H–0343: Redundancy removal of syntax

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Content

❖ **Max CU QP delta depth coding**
   - Proposed design 1: diff_cu_qp_delta_depth_slice_granularity
   - Proposed design 2: semantics change of max_cu_qp_delta_depth

❖ **Redundancy removal of coding entropy slice information**
   - entropy_slice_flag
   - 5_minus_max_num_merge_cand

❖ The current WD

pic_parameter_set_rbsp( ) {	Descriptor
…	…
slice_granularity	u(2)
max_cu_qp_delta_depth	ue(v)
…	…
}	

slice_granularity indicates the slice granularity within a picture. The value of slice_granularity shall not be larger than Min(Log2MaxCUSize – 4, log2_diff_max_min_coding_block_size). The variable SliceGranularity is set to the value of (slice_granularity << 1).

max_cu_qp_delta_depth specifies the maximum allowed depth that is used for specifying QP_Y values for coding unit. The value of max_cu_qp_delta_depth shall be in the range of 0 to 15, inclusive.
The variable log2MinCUDQPSize specifying the minimum coding unit size that can further modifies the value of QP_Y as follows:

log2MinCUDQPSize = Log2MaxCUSize - max_cu_qp_delta_depth

Max CU QP delta depth coding (2)

❖ The related adoption in the last Geneva meeting

- ‘The value of log2MinCUDQPSize shall be smaller than or equal to the CU size specified by the value of slice granularity’

❖ Relationship between slice_granularity and max_cu_qp_delta_depth

- In similar way of the variable log2MinCUDQPSize , the minimum coding unit size that allows slicing can be described as follows:

  $$log2MinCUFGSSize = Log2MaxCUSize - slice\_granularity$$

- Again, the minimum coding unit size that can further modifies the value of QPY as follows:

  $$log2MinCUDQPSize = Log2MaxCUSize - max\_cu\_qp\_delta\_depth$$

- Therefore, if log2MinCUDQPSize <= log2MinCUFGSSize,

  $$slice\_granularity <= max\_cu\_qp\_delta\_depth$$

- → **The restriction on max_cu_qp_delta_depth needs to be clarified in WD**

Max CU QP delta depth coding (3)

- ❖ Proposed design 1: diff_cu_qp_delta_depth_slice_granularity
  - ▪ To maintain 'depth' concept as it was to be started from max CU size
  - ▪ To clarify the restriction on max_cu_qp_delta_depth and remove redundancy on coding of it
  - ▪ The following syntax and semantics change are proposed

pic_parameter_set_rbsp( ) {	Descriptor
…	…
slice_granularity	u(2)
diff_cu_qp_delta_depth_slice_granularity	ue(v)
…	…
}	

diff_cu_qp_delta_depth_slice_granularity specifies the difference between the maximum allowed depth that is used for specifying QP_Y values for coding unit and slice_granularity.

The variable log2MinCUDQPSize specifying the minimum coding unit size that can further modifies the value of QP_Y as follows:

log2MinCUDQPSize = Log2MaxCUSize – diff_cu_qp_delta_depth_slice_granularity – slice_granularity

Max CU QP delta depth coding (4)

❖ Proposed design 2: semantics change of max_cu_qp_delta_depth
- Or, change 'depth' for CU QP delta to be started from min FGS size
- The following semantics change is proposed as an alternative of design 1

max_cu_qp_delta_depth specifies the maximum allowed depth from the depth specified by slice_granularity that is used for specifying QP_Y values for coding unit. The value of max_cu_qp_delta_depth shall be in the range of 0 to 15, inclusive.
The variable log2MinCUDQPSize specifying the minimum coding unit size that can further modifies the value of QP_Y as follows:

$$log2MinCUDQPSize = Log2MaxCUSize - max\_cu\_qp\_delta\_depth$$

Coding entropy slice information (1)

❖ The current WD
  ▪ By moving slice address to beginning of the slice header which was adopted in the last Geneva meeting, the current WD shall be changed as follows:

slice_header( ) {	Descriptor
first_slice_in_pic_flag	u(1)
if(first_slice_in_pic_flag == 0)	
slice_address	u(v)
slice_type	
entropy_slice_flag	
if(!entropy_slice_flag) {	
…	
}	
if(slice_type = = P || slice_type = = B)	
5_minus_max_num_merge_cand	ue(v)
…	
}	

Coding entropy slice information (2)

- ❖ entropy_slice_flag
  - In the current WD,
    entropy_slice_flag equal to 1 specifies that the value of slice header syntax elements not present shall be inferred to be equal to the value of slice header syntax elements in a proceeding slice, where a proceeding slice is defined as the slice containing treeblock with location (LCUAddress – 1). entropy_slice_flag shall be equal to 0 when LCUAddress equal to 0.
  - → When LCUAddress is equal to 0, that is, first_slice_in_pic_flag is equal to 1, entropy_slice_flag can be inferred as 0

- ❖ 5_minus_max_num_merge_cand
  - As other syntax elements of slice header, **5_minus_max_num_merge_cand** doesn't need to be signalled when entropy_slice_flag (or lightweight_slice_flag in HM) indicates that the current slice is entropy slice

Coding entropy slice information (3)

❖ To remove redundancy on coding of entropy_slice_flag and 5_minus_max_num_merge_cand, the following syntax table and semantics are proposed from the previous observation:

slice_header( ) {	Descriptor
first_slice_in_pic_flag	u(1)
if(first_slice_in_pic_flag == 0)	
slice_address	u(v)
slice_type	
if(first_slice_in_pic_flag == 0)	
entropy_slice_flag	
if(!entropy_slice_flag) {	
…	
}	
if(!entropy_slice_flag) {	
if(slice_type = = P || slice_type = = B)	
5_minus_max_num_merge_cand	ue(v)
}	

When entropy_slice_flag is not present, it shall be inferred to be equal to 0

When 5_minus_max_num_merge_cand is not present, it shall be inferred to be equal to the corresponding value of slice header in a proceeding slice as other syntax elements

Summary

- ❖ Max CU QP delta depth coding
  - By consideration of restriction on max_cu_qp_delta_depth, two designs are proposed
    - Proposed design 1: diff_cu_qp_delta_depth_slice_granularity
    - Proposed design 2: semantics change of max_cu_qp_delta_depth
  - To make 'depth' concept consistently to be started from the max CU, design 1 is recommended
- ❖ Redundancy removal of coding entropy slice information
  - Since the first slice within a picture is not entropy slice, conditional coding of entropy_slice_flag is proposed
  - To make consistent with other slice header syntax elements, it is recommended to derive 5_minus_max_num_merge_cand from the preceding slice in entropy slices

Thank you !