**COMMITTEE DRAFT AMENDMENT****© ISO/IEC 2022 – All rights reserved****Text of ISO/IEC 23090-3:202x/CDAM 1****63****Part 3: Versatile video coding, AMENDMENT 1: New level and systems-related supplemental enhancement information****Information technology — Coded representation of immersive media****Élément introductif — Élément central — Partie 3: Titre de la partie****Information technology — Coded representation of immersive media — Part 3: Versatile video coding, AMENDMENT 1: New level and systems-related supplemental enhancement information****E****2022-05-20****(30) Committee****ISO/IEC****ISO/IEC J****202x****1****Amendment****International Standard****202x****129****ISO/IEC 23090‑****ISO/IEC 23090‑3****ISO/IEC 23090-3:202x/CDAM 1****JISC****Coding of audio, picture, multimedia and hypermedia information****Information technology****5****29****1** **2****見出し 2****見出し 1****0****2****STD Version 2.1c2****30** **4** **ISO/IEC JTC 1/SC 29 /WG 5 N 129**

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ISO/IEC JTC 1/SC 29/WG 5

Secretariat:  JISC

**Information technology — Coded representation of immersive media — Part 3: Versatile video coding, AMENDMENT 1: New level and systems-related supplemental enhancement information**

*Élément introductif — Élément central — Partie 3: Titre de la partie*

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Information technology — Coded representation of immersive media — Part 3: Versatile video coding, AMENDMENT 1: New level and systems-related supplemental enhancement information

*Replace subclause 2.3 with the following:*

**2.3 Additional references**

– Rec. ITU-T T.35 (in force), *Procedure for the allocation of ITU-T defined codes for non standard facilities*

– ISO/IEC 23001-11, Information Technology — MPEG Systems technologies — Part 11: Energy-efficient media consumption (green metadata)

– ISO/IEC 23090-13, Information technology — Coded representation of immersive media — Part 13: Video decoding interface for immersive media

*Replace the text in subclause 7.4.12.11 with the following:*

**sb\_coded\_flag**[ xS ][ yS ] specifies the following for the subblock at location ( xS, yS ) within the current transform block, where a subblock is an array of numSbCoeff transform coefficient levels:

~~When sb\_coded\_flag[ xS ][ yS ] is equal to 0, all transform coefficient levels of the subblock at location ( xS, yS ) are inferred to be equal to 0.~~

~~When sb\_coded\_flag[ xS ][ yS ] is not present, it is inferred to be equal to 1.~~

* If transform\_skip\_flag[ x0 ][ y0 ][ cIdx ] is equal to 0 or sh\_ts\_residual\_coding\_disabled\_flag is equal to 1, the following applies:
* When sb\_coded\_flag[ xS ][ yS ] is not present, it is inferred as follows:
* If one or more of the following conditions are true, sb\_coded\_flag[ xS ][ yS ] is inferred to be equal to 1:
* ( xS, yS ) is equal to ( 0, 0 ).
* ( xS, yS ) is equal to ( LastSignificantCoeffX  >>  log2SbW, LastSignificantCoeffY  >>  log2SbH ).
* Otherwise, sb\_coded\_flag[ xS ][ yS ] is inferred to be equal to 0.
* If sb\_coded\_flag[ xS ][ yS ] is equal to 0, all transform coefficient levels of the subblock at location ( xS, yS ) are inferred to be equal to 0.
* Otherwise (sb\_coded\_flag[ xS ][ yS ] is equal to 1), the following applies:
* If ( xS, yS ) is equal to ( 0, 0 ) and ( LastSignificantCoeffX, LastSignificantCoeffY ) is not equal to ( 0, 0 ), at least one of the sig\_coeff\_flag syntax elements is present for the subblock at location ( xS, yS ).
* Otherwise, at least one of the transform coefficient levels of the subblock at location ( xS, yS ) has a non-zero value.
* Otherwise (transform\_skip\_flag[ x0 ][ y0 ][ cIdx ] is equal to 1 and sh\_ts\_residual\_coding\_disabled\_flag is equal to 0), the following applies:
* When sb\_coded\_flag[ xS ][ yS ] is not present, it is inferred to be equal to 1.
* If sb\_coded\_flag[ xS ][ yS ] is equal to 0, all transform coefficient levels of the subblock at location ( xS, yS ) are inferred to be equal to 0.
* Otherwise (sb\_coded\_flag[ xS ][ yS ] is equal to 1), at least one of the transform coefficient levels of the subblock at location ( xS, yS ) has a non-zero value.

*In subclause 8.7.5.1, make the following changes and adjust the equation indices of the remaining equations accordingly:*

...

The variables subW and subH are derived as follows:

subW = cIdx = = 0 ? 1 : SubWidthC (1204)

subH = cIdx = = 0 ? 1 : SubHeightC (1205)

The following assignments are made for i = 0..nCurrSw \* subW − 1, j = 0..nCurrSh \* subH − 1:

IsAvailable[ cIdx ][ xCurr \* subW + i ][ yCurr \* subH + j ] = TRUE (1206)

~~The following assignments are made for i = 0..nCurrSw \* SubWidthC − 1, j = 0..nCurrSh\* SubHeightC − 1:~~

~~IsAvailable[ cIdx ][ xCurr \* SubWidthC + i ][ yCurr \* SubHeightC + j ] = TRUE (1204)~~

...

*Replace the text in subclause A.3.1 with the following:*

**A.3.1 Main 10 and Main 10 Still Picture profiles**

Bitstreams conforming to the Main 10 or Main 10 Still Picture profile shall obey the following constraints:

* Referenced SPSs shall have ptl\_multilayer\_enabled\_flag equal to 0.
* In a bitstream conforming to the Main 10 Still Picture profile, the bitstream shall contain only one picture.
* Referenced SPSs shall have sps\_chroma\_format\_idc equal to 0 or 1.
* Referenced SPSs shall have sps\_bitdepth\_minus8 in the range of 0 to 2, inclusive.
* Referenced SPSs shall have sps\_palette\_enabled\_flag equal to 0.
* ~~In a bitstream conforming to the Main 10 profile, general\_level\_idc and sublayer\_level\_idc[ i ] for all values of i in the referenced VPS (when available) and in the referenced SPSs shall not be equal to 255 (which indicates level 15.5).~~
* The tier and level constraints specified for the Main 10 or Main 10 Still Picture profile in clause A.4, as applicable, shall be fulfilled.

Conformance of a bitstream to the Main 10 profile is indicated by general\_profile\_idc being equal to 1.

Conformance of a bitstream to the Main 10 Still Picture profile is indicated by general\_profile\_idc being equal to 65.

NOTE – When the conformance of a bitstream to the Main 10 Still Picture profile is indicated by general\_profile\_idc being equal to 65, and the indicated level is not level 15.5, the conditions for indication of the conformance of the bitstream to the Main 10 profile are also fulfilled.

Decoders conforming to the Main 10 profile at a specific level of a specific tier shall be capable of decoding all bitstreams for which all of the following conditions apply:

* The bitstream is indicated to conform to the Main 10 or Main 10 Still Picture profile.
* The bitstream is indicated to conform to a tier that is lower than or equal to the specified tier.
* The bitstream is indicated to conform to a level that is not level 15.5 and is lower than or equal to the specified level.

Decoders conforming to the Main 10 Still Picture profile at a specific level of a specific tier shall be capable of decoding all bitstreams for which all of the following conditions apply:

* The bitstream is indicated to conform to the Main 10 Still Picture profile.
* The bitstream is indicated to conform to a tier that is lower than or equal to the specified tier.
* The bitstream is indicated to conform to a level that is not level 15.5 and is lower than or equal to the specified level.

Decoders conforming to the Main 10 Still Picture profile at a specific level of a specific tier shall also be capable of decoding of the first picture of a bitstream when both of the following conditions apply:

* That bitstream is indicated to conform to the Main 10 profile, to conform to a tier that is lower than or equal to the specified tier, and to conform to a level that is not level 15.5 and is lower than or equal to the specified level.
* That picture is an IRAP picture or is a GDR picture with ph\_recovery\_poc\_cnt equal to 0, is in an output layer, and has ph\_pic\_output\_flag equal to 1.

*Replace the text in subclause A.3.2 with the following:*

**A.3.2 Main 10 4:4:4 and Main 10 4:4:4 Still Picture profiles**

Bitstreams conforming to the Main 10 4:4:4 or Main 10 4:4:4 Still Picture profile shall obey the following constraints:

* Referenced SPSs shall have ptl\_multilayer\_enabled\_flag equal to 0.
* In a bitstream conforming to the Main 10 4:4:4 Still Picture profile, the bitstream shall contain only one picture.
* Referenced SPSs shall have sps\_chroma\_format\_idc in the range of 0 to 3, inclusive.
* Referenced SPSs shall have sps\_bitdepth\_minus8 in the range of 0 to 2, inclusive.
* ~~In a bitstream conforming to the Main 10 4:4:4 profile, general\_level\_idc and sublayer\_level\_idc[ i ] for all values of i in the referenced VPS (when available) and in the referenced SPSs shall not be equal to 255 (which indicates level 15.5).~~
* The tier and level constraints specified for the Main 10 4:4:4 or Main 10 4:4:4 Still Picture profile in clause A.4, as applicable, shall be fulfilled.

Conformance of a bitstream to the Main 10 4:4:4 profile is indicated by general\_profile\_idc being equal to 33.

Conformance of a bitstream to the Main 10 4:4:4 Still Picture profile is indicated by general\_profile\_idc being equal to 97.

NOTE – When the conformance of a bitstream to the Main 10 4:4:4 Still Picture profile is indicated by general\_profile\_idc being equal to 97, and the indicated level is not level 15.5, the conditions for indication of the conformance of the bitstream to the Main 10 4:4:4 profile are also fulfilled.

Decoders conforming to the Main 10 4:4:4 profile at a specific level of a specific tier shall be capable of decoding all bitstreams for which all of the following conditions apply:

* The bitstream is indicated to conform to the Main 10 4:4:4, Main 10, Main 10 4:4:4 Still Picture, or Main 10 Still Picture profile.
* The bitstream is indicated to conform to a tier that is lower than or equal to the specified tier.
* The bitstream is indicated to conform to a level that is not level 15.5 and is lower than or equal to the specified level.

Decoders conforming to the Main 10 4:4:4 Still Picture profile at a specific level of a specific tier shall be capable of decoding all bitstreams for which all of the following conditions apply:

* The bitstream is indicated to conform to the Main 10 4:4:4 Still Picture or Main 10 Still Picture profile.
* The bitstream is indicated to conform to a tier that is lower than or equal to the specified tier.
* The bitstream is indicated to conform to a level that is not level 15.5 and is lower than or equal to the specified level.

Decoders conforming to the Main 10 4:4:4 Still Picture profile at a specific level of a specific tier shall also be capable of decoding of the first picture of a bitstream when both of the following conditions apply:

* That bitstream is indicated to conform to the Main 10 or Main 10 4:4:4 profile, to conform to a tier that is lower than or equal to the specified tier, to conform to a level that is not level 15.5 and is lower than or equal to the specified level.
* That picture is an IRAP picture or is a GDR picture with ph\_recovery\_poc\_cnt equal to 0, is in an output layer, and has ph\_pic\_output\_flag equal to 1.

*Replace the text in subclause A.3.3 with the following:*

**A.3.3 Multilayer Main 10 profile**

Bitstreams conforming to the Multilayer Main 10 shall obey the following constraints:

* Referenced SPSs shall have sps\_chroma\_format\_idc equal to 0 or 1.
* Referenced SPSs shall have sps\_bitdepth\_minus8 in the range of 0 to 2, inclusive.
* Referenced SPSs shall have sps\_palette\_enabled\_flag equal to 0.
* ~~In a bitstream conforming to the Multilayer Main 10 profile, general\_level\_idc and sublayer\_level\_idc[ i ] for all values of i in the referenced VPS (when available) and in the referenced SPSs shall not be equal to 255 (which indicates level 15.5).~~
* The tier and level constraints specified for the Multilayer Main 10 profile in clause A.4, as applicable, shall be fulfilled.

Conformance of a bitstream to the Multilayer Main 10 profile is indicated by general\_profile\_idc being equal to 17.

Decoders conforming to the Multilayer Main 10 profile at a specific level of a specific tier shall be capable of decoding all bitstreams for which all of the following conditions apply:

* The bitstream is indicated to conform to the Multilayer Main 10, Main 10, or Main 10 Still Picture profile.
* The bitstream is indicated to conform to a tier that is lower than or equal to the specified tier.
* The bitstream is indicated to conform to a level that is not level 15.5 and is lower than or equal to the specified level.

*Replace the text in subclause A.3.4 with the following:*

**A.3.4 Multilayer Main 10 4:4:4 profile**

Bitstreams conforming to the Multilayer Main 10 4:4:4 profile shall obey the following constraints:

* Referenced SPSs shall have sps\_chroma\_format\_idc in the range of 0 to 3, inclusive.
* Referenced SPSs shall have sps\_bitdepth\_minus8 in the range of 0 to 2, inclusive.
* ~~In a bitstream conforming to the Multilayer Main 10 4:4:4 profile, general\_level\_idc and sublayer\_level\_idc[ i ] for all values of i in the referenced VPS (when available) and in the referenced SPSs shall not be equal to 255 (which indicates level 15.5).~~
* The tier and level constraints specified for the Multilayer Main 10 4:4:4 profile in clause A.4, as applicable, shall be fulfilled.

Conformance of a bitstream to the Multilayer Main 10 4:4:4 profile is indicated by general\_profile\_idc being equal to 49.

Decoders conforming to the Multilayer Main 10 4:4:4 profile at a specific level of a specific tier shall be capable of decoding all bitstreams for which all of the following conditions apply:

* The bitstream is indicated to conform to the Multilayer Main 10 4:4:4, Multilayer Main 10, Main 10 4:4:4, Main 10, Main 10 4:4:4 Still Picture, or Main 10 Still Picture profile.
* The bitstream is indicated to conform to a tier that is lower than or equal to the specified tier.
* The bitstream is indicated to conform to a level that is not level 15.5 and is lower than or equal to the specified level.

*Replace the text in subclause A.3.5 with the following:*

**A.3.5 Format range extensions profiles**

The following profiles, collectively referred to as the operation range extensions profiles, are specified in this clause:

* The Main 12, Main 12 4:4:4 and Main 16 4:4:4 profiles
* The Main 12 Intra, Main 12 4:4:4 Intra and Main 16 4:4:4 Intra profiles
* The Main 12 Still Picture, Main 12 4:4:4 Still Picture and Main 16 4:4:4 Still Picture profiles

Bitstreams conforming to the operation range extensions profiles shall obey the following constraints:

* Referenced SPSs shall have ptl\_multilayer\_enabled\_flag equal to 0.
* In bitstreams conforming to the Main 12 Still Picture, Main 12 4:4:4 Still Picture or Main 16 4:4:4 Still Picture profile, the bitstream shall contain only one picture.
* ~~In bitstreams conforming to the Main 12, Main 12 4:4:4, Main 16 4:4:4, Main 12 Intra, Main 12 4:4:4 Intra, or Main 16 4:4:4 Intra profile, general\_level\_idc in the referenced SPSs shall not be equal to 255 (which indicates level 15.5).~~
* The allowed values for syntax elements as specified in Table A.1 shall be fulfilled.
* The tier and level constraints specified for the Main 12, Main 12 4:4:4, Main 16 4:4:4, Main 12 Intra, Main 12 4:4:4 Intra or Main 16 4:4:4 Intra profile in clause A.4, as applicable, shall be fulfilled.
* In bitstreams conforming to the Main 12 Intra, Main 12 4:4:4 Intra or Main 16 4:4:4 Intra profile, all pictures shall be GDR pictures with ph\_recovery\_poc\_cnt equal to 0 or IRAP pictures.

**Table A.1 – Allowed values for syntax elements in the operation range extensions profiles**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Profile for which constraint is specified** | **sps\_chroma\_format\_idc** | **sps\_bitdepth\_minus8** | **sps\_palette\_enabled\_flag** | **sps\_extended\_precision\_flag sps\_ts\_residual\_coding\_rice\_present\_in\_sh\_flag, sps\_rrc\_rice\_extension\_flag, sps\_persistent\_rice\_adaptation\_enabled\_flag sps\_reverse\_last\_sig\_coeff\_enabled\_flag** |
| Main 12 | 0..1 | 0..4 | 0 | 0 |
| Main 12 4:4:4 | 0..3 | 0..4 | 0..1 | 0..1 |
| Main 16 4:4:4 | 0..3 | 0..8 | 0..1 | 0..1 |
| Main 12 Intra | 0..1 | 0..4 | 0 | 0 |
| Main 12 4:4:4 Intra | 0..3 | 0..4 | 0..1 | 0..1 |
| Main 16 4:4:4 Intra | 0..3 | 0..8 | 0..1 | 0..1 |
| Main 12 Still Picture | 0..1 | 0..4 | 0 | 0 |
| Main 12 4:4:4 Still Picture | 0..3 | 0..4 | 0..1 | 0..1 |
| Main 16 4:4:4 Still Picture | 0..3 | 0..8 | 0..1 | 0..1 |

Conformance of a bitstream to the Main 12 profile is indicated by general\_profile\_idc being equal to 2.

Conformance of a bitstream to the Main 12 Intra profile is indicated by general\_profile\_idc being equal to 10.

Conformance of a bitstream to the Main 12 Still Picture profile is indicated by general\_profile\_idc being equal to 66.

Conformance of a bitstream to the Main 12 4:4:4 profile is indicated by general\_profile\_idc being equal to 34.

Conformance of a bitstream to the Main 12 4:4:4 Intra profile is indicated by general\_profile\_idc being equal to 42.

Conformance of a bitstream to the Main 12 4:4:4 Still Picture profile is indicated by general\_profile\_idc being equal to 98.

Conformance of a bitstream to the Main 16 4:4:4 profile is indicated by general\_profile\_idc being equal to 35.

Conformance of a bitstream to the Main 16 4:4:4 Intra profile is indicated by general\_profile\_idc being equal to 43.

Conformance of a bitstream to the Main 16 4:4:4 Still Picture profile is indicated by general\_profile\_idc being equal to 99.

Decoders conforming to an operation range extensions profile at a specific level (identified by a specific value of general\_level\_idc) of a specific tier (identified by a specific value of general\_tier\_flag) shall be capable of decoding all bitstreams and sub-layer representations for which all of the following conditions apply:

* Any of the following conditions apply:
  + The decoder conforms to the Main 12 profile, and the bitstream is indicated to conform to the Main 10, Main 10 Still Picture, Main 12, Main 12 Intra, or Main 12 Still Picture profile.
  + The decoder conforms to the Main 12 4:4:4 profile, and the bitstream is indicated to conform to the Main 10, Main 10 Still Picture, Main 10 4:4:4, Main 10 4:4:4 Still Picture, Main 12, Main 12 Intra, Main 12 Still Picture, Main 12 4:4:4, Main 12 4:4:4 Intra, or Main 12 4:4:4 Still Picture profile.
  + The decoder conforms to the Main 16 4:4:4 profile, and the bitstream is indicated to conform to Main 10, Main 10 Still Picture, Main 10 4:4:4, Main 10 4:4:4 Still Picture, or any of the operation range extensions profile.
  + The decoder conforms to the Main 12 Intra profile, and either 1) the bitstream is indicated to conform to the Main 10 Still Picture, Main 12 Intra, or Main 12 Still Picture profile, or 2) the gci\_all\_rap\_pictures\_constraint\_flag is equal to 1 and the bitstream is indicated to conform to the Main 10 or Main 12 profile.
  + The decoder conforms to the Main 12 4:4:4 Intra profile, and either 1) the bitstream is indicated to conform to the Main 10 Still Picture, Main 10 4:4:4 Still Picture, Main 12 Intra, Main 12 4:4:4 Intra, Main 12 Still Picture, or Main 12 4:4:4 Still Picture profile, or 2) the gci\_all\_rap\_pictures\_constraint\_flag is equal to 1 and the bitstream is indicated to conform to the Main 10, Main 10 4:4:4, Main 12, or Main 12 4:4:4 profile.
  + The decoder conforms to the Main 16 4:4:4 Intra profile, and either 1) the bitstream is indicated to conform to the Main 10 Still Picture, Main 10 4:4:4 Still Picture, Main 12 Intra, Main 12 4:4:4 Intra, Main 16 4:4:4 Intra, Main 12 Still Picture, Main 12 4:4:4 Still Picture, or Main 16 4:4:4 Still Picture profile, or 2) the gci\_all\_rap\_pictures\_constraint\_flag is equal to 1 and the bitstream is indicated to conform to the Main 10, Main 10 4:4:4, Main 12, Main 12 4:4:4, or Main 16 4:4:4 profile.
  + The decoder conforms to the Main 12 Still Picture profile, and the bitstream is indicated to conform to the Main 10 Still Picture or Main 12 Still Picture profile.
  + The decoder conforms to the Main 12 4:4:4 Still Picture profile, and the bitstream is indicated to conform to the Main 10 Still Picture, Main 10 4:4:4 Still Picture, Main 12 Still Picture or Main 12 4:4:4 Still Picture profile.
  + The decoder conforms to the Main 16 4:4:4 Still Picture profile, and the bitstream is indicated to conform to the Main 10 Still Picture, Main 10 4:4:4 Still Picture, Main 12 Still Picture, Main 12 4:4:4 Still Picture, or Main 16 4:4:4 Still Picture profile.
* The bitstream is indicated to conform to a tier that is lower than or equal to the specified tier.
* The bitstream is indicated to conform to a level that is not level 15.5 and is lower than or equal to the specified level.

Decoders conforming to the Main 12 Still Picture profile at a specific level of a specific tier shall also be capable of decoding of the first picture of a bitstream when both of the following conditions apply:

* That bitstream is indicated to conform to the Main 10, Main 12, or Main 12 Intra profile, to conform to a tier that is lower than or equal to the specified tier, and to conform to a level that is not level 15.5 and is lower than or equal to the specified level.
* That picture is a GDR picture with ph\_recovery\_poc\_cnt equal to 0 or an IRAP picture, is in an output layer, and has ph\_pic\_output\_flag equal to 1.

Decoders conforming to the Main 12 4:4:4 Still Picture profile at a specific level of a specific tier shall also be capable of decoding of the first picture of a bitstream when both of the following conditions apply:

* That bitstream is indicated to conform to the Main 10, Main 10 4:4:4, Main 12, Main 12 Intra, Main 12 4:4:4, or Main 12 4:4:4 Intra profile, to conform to a tier that is lower than or equal to the specified tier, and to conform to a level that is not level 15.5 and is lower than or equal to the specified level.
* That picture is a GDR picture with ph\_recovery\_poc\_cnt equal to 0 or an IRAP picture, is in an output layer, and has ph\_pic\_output\_flag equal to 1.

Decoders conforming to the Main 16 4:4:4 Still Picture profile at a specific level of a specific tier shall also be capable of decoding of the first picture of a bitstream when both of the following conditions apply:

* That bitstream is indicated to conform to the Main 10, Main 10 4:4:4, Main 12, Main 12 Intra, Main 12 4:4:4, Main 12 4:4:4 Intra, Main 16 4:4:4, or Main 16 4:4:4 Intra profile, to conform to a tier that is lower than or equal to the specified tier, and to conform to a level that is not level 15.5 and is lower than or equal to the specified level.
* That picture is a GDR picture with ph\_recovery\_poc\_cnt equal to 0 or an IRAP picture, is in an output layer, and has ph\_pic\_output\_flag equal to 1.

*In subclause A.4.1, make the following changes:*

...

Table A.2 specifies the limits for each level of each tier for levels other than level 15.5.

NOTE – Since there are no limits specified by Table A.2 for level 15.5, it is not possible in general for a practical decoder to be assured of being able to decode all bitstreams that conform to this level. The purpose of the definition of level 15.5 is to provide a suitable label for bitstreams that can exceed the limits of all other specified levels. When the bitstream is indicated to conform to level 15.5, a decoder is expected to examine the characteristics of the bitstream during its operation in order to determine whether it is capable of decoding the bitstream.

*In subclause A.4.2, make the following changes:*

...

When the specified level is not level 15.5, bitstreams ~~Bitstreams~~ conforming to the Main 10, Main 10 4:4:4, Multilayer Main 10, Multilayer Main 10 4:4:4, Main 12, Main 12 4:4:4, Main 16 4:4:4, Main 12 Intra, Main 12 4:4:4 Intra, or Main 16 4:4:4 Intra profile at a specified tier and level shall obey the following constraints for each bitstream conformance test as specified in Annex C:

...

*Replace subclause D2.1 with the following:*

**D.2.1 General SEI payload syntax**

|  |  |
| --- | --- |
| sei\_payload( payloadType, payloadSize ) { | **Descriptor** |
| SeiExtensionBitsPresentFlag = 0 |  |
| if( nal\_unit\_type = = PREFIX\_SEI\_NUT ) |  |
| if( payloadType = = 0 ) |  |
| buffering\_period( payloadSize ) |  |
| else if( payloadType = = 1 ) |  |
| pic\_timing( payloadSize ) |  |
| else if( payloadType = = 3 ) |  |
| filler\_payload( payloadSize ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| else if( payloadType = = 4 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| user\_data\_registered\_itu\_t\_t35( payloadSize ) |  |
| else if( payloadType = = 5 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| user\_data\_unregistered( payloadSize ) |  |
| else if( payloadType = = 19 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| film\_grain\_characteristics( payloadSize ) |  |
| else if( payloadType = = 45 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| frame\_packing\_arrangement( payloadSize ) |  |
| else if( payloadType = = 47 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| display\_orientation( payloadSize ) |  |
| else if( payloadType = = 56 ) /\* Specified in ISO/IEC 23001-11 \*/ |  |
| green\_metadata( payloadsize ) |  |
| else if( payloadType = = 129 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| parameter\_sets\_inclusion\_indication( payloadSize ) |  |
| else if( payloadType = = 130 ) |  |
| decoding\_unit\_info( payloadSize ) |  |
| else if( payloadType = = 133 ) |  |
| scalable\_nesting( payloadSize ) |  |
| else if( payloadType = = 137 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| mastering\_display\_colour\_volume( payloadSize ) |  |
| else if( payloadType = = 142 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| colour\_transform\_info( payloadSize ) |  |
| else if( payloadType = = 144 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| content\_light\_level\_info( payloadSize ) |  |
| else if( payloadType = = 145 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| dependent\_rap\_indication( payloadSize ) |  |
| else if( payloadType = = 147 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| alternative\_transfer\_characteristics( payloadSize ) |  |
| else if( payloadType = = 148 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| ambient\_viewing\_environment( payloadSize ) |  |
| else if( payloadType = = 149 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| content\_colour\_volume( payloadSize ) |  |
| else if( payloadType = = 150 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| equirectangular\_projection( payloadSize ) |  |
| else if( payloadType = = 153 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| generalized\_cubemap\_projection( payloadSize ) |  |
| else if( payloadType = = 154 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| sphere\_rotation( payloadSize ) |  |
| else if( payloadType = = 155 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| regionwise\_packing( payloadSize ) |  |
| else if( payloadType = = 156 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| omni\_viewport( payloadSize ) |  |
| else if( payloadType = = 165 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| alpha\_channel\_info( payloadSize ) |  |
| else if( payloadType = = 168 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| frame\_field\_info( payloadSize ) |  |
| else if( payloadType = = 177 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| depth\_representation\_info( payloadSize ) |  |
| else if( payloadType = = 179 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| multiview\_acquisition\_info( payloadSize ) |  |
| else if( payloadType = = 180 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| multiview\_view\_position( payloadSize ) |  |
| else if( payloadType = = 200 ) |  |
| sei\_manifest( payloadSize ) |  |
| else if( payloadType = = 201 ) |  |
| sei\_prefix\_indication( payloadSize ) |  |
| else if( payloadType = = 202 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| annotated\_regions( payloadSize ) |  |
| else if( payloadType = = 203 ) |  |
| subpic\_level\_info( payloadSize ) |  |
| else if( payloadType = = 204 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| sample\_aspect\_ratio\_info( payloadSize ) |  |
| else if( payloadType = = 205 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| scalability\_dimension\_info( payloadSize ) |  |
| else if( payloadType = = 206 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| extended\_drap\_indication( payloadSize ) |  |
| else if( payloadType = = 207 ) |  |
| constrained\_rasl\_encoding\_indication( payloadSize ) |  |
| else if( payloadType = = 208 ) /\* Specified in ISO/IEC 23090-13 \*/ |  |
| vdi\_sei\_envelope( payloadsize ) |  |
| else /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| reserved\_message( payloadSize ) |  |
| else /\* nal\_unit\_type = = SUFFIX\_SEI\_NUT \*/ |  |
| if( payloadType = = 3 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| filler\_payload( payloadSize ) |  |
| else if( payloadType = = 132 ) /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| decoded\_picture\_hash( payloadSize ) |  |
| else if( payloadType = = 133 ) |  |
| scalable\_nesting( payloadSize ) |  |
| else /\* Specified in Rec. ITU-T H.274 | ISO/IEC 23002-7 \*/ |  |
| reserved\_message( payloadSize ) |  |
| if( SeiExtensionBitsPresentFlag | | more\_data\_in\_payload( ) ) { |  |
| if( payload\_extension\_present( ) ) |  |
| **sei\_reserved\_payload\_extension\_data** | u(v) |
| **sei\_payload\_bit\_equal\_to\_one** /\* equal to 1 \*/ | f(1) |
| while( !byte\_aligned( ) ) |  |
| **sei\_payload\_bit\_equal\_to\_zero** /\* equal to 0 \*/ | f(1) |
| } |  |
| } |  |

*In subclause D2.2, make the following changes:*

...

**Table D.1 – Persistence scope of SEI messages (informative)**

|  |  |
| --- | --- |
| **SEI message** | **Persistence scope** |
| Buffering period | The remainder of the bitstream |
| Picture timing | The AU containing the SEI message |
| DU information | The AU containing the SEI message |
| Scalable nesting | Depending on the scalable-nested SEI messages. Each scalable-nested SEI message has the same persistence scope as if the SEI message was not scalable-nested |
| SEI manifest | The CVS containing the SEI message |
| SEI prefix indication | The CVS containing the SEI message |
| Subpicture level information | The CVS containing the SLI SEI message and up to but not including the next CVS, in decoding order, that contains an SLI SEI message with different content |
| Constrained RASL encoding indication | The CVS containing the SEI messag |
| Green metadata | Specified by the syntax of the SEI message |
| VDI envelope | The CVS containing the SEI message |

...

The following applies on the content of scalable-nested and non-scalable-nested SEI messages applying to the same OLS or layer:

– When there are multiple SEI messages with a particular value of payloadType not equal to any of 4, 5, and 133 that are associated with a particular AU or DU and apply to a particular OLS, layer, or subpicture ~~OLS or layer~~, regardless of whether some or all of these SEI messages are scalable-nested, the SEI messages shall have the same SEI payload content.

...

*Rename subclause D.11 Use of ITU-T H.274 | ISO/IEC 23002-7 VUI parameters*

*as subclause D.13 Use of ITU-T H.274 | ISO/IEC 23002-7 VUI parameters*

*Rename subclause D.12 Use of ITU-T H.274 | ISO/IEC 23002-7 SEI messages*

*as subclause D.14 Use of ITU-T H.274 | ISO/IEC 23002-7 SEI messages*

*Add subclause D.11 as follows:*

**D.11 Green metadata SEI message**

**D.11.1 Green metadata SEI message syntax**

The syntax for the green metadata SEI message is specified in ISO/IEC 23001-11 (Green metadata).

**D.11.2 Green metadata SEI message semantics**

The semantics for the green metadata SEI message is specified in ISO/IEC 23001-11 (Green metadata). ISO/IEC 23001-11 facilitates reduced power consumption in decoders, encoders, displays and in media selection.

*Add clause D.12 as follows:*

**D.12 VDI envelope SEI message**

**D.12.1 VDI envelope SEI message syntax**

The syntax for the video decoding interface (VDI) envelope SEI message is specified in ISO/IEC 23090-13 (Multi-decoder video interface for immersive media).

**D.12.1 VDI envelope SEI message semantics**

The semantics for the video decoding interface (VDI) envelope SEI message is specified in ISO/IEC 23090-13 (Multi-decoder video interface for immersive media). ISO/IEC 23090-13 specifies the control, input, and output interfaces of a video decoding engine as well as the operations that can be performed by this video decoding engine: input formatting for elementary streams, time locking of decoded sequences and metadata streams, output formatting of decoded sequences and metadata streams, and the application programming interface for an application to control these operations.

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