International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.264.1

(03/2005)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Coding of moving video

Conformance specification for H.264 advanced video coding

ITU-T Recommendation H.264.1

ITU-T

International
Telecommunication
Union

ITU-T H-SERIES RECOMMENDATIONS

AUDIOVISUAL AND MULTIMEDIA SYSTEMS

CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	H.220–H.229
Systems aspects	H.230–H.239
Communication procedures	H.240–H.259
Coding of moving video	**H.260–H.279**
Related systems aspects	H.280–H.299
Systems and terminal equipment for audiovisual services	H.300–H.349
Directory services architecture for audiovisual and multimedia services	H.350–H.359
Quality of service architecture for audiovisual and multimedia services	H.360–H.369
Supplementary services for multimedia	H.450–H.499
MOBILITY AND COLLABORATION PROCEDURES	
Overview of Mobility and Collaboration, definitions, protocols and procedures	H.500–H.509
Mobility for H-Series multimedia systems and services	H.510–H.519
Mobile multimedia collaboration applications and services	H.520–H.529
Security for mobile multimedia systems and services	H.530–H.539
Security for mobile multimedia collaboration applications and services	H.540–H.549
Mobility interworking procedures	H.550–H.559
Mobile multimedia collaboration inter-working procedures	H.560–H.569
BROADBAND AND TRIPLE-PLAY MULTIMEDIA SERVICES	
Broadband multimedia services over VDSL	H.610–H.619

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation H.264.1

Conformance specification for H.264 advanced video coding

Summary

This Recommendation specifies tests designed to verify whether bitstreams and decoders meet the normative requirements specified in ITU-T Rec. H.264 | ISO/IEC 14496-10:

- An encoder can claim conformance to ITU-T Rec. H.264 | ISO/IEC 14496-10 if the bitstreams that it generates are conforming bitstreams.
- A decoder can claim conformance to a specified profile and level of ITU-T Rec. H.264 if it can properly decode all bitstreams obeying constraints specified in ITU-T Rec. H.264 | ISO/IEC 14496-10.

The tests specified in this Recommendation provide methods for (non-exhaustive) testing of whether encoders and decoders meet these requirements.

This twin text with ISO/IEC has been jointly developed in the context of JVT and has been submitted to the ISO/IEC JTC 1/SC 29/WG 11 (MPEG) as ISO/IEC 14496-4:2002/Amendment 6 (2005 E) and ISO/IEC 14496-4:2004/Amendment 9.

Corrigendum 1 to H.264.1 (09/2005), which has been integrated into this edition of ITU-T Rec. H.264.1, provides improved synchronization with the technically-aligned twin text in ISO/IEC, removes some errors, and adds tests for some required features that were not tested in the previous version.

The conformance bitstreams identified in H.264.1 are available as an electronic attachment to this Recommendation.

Source

ITU-T Recommendation H.264.1 was approved on 1 March 2005 by ITU-T Study Group 16 (2005-2008) under the ITU-T Recommendation A.8 procedure.

This edition includes the modifications introduced by H.264.1 (2005) Corrigendum 1 approved on 13 September 2005 by ITU-T Study Group 16 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

CONTENTS

Introduction

This Recommendation | International Standard has been jointly developed by ITU-T Video Coding Experts Group (VCEG) and the ISO/IEC Moving Picture Experts Group. It is published as technically-aligned twin text in both organizations ITU-T and ISO/IEC.

This Recommendation | International Standard specifies conformance test of ITU-T Rec. H.264 | ISO/IEC 14496-10 video bitstreams and decoders, and it specifically applies to ITU-T Rec. H.264 | ISO/IEC 14496-10, Advanced Video Coding.

The following subclauses specify the normative tests for verifying conformance of ITU-T Rec. H.264 | ISO/IEC 14496-10 video bitstreams and video decoders. These normative tests make use of test data (bitstream test suites) provided as an electronic annex to this Recommendation | International Standard, and the reference software decoder specified in ITU-T Rec. H.264.2 | ISO/IEC 14496-5 with source code available in electronic format.

As the bitstreams files accompanying this Recommendation | International Standard require a substantial amount of disk space, as of the publication of this specification, they are only available in physical medium (DVD), for purchase directly from the ITU-T bookshop.

ITU-T Recommendation H.264.1

Conformance specification for H.264 advanced video coding

1 Scope

This Recommendation | International Standard specifies tests designed to verify whether bitstreams and decoders meet normative requirements specified in ITU-T Rec. H.264 | ISO/IEC 14496-10. An encoder can claim conformance to ITU T Rec. H.264 | ISO/IEC 14496-10 if the bitstreams that it generates are conforming bitstreams.

Characteristics of coded bitstreams and decoders are defined for ITU-T Rec. H.264 | ISO/IEC 14496-10. The characteristics of a bitstream define the subset of the standard that is exploited in the bitstream. Examples are the applied values or range of the picture size and bit rate parameters. Decoder characteristics define the properties and capabilities of the applied decoding process. The capabilities of a decoder specify which bitstreams the decoder can decode and reconstruct, by defining the subset of the ITU-T Rec. H.264 | ISO/IEC 14496-10 standard that may be exploited in the bitstreams that it will decode. A bitstream can be decoded by a decoder if the characteristics of the bitstream are within the subset of the standard specified by the decoder capabilities.

Procedures are described for testing conformance of bitstreams and decoders to the requirements defined in ITU-T Rec. H.264 | ISO/IEC 14496-10. Given the set of characteristics claimed, the requirements that shall be met are fully determined by ITU-T Rec. H.264 | ISO/IEC 14496-10. This Recommendation | International Standard summarizes the requirements, cross references them to characteristics, and defines how conformance with them can be tested. Guidelines are given on constructing tests to verify bitstream and decoder conformance. This Recommendation | International Standard gives guidelines on how to construct bitstream test suites to check or verify decoder conformance. In addition, the test bitstreams implemented according to those guidelines are provided as an electronic annex to this Recommendation | International Standard.

NOTE – This edition includes the text approved 03/2005 and its Corrigendum 1 approved 09/2005.

2 Normative references

2.1 General

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.2 Identical Recommendations | International Standards

– None.

2.3 Paired Recommendations | International Standards equivalent in technical content

– ITU-T Recommendation H.264 (2005), *Advanced video coding for generic audiovisual services*.

ISO/IEC 14496-10:2005, *Information technology – Coding of audio-visual objects – Part 10: Advanced video coding*.

– ITU-T Recommendation H.264.2 (2005), *Reference software for H.264 advanced video coding*.

ISO/IEC 14496-5:2005, *Information technology – Coding of audio-visual objects – Part 5: Reference software*.

2.4 Additional references

– None.

3 Definitions

For the purposes of this Recommendation | International Standard, the terms, definitions, abbreviations and symbols specified in ITU-T Rec. H.264 | ISO/IEC 14496-10 (particularly in clause 3) apply. The following terms are further clarified for purposes herein as follows.

3.1 bitstream: An ITU-T Rec. H.264 | ISO/IEC 14496-10 video bitstream. A bitstream may contain IDR, I, P, B, SI, and SP slices.

3.2 decoder: An ITU-T Rec. H.264 | ISO/IEC 14496-10 video decoder, i.e., an embodiment of the decoding process specified by ITU-T Rec. H.264 | ISO/IEC 14496-10. The decoder does not include the display process, which is outside the scope of this Recommendation | International Standard.

3.3 reference software decoder: The software decoders contained in ITU-T Rec. H.264.2 | ISO/IEC 14496-5.

4 Abbreviations

For the purposes of this Recommendation | International Standard, relevant abbreviations are specified in clause 4 of ITU-T Rec. H.264 | ISO/IEC 14496-10.

5 Conventions

For the purposes of this Recommendation | International Standard, relevant conventions are specified in clause 5 in ITU-T Rec. 264 | ISO/IEC 14496-10.

6 Conformance for ITU-T Rec. H.264 | ISO/IEC 14496-10

6.1 Introduction

The following subclauses specify the normative tests for verifying conformance of video bitstreams as well as decoders. Those normative tests make use of test data (bitstream test suites) provided as an electronic annex to this Recommendation | International Standard, and the reference software decoder specified in ITU-T Rec. H.264.2 | ISO/IEC 14496-5 with source code included in electronic format.

6.2 Bitstream conformance

The bitstream conformance of ITU-T Rec. H.264 | ISO/IEC 14496-10 is specified by subclause C.3 of ITU-T Rec. H.264 | ISO/IEC 14496-10.

6.3 Decoder conformance

The decoder conformance of ITU-T Rec. H.264 | ISO/IEC 14496-10 is specified by subclause C.4 of ITU-T Rec. H.264 | ISO/IEC 14496-10.

6.4 Procedure to test bitstreams

A bitstream that claims conformance with this Recommendation | International Standard shall pass the following normative test:

The bitstream shall be decoded by processing it with the reference software decoder specified in ITU-T Rec. H.264.2 | ISO/IEC 14496-5. When processed by the reference software decoder, the bitstream shall not cause any error or non-conformance messages to be reported by the reference software decoder. This test should not be applied to bitstreams that are known to contain errors introduced by transmission, as such errors are highly likely to result in bitstreams that lack conformance to ITU-T Rec. H.264 | ISO/IEC 14496-10.

Successfully passing the reference software decoder test provides only a strong presumption that the bitstream under test is conforming to the video layer, i.e., that it does indeed meet all the requirements for the video layer (except Annexes C, D and E) specified in ITU-T Rec. H.264 | ISO/IEC 14496-10 that are tested by the reference software decoder.

Additional tests may be necessary to more thoroughly check that the bitstream properly meets all the requirements specified in ITU-T Rec. H.264 | ISO/IEC 14496-10 including the HRD conformance (based on Annexes C, D and E). These complementary tests may be performed using other video bitstream verifiers that perform more complete tests than those implemented by the reference software decoder.

ITU-T Rec. H.264 | ISO/IEC 14496-10 contains several informative recommendations that are not an integral part of that Recommendation | International Standard. When testing a bitstream for conformance, it may also be useful to test whether or not the bitstream follows those recommendations.

To check correctness of a bitstream, it is necessary to parse the entire bitstream and to extract all the syntactic elements and other values derived from those syntactic elements and used by the decoding process specified in ITU-T Rec. H.264 | ISO/IEC 14496-10.

A verifier may not necessarily perform all stages of the decoding process described in ITU-T Rec. H.264 | ISO/IEC 14496-10 in order to verify bitstream correctness. Many tests can be performed on syntax elements in a state prior to their use in some processing stages.

6.5 Procedure to test decoder conformance

6.5.1 Conformance bitstreams

In this subclause, except where stated otherwise, the term "bitstream" refers to a conforming ITU-T Rec. H.264 | ISO/IEC 14496-10 video bitstream (as defined in this Recommendation | International Standard), that has values of profile_idc, level_idc, and constraint_setX_flag values (where X is a number in the range of 0 to 2, inclusive) corresponding to a set of specified constraints on a bitstream for which a decoder conforming to a specified profile and level is required in Annex A of ITU-T Rec. H.264 | ISO/IEC 14496-10 to properly perform the decoding process.

6.5.2 Contents of bitstream file

The conformance bitstreams are included in this Recommendation | International Standard 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.

6.5.3 Requirements on output of the decoding process and timing

Two classes of decoder conformance are specified:

- Output order conformance; and
- Output timing conformance.

The output of the decoding process is specified by clause 8 and Annex C of ITU-T Rec. H.264 | ISO/IEC 14496-10.

For output order conformance, it is a requirement that all of the decoded pictures specified for output in Annex C of ITU-T Rec. H.264 | ISO/IEC 14496-10 shall be output by a conforming decoder in the specified order and that the values of the decoded samples in all of the pictures that are output shall be (exactly equal to) the values specified in clause 8 of ITU-T Rec. H.264 | ISO/IEC 14496-10.

For output timing conformance, it is a requirement that a conforming decoder shall also output the reconstructed samples at the rates and times specified in Annex C of ITU-T Rec. H.264 | ISO/IEC 14496-10.

The display process, which ordinarily follows the output of the decoding process, is outside the scope of this Recommendation | International Standard.

6.5.4 Recommendations (informative)

In addition to the requirements, it is desirable that conforming decoders implement various informative recommendations defined in ITU-T Rec. H.264 | ISO/IEC 14496-10 that are not an integral part of that Recommendation | International Standard. This subclause lists some of these recommendations.

It is recommended that a conforming decoder be able to resume the decoding process as soon as possible after the loss or corruption of part of a bitstream. In most cases it is possible to resume decoding at the next start code or slice header. It is recommended that a conforming decoder be able to perform concealment for the macroblocks or video packets for which all the coded data has not been received.

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.

6.5.6 Dynamic tests for output timing conformance

Dynamic tests are applied to check that all the reconstructed samples are output and that the timing of the output of the decoder's reconstructed samples conforms to the specification of clause 8 and Annex C of ITU-T Rec. H.264 | ISO/IEC 14496-10, and to verify that the HRD models (as defined by the CPB and DPB specification in Annex C of ITU-T Rec. H.264 | ISO/IEC 14496-10) are not violated when the bits are delivered at the proper rate.

The dynamic test is often easier to perform on a complete decoder system, which may include a systems decoder, a video decoder and a display process. It may be possible to record the output of the display process and to check that display order and timing of fields or frames are correct at the output of the display process. However, since the display process is not within the normative scope of ITU-T Rec. H.264 | ISO/IEC 14496-10, there may be cases where the output of the display process differs in timing or value even though the video decoder is conforming. In this case, the output of the video decoder itself (before the display process) would need to be captured in order to perform the dynamic tests on the video decoder. In particular the field or frame order and timing shall be correct.

If buffering period SEI and picture timing SEI are included in the test bitstream, HRD conformance shall be verified using the values of initial_cpb_removal_delay, initial_cpb_removal_delay_offset, cpb_removal_delay and dpb_removal_delay that are included in the bitstream.

If buffering period SEI and picture timing SEI are not included in the bitstream, the following inferences shall be made to generate the missing parameters:

- fixed_frame_rate_flag shall be inferred to be 1.
- low_delay_hrd_flag shall be inferred to be 0.
- cbr_flag shall be inferred to be 0.
- The frame rate of the stream shall be inferred to be the frame rate value specified in Table 1. If this is missing, then a frame rate of either 25 or 30000 ÷ 1001 can be inferred.
- time_scale shall be set to 90,000 and the value of num_units_in_tick shall be computed based on field rate (twice the frame rate).
- The bit rate of the bitstream shall be inferred to be the maximum value for the level defined in Table A.1 in ITU-T Rec. H.264 | ISO/IEC 14496-10.
- CPB and DPB sizes shall be inferred to be the maximum value for the level defined in Table A.1 in ITU-T Rec. H.264 | ISO/IEC 14496-10.

With the above inferences, the HRD shall be operated as follows.

- The CPB is filled starting at time t = 0, until it is full, before removal of the first access unit. This means that the initial_cpb_removal_delay shall be inferred to be equal to the total CPB buffer size divided by the bit rate divided by 90000 (rounded downwards) and initial_cpb_removal_delay_offset shall be inferred to be equal to zero.
- The first access unit is removed at time t = initial_cpb_removal_delay ÷ 90000 and subsequent access units are removed at intervals based on the frame distance, i.e., 2 * (90000 ÷ num_units_in_tick) or the field distance i.e., (90000 / num_units_in_tick), depending on whether the access unit is coded as a frame picture or field picture.
- Using these inferences, the CPB will not overflow or underflow and the DPB will not overflow.

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 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 6.5.5 and the dynamic test defined in subclause 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 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 2, a compliant decoder shall decode Main profile streams in Table 1.

6.6 Specification of the test bitstreams

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

6.6.1 Test Bitstreams – General

6.6.1.1 Test bitstream #AVCNL-1, #AVCNL-2

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. 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.

Purpose: Check that decoder can properly decode I slices.

6.6.1.2 Test bitstream #AVCNL-3, #AVCNL-4

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. 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.

Purpose: Check that decoder can properly decode P slices.

6.6.1.3 Test bitstream #AVCBA-1

Specification: All slices are coded as I 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. 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 with the deblocking filter process enabled.

Purpose: Check that the decoder can properly decode I slices with the deblocking filter process enabled.

6.6.1.4 Test bitstream #AVCBA-2

Specification: All slices are coded as I 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 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 slices with the deblocking filter process enabled.

Purpose: Check that the decoder can properly decode I slices with the deblocking filter process enabled.

6.6.1.5 Test bitstream #AVCBA-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. 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 with the deblocking filter process enabled.

Purpose: Check that the decoder can properly decode P slice with the deblocking filter process enabled.

6.6.1.6 Test bitstream #AVCBA-4

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 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 P slices with the deblocking filter process enabled.

Purpose: Check that the decoder can properly decode P slices with the deblocking filter process enabled.

6.6.1.7 Test bitstream #AVCBA-5, #AVCBA-6

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. 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 with the deblocking filter process enabled.

Purpose: Check that the decoder can properly decode P slices with the deblocking filter process enabled.

6.6.1.8 Test bitstream #AVCBA-7, #AVCBA-8

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 2. Macroblock/sub-macroblock partition size is limited to 8x8 and above. 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 with the deblocking filter process enabled.

Purpose: Check that the decoder can properly decode P slices with the deblocking filter process enabled.

6.6.1.9 Test bitstream #AVCMQ-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 1. mb_qp_delta is equal to a non-zero value to change the quantizer scale at each MB. 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 with mb_qp_delta not equal to 0.

Purpose: Check that decoder can properly decode I slices with mb_qp_delta not equal to 0.

6.6.1.10 Test bitstream #AVCMQ-2

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 1. mb_qp_delta is equal to a non-zero value to change the quantizer scale at each MB. 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 with mb_qp_delta not equal to 0.

Purpose: Check that decoder can properly decode P slices with mb_qp_delta not equal to 0.

6.6.1.11 Test bitstream #AVCMQ-3

Specification: All slices are coded as I 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 1. Spatial direct prediction is used for direct prediction. mb_qp_delta is equal to a non-zero value to change the quantizer scale at each MB. 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 with mb_qp_delta not equal to 0.

Purpose: Check that decoder can properly decode I slices with mb_qp_delta not equal to 0.

6.6.1.12 Test bitstream #AVCMQ-4

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 1. Spatial direct prediction is used for direct prediction. mb_qp_delta is equal to a non-zero value to change the quantizer scale at some MBs. 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 with mb_qp_delta not equal to 0.

Purpose: Check that decoder can properly decode P slices with mb_qp_delta not equal to 0.

6.6.1.13 Test bitstream #AVCSL-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. pic_order_cnt_type 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: Decoding of I and P slices.

Purpose: Check that decoder can properly decode pictures with multiple slices.

6.6.1.14 Test bitstream #AVCSL-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 0, specifying the CAVLC parsing process. pic_order_cnt_type is 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 and P slices.

Purpose: Check that decoder can properly decode pictures with multiple slices.

6.6.1.15 Test bitstream #AVCSQ-1

Specification: All slices are coded as I slices. Each picture contains 20 slices. 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. slice_qp_delta is equal to a non-zero value to change the quantizer scale at each slice. 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 with non-zero values of slice_qp_delta.

Purpose: Check that decoder can properly decode I slices with non-zero values of slice_qp_delta.

6.6.1.16 Test bitstream #AVCFM-1

Specification: All slices are coded as I or P slices. The number of slices and slice groups is greater than 1 in each picture. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is 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. Multiple parameter sets are included in the bitstream.

Functional stage: Slice groups.

Purpose: Check that decoder handles multiple slice groups and parameter sets.

6.6.1.17 Test bitstream #AVCFM-2

Specification: All slices are coded as I or P slices. The number of slices and slice groups is greater than 1 in each picture. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type 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: Slice groups.

Purpose: Check that decoder handles multiple slice groups and parameter sets.

6.6.1.18 Test bitstream #AVCFM-3

Specification: All slices are coded as I or P slices. The number of slices and slice groups is greater than 1 in each picture. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 2. Recovery point SEI is included in this 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: Slice groups.

Purpose: Check that decoder handles multiple slice groups and parameter sets.

6.6.1.19 Test bitstream #AVCCI-1

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. constrained_intra_pred_flag 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: Constrained intra prediction.

Purpose: Check that decoder handles constrained intra prediction.

6.6.1.20 Test bitstream #AVCCI-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 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. constrained_intra_pred_flag 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: Constrained intra prediction

Purpose: Check that decoder handles constrained intra prediction.

6.6.1.21 Test bitstream #AVCCI-3

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 2. constrained_intra_pred_flag 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: Constrained intra prediction

Purpose: Check that decoder handles constrained intra prediction.

6.6.1.22 Test bitstream #AVCFC-1

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. Decoded pictures are cropped with frame_croping_flag 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 I and P slices with frame cropping.

Purpose: Check that decoder can properly decode I and P slices with frame cropping.

6.6.1.23 Test bitstream #AVCAUD-1

Specification: All slices are coded as I 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. Access unit delimiter NAL units are 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: Decoding of I slices with Access unit delimiter NAL units.

Purpose: Check that decoder can properly decode I slices with Access unit delimiter NAL units.

6.6.1.24 Test bitstream #AVCMIDR-1

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. IDR is inserted in every two 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: Decoding of I slices and more than one IDR.

Purpose: Check that decoder can properly decode I slices with more than IDR in bitstream.

6.6.1.25 Test bitstream #AVCNRF-1

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. Two non-reference pictures are present. 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 and P slices with non-reference pictures.

Purpose: Check that decoder can properly decode I and P slices with non-reference pictures.

6.6.1.26 Test bitstream #AVCMPS-1

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. Multiple parameter sets are included in this 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: Decoding of I and P slices with multiple parameter set.

Purpose: Check that decoder can properly decode I and P slices with multiple parameter set.

6.6.1.27 Test bitstream #AVCBS-1

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. 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 with temporal direct prediction.

Purpose: Check that decoder can properly decode B slices with temporal direct prediction.

6.6.1.28 Test bitstream #AVCBS-2

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 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 with spatial direct prediction.

Purpose: Check that decoder can properly decode B slices with spatial direct prediction.

6.6.1.29 Test bitstream #AVCBS-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. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is 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 with temporal direct prediction.

Purpose: Check that decoder can properly decode B slices with temporal direct prediction.

6.6.1.30 Test bitstream #AVCBS-4

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. 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 with spatial direct prediction.

Purpose: Check that decoder can properly decode B slices with spatial direct prediction.

6.6.1.31 Test bitstream #AVCBS-5

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 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 with spatial direct prediction.

Purpose: Check that decoder can properly decode B slices with spatial direct prediction.

6.6.2 Test Bitstreams – I_PCM

6.6.2.1 Test bitstream #AVCPCM-1, AVCPCM-2

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. mb_type is equal to I_PCM for some macroblocks. 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 macroblocks with mb_type equal to I_PCM.

Purpose: Check that decoder can properly decode macroblocks with mb_type equal to I_PCM.

6.6.3 Test Bitstreams – Memory management control operation

6.6.3.1 Test bitstream #AVCMR-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. pic_order_cnt_type is equal to 1. Reference picture list reordering and memory management control operations 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: Reference picture list reordering and memory management control operations.

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

6.6.3.2 Test bitstream #AVCMR-2

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 2. Reference picture list reordering and memory management control operations 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: Reference picture list reordering and memory management control operations.

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

6.6.3.3 Test bitstream #AVCMR-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 2. gaps_in_frame_num_value_allowed_flag is equal to 1. Reference picture list reordering and various memory management control operation is 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: Reference picture list reordering and memory management control operations.

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

6.6.3.4 Test bitstream #AVCMR-4

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. gaps_in_frame_num_value_allowed_flag is equal to 1. Reference picture list reordering and various memory management control operations are used. The decoding order is different from the output order. 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, memory management control operations and non-increasing PicOrderCnt values.

Purpose: Check that decoder handles reference picture list reordering and memory management control operations. Test output order conformance for non-increasing PicOrderCnt values.

6.6.3.5 Test bitstream #AVCMR-5

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 1. gaps_in_frame_num_value_allowed_flag is equal to 1. Reference picture list reordering and various memory management control operation is used. The decoding order is different from the output order. 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, memory management control operation and non-increasing PicOrderCnt values.

Purpose: Check that decoder handles gaps_in_frame_num_value_allowed_flag equal to 1, reference picture list reordering and memory management control operation. Test output order conformance for non-increasing PicOrderCnt values.

6.6.3.6 Test bitstream #AVCMR-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. pic_order_cnt_type is equal to 0. Reference picture list reordering is 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: Reference picture list reordering.

Purpose: Check that decoder handles reference picture list reordering.

6.6.3.7 Test bitstream #AVCMR-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 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. Memory management control operations 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: Memory management control operations.

Purpose: Check that decoder handles memory management control operations.

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.

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.

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.

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.

6.6.4 Test Bitstreams – Weighted sample prediction process

6.6.4.1 Test bitstream #AVCWP-1

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 2. weighted_pred_flag is equal to 1. Plural reference indices are assigned to each reference picture. 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: Weighted sample prediction process for P slices with plural reference indices.

Purpose: Check that decoder handles weighted sample prediction for P slices with plural reference indexes.

6.6.4.2 Test bitstream #AVCWP-2

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 2. weighted_pred_flag is equal to 1. All NAL units are encapsulated into the byte stream.

Functional stage: Weighted sample prediction process for P slices.

Purpose: Check that decode handles weighted sample prediction for P slices.

6.6.4.3 Test bitstream #AVCWP-3

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. weighted_bipred_idc 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: Weighted sample prediction process for B slices with temporal direct prediction.

Purpose: Check that decoder handles weighted sample prediction for B slices with temporal direct prediction.

6.6.4.4 Test bitstream #AVCWP-4

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. weighted_bipred_idc 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: Weighted sample prediction process for B slices with temporal direct prediction.

Purpose: Check that decoder handles weighted sample prediction for B slices with temporal direct prediction.

6.6.5 Test Bitstreams – Slice of coded field

6.6.5.1 Test bitstream #AVCFI-1

Specification: All slices are coded as I or P slices. Each picture contains only one slice. Each slice is a coded field. 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. 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: Slices of coded fields.

Purpose: Check that decoder handles I and P slices of coded fields.

6.6.5.2 Test bitstream #AVCFI-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. Each slice is a coded field. 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. 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: Slices of coded fields with spatial direct prediction.

Purpose: Check that decoder handles B slices of coded fields with spatial direct prediction.

6.6.5.3 Test bitstream #AVCFI-3

Specification: All slices are coded as I or P slices. Each picture contains only one slice. Each slice is a coded field. 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 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: Slices of coded fields.

Purpose: Check that decoder handles I and P slices of coded fields.

6.6.5.4 Test bitstream #AVCFI-4

Specification: All slices are coded as I or P slices. Each picture contains only one slice. Each slice is a coded field. 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 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: Slices of coded fields.

Purpose: Check that decoder handles I and P slices of coded fields.

6.6.5.5 Test bitstream #AVCFI-5

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. Each slice is a coded field. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 1. Spatial direct prediction is used for direct prediction. 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: Slices of coded fields.

Purpose: Check that decoder handles B slices of coded fields.

6.6.5.6 Test bitstream #AVCFI-6

Specification: All slices are coded as I or P slices. Each picture contains more than one slice. Each slice is a coded field. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is 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: Slices of coded fields.

Purpose: Check that decoder handles I and P slices of coded fields.

6.6.5.7 Test bitstream #AVCFI-7

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. Each slice is a coded field. 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. 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: Slices of coded fields with temporal direct prediction.

Purpose: Check that decoder handles B slices of coded fields with temporal direct prediction.

6.6.5.8 Test bitstream #AVCFI-8

Specification: All slices are coded as I slices. Only one slice is contained in each picture. Each slice is a coded field. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is 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: Slices of coded fields.

Purpose: Check that decoder handles I slices of coded fields.

6.6.5.9 Test bitstream #AVCFI-9

Specification: All slices are coded as I or P slices. Each picture contains only one slice. Each slice is a coded field. entropy_coding_mode_flag is equal to 0, specifying the CAVLC parsing process. pic_order_cnt_type is 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: Slices of coded fields.

Purpose: Check that decoder handles I and P slices of coded fields.

6.6.5.10 Test bitstream #AVCFI-10

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. Each slice is a coded field. 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. 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: Slices of coded fields with temporal direct prediction.

Purpose: Check that decoder handles B slices of coded fields with temporal direct prediction.

6.6.5.11 Test bitstream #AVCFI-11

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. Each slice is a coded field. 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. 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: Slices of coded fields with spatial direct prediction.

Purpose: Check that decoder handles B slices of coded fields with spatial direct prediction.

6.6.5.12 Test bitstream #AVCFI-12

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. The number of motion vectors per two consecutive MBs is equal to the maximum value specified in Annex A.3.1.m in ITU-T Rec. H.264 | ISO/IEC 14496-10. No intra, skip and direct MBs are included in P and B slices. 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: Slices of coded fields.

Purpose: Check that decoder can properly decode slices of coded fields with maximum number of motion vectors per consecutive MBs.

6.6.6 Test Bitstreams – Frame/field coding

6.6.6.1 Test bitstream #AVCPA-1

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 1. Spatial direct prediction is used for direct prediction. 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: Slices of coded frames/fields.

Purpose: Check that decoder can properly decode slices of coded frames and fields.

6.6.6.2 Test bitstream #AVCPA-2

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. 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: Slices of coded frames/fields.

Purpose: Check that decoder can properly decode slices of coded frames and fields.

6.6.6.3 Test bitstream #AVCPA-3

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. 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: Slices of coded frames/fields.

Purpose: Check that decoder can properly decode slices of coded frames and fields.

6.6.7 Test bitstreams – Macroblock adaptive frame/field coding

6.6.7.1 Test bitstream #AVCMA-1

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. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.7.2 Test bitstream #AVCMA-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. Temporal direct prediction is used for direct prediction. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.7.3 Test bitstream #AVCMA-3

Specification: All slices are coded as I 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. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.7.4 Test bitstream #AVCMA-4

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. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.7.5 Test bitstream #AVCMA-5

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. mb_adaptive_frame_field_coding is equal to 1. mb_qp_delta is equal to a non-zero value to change the quantizer scale at some MBs. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.7.6 Test bitstream #AVCMA-6

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. mb_adaptive_frame_field_coding is equal to 1. mb_qp_delta is equal to a non-zero value to change the quantizer scale at some MBs. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.7.7 Test bitstream #AVCMA-7

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. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. Some slices are coded as a coded field. mb_adaptive_frame_field_coding is equal to 1 in the rest of the frames. mb_qp_delta is equal to a non-zero value to change the quantizer scale at some MBs. 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 field.

Purpose: Check that decoder can properly decode both slices of a coded frame with mb_adaptive_frame_field_flag=1 and slices of a coded field.

6.6.7.8 Test bitstream #AVCMA-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 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 1. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.7.9 Test bitstream #AVCMA-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 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 0. The number of motion vectors per two consecutive MBs is equal to the maximum value specified in Annex A.3.1.m in ITU-T Rec. H.264 | ISO/IEC 14496-10. No intra, skip and direct MBs are included in P and B slices. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1 and with maximum number of motion vectors per consecutive MBs.

6.6.8 Test Bitstreams – S picture

6.6.8.1 Test bitstream #AVCSP-1

Specification: All slices are coded as I, P and SP slice. 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 0, specifying the CAVLC parsing process. pic_order_cnt_type is equal to 1. memory_management_operation is set to 5 on SP slice. 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 SP slice.

Purpose: Check that decoder can properly decode SP slice.

6.6.8.2 Test bitstream #AVCSP-2

Specification: All slices are coded as I, P and SP slice. 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. memory_management_operation is set to 5 on SP slice. 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 SP slice.

Purpose: Check that decoder can properly decode SP slice with deblocking filter.

6.6.9 Test Bitstreams – Long sequence

6.6.9.1 Test bitstream #AVCLS-1

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. 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 picture order count for long sequence.

Purpose: Check that the decoder can properly decode picture order count for long sequence.

6.6.10 Test Bitstreams – SEI/VUI

6.6.10.1 Test bitstream #AVCSE-1

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. SEI (Buffering period SEI and Picture timing SEI with pic_struct) and VUI are 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: Decoding of SEI/VUI.

Purpose: Check that the decoder can properly decode SEI/VUI.

6.6.10.2 Test bitstream #AVCSE-2

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. SEI (Buffering period SEI and Picture timing SEI with pic_struct) and VUI are 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: Decoding of SEI/VUI.

Purpose: Check that the decoder can properly decode SEI/VUI.

6.6.10.3 Test bitstream #AVCSE-3

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. SEI (Buffering period SEI and Picture timing SEI with pic_struct) and VUI are 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: Decoding of SEI/VUI.

Purpose: Check that the decoder can properly decode SEI/VUI.

6.6.11 Test Bitstreams – CABAC: Basic features

6.6.11.1 Test bitstream #AVCCANL-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 1, specifying the CABAC parsing process. pic_order_cnt_type 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: Decoding of I slice with CABAC parsing.

Purpose: Check that decoder can properly decode I slices with CABAC parsing.

6.6.11.2 Test bitstream #AVCCANL-2

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 1, specifying the CABAC parsing process. pic_order_cnt_type is 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 slice with CABAC parsing.

Purpose: Check that decoder can properly decode I slices with CABAC parsing.

6.6.11.3 Test bitstream #AVCCANL-3

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 1, specifying the CABAC parsing process. pic_order_cnt_type is 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 with CABAC parsing.

Purpose: Check that decoder can properly decode P slices with CABAC parsing.

6.6.11.4 Test bitstream #AVCCANL-4

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 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. 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 with CABAC parsing.

Purpose: Check that decoder can properly decode B slices with CABAC parsing.

6.6.11.5 Test bitstream #AVCCANL-5

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 1, specifying the CABAC parsing process. pic_order_cnt_type 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: Decoding of I slice with CABAC parsing.

Purpose: Check that decoder can properly decode I slices with CABAC parsing.

6.6.11.6 Test bitstream #AVCCANL-6

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 1, specifying the CABAC parsing process. pic_order_cnt_type is 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 slice with CABAC parsing.

Purpose: Check that decoder can properly decode I slices with CABAC parsing.

6.6.11.7 Test bitstream #AVCCANL-7

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 1, specifying the CABAC parsing process. pic_order_cnt_type is 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 with CABAC parsing.

Purpose: Check that decoder can properly decode P slices with CABAC parsing.

6.6.11.8 Test bitstream #AVCCANL-8

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 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. Spatial direct prediction is used for direct prediction. 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 with CABAC parsing.

Purpose: Check that decoder can properly decode B slices with CABAC parsing.

6.6.11.9 Test bitstream #AVCCABA-1

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. 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 slice with the deblocking filter process enabled and CABAC.

Purpose: Check that decoder can properly decode I slices with CABAC parsing.

6.6.11.10 Test bitstream #AVCCABA-2

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. 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 with CABAC parsing.

Purpose: Check that decoder can properly decode P slices with CABAC parsing.

6.6.11.11 Test bitstream #AVCCABA-3

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. 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 with CABAC parsing.

Purpose: Check that decoder can properly decode B slices with CABAC parsing.

6.6.11.12 Test bitstream #AVCCABA-4

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. 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 with CABAC parsing.

Purpose: Check that decoder can properly decode P slices with CABAC parsing.

6.6.11.13 Test bitstream #AVCCABA-5

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. 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 slice with the deblocking filter process enabled and CABAC.

Purpose: Check that decoder can properly decode I slices with CABAC parsing.

6.6.11.14 Test bitstream #AVCCABA-6

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. 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 with CABAC parsing.

Purpose: Check that decoder can properly decode P slices with CABAC parsing.

6.6.11.15 Test bitstream #AVCCABA-7

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. 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 with CABAC parsing.

Purpose: Check that decoder can properly decode B slices with CABAC parsing.

6.6.11.16 Test bitstream #AVCCABA-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. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. 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 with CABAC parsing.

Purpose: Check that decoder can properly decode B slices with CABAC parsing.

6.6.12 Test Bitstreams – CABAC: Initialization

6.6.12.1 Test bitstream #AVCCAIN-1

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 0. cabac_init_idc is equal to 0, 1, or 2 at slice header. 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: Initialization of CABAC.

Purpose: Check that decoder can initialize CABAC with cabac_init_idc=0, 1, or 2.

6.6.13 Test Bitstreams – CABAC: MB QP Delta

6.6.13.1 Test bitstream #AVCCAQP-1

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 1. mb_qp_delta is equal to non-zero value to change the quantizer scale at each MB. 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 with mb_qp_delta not equal to 0.

Purpose: Check that decoder can properly decode I slices with mb_qp_delta not equal to 0.

6.6.13.2 Test bitstream #AVCCAQP-2

Specification: All slices are coded as I, P or B slices. Each picture contains more than one slice. Each slice has different size. 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. mb_qp_delta is equal to non-zero value to change the quantizer scale at each MB. disable_deblocking_filter_idc is equal to 2. chroma_qp_index_offset is equal to non-zero value. 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 with mb_qp_delta not equal to 0.

Purpose: Check that decoder can properly decode I slices with mb_qp_delta not equal to 0, disable_deblocking_filter_idc equal to 2, and non-zero chroma_qp_index_offset.

6.6.14 Test Bitstreams – CABAC: Slice

6.6.14.1 Test bitstream #AVCCASL-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 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. Each picture contains more than one slice. 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 different slice types in a picture with CABAC parsing.

Purpose: Check that decoder can properly decode different slice types in a picture with CABAC parsing.

6.6.14.2 Test bitstream #AVCCASL-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. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 0. Slices with different slice types are included in a picture. Stored B slices are 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: Decoding of different slice types in a picture with CABAC parsing.

Purpose: Check that decoder can properly decode different slice types in a picture with CABAC parsing.

6.6.15 Test Bitstreams – CABAC: I_PCM

6.6.15.1 Test bitstream #AVCCAPCM-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 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. mb_type is equal to I_PCM at some Macroblocks. 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 Macroblock with mb_type equal to I_PCM.

Purpose: Check that decoder can properly decode Macroblock with mb_type equal to I_PCM.

6.6.15.2 Test bitstream #AVCCAPCM-2

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. mb_type is equal to I_PCM at some Macroblocks. 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 Macroblock with mb_type equal to I_PCM.

Purpose: Check that decoder can properly decode Macroblock with mb_type equal to I_PCM.

6.6.15.3 Test bitstream #AVCCAPCM-3

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. mb_type is equal to I_PCM at some Macroblocks. 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 Macroblock with mb_type equal to I_PCM.

Purpose: Check that decoder can properly decode macroblocks with mb_type equal to I_PCM.

6.6.16 Test Bitstreams – CABAC: Memory management control operation

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.

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.

6.6.17 Test Bitstreams – CABAC: Weighted sample prediction process

6.6.17.1 Test bitstream #AVCCAWP-1

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 2. weighted_pred_flag 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: Weighted sample prediction process for P slice.

Purpose: Check that decode handles weighted sample prediction for P slice.

6.6.17.2 Test bitstream #AVCCAWP-2

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 2. weighted_pred_flag is equal to 1. Plural reference indices are assigned to each reference picture. 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: Weighted sample prediction process for P slices with plural reference indices.

Purpose: Check that decoder handles weighted sample prediction for P slices with plural reference indexes.

6.6.18 Test Bitstreams – CABAC: Field coding

6.6.18.1 Test bitstream #AVCCAFI-1

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. Each slice is a coded field. Stored B slices are 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: Decoding of coded fields.

Purpose: Check that decoder can properly decode slice of coded field including stored B slice.

6.6.18.2 Test bitstream #AVCCAFI-2

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. 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 coded fields.

Purpose: Check that decoder can properly decode slice of coded field.

6.6.18.3 Test bitstream #AVCCAFI-3

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. 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 coded fields.

Purpose: Check that decoder can properly decode slice of coded field.

6.6.19 Test Bitstreams – CABAC: Frame/field decoding

6.6.19.1 Test bitstream #AVCCAPA-1

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 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 1. Spatial direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. 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: Picture adaptive frame/field decoding.

Purpose: Check that decoder can properly decode slices of coded frames and fields with direct_8x8_inference_flag=1.

6.6.19.2 Test bitstream #AVCCAPA-2

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. 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: Picture adaptive frame/field decoding.

Purpose: Check that decoder can properly decode slices of coded frames and fields with direct_8x8_inference_flag=1.

6.6.19.3 Test bitstream #AVCCAPA-3

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. 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: Picture adaptive frame/field decoding.

Purpose: Check that decoder can properly decode slices of coded frames and fields with direct_8x8_inference_flag=1.

6.6.20 Test bitstreams – Macroblock adaptive frame/field decoding

6.6.20.1 Test bitstream #AVCCAMA-1

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 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 1. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.2 Test bitstream #AVCCAMA-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 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. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.3 Test bitstream #AVCCAMA-3

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 1, specifying the CABAC parsing process. pic_order_cnt_type is equal to 0. num_ref_frames is equal to 1. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.4 Test bitstream #AVCCAMA-4

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 1, specifying the

CABAC parsing process. pic_order_cnt_type is equal to 0. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.5 Test bitstream #AVCCAMA-5

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. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.6 Test bitstream #AVCCAMA-6

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 1. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.7 Test bitstream #AVCCAMA-7

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 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. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.8 Test bitstream #AVCCAMA-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. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.9 Test bitstream #AVCCAMA-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. pic_order_cnt_type is equal to 0. Temporal direct prediction is used for direct prediction. direct_8x8_inference_flag is equal to 1. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.10 Test bitstream #AVCCAMA-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. pic_order_cnt_type is equal to 0. direct_8x8_inference_flag is equal to 1. mb_adaptive_frame_field_coding is equal to 1. constrained_intra_pred_flag 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.

Purpose: Check that decoder can handle constrained intra prediction with mb_adaptive_frame_field_flag=1.

6.6.20.11 Test bitstream #AVCCAMA-11

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. direct_8x8_inference_flag is equal to 1. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1.

6.6.20.12 Test bitstream #AVCCAMA-12 and AVCCAMA-13

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. The number of motion vectors per two consecutive MBs is equal to the maximum value specified in Annex A.3.1.m in ITU-T Rec. H.264 | ISO/IEC 14496-10. No intra, skip and direct MBs are included in P and B slices. 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.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1 and with maximum number of motion vectors per consecutive MBs.

6.6.20.13 Test bitstream #AVCCAPAMA-1

Specification: All slices are coded as I, P or B slices. Each picture contains only one slice. Both coded frames and coded fields are included in the bitstream. 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. 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 field.

Purpose: Check that decoder can properly decode both slice of a coded frame with mb_adaptive_frame_field_flag=1 and slices of a coded field.

6.6.20.14 Test bitstream #AVCCAPAMA-2

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. The first field of the first frame only contains I slice and the second field only contains P slice. mb_adaptive_frame_field_coding is equal to 1 in the rest of the frames. The indicated display of this bitstream is bottom field first. 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 field.

Purpose: Check that decoder can properly decode both slice of a coded frame with mb_adaptive_frame_field_flag=1 and slices of a coded field.

6.6.20.15 Test bitstream #AVCCAPAMA-3

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 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. The first field of the first frame only contains I slice and the second field only contains P slice. mb_adaptive_frame_field_coding is equal to 1 in the rest of the frames. The indicated display of this bitstream is top field first. 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 field.

Purpose: Check that decoder can properly decode both slices of a coded frame with mb_adaptive_frame_field_flag=1 and slices of a coded field.

6.6.20.16 Test bitstream #AVCCAPAMA-4

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. The first field of the first frame only contains I slice and the second field only contains P slice. mb_adaptive_frame_field_coding is equal to 1 in the rest of the frames. The indicated display of this bitstream is top field first. 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 field.

Purpose: Check that decoder can properly decode both slices of a coded frame with mb_adaptive_frame_field_flag=1 and slices of a coded field.

6.6.20.17 Test bitstream #AVCCAMV-1

Specification: The bitstream conforms to MP@L3.0. Frame size is 720x480. All slices are coded as I, P or B slices. 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. In P slices, each macroblock is coded as sixteen 4x4 blocks. Each block has one motion vector in 1/4 sample position. In B slices, each macroblock is coded as eight 8x4 blocks. Each block has two motion vectors, one for list0 the other for list1. Both vectors are in 1/4 sample position. 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: Prediction bandwidth.

Purpose: Check that the decoder handles the worse case of prediction bandwidth. Prediction bandwidth is at maximum due to largest number of motion vectors (in 1/4 sample position) per macroblock pair (32 as defined in standard). Non-integer position motion vectors require using 6-tap filter always.

6.6.20.18 Test bitstream #AVCCVCANLMA-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. Both entropy_coding_mode_flag equal to 0, specifying the CAVLC parsing process, and entropy_coding_mode_flag equal to 1, specifying the CABAC parsing process are present within the bitstream. pic_order_cnt_type is equal to 0. 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 using both CAVLC and CABAC.

Purpose: Check that decoder can properly decode slices with mb_adaptive_frame_field_flag=1 Check that the decoder can properly decode both CABAC and CAVLC.

6.6.21 Test bitstreams – Fidelity Range Extensions: 4:2:0 8 bit

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.

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.

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 n 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.

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 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.

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.

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.

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.

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.

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.

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.

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.

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.

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

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.

6.6.21.13 Test bitstream #FREH-13, #FREH-14, #FREH-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.

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.

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.

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.

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.

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.

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.

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.

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

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.

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.

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.

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 coded frame for monochrome chroma format.

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 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 CABAC entropy coding.

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

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 coded frame with second_chroma_qp_index_offset.

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.

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.

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.

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.

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.

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.

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

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.

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.

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 a decoder handles reference picture list reordering and memory management control operations.

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

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.

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.

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.

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

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.

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.

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.

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.

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.

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.

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.

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 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.

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.

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.

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.

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.

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.

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.

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.

6.6.23.16 Test bitstream #FREH422-16

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.

6.6.23.17 Test bitstream #FREH422-17

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. 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 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.

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.

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.

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.

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. 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.

6.6.24 Test bitstreams – Fidelity Range Extensions: 4:4:4 12 bit

6.6.24.1 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.

6.6.24.2 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.

6.6.25 Auxiliary coded picture

6.6.25.1 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 auxiliary coded picture.

6.7 Normative Test Suites for ITU-T Rec. H.264 | ISO/IEC 14496-10

Legend:

X – Bitstream is for static and dynamic test

Table 1 – Bitstreams for Baseline, Extended and Main profile

Categories	Bitstream	Donated by	File name	Baseline	Extended	Main	Level	Frame rate (Frames/sec)
General	AVCNL-1	Sony	NL1_Sony_D	X	X	X	1.2 and higher	15
	AVCNL-2	SVA	SVA_NL1_B	X	X	X	2.1 and higher	29.97
	AVCNL-3	Sony	NL2_Sony_H	X	X	X	3.1 and higher	15
	AVCNL-4	SVA	SVA_NL2_E	X	X	X	2.1 and higher	29.97
	AVCBA-1	Sony	BA1_Sony_D	X	X	X	1.2 and higher	15
	AVCBA-2	SVA	SVA_BA1_B	X	X	X	2.1 and higher	29.97
	AVCBA-3	Sony	BA2_Sony_F	X	X	X	3.1 and higher	15
	AVCBA-4	SVA	SVA_BA2_D	X	X	X	2.1 and higher	29.97
	AVCBA-5	MCubeworks	BA_MW_D	X	X	X	1.0 and higher	15
	AVCBA-6	MCubeworks	BANM_MW_D	X	X	X	1.0 and higher	15
	AVCBA-7	France Telecom	BA1_FT_C	X	X	X	2.0 and higher	25
	AVCMQ-1	JVC	NLMQ1_JVC_C	X	X	X	2.0 and higher	25
	AVCMQ-2	JVC	NLMQ2_JVC_C	X	X	X	2.0 and higher	25
	AVCMQ-3	JVC	BAMQ1_JVC_C	X	X	X	2.0 and higher	25
	AVCMQ-4	JVC	BAMQ2_JVC_C	X	X	X	2.0 and higher	25
	AVCSL-1	SVA	SVA_Base_B	X	X	X	2.1 and higher	29.97
	AVCSL-2	SVA	SVA_FM1_E	X	X	X	2.1 and higher	29.97
	AVCSQ-1	Sony	BASQP1_Sony_C	X	X	X	2.1 and higher	15
	AVCFM-1	British Telecom	FM1_BT_B	X	X		1.0 and higher	5
	AVCFM-2	SVA	FM2_SVA_C	X	X		2.1 and higher	15

Table 1 – Bitstreams for Baseline, Extended and Main profile

Categories	Bitstream	Donated by	File name	Baseline	Extended	Main	Level	Frame rate (Frames/sec)
	AVCFM-3	France Telecom	FM1_FT_E	X	X		2.0 and higher	25
	AVCCI-1	MCubeworks	CI_MW_D	X	X	X	1.0 and higher	15
	AVCCI-2	SVA	SVA_CL1_E	X	X	X	2.1 and higher	29.97
	AVCCI-3	France Telecom	CI1_FT_B	X	X	X	2.0 and higher	25
	AVCFC-1	Sony	CVFC1_Sony_C	X	X	X	3.1 and higher	29.97
	AVCAUD-1	Mcubeworks	AUD_MW_E	X	X	X	1.0 and higher	15
	AVCMIDR-1	Mcubeworks	MIDR_MW_D	X	X	X	1.0 and higher	15
	AVCNRF-1	Mcubeworks	NRF_MW_E	X	X	X	1.0 and higher	15
	AVCMPS-1	Mcubeworks	MPS_MW_A	X	X	X	1.1 and higher	15
	AVCBS-1	Sony	CVBS3_Sony_C		X	X	1.2 and higher	15
	AVCBS-2	SVA	BA3_SVA_C		X	X	2.1 and higher	29.97
	AVCBS-3	SVA	SL1_SVA_B			X	2.1 and higher	29.97
	AVCBS-4	SVA	NL3_SVA_E		X	X	1.1 and higher	29.97
	AVCBS-5	Motorola	cavlc_mot_frm0_full_B		X	X	2.2 and higher	29.97
I_PCM	AVCPCM-1	SVA	CVPCMNL1_SVA_C	X	X	X	4.0 and higher	29.97
	AVCPCM-2	SVA	CVPCMNL2_SVA_C	X	X	X	4.0 and higher	60
MMCO	AVCMR-1	British Telecom	MR1_BT_A	X	X	X	1.1 and higher	20
	AVCMR-2	Tandberg	MR2_Tandberg_E	X	X		3.1 and higher	29.97
	AVCMR-3	Tandberg	MR3_Tandberg_B	X	X		3.1 and higher	29.97
	AVCMR-4	Tandberg	MR4_Tandberg_C	X	X		3.1 and higher	29.97
	AVCMR-5	Tandberg	MR5_Tandberg_C	X	X		3.1 and higher	29.97
	AVCMR-6	Mcubeworks	MR1_MW_A	X	X	X	1.1 and higher	15
	AVCMR-7	Mcubeworks	MR2_MW_A	X	X	X	1.1 and higher	15
	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
WP	AVCWP-1	Toshiba	CVWP5_TOSHIBA_E		X	X	2.0 and higher	7.5
	AVCWP-2	Toshiba	CVWP1_TOSHIBA_E			X	2.0 and higher	7.5
	AVCWP-3	Toshiba	CVWP2_TOSHIBA_E			X	2.0 and higher	7.5
	AVCWP-4	Toshiba	CVWP3_TOSHIBA_E			X	2.0 and higher	7.5
Field coding	AVCFI-1	Sony	CVNLFI1_Sony_C		X	X	3.1 and higher	29.97
	AVCFI-2	Sony	CVNLFI2_Sony_H		X	X	3.1 and higher	29.97
	AVCFI-3	Sharp Labs	Sharp_MP_Field1_B		X	X	3.0 and higher	29.97
	AVCFI-4	Sharp Labs	Sharp_MP_Field2_B		X	X	3.0 and higher	29.97
	AVCFI-5	Sharp Labs	Sharp_MP_Field3_B		X	X	3.0 and higher	29.97
	AVCFI-6	Sony	CVFI1_Sony_D		X	X	3.1 and higher	29.97
	AVCFI-7	Sony	CVFI2_Sony_H			X	3.1 and higher	29.97
	AVCFI-8	Sony	FI1_Sony_E		X	X	2.1 and higher	29.97
	AVCFI-9	SVA	CVFI1_SVA_C			X	3.0 and higher	29.97

Table 1 – Bitstreams for Baseline, Extended and Main profile

Categories	Bitstream	Donated by	File name	Baseline	Extended	Main	Level	Frame rate (Frames/sec)
	AVCFI-10	SVA	CVFI2_SVA_C		X	X	3.0 and higher	29.97
	AVCFI-11	Motorola	cavlc_mot_fld0_full_B		X	X	2.2 and higher	29.97
	AVCFI-12	Motorola	CVMP_MOT_FLD_L30_B		X	X	3.0 and higher	29.97
Frame/field coding	AVCPA-1	Sharp Labs	Sharp_MP_PAFF_1r2		X	X	3.0 and higher	29.97
	AVCPA-2	Toshiba	CVPA1_TOSHIBA_B		X	X	2.1 and higher	25
	AVCPA-3	Motorola	cavlc_mot_picaff0_full_B		X	X	2.2 and higher	29.97
MBAFF	AVCMA-1	Toshiba	CVMANL1_TOSHIBA_B		X	X	2.1 and higher	25
	AVCMA-2	Toshiba	CVMANL2_TOSHIBA_B		X	X	2.1 and higher	25
	AVCMA-3	Sony	CVMA1_Sony_D		X	X	3.1 and higher	29.97
	AVCMA-4	Toshiba	CVMA1_TOSHIBA_B		X	X	2.1 and higher	25
	AVCMA-5	Sony	CVMAQP2_Sony_G		X	X	3.1 and higher	29.97
	AVCMA-6	Sony	CVMAQP3_Sony_D		X	X	2.1 and higher	29.97
	AVCMA-7	Sony	CVMAPAQP3_Sony_E		X	X	3.1 and higher	29.97
	AVCMA-8	Motorola	cavlc_mot_mbaff0_full_B		X	X	2.2 and higher	29.97
	AVCMA-9	Motorola	CVMP_MOT_FRM_L31_B		X	X	3.1 and higher	29.97
S Picture	AVCSP-1	British Telecom	SP1_BT_A		X		1.0 and higher	10
	AVCSP-2	British Telecom	SP2_BT_B		X		1.0 and higher	20
Long Sequence	AVCLS-1	SVA	LS_SVA_D	X	X	X	1.3 and higher	29.97
SEI/VUI	AVCSE-1	Sony	CVSE2_Sony_B		X	X	2.1 and higher	15
	AVCSE-2	Sony	CVSE3_Sony_H		X	X	2.1 and higher	15
	AVCSE-3	Sony	CVSEFDFT3_Sony_E		X	X	2.1 and higher	15
CABAC	AVCCANL-1	Toshiba	CANL1_TOSHIBA_G			X	1.2 and higher	29.97
	AVCCANL-2	Sony	CANL1_Sony_E			X	2.1 and higher	15
	AVCCANL-3	Sony	CANL2_Sony_E			X	2.1 and higher	15
	AVCCANL-4	Sony	CANL3_Sony_C			X	1.2 and higher	15
	AVCCANL-5	SVA	CANL1_SVA_B			X	2.1 and higher	29.97
	AVCCANL-6	SVA	CANL2_SVA_B			X	2.1 and higher	29.97
	AVCCANL-7	SVA	CANL3_SVA_B			X	2.1 and higher	29.97
	AVCCANL-8	SVA	CANL4_SVA_B			X	2.1 and higher	29.97
	AVCCABA-1	Sony	CABA1_Sony_D			X	2.1 and higher	15
	AVCCABA-2	Sony	CABA2_Sony_E			X	2.1 and higher	15
	AVCCABA-3	Sony	CABA3_Sony_C			X	1.2 and higher	15
	AVCCABA-4	Toshiba	CABA3_TOSHIBA_E			X	1.2 and higher	29.97
	AVCCABA-5	SVA	CABA1_SVA_B			X	2.1 and higher	29.97
	AVCCABA-6	SVA	CABA2_SVA_B			X	2.1 and higher	29.97
	AVCCABA-7	SVA	CABA3_SVA_B			X	2.1 and higher	29.97
	AVCCABA-8	Motorola	cabac_mot_frm0_full			X	2.2 and higher	29.97
CABAC: Initialization	AVCCAIN-1	Sony	CABACI3_Sony_B			X	2.1 and higher	15
CABAC: MB QP Delta	AVCCAQP-1	Sony	CAQP1_Sony_B			X	1.2 and higher	15

Table 1 – Bitstreams for Baseline, Extended and Main profile

Categories	Bitstream	Donated by	File name	Baseline	Extended	Main	Level	Frame rate (Frames/sec)
	AVCCAQP-2	Sony	CACQP3_Sony_D			X	2.1 and higher	15
CABAC: Slice	AVCCASL-1	Sony	CABAST3_Sony_E			X	2.1 and higher	29.97
	AVCCASL-2	Sony	CABASTBR3_Sony_B			X	2.1 and higher	29.97
CABAC: I_PCM	AVCCAPCM-1	Broadcom	CAPCMNL1_Sand_E			X	4.0 and higher	29.97
	AVCCAPCM-2	Broadcom	CAPCM1_Sand_E			X	4.0 and higher	29.97
	AVCCAPCM-3	Sony	CAPM3_Sony_D			X	2.1 and higher	15
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
CABAC: WP	AVCCAWP-1	Toshiba	CAWP1_TOSHIBA_E			X	2.0 and higher	7.5
	AVCCAWP-2	Toshiba	CAWP5_TOSHIBA_E			X	2.0 and higher	7.5
CABAC: Field coding	AVCCAFI-1	Broadcom	CABREF3_Sand_D			X	4.0 and higher	29.97
	AVCCAFI-2	SVA	CAFI_SVA_C			X	3.0 and higher	29.97
	AVCCAFI-3	Motorola	cabac_mot_fld0_full			X	2.2 and higher	29.97
CABAC: Frame/Field Coding	AVCCAPA-1	Sharp Labs	Sharp_MP_PAFF_2r			X	3.0 and higher	29.97
	AVCCAPA-2	Toshiba	CAPA1_TOSHIBA_B			X	2.1 and higher	25
	AVCCAPA-3	Motorola	cabac_mot_paff0_full			X	2.2 and higher	29.97
CABAC: MBAFF	AVCCAMA-1	Toshiba	CAMANL1_TOSHIBA_B			X	2.1 and higher	25
	AVCCAMA-2	Toshiba	CAMANL2_TOSHIBA_B			X	2.1 and higher	25
	AVCCAMA-3	Sony	CANLMA2_Sony_C			X	3.1 and higher	29.97
	AVCCAMA-4	Sony	CANLMA3_Sony_C			X	3.1 and higher	29.97
	AVCCAMA-5	Sony	CAMA1_Sony_C			X	3.1 and higher	29.97
	AVCCAMA-6	Toshiba	CAMA1_TOSHIBA_B			X	2.1 and higher	25
	AVCCAMA-7	Broadcom	CAMANL3_Sand_E			X	4.0 and higher	29.97
	AVCCAMA-8	Broadcom	CAMA3_Sand_E			X	4.0 and higher	29.97
	AVCCAMA-9	Sony	CAMASL3_Sony_B			X	2.1 and higher	29.97
	AVCCAMA-10	Sony	CAMACI3_Sony_C			X	2.1 and higher	29.97
	AVCCAMA-11	Motorola	cabac_mot_mbaff0_full			X	2.2 and higher	29.97
	AVCCAMA-12	Motorola	CAMP_MOT_MBAFF_L30			X	3.0 and higher	29.97
	AVCCAMA-13	Motorola	CAMP_MOT_MBAFF_L31			X	3.1 and higher	29.97
	AVCCAPAMA-1	Broadcom	CAPAMA3_Sand_F			X	4.0 and higher	29.97
	AVCCAPAMA-2	VideoTele.com	CAMA1_VTC_C			X	3.0 and higher	29.97
	AVCCAPAMA-3	VideoTele.com	CAMA2_VTC_B			X	3.0 and higher	25
	AVCCAPAMA-4	VideoTele.com	CAMA3_VTC_B			X	3.0 and higher	25
CABAC: Prediction Bandwidth	AVCCAMV-1	Broadcom	MV1_BRCM_D			X	3.0 and higher	29.97
CABAC/CAVLC	AVCCVCANLMA-1	Sony	CVCANLMA2_Sony_C			X	3.1 and higher	29.97

Table 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 (Frames/ 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
	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
	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

Table 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 (Frames/ sec)
	FREH-24	Sony	HVLCMFF0_Sony_A	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
	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

Table 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 (Frames/ sec)
	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
	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

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	**Audiovisual and multimedia systems**
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	Telecommunication management, including TMN and network maintenance
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks, open system communications and security
Series Y	Global information infrastructure, Internet protocol aspects and next-generation networks
Series Z	Languages and general software aspects for telecommunication systems

Printed in Switzerland
Geneva, 2005