are used. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode B slices for 4:2:2 10 bit without deblocking filter.

10.6.6.23.18 Test bitstream #FREH422-18

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode B slices of coded fields for 4:2:2 10 bit.

10.6.6.23.19 Test bitstream #FREH422-19

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded frame. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode B slices of coded frames for 4:2:2 10 bit.

10.6.6.23.20 Test bitstream #FREH422-20

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is either a coded frame or a coded field. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode B slices of coded frames and fields for 4:2:2 10 bit.

10.6.6.23.21 Test bitstream #FREH422-21

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0.

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chroma_format_idc is equal to 2, specifying 4:2:2 chroma format. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 2, specifying 10 bit video. Both 4x4 and 8x8 block size transform modes are used. seq_scaling_matrix_present_flag is set to 1. Scaling lists are included in the sequence parameter set and the picture parameter set. Each slice is a coded frame. mb_adaptive_frame_field_coding is equal to 1. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of B slices for 4:2:2 10 bit.

Purpose: Check that a decoder can properly decode B slices with mb_adaptive_frame_field_flag=1 for 4:2:2 10 bit.

10.6.6.23 Test Bitstreams – Fidelity Range Extensions: 4:4:4 12 bit

10.6.6.23.1 Test bitstream #FREH444-1

Specification: All slices are coded as I slices. Each picture contains only one slice. disable_deblocking_filter_idc is equal to 1, specifying disabling of the deblocking filter process. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. frame_mbs_only_flag is equal to 1. chroma_format_idc is equal to 3. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 4. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I slices for 4:4:4 12-bit

Purpose: Check that the decoder can properly decode I slices for 4:4:4 12-bit.

10.6.6.23.2 Test bitstream #FREH444-2

Specification: All slices are coded as IBBP slices. Each picture contains only 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. pic_order_cnt_type is equal to 0. frame_mbs_only_flag is equal to 1. chroma_format_idc is equal to 3. residual_colour_transform_flag is equal to 1. Both bit_depth_luma_minus8 and bit_depth_chroma_minus8 are set equal to 4. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of I, P, and B slices for 4:4:4 12-bit

Purpose: Check that the decoder can properly decode I, P and B slices for 4:4:4 12-bit with residual colour transform.

10.6.6.24 Auxiliary coded picture

10.6.6.24.1 Test bitstream #FREAUX-1

Specification: Coded slices of an auxiliary coded picture are included in this bitstream. The rest of the slices are coded as either an I slice or a P slice. entropy_coding_mode_flag is equal to 1, specifying the CABAC parsing process. All NAL units are encapsulated into the byte stream format specified in Annex B in ITU-T Rec. H.264 | ISO/IEC 14496-10.

Functional stage: Decoding of coded slices of an auxiliary coded picture

Purpose: Check that the decoder can properly handle coded slices of an auziliary coded picture

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In subclause 10.6.7, replace:

Table AMD9-1 – Bitstreams included in this Specification

with:

Table AMD9-1 – Bitstreams for Baseline, Extended and Main profile

In subclause 10.6.7, add the following raws after the AVCMR-7 in Table AMD9-1:

	AVCMR-8	British Telecom	MR6_BT_B		X	X	2.1 and higher	25
	AVCMR-9	British Telecom	MR7_BT_B		X	X	2.1 and higher	25
	AVCMR-10	British Telecom	MR8_BT_B		X	X	2.1 and higher	25
	AVCMR-11	HHI	HCBP1_HHI_A	X	X	X	3.1 and higher	29.97
	AVCMR-12	HHI	HCBP2_HHI_A	X	X	X	3.1 and higher	29.97

In subclause 10.6.7, add the following raws after the AVCCAPCM-3 in Table AMD9-1.

CABAC: MMCO	AVCCAMR-1	British Telecom	MR9_BT_B			X	2.1 and higher	25
	AVCCAMR-2	HHI	HCMP1_HHI_A			X	3.0 and higher	29.97

In subclause 10.6.7, add the following subclause after Table-AMD9-1:

Table AMD9-2 – Bitstreams for High, High 10, High 4:2:2, and High 4:4:4 profile

Categories	**Bitstream**	**Donated by**	**File Name**	**High**	**High 10**	**High 4:2:2**	**High 4:4:4**	**Level**	**Frame Rate (Frame/Sec)**
4:2:0 8 bit	FREH-1	Panasonic Singapore Lab.	FRExt1_Panasonic_C	X	X	X	X	2.1 and higher	29.97
	FREH-2	Panasonic Singapore Lab.	FRExt3_Panasonic_D	X	X	X	X	2.1 and higher	29.97

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	FREH-3	HHI	HCAFR1_HHI_C	X	X	X	X	3.0 and higher	15
	FREH-4	HHI	HCAFF1_HHI_B	X	X	X	X	3.0 and higher	15
	FREH-5	HHI	HCAMFF1_HHI_B	X	X	X	X	3.0 and higher	15
	FREH-6	Panasonic Singapore Lab.	FRExt2_Panasonic_B	X	X	X	X	2.1 and higher	29.97
	FREH-7	Panasonic Singapore Lab.	FRExt4_Panasonic_A	X	X	X	X	2.1 and higher	29.97
	FREH-8	Broadcom	HPCANL_BRCM_C	X	X	X	X	4.0 and higher	29.97
	FREH-9	Broadcom	HPCA_BRCM_C	X	X	X	X	4.0 and higher	29.97
	FREH-10	Broadcom	HPCAFLNL_BRCM_C	X	X	X	X	4.0 and higher	29.97
	FREH-11	Broadcom	HPCAFL_BRCM_C	X	X	X	X	4.0 and higher	29.97
	FREH-12	HHI	HCAFR2_HHI_A	X	X	X	X	2.0 and higher	15
	FREH-13	HHI	HCAFR3_HHI_A	X	X	X	X	3.0 and higher	15
	FREH-14	HHI	HCAFR4_HHI_A	X	X	X	X	3.0 and higher	15
	FREH-15	Broadcom	HPCADQ_BRCM_B	X	X	X	X	4.0 and higher	29.97
	FREH-16	Broadcom	HPCALQ_BRCM_B	X	X	X	X	4.0 and higher	29.97
	FREH-17	Broadcom	HPCAMAPALQ_BRCM_B	X	X	X	X	4.0 and higher	29.97
	FREH-18	Broadcom	HPCV_BRCM_A	X	X	X	X	4.0 and higher	29.97
	FREH-19	Broadcom	HPCVNL_BRCM_A	X	X	X	X	4.0 and higher	29.97
	FREH-20	Broadcom	HPCVFL_BRCM_A	X	X	X	X	4.0 and higher	29.97

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	FREH-21	Broadcom	HPCVFLNL_BRCM_A	X	X	X	X	4.0 and higher	29.97
	FREH-22	Sony	HVLCFI0_Sony_B	X	X	X	X	3.1 and higher	29.97
	FREH-23	Sony	HVLCPFF0_Sony_B	X	X	X	X	3.1 and higher	29.97
	FREH-24	Sony	HVLCMFF0_Sony_B	X	X	X	X	3.1 and higher	29.97
	FREH-25	Broadcom	HPCVMOLQ_BRCM_B	X	X	X	X	4.0 and higher	29.97
	FREH-26	Broadcom	HPCAMOLQ_BRCM_B	X	X	X	X	4.0 and higher	29.97
	FREH-27	Broadcom	HPCAQ2LQ_BRCM_B	X	X	X	X	4.0 and higher	29.97
	FREH-28	Broadcom	brcm_freh1_B	X	X	X	X	3.0 and higher	29.97
	FREH-29	Broadcom	brcm_freh2_B	X	X	X	X	3.0 and higher	29.97
	FREH-30	Broadcom	brcm_freh3	X	X	X	X	3.0 and higher	29.97
	FREH-31	Broadcom	brcm_freh4	X	X	X	X	3.0 and higher	29.97
	FREH-32	Broadcom	brcm_freh5	X	X	X	X	3.0 and higher	29.97
	FREH-33	Broadcom	brcm_freh6	X	X	X	X	3.0 and higher	29.97
	FREH-34	Broadcom	brcm_freh7_B	X	X	X	X	3.0 and higher	29.97
	FREH-35	Broadcom	brcm_freh8	X	X	X	X	3.0 and higher	29.97
	FREH-36	Broadcom	brcm_freh9	X	X	X	X	3.0 and higher	29.97
	FREH-37	Broadcom	brcm_freh10	X	X	X	X	3.0 and higher	29.97
	FREH-38	Broadcom	brcm_freh11	X	X	X	X	3.0 and higher	29.97
	FREH-39	Broadcom	brcm_freh12_B	X	X	X	X	3.0 and higher	29.97

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	FREH-40	HHI	HCHP1_HHI_B	X	X	X	X	2.1 and higher	29.97
	FREH-41	HHI	HCHP2_HHI_A	X	X	X	X	3.1 and higher	29.97
	FREH-42	HHI	HCHP3_HHI_A	X	X	X	X	4.1 and higher	29.97
	FREH-43	JVC	FREXT01_JVC_D	X	X	X	X	3.1 and higher	29.97
	FREH-44	JVC	FREXT01_JVC_C	X	X	X	X	3.1 and higher	29.97
	FREH-45	Sony	FREXT_MMCO4_Sony_B	X	X	X	X	3.1 and higher	29.97
4:2:0 10 bit	FREH10-1	Dolby	FREH10-1		X	X	X	4 and higher	24
	FREH10-2	Dolby	FREH10-2		X	X	X	4 and higher	24
4:2:2 10 bit	FREH422-1	Tandberg	FREXT1_TANDBERG_A			X	X	2.1 and higher	29.97
	FREH422-2	Tandberg	FREXT2_TANDBERG_A			X	X	2.1 and higher	29.97
	FREH422-3	Tandberg	FREXT3_TANDBERG_A			X	X	2.1 and higher	29.97
	FREH422-4	Sony	Hi422FREXT1_Sony_A			X	X	3.1 and higher	29.97
	FREH422-5	Sony	Hi422FREXT2_Sony_A			X	X	3.1 and higher	29.97
	FREH422-6	Sony	Hi422FREXT3_Sony_A			X	X	3.1 and higher	29.97
	FREH422-7	Sony	Hi422FREXT4_Sony_A			X	X	3.1 and higher	29.97
	FREH422-8	Sony	Hi422FREXT6_Sony_A			X	X	3.1 and higher	29.97
	FREH422-9	Sony	Hi422FREXT7_Sony_A			X	X	3.1 and higher	29.97
	FREH422-10	Sony	Hi422FREXT8_Sony_A			X	X	3.1 and higher	29.97
	FREH422-11	Sony	Hi422FREXT9_Sony_A			X	X	3.1 and higher	29.97

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	FREH422-12	Sony	Hi422FREXT10_Sony_A			X	X	3.1 and higher	29.97
	FREH422-13	Sony	Hi422FREXT11_Sony_A			X	X	3.1 and higher	29.97
	FREH422-14	Sony	Hi422FREXT12_Sony_A			X	X	3.1 and higher	29.97
	FREH422-15	Sony	Hi422FREXT13_Sony_A			X	X	3.1 and higher	29.97
	FREH422-16	Sony	Hi422FREXT14_Sony_A			X	X	3.1 and higher	29.97
	FREH422-17	Sony	Hi422FREXT15_Sony_A			X	X	3.1 and higher	29.97
	FREH422-18	Sony	Hi422FREXT16_Sony_A			X	X	4 and higher	29.97
	FREH422-19	Sony	Hi422FREXT17_Sony_A			X	X	4 and higher	29.97
	FREH422-20	Sony	Hi422FREXT18_Sony_A			X	X	4 and higher	29.97
	FREH422-21	Sony	Hi422FREXT19_Sony_A			X	X	4 and higher	29.97
4:4:4 12 bit	FREH444-1	Dolby	FREXT9_Dolby_C				X	4 and higher	24
	FREH444-2	Samsung AIT	FREXT10_Samsung_A				X	4 and higher	24
Auxiliary codec picture	FREAUX-1	Apple	alphaconformanceA	X	X	X	X	2.1 and higher	29.97

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