

**m55324**

# **Conditional signalling of chroma related syntax elements**

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## ■ Problem statement

- **The following chroma related SEs are in APS and always signalled.**
  - aps\_attr\_chroma\_qp\_offset
  - lifting\_last\_component\_prediction\_enabled\_flag
  - inter\_component\_prediction\_enabled\_flag
- **However, chroma components are not always included in the sequence.**
  - LiDAR data such as Cat3-frame sequences only have reflectance data.

## ■ Proposal

- **Chroma related SEs in APS are not signalled when chroma components are not included in the sequence.**

- **It is checked whether chroma components are included in the sequence.**
  - A local flag named `attr_secondary_dim_present_flag` is introduced in SPS and APS.
  - A value of `attr_secondary_dim_present_flag` is defined according to values of `attribute_dimension_minus1[ i ]` in SPS.
    - If, all of components of `attribute_dimension_minus1[ i ]` are equal to 0, `attr_secondary_dim_present_flag` is set to be 0.
    - Otherwise, `attr_secondary_dim_present_flag` is set to be 1.
- **When chroma components are included (i.e. `attr_secondary_dim_present_flag` is equal to be 1), the following SEs are signalled.**
  - `aps_attr_chroma_qp_offset`
  - `lifting_last_component_prediction_enabled_flag`
  - `inter_component_prediction_enabled_flag`
- **Definition of inferred value is added to the following each SE.**
  - `aps_attr_chroma_qp_offset`
  - `inter_component_prediction_enabled_flag`

(Inferred value of `lifting_last_component_prediction_enabled_flag` is already defined.)

# Proposed text changes - SPS

seq_parameter_set() {	Descriptor
...	
<b>sps_num_attribute_sets</b>	ue(v)
<b>attr_secondary_dim_present_flag = 0</b>	
for( i = 0; i < sps_num_attribute_sets; i++ ) {	
<b>attribute_dimension_minus1[ i ]</b>	ue(v)
<b>attribute_instance_id[ i ]</b>	ue(v)
<b>attribute_bitdepth_minus1[ i ]</b>	ue(v)
if( attribute_dimension_minus1[ i ] > 0 ) {	
<b>attribute_secondary_bitdepth_minus1[ i ]</b>	ue(v)
<b>attr_secondary_dim_present_flag = 1</b>	
}	
...	
}	
...	
}	

# Proposed text changes - APS

	Descriptor
attribute_parameter_set() {	
aps_attr_parameter_set_id	ue(v)
aps_seq_parameter_set_id	ue(v)
attr_coding_type	ue(v)
aps_attr_initial_qp_minus4	ue(v)
if ( attr_secondary_dim_present_flag )	
aps_attr_chroma_qp_offset	se(v)
aps_slice_qp_offset_present_flag	u(1)
if(attr_coding_type == 0) { //RAHT	
...	
}	
else if (attr_coding_type <= 2) {	
lifting_num_pred_nearest_neighbours_minus1	ue(v)
lifting_search_range_minus1	ue(v)
for( k = 0; k < 3; k++ )	
lifting_neighbour_bias_minus1_xyz[ k ]	ue(v)
if ( attr_coding_type == 2 && attr_secondary_dim_present_flag )	
lifting_last_component_prediction_enabled_flag	u(1)
...	
if( attr_coding_type == 1 ) {	
lifting_max_num_direct_predictors	ue(v)
if( lifting_max_num_direct_predictors )	
lifting_adaptive_prediction_threshold	ue(v)
lifting_intra_lod_prediction_num_layers	ue(v)
if ( attr_secondary_dim_present_flag )	
inter_component_prediction_enabled_flag	u(1)
}	
}	
...	
}	

**aps\_attr\_chroma\_qp\_offset** specifies an offset to be applied to the initial quantization parameter signalled by the syntax `aps_attr_initial_qp_minus4`. When not present, `aps_attr_chroma_qp_offset` is inferred to be 0.

**inter\_component\_prediction\_enabled\_flag** equal to 1 specifies that the primary component of a multi component attribute is used to predict the reconstructed value of non-primary components. `inter_component_prediction_enabled_flag` equal to 0 specifies that all attribute components are reconstructed independently. When not present, `inter_component_prediction_enabled_flag` is inferred to be 0.

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## ■ It is recommended that the proposal is adopted to the next draft.