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Part 11: Energy-efficient media consumption (green metadata)

AMENDMENT 1: Energy-efficient media consumption (green metadata) for EVC

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Information technology — MPEG systems technologies —

Part 11:
Energy-efficient media consumption (green metadata)

AMENDMENT 1: Energy-efficient media consumption (green metadata) for EVC

6.2.1

Replace the following:

With respect to the functional architecture in Figure 1, the green-metadata generator provides CMs that indicate the picture-decoding complexity of an AVC, HEVC or VVC bitstream to the decoder.

with:

With respect to the functional architecture in Figure 1, the green-metadata generator provides CMs that indicate the picture-decoding complexity of an AVC, HEVC, VVC or EVC bitstream to the decoder.

6.2.2

Add the following at the end of the subclause:

The syntax for the EVC CMs is described in Table X.1:

Table X.1 — Syntax for the HEVC CMs

period_type	u(8)
if (profile_idc == 0) {	
if (period_type = = 0 || period_type == 2) {	
num_non_zero_4_cus	uk(v)
num_non_zero_8_cus	uk(v)
num_non_zero_16_cus	uk(v)
num_non_zero_32_cus	uk(v)
num_non_zero_64_cus	uk(v)
portion_fractional_prediction_sample	u(8)
} else if (period_type = = 1 || period_type == 3) {	
num_count	u(16)
for (t=0; t<num_count; t++) {	
num_non_zero_4_cus [t]	uk(v)
num _non_zero_8_cus [t]	uk(v)
num _non_zero_16_cus [t]	uk(v)
num _non_zero_32_cus [t]	uk(v)
num _non_zero_64_cus [t]	uk(v)

Table X.1 *(continued)*

portion_fractional_prediction_sample [t]	u(8)
}	
}	
else if (profile_idc ==1) {	
if (period_type = = 0 || period_type == 2) {	
num_non_zero_samples	uk(v)
num_affine_samples	uk(v)
num_dmvr_samples	uk(v)
num_alf_samples	uk(v)
num_deblocking_filter_samples	uk(v)
num_htdf_samples	uk(v)
} else if (period_type = = 1 || period_type == 3) {	
num_count	u(8)
for (t=0; t<num_count; t++) {	
num_non_zero_samples [t]	uk(v)
num__samples [t]	uk(v)
num_dmvr_samples [t]	uk(v)
num_alf_samples [t]	uk(v)
num_deblocking_filter_samples [t]	uk(v)
num_htdf_samples [t]	uk(v)
}	
}	
}	

6.2.4.4

Add the following new subclause after subclause 6.2.4.3:

6.2.4.4 EVC Semantics

6.2.4.4.1 General

As EVC Baseline profile and Main profile share almost no tools and the methods used for partition of the pictures are not same, the profile the CVS conforming to is used to decide the set of syntax elements to describe the complexity metrics to be applied to each CVS. In addition, As the largest size of picture is indicated by the level the CVS is conformed to, the length of the syntax elements indicating the number of pixels and coding units are decided by the level. In addition, the width and height of the coding units are also considered when the length of the syntax elements indicating the number of coding units for the CVS conforming to the baseline profile is decided.

6.2.4.4.2 Variable length syntax element for EVC Semantics

The maximum number of pixels and coding units depend on the size of the picture the complexity metric is applied to. As the largest size of picture is indicated by the level the CVS is conformed to the length of the syntax elements indicating the number of pixels and coding units are decided by the levels. In addition, the width and height of the coding units are also considered when the length of the syntax elements indicating the number of coding units for the CVS conforming to the baseline profile as the width and height of the coding units get larger than the maximum number of coding units get smaller.

– uk(v): the field is unsigned integer and the length is decided by the value of the level_idc field in the SPS used by the CVS this SEI message is applied to and the value of k assigned to each field based on the size of the units counted. The length of the field according to each value of both level_idc and k is shown in the Table X.2.

Table X.2 — length of uk(v)

level	value of level_idc	length of the field					
		k==1	k==4	k==8	k==16	k==32	k==64
1	30	16	16	16	8	8	8
2	60	24	16	16	16	8	8
2.1	63	24	16	16	16	8	8
3	90	24	16	16	16	16	8
3.1	93	24	16	16	16	16	8
4	120	24	24	16	16	16	16
4.1	123	24	24	16	16	16	16
5	150	24	24	24	16	16	16
5.1	153	24	24	24	16	16	16
5.2	156	24	24	24	16	16	16
6	180	32	24	24	24	16	16
6.1	183	32	24	24	24	16	16
6.2	186	32	24	24	24	16	16

6.2.4.4.2 Semantics of EVC CM

profile_idc indicates the profile of the CVS this SEI message is associated with.

period_type specifies the type of upcoming period over which the complexity metrics are applicable and is defined in the Table X.3.

Table X.3 — specification of period_type for EVC

Value	Description
0x0	complexity metrics are applicable to a single picture
0x1	complexity metrics are applicable over a specified number of pictures counted in decoding order
0x2	complexity metrics are applicable to a single slice
0x3	complexity metrics are applicable to a specified number of slices counted in decoding order
0x4-0xF	user-defined

num_non_zero_4_cus indicates the number of coding units whose width and height are not greater than 4 samples and have non-zero transform coefficients values in the period complexity metrics is applied to. The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to and the value of the k is equal to 4.

num_non_zero_8_cus indicates the number of coding units whose width and height are 8 samples and have non-zero transform coefficients values in the period complexity metrics is applied to. The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to and the value of the k is equal to 8.

num_non_zero_16_cus indicates the number of coding units whose width and height are 16 samples and have non-zero transform coefficients values in the period complexity metrics is applied to. The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to and the value of the k is equal to 16.

num_non_zero_32_cus indicates the number of coding units whose width and height are 32 samples and have non-zero transform coefficients values in the period complexity metrics is applied to. The length of this

field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field applied to and the value of the k is equal to 32.

num_non_zero_64_cus indicates the number of coding units whose width and height are 32 samples and have non-zero transform coefficients values in the period complexity metrics is applied to. The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to and the value of the k is equal to 64.

portion_fractional_prediction_sample indicates the portion of the samples requires fractional sample interpolation process applied in the period complexity metrics is applied to. It is defined as follows:

$$portion\_fractional\_prediction\_sample = Floor\left(\frac{number\ of\ samples\ requiring\ fractional\ sample\ interpolation\ process}{total\ number\ of\ samples\ in\ the\ period} * 255\right) \quad (0\text{-}1)$$

num_count indicates the number of pictures or slices over which the complexity metrics is applicable when period_type is 1, 3, or 5.

When period_type is 1, then num_count indicates the number of pictures in decoding order. When period_type is 3, then num_count indicates the number of slices in decoding order.

num_non_zero_4_cus [t] indicates the number of coding units whose width and height are not greater than 4 samples and have non-zero transform coefficients values in the period $(t+1)^{th}$ complexity metrics is applied to. The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to with and the value of the k is equal to 4. When period_type is 1, the period this metrics applied is t^{th} picture in decoding order. When period_type is 3, the period this metrics applied is t^{th} slice in decoding order.

num_non_zero_8_cus [t] indicates the number of coding units whose width and height are 8 samples and have non-zero transform coefficients values in the period $(t+1)^{th}$ complexity metrics is applied to. The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to and the value of the k is equal to 8. When period_type is 1, the period this metrics applied is $(t+1)^{th}$ picture in decoding order. When period_type is 3, the period this metrics applied is $(t+1)^{th}$ slice in decoding order.

num_non_zero_16_cus [t] indicates the number of coding units whose width and height are 16 samples and have non-zero transform coefficients values in the period $(t+1)^{th}$ complexity metrics is applied to . The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to with and the value of the k is equal to 16. When period_type is 1, the period this metrics applied is $(t+1)^{th}$ picture in decoding order. When period_type is 3, the period this metrics applied is $(t+1)^{th}$ slice in decoding order.

num_non_zero_32_cus [t] indicates the number of coding units whose width and height are 32 samples and have non-zero transform coefficients values in the period $(t+1)^{th}$ complexity metrics is applied to . The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to and the value of the k is equal to 32. When period_type is 1, the period this metrics applied is $(t+1)^{th}$ picture in decoding order. When period_type is 3, the period this metrics applied is $(t+1)^{th}$ slice in decoding order.

num_non_zero_64_cus [t] indicates the number of coding units whose width and height are 64 samples and have non-zero transform coefficients values in the period $(t+1)^{th}$ complexity metrics is applied to. The length of this field is decided by the value of the level_idc field in the SPS used by the CVS the SEI message this field is applied to and the value of the k is equal to 464 . When period_type is 1, the period this metrics applied is $(t+1)^{th}$ picture in decoding order. When period_type is 3, the period this metrics applied is $(t+1)^{th}$ slice in decoding order.

portion_fractional_prediction_sample [t] indicates the portion of the samples requires fractional sample interpolation process applied to in the period $(t+1)^{th}$ complexity metrics is applied. When period_type is 1, the period this metrics applied is $(t+1)^{th}$ picture in decoding order. When period_type is 3, the period this metrics applied is $(t+1)^{th}$ slice in decoding order.