**Proposed draft text attachment to JCTVC-AE0021**

7.3.3 Profile, tier and level syntax

|  |  |
| --- | --- |
| profile\_tier\_level( profilePresentFlag, maxNumSubLayersMinus1 ) { | **Descriptor** |
| if( profilePresentFlag ) { |  |
| **general\_profile\_space** | u(2) |
| **general\_tier\_flag** | u(1) |
| **general\_profile\_idc** | u(5) |
| for( j = 0; j < 32; j++ ) |  |
| **general\_profile\_compatibility\_flag**[ j ] | u(1) |
| **general\_progressive\_source\_flag** | u(1) |
| **general\_interlaced\_source\_flag** | u(1) |
| **general\_non\_packed\_constraint\_flag** | u(1) |
| **general\_frame\_only\_constraint\_flag** | u(1) |
| if( general\_profile\_idc = = 4 | | general\_profile\_compatibility\_flag[ 4 ] | |  general\_profile\_idc = = 5 | | general\_profile\_compatibility\_flag[ 5 ] | |  general\_profile\_idc = = 6 | | general\_profile\_compatibility\_flag[ 6 ] | |  general\_profile\_idc = = 7 | | general\_profile\_compatibility\_flag[ 7 ] ) | |  general\_profile\_idc = = 8 | | general\_profile\_compatibility\_flag[ 8 ] | |  general\_profile\_idc = = 9 | | general\_profile\_compatibility\_flag[ 9 ] | |  general\_profile\_idc = = 10 | | general\_profile\_compatibility\_flag[ 10 ] | |  general\_profile\_idc = = 11 | | general\_profile\_compatibility\_flag[ 11 ] ) {  /\* The number of bits in this syntax structure is not affected by this condition \*/ |  |
| **general\_max\_12bit\_constraint\_flag** | u(1) |
| **general\_max\_10bit\_constraint\_flag** | u(1) |
| **general\_max\_8bit\_constraint\_flag** | u(1) |
| **general\_max\_422chroma\_constraint\_flag** | u(1) |
| **general\_max\_420chroma\_constraint\_flag** | u(1) |
| **general\_max\_monochrome\_constraint\_flag** | u(1) |
| **general\_intra\_constraint\_flag** | u(1) |
| **general\_one\_picture\_only\_constraint\_flag** | u(1) |
| **general\_lower\_bit\_rate\_constraint\_flag** | u(1) |
| if( general\_profile\_idc = = 5 | | general\_profile\_compatibility\_flag[ 5 ] | |  general\_profile\_idc = = 9 | | general\_profile\_compatibility\_flag[ 9 ] | |  general\_profile\_idc = = 10 | | general\_profile\_compatibility\_flag[ 10 ] | |  general\_profile\_idc = = 11 | | general\_profile\_compatibility\_flag[ 11 ] ) { |  |
| **general\_max\_14bit\_constraint\_flag** | u(1) |
| **general\_reserved\_zero\_33bits** | u(33) |
| } else |  |
| **general\_reserved\_zero\_34bits** | u(34) |
| } else if( general\_profile\_idc = = 2 | | general\_profile\_compatibility\_flag[ 2 ] ) { |  |
| **general\_reserved\_zero\_7bits** | u(7) |
| **general\_one\_picture\_only\_constraint\_flag** | u(1) |
| **general\_reserved\_zero\_35bits** | u(35) |
| } else |  |
| **general\_reserved\_zero\_43bits** | u(43) |
| if( ( general\_profile\_idc >= 1 && general\_profile\_idc <= 5 ) | |  general\_profile\_idc = = 9 | | general\_profile\_idc = = 11 | |  general\_profile\_compatibility\_flag[ 1 ] | | general\_profile\_compatibility\_flag[ 2 ] | |  general\_profile\_compatibility\_flag[ 3 ] | | general\_profile\_compatibility\_flag[ 4 ] | |  general\_profile\_compatibility\_flag[ 5 ] | | general\_profile\_compatibility\_flag[ 9 ] | |  general\_profile\_compatibility\_flag[ 11 ] )  /\* The number of bits in this syntax structure is not affected by this condition \*/ |  |
| **general\_inbld\_flag** | u(1) |
| else |  |
| **general\_reserved\_zero\_bit** | u(1) |
| } |  |
| **general\_level\_idc** | u(8) |
| for( i = 0; i < maxNumSubLayersMinus1; i++ ) { |  |
| **sub\_layer\_profile\_present\_flag**[ i ] | u(1) |
| **sub\_layer\_level\_present\_flag**[ i ] | u(1) |
| } |  |
| if( maxNumSubLayersMinus1 > 0 ) |  |
| for( i = maxNumSubLayersMinus1; i < 8; i++ ) |  |
| **reserved\_zero\_2bits**[ i ] | u(2) |
| for( i = 0; i < maxNumSubLayersMinus1; i++ ) { |  |
| if( sub\_layer\_profile\_present\_flag[ i ] ) { |  |
| **sub\_layer\_profile\_space**[ i ] | u(2) |
| **sub\_layer\_tier\_flag**[ i ] | u(1) |
| **sub\_layer\_profile\_idc**[ i ] | u(5) |
| for( j = 0; j < 32; j++ ) |  |
| **sub\_layer\_profile\_compatibility\_flag**[ i ][ j ] | u(1) |
| **sub\_layer\_progressive\_source\_flag**[ i ] | u(1) |
| **sub\_layer\_interlaced\_source\_flag**[ i ] | u(1) |
| **sub\_layer\_non\_packed\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_frame\_only\_constraint\_flag**[ i ] | u(1) |
| if( sub\_layer\_profile\_idc[ i ] = = 4 | | sub\_layer\_profile\_compatibility\_flag[ i ][ 4 ] | |  sub\_layer\_profile\_idc[ i ] = = 5 | | sub\_layer\_profile\_compatibility\_flag[ i ][ 5 ] | |  sub\_layer\_profile\_idc[ i ] = = 6 | | sub\_layer\_profile\_compatibility\_flag[ i ][ 6 ] | |  sub\_layer\_profile\_idc[ i ] = = 7 | | sub\_layer\_profile\_compatibility\_flag[ i ][ 7 ] | |  sub\_layer\_profile\_idc[ i ] = = 8 | | sub\_layer\_profile\_compatibility\_flag[ i ][ 8 ] | |  sub\_layer\_profile\_idc[ i ] = = 9 | | sub\_layer\_profile\_compatibility\_flag[ i ][ 9 ] | |  sub\_layer\_profile\_idc[ i ] = = 10 | |  sub\_layer\_profile\_compatibility\_flag[ i ][ 10 ] | |  sub\_layer\_profile\_idc[ i ] = = 11 | |  sub\_layer\_profile\_compatibility\_flag[ i ][ 11 ] ) {  /\* The number of bits in this syntax structure is not affected by this condition \*/ |  |
| **sub\_layer\_max\_12bit\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_max\_10bit\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_max\_8bit\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_max\_422chroma\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_max\_420chroma\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_max\_monochrome\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_intra\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_one\_picture\_only\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_lower\_bit\_rate\_constraint\_flag**[ i ] | u(1) |
| if( sub\_layer\_profile\_idc[ i ] = = 5 | |  sub\_layer\_profile\_compatibility\_flag[ j ][ 5 ] ) { |  |
| **sub\_layer\_max\_14bit\_constraint\_flag** | u(1) |
| **sub\_layer\_reserved\_zero\_33bits**[ i ] | u(33) |
| } else |  |
| **sub\_layer\_reserved\_zero\_34bits**[ i ] | u(34) |
| } else if( sub\_layer\_profile\_idc[ i ] = = 2 | |  sub\_layer\_profile\_compatibility\_flag[ i ][ 2 ] ) { |  |
| **sub\_layer\_reserved\_zero\_7bits**[ i ] | u(7) |
| **sub\_layer\_one\_picture\_only\_constraint\_flag**[ i ] | u(1) |
| **sub\_layer\_reserved\_zero\_35bits**[ i ] | u(35) |
| } else |  |
| **sub\_layer\_reserved\_zero\_43bits**[ i ] | u(43) |
| if( ( sub\_layer\_profile\_idc[ i ] >= 1 && sub\_layer\_profile\_idc[ i ] <= 5 ) | |  sub\_layer\_profile\_idc[ i ] = = 9 | |  sub\_layer\_profile\_idc[ i ] = = 11 | |  sub\_layer\_profile\_compatibility\_flag[ 1 ] | |  sub\_layer\_profile\_compatibility\_flag[ 2 ] | |  sub\_layer\_profile\_compatibility\_flag[ 3 ] | |  sub\_layer\_profile\_compatibility\_flag[ 4 ] | |  sub\_layer\_profile\_compatibility\_flag[ 5 ] | |  sub\_layer\_profile\_compatibility\_flag[ 9 ] | |  sub\_layer\_profile\_compatibility\_flag[ 11 ] )  /\* The number of bits in this syntax structure is not affected by this condition \*/ |  |
| **sub\_layer\_inbld\_flag**[ i ] | u(1) |
| else |  |
| **sub\_layer\_reserved\_zero\_bit**[ i ] | u(1) |
| } |  |
| if( sub\_layer\_level\_present\_flag[ i ] ) |  |
| **sub\_layer\_level\_idc**[ i ] | u(8) |
| } |  |
| } |  |

7.4.4 Profile, tier and level semantics

…

**general\_inbld\_flag** equal to 1 specifies that the INBLD capability as specified in Annex F is required for decoding of the layer to which the profile\_tier\_level( ) syntax structure applies. general\_inbld\_flag equal to 0 specifies that the INBLD capability as specified in Annex F is not required for decoding of the layer to which the profile\_tier\_level( ) syntax structure applies. When profilePresentFlag is equal to 1, general\_profile\_idc is not equal to 9 or 11 and is not in the range of 1 to 5, inclusive, general\_profile\_compatibility\_flag[ 9 ] is not equal to 1, general\_profile\_compatibility\_flag[ 11 ] is not equal to 1, and general\_profile\_compatibility\_flag[ j ] is not equal to 1 for any value of j in the range of 1 to 5, inclusive, the value of general\_inbld\_flag is inferred to be equal to 0.

…

A.3.6 High throughput profiles

The following profiles, collectively referred to as the high throughput profiles, are specified in this clause:

* The High Throughput 4:4:4, High Throughput 4:4:4 10 and High Throughput 4:4:4 14 profiles
* The High Throughput 4:4:4 16 Intra profile

NOTE  – For purposes of this terminology, the high throughput screen content coding extensions profiles specified in clause A.3.8 are not included in the set of profiles that are collectively referred to as the high throughput profiles, although the names of some of the high throughput screen content coding extensions profiles include the term "High Throughput".

…

A.3.7 Screen content coding extensions profiles

The following profiles, collectively referred to as the screen content coding extensions profiles, are specified in this clause:

– The Screen-Extended Main and Screen-Extended Main 10 profiles

– The Screen-Extended Main 4:4:4 and Screen-Extended Main 4:4:4 10 profiles

NOTE 1 – For purposes of this terminology, the high throughput screen content coding extensions profiles specified in clause A.3.8 are not included in the set of profiles that are collectively referred to as the screen content coding extensions profiles, although the names of some of the high throughput screen content coding extensions profiles include the term "Screen-Extended".

Bitstreams conforming to the screen content coding extensions profiles shall obey the following constraints:

– The constraints specified in Table A.4 shall apply, in which entries marked with "–" indicate that the table entry does not impose a profile-specific constraint on the corresponding syntax element.

– Active VPSs shall have vps\_base\_layer\_internal\_flag and vps\_base\_layer\_available\_flag both equal to 1 only.

– Active SPSs for the base layer shall have separate\_colour\_plane\_flag, when present, equal to 0 only.

– CtbLog2SizeY derived according to active SPSs for the base layer shall be in the range of 4 to 6, inclusive.

– When an active SPS for the base layer has palette\_mode\_enabled\_flag equal to 1, palette\_max\_size shall be less than or equal to 64 and PaletteMaxPredictorSize shall be less than or equal to 128.

– In bitstreams conforming to the Screen-Extended Main, Screen-Extended Main 10, Screen-Extended Main 4:4:4, or Screen-Extended Main 4:4:4 10, active SPSs for the base layer shall have extended\_precision\_processing\_flag, and cabac\_bypass\_alignment\_enabled\_flag, when present, equal to 0 only.

– In bitstreams conforming to the Screen-Extended Main or Screen-Extended Main 10 profiles, when an active PPS for the base layer has tiles\_enabled\_flag equal to 1, it shall have entropy\_coding\_sync\_enabled\_flag equal to 0.

– When an active PPS for the base layer has tiles\_enabled\_flag equal to 1, ColumnWidthInLumaSamples[ i ] shall be greater than or equal to 256 for all values of i in the range of 0 to num\_tile\_columns\_minus1, inclusive, and RowHeightInLumaSamples[ j ] shall be greater than or equal to 64 for all values of j in the range of 0 to num\_tile\_rows\_minus1, inclusive.

– The number of times read\_bits( 1 ) is called in clauses 9.3.4.3.3 and 9.3.4.3.4 when parsing coding\_tree\_unit( ) data for any CTU shall be less than or equal to 5 \* RawCtuBits / 3.

– general\_level\_idc and sub\_layer\_level\_idc[ i ] for all values of i in active SPSs for the base layer shall not be equal to 255 (which indicates level 8.5).

– The tier and level constraints specified for the Screen-Extended Main, Screen-Extended Main 10, Screen-Extended Main 4:4:4 or Screen-Extended Main 4:4:4 10 profiles in clause A.4, as applicable, shall be fulfilled.

Table A.4 – Allowed values for syntax elements in the screen content coding extensions profiles

|  |  |  |
| --- | --- | --- |
| **Profile for which constraint is specified** | **chroma\_format\_idc** | **bit\_depth\_luma\_minus8** and **bit\_depth\_chroma\_minus8** |
| Screen-Extended Main | 1 | 0 |
| Screen-Extended Main 10 | 1 | 0..2 |
| Screen-Extended Main 4:4:4 | 0, 1, or 3 | 0 |
| Screen-Extended Main 4:4:4 10 | 0, 1, or 3 | 0..2 |

Conformance of a bitstream to the screen content coding extensions profiles is indicated by general\_profile\_idc being equal to 9 or general\_profile\_compatibility\_flag[ 9 ] being equal to 1 with the additional indications specified in Table A.5. Conformance of a sub-layer representation with TemporalId equal to i to the screen content coding extensions profiles is indicated by sub\_layer\_profile\_idc[ i ] being equal to 9 or sub\_layer\_profile\_compatibility\_flag[ i ][ 9 ] being equal to 1 with the additional indications specified in Table A.5, with general\_max\_14bit\_**‌**constraint\_flag, general\_max\_12bit\_**‌**constraint\_flag, general\_max\_10bit\_**‌**constraint\_flag, general\_max\_8bit\_**‌**constraint\_flag, general\_max\_422chroma\_**‌**constraint\_flag, general\_max\_420chroma\_**‌**constraint\_flag, general\_max\_monochrome\_**‌**constraint\_flag, general\_intra\_**‌**constraint\_flag, general\_one\_picture\_only\_**‌**constraint\_flag and general\_lower\_bit\_rate\_**‌**constraint\_flag replaced by sub\_layer\_max\_12bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_10bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_8bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_422chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_420chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_monochrome\_**‌**constraint\_flag[ i ], sub\_layer\_intra\_**‌**constraint\_flag[ i ], sub\_layer\_one\_picture\_only\_**‌**constraint\_flag[ i ] and sub\_layer\_lower\_bit\_rate\_**‌**constraint\_flag[ i ], respectively.

All other combinations of general\_max\_12bit\_**‌**constraint\_flag, general\_max\_10bit\_**‌**constraint\_flag, general\_max\_8bit\_**‌**constraint\_flag, general\_max\_422chroma\_**‌**constraint\_flag, general\_max\_420chroma\_**‌**constraint\_flag, general\_max\_monochrome\_**‌**constraint\_flag, general\_intra\_**‌**constraint\_flag, general\_one\_picture\_only\_**‌**constraint\_flag and general\_lower\_bit\_rate\_**‌**constraint\_flag with general\_profile\_idc equal to 9 or general\_profile\_compatibility\_flag[ 9 ] equal to 1 are reserved for future use by ITU-T | ISO/IEC. All other combinations of sub\_layer\_max\_12bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_10bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_8bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_422chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_420chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_monochrome\_**‌**constraint\_flag[ i ], sub\_layer\_intra\_**‌**constraint\_flag[ i ], sub\_layer\_one\_picture\_only\_**‌**constraint\_flag[ i ] and sub\_layer\_lower\_bit\_rate\_**‌**constraint\_flag[ i ] with sub\_layer\_profile\_idc[ i ] equal to 9 or sub\_layer\_profile\_compatibility\_flag[ i ][ 9 ] equal to 1 are reserved for future use by ITU-T | ISO/IEC. Such combinations shall not be present in bitstreams conforming to this Specification. However, decoders conforming to the screen content coding extensions profiles shall allow other combinations as specified below in this clause to occur in the bitstream.

Table A.5 – Bitstream indications for conformance to screen content coding extensions profiles

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Profile for which the bitstream indicates conformance** | **general\_max\_14bit\_constraint\_flag** | **general\_max\_12bit\_constraint\_flag** | **general\_max\_10bit\_constraint\_flag** | **general\_max\_8bit\_constraint\_flag** | **general\_max\_422chroma\_constraint\_flag** | **general\_max\_420chroma\_constraint\_flag** | **general\_max\_monochrome\_constraint\_flag** | **general\_intra\_constraint\_flag** | **general\_one\_picture\_only\_constraint\_flag** | **general\_lower\_bit\_rate\_constraint\_flag** |
| Screen-Extended Main | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| Screen-Extended Main 10 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| Screen-Extended Main 4:4:4 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Screen-Extended Main 4:4:4 10 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Decoders conforming to a screen content coding 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 bitstream or sub-layer representation is indicated to conform to the Main, Main Still Picture, or Monochrome profile.

– The decoder conforms to the Screen-Extended Main 10 or Screen-Extended Main 4:4:4 10 profile, and the bitstream or sub-layer representation is indicated to conform to the Main 10 profile.

– The decoder conforms to the Screen-Extended Main 4:4:4 or Screen-Extended Main 4:4:4 10 profile, and the bitstream or sub-layer representation is indicated to conform to the Main 4:4:4 profile.

– The decoder conforms to the Screen-Extended Main 4:4:4 10 profile, and the bitstream or sub-layer representation is indicated to conform to the Main 4:4:4 10 profile.

– general\_profile\_idc is equal to 4 or general\_profile\_compatibility\_flag[ 4 ] is equal to 1 or general\_profile\_idc is equal to 9 or general\_profile\_compatibility\_flag[ 9 ] is equal to 1 for the bitstream, and the value of each constraint flag listed in Table A.5 is greater than or equal to the value(s) specified in the row of Table A.5 for the screen content coding extensions profile for which the decoder conformance is evaluated, and general\_max\_422chroma\_constraint\_flag is equal to general\_max\_420chroma\_constraint\_flag.

– sub\_layer\_profile\_idc[ i ] is equal to 4 or sub\_layer\_profile\_compatibility\_flag[ i ][ 4 ] is equal to 1 or sub\_layer\_profile\_idc[ i ] is equal to 9 or sub\_layer\_profile\_compatibility\_flag[ i ][ 9 ] is equal to 1 for the sub-layer representation, and the value of each constraint flag listed in Table A.5 is greater than or equal to the value(s) specified in the row of Table A.5 for the screen content coding extensions profile for which the decoder conformance is evaluated, and general\_max\_422chroma\_constraint\_flag is equal to general\_max\_420chroma\_constraint\_flag, with general\_max\_14bit\_**‌**constraint\_flag, general\_max\_12bit\_**‌**constraint\_flag, general\_max\_10bit\_**‌**constraint\_flag, general\_max\_8bit\_**‌**constraint\_flag, general\_max\_422chroma\_**‌**constraint\_flag, general\_max\_420chroma\_**‌**constraint\_flag, general\_max\_monochrome\_**‌**constraint\_flag, general\_intra\_**‌**constraint\_flag, general\_one\_picture\_only\_**‌**constraint\_flag and general\_lower\_bit\_rate\_**‌**constraint\_flag replaced by sub\_layer\_max\_12bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_10bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_8bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_422chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_420chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_monochrome\_**‌**constraint\_flag[ i ], sub\_layer\_intra\_**‌**constraint\_flag[ i ], sub\_layer\_one\_picture\_only\_**‌**constraint\_flag[ i ] and sub\_layer\_lower\_bit\_rate\_**‌**constraint\_flag[ i ], respectively.

* The bitstream or sub-layer representation is indicated to conform to a level that is not level 8.5 and is lower than or equal to the specified level.
* The bitstream or sub-layer representation is indicated to conform to a tier that is lower than or equal to the specified tier.

A.3.8 High throughput screen content coding extensions profiles

The following profiles, collectively referred to as the high throughput screen content coding extensions profiles, are specified in this clause:

– The Screen-Extended High Throughput 4:4:4, Screen-Extended High Throughput 4:4:4 10, and Screen-Extended High Throughput 14 profiles

Bitstreams conforming to the screen content coding extensions profiles shall obey the following constraints:

– The constraints specified in Table A.6 shall apply, in which entries marked with "–" indicate that the table entry does not impose a profile-specific constraint on the corresponding syntax element.

– Active VPSs shall have vps\_base\_layer\_internal\_flag and vps\_base\_layer\_available\_flag both equal to 1 only.

– Active SPSs for the base layer shall have separate\_colour\_plane\_flag, when present, equal to 0 only.

– CtbLog2SizeY derived according to active SPSs for the base layer shall be in the range of 4 to 6, inclusive.

– When an active SPS for the base layer has palette\_mode\_enabled\_flag equal to 1, palette\_max\_size shall be less than or equal to 64 and PaletteMaxPredictorSize shall be less than or equal to 128.

– Active SPSs for the base layer shall have extended\_precision\_processing\_flag, and cabac\_bypass\_alignment\_enabled\_flag, when present, equal to 0 only.

– Active PPSs for the base layer shall have entropy\_coding\_sync\_enabled\_flag equal to 1 only.

NOTE – Unlike for some other profiles specified in this annex, an active PPS for the base layer for Screen-Extended High Throughput 4:4:4, Screen-Extended High Throughput 4:4:4 10, or Screen-Extended High Throughput 4:4:4 14 profiles may have tiles\_enabled\_flag equal to 1 with entropy\_coding\_sync\_enabled\_flag equal to 1.

– When an active PPS for the base layer has tiles\_enabled\_flag equal to 1, ColumnWidthInLumaSamples[ i ] shall be greater than or equal to 256 for all values of i in the range of 0 to num\_tile\_columns\_minus1, inclusive, and RowHeightInLumaSamples[ j ] shall be greater than or equal to 64 for all values of j in the range of 0 to num\_tile\_rows\_minus1, inclusive.

– The number of times read\_bits( 1 ) is called in clauses 9.3.4.3.3 and 9.3.4.3.4 when parsing coding\_tree\_unit( ) data for any CTU shall be less than or equal to 5 \* RawCtuBits / 3.

– general\_level\_idc and sub\_layer\_level\_idc[ i ] for all values of i in active SPSs for the base layer shall not be equal to 255 (which indicates level 8.5).

– The tier and level constraints specified for the Screen-Extended High Throughput 4:4:4, Screen-Extended High Throughput 4:4:4 10, and Screen-Extended High Throughput 14 profiles in clause A.4, as applicable, shall be fulfilled.

Table A.6 – Allowed values for syntax elements in the high throughput screen content coding extensions profiles

|  |  |  |
| --- | --- | --- |
| **Profile for which constraint is specified** | **chroma\_format\_idc** | **bit\_depth\_luma\_minus8** and **bit\_depth\_chroma\_minus8** |
| Screen-Extended High Throughput 4:4:4 | – | 0 |
| Screen-Extended High Throughput 4:4:4 10 | – | 0..2 |
| Screen-Extended High Throughput 4:4:4 14 | – | 0..6 |

Conformance of a bitstream to the high throughput screen content coding extensions profiles is indicated by general\_profile\_idc being equal to 11 or general\_profile\_compatibility\_flag[ 11 ] being equal to 1 with the additional indications specified in Table A.7. Conformance of a sub-layer representation with TemporalId equal to i to the screen content coding extensions profiles is indicated by sub\_layer\_profile\_idc[ i ] being equal to 11 or sub\_layer\_profile\_compatibility\_flag[ i ][ 11 ] being equal to 1 with the additional indications specified in Table A.7, with general\_max\_14bit\_**‌**constraint\_flag, general\_max\_12bit\_**‌**constraint\_flag, general\_max\_10bit\_**‌**constraint\_flag, general\_max\_8bit\_**‌**constraint\_flag, general\_max\_422chroma\_**‌**constraint\_flag, general\_max\_420chroma\_**‌**constraint\_flag, general\_max\_monochrome\_**‌**constraint\_flag, general\_intra\_**‌**constraint\_flag, general\_one\_picture\_only\_**‌**constraint\_flag and general\_lower\_bit\_rate\_**‌**constraint\_flag replaced by sub\_layer\_max\_12bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_10bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_8bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_422chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_420chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_monochrome\_**‌**constraint\_flag[ i ], sub\_layer\_intra\_**‌**constraint\_flag[ i ], sub\_layer\_one\_picture\_only\_**‌**constraint\_flag[ i ] and sub\_layer\_lower\_bit\_rate\_**‌**constraint\_flag[ i ], respectively.

All other combinations of general\_max\_12bit\_**‌**constraint\_flag, general\_max\_10bit\_**‌**constraint\_flag, general\_max\_8bit\_**‌**constraint\_flag, general\_max\_422chroma\_**‌**constraint\_flag, general\_max\_420chroma\_**‌**constraint\_flag, general\_max\_monochrome\_**‌**constraint\_flag, general\_intra\_**‌**constraint\_flag, general\_one\_picture\_only\_**‌**constraint\_flag and general\_lower\_bit\_rate\_**‌**constraint\_flag with general\_profile\_idc equal to 11 or general\_profile\_compatibility\_flag[ 11 ] equal to 1 are reserved for future use by ITU-T | ISO/IEC. All other combinations of sub\_layer\_max\_12bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_10bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_8bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_422chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_420chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_monochrome\_**‌**constraint\_flag[ i ], sub\_layer\_intra\_**‌**constraint\_flag[ i ], sub\_layer\_one\_picture\_only\_**‌**constraint\_flag[ i ] and sub\_layer\_lower\_bit\_rate\_**‌**constraint\_flag[ i ] with sub\_layer\_profile\_idc[ i ] equal to 11 or sub\_layer\_profile\_compatibility\_flag[ i ][ 11 ] equal to 1 are reserved for future use by ITU-T | ISO/IEC. Such combinations shall not be present in bitstreams conforming to this Specification. However, decoders conforming to the screen content coding extensions profiles shall allow other combinations as specified below in this clause to occur in the bitstream.

Table A.7 – Bitstream indications for conformance to high throughput screen content coding extensions profiles

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Profile for which the bitstream indicates conformance** | **general\_max\_14bit\_constraint\_flag** | **general\_max\_12bit\_constraint\_flag** | **general\_max\_10bit\_constraint\_flag** | **general\_max\_8bit\_constraint\_flag** | **general\_max\_422chroma\_constraint\_flag** | **general\_max\_420chroma\_constraint\_flag** | **general\_max\_monochrome\_constraint\_flag** | **general\_intra\_constraint\_flag** | **general\_one\_picture\_only\_constraint\_flag** | **general\_lower\_bit\_rate\_constraint\_flag** |
| Screen-Extended High Throughput 4:4:4 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Screen-Extended High Throughput 4:4:4 10 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Screen-Extended High Throughput 4:4:4 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

Decoders conforming to a high throughput screen content coding 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 bitstream or sub-layer representation is indicated to conform to the Main, Main Still Picture, or Monochrome profile.

– The bitstream or sub-layer representation is indicated to conform to the High Throughput 4:4:4 profile.

– The decoder conforms to the Screen-Extended High Throughput 4:4:4 10 or Screen-Extended High Throughput 4:4:4 14 profile, and the bitstream or sub-layer representation is indicated to conform to the High Throughput 4:4:4 10 profile.

– The decoder conforms to the Screen-Extended High Throughput 4:4:4 14 profile, and the bitstream or sub-layer representation is indicated to conform to the High Throughput 4:4:4 14 profile.

– general\_profile\_idc is equal to 4 or general\_profile\_compatibility\_flag[ 4 ] is equal to 1 or general\_profile\_idc is equal to 11 or general\_profile\_compatibility\_flag[ 11 ] is equal to 1 for the bitstream, and the value of each constraint flag listed in Table A.7 is greater than or equal to the value(s) specified in the row of Table A.7 for the screen content coding extensions profile for which the decoder conformance is evaluated, and general\_max\_422chroma\_constraint\_flag is equal to general\_max\_420chroma\_constraint\_flag.

– sub\_layer\_profile\_idc[ i ] is equal to 4 or sub\_layer\_profile\_compatibility\_flag[ i ][ 4 ] is equal to 1 or sub\_layer\_profile\_idc[ i ] is equal to 11 or sub\_layer\_profile\_compatibility\_flag[ i ][ 11 ] is equal to 1 for the sub-layer representation, and the value of each constraint flag listed in Table A.7 is greater than or equal to the value(s) specified in the row of Table A.7 for the screen content coding extensions profile for which the decoder conformance is evaluated, and general\_max\_422chroma\_constraint\_flag is equal to general\_max\_420chroma\_constraint\_flag, with general\_max\_14bit\_**‌**constraint\_flag, general\_max\_12bit\_**‌**constraint\_flag, general\_max\_10bit\_**‌**constraint\_flag, general\_max\_8bit\_**‌**constraint\_flag, general\_max\_422chroma\_**‌**constraint\_flag, general\_max\_420chroma\_**‌**constraint\_flag, general\_max\_monochrome\_**‌**constraint\_flag, general\_intra\_**‌**constraint\_flag, general\_one\_picture\_only\_**‌**constraint\_flag and general\_lower\_bit\_rate\_**‌**constraint\_flag replaced by sub\_layer\_max\_12bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_10bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_8bit\_**‌**constraint\_flag[ i ], sub\_layer\_max\_422chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_420chroma\_**‌**constraint\_flag[ i ], sub\_layer\_max\_monochrome\_**‌**constraint\_flag[ i ], sub\_layer\_intra\_**‌**constraint\_flag[ i ], sub\_layer\_one\_picture\_only\_**‌**constraint\_flag[ i ] and sub\_layer\_lower\_bit\_rate\_**‌**constraint\_flag[ i ], respectively.

* The bitstream or sub-layer representation is indicated to conform to a level that is not level 8.5 and is lower than or equal to the specified level.
* The bitstream or sub-layer representation is indicated to conform to a tier that is lower than or equal to the specified tier.