

**JCTVC-M0120**

**On signaling the syntax of  
'sps\_inter\_layer\_mfm\_enable\_flag'**

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# Introduction

## □ Motion field mapping

- ❖ At the previous meeting, motion field mapping was adopted in reference index based SHVC.
- ❖ In reference index based SHVC, inter-layer motion parameter prediction can be enabled by
  - performing motion field mapping process between the current layer and its reference layer
  - setting the inter-layer reference picture as the collocated picture for TMVP derivation
- ❖ The syntax ‘`sps_inter_layer_mfm_enable_flag`’ in SPS extension is used to indicate whether the motion field mapping process is applied or not.

<code>sps_extension() {</code>	Descriptor
<code>  sps_inter_layer_mfm_enable_flag</code>	<code>u(1)</code>
<code>}</code>	

## □ Proposals

- ❖ Signal the syntax ‘`sps_inter_layer_mfm_enable_flag`’ depending on the syntax ‘`sps_temporal_mvp_enabled_flag`’
- ❖ Constrain the collocated picture for TMVP derivation for reducing memory requirement

# Proposals

## □ Proposal 1

- ❖ When TMVP is disabled, the motion field mapping process is unnecessary so that ‘sps\_inter\_layer\_mfm\_enable\_flag’ usually be set to 0.
  - In such case, ‘sps\_inter\_layer\_mfm\_enable\_flag’ should not be signaled.
- ❖ Propose to change the signal of syntax ‘sps\_inter\_layer\_mfm\_enable\_flag’ as follows
  - When TMVP is enabled, the syntax ‘sps\_inter\_layer\_mfm\_enable\_flag’ is signaled

sps_extension() {	Descriptor
if( sps_temporal_mvp_enabled_flag )	
<b>sps_inter_layer_mfm_enable_flag</b>	u(1)
}	

- Add constraint on semantic of ‘sps\_inter\_layer\_mfm\_enable\_flag’
  - When sps\_inter\_layer\_mfm\_enable\_flag is equal to 0, the inter-layer reference picture shall not be specified as collocated picture for TMVP derivation.
- Put the notes on semantic of ‘collocated\_ref\_idx’
  - NOTE- when ‘sps\_inter\_layer\_mfm\_flag’ in the SPS extension is equal to 0, the picture referred to by collocated\_ref\_idx shall not be inter-layer reference picture.

# Proposals

## □ Proposal 2

- ❖ When 'sps\_inter\_layer\_mfm\_enable\_flag' is equal to 1, there are two kinds of the collocated picture for TMVP derivation
  - Reference pictures with the same layer index as the current picture (i.e. temporal reference pictures)
  - Inter-layer reference picture
- ❖ Therefore, in addition to motion information of inter-layer reference picture, the motion information of temporal reference pictures always has to be stored.
  - In SHM1.0 RefIdx CTC, 'sps\_inter\_layer\_mfm\_enable\_flag' is equal to 1 and inter-layer picture is always used as collocated picture for TMVP derivation by encoder control. → motion parameters of temporal reference picture are not used.
- ❖ Propose to constrain the collocated picture for TMVP derivation to be inter-layer reference picture for reducing the memory requirement for storing motion parameter information of reference pictures

# Proposals

## □ Proposal 2

### ❖ Approach 1

- Add constrain on the semantic of ‘sps\_inter\_layer\_mfm\_enable\_flag’.
- When sps\_inter\_layer\_mfm\_enable\_flag is equal to 1, the only inter-layer reference picture can be used as collocated picture for TMVP derivation, As a results, the motion information of temporal reference pictures are no longer stored.

	Descriptor
sps_extension() {	
if( sps_temporal_mvp_enabled_flag )	
<b>sps_inter_layer_mfm_enable_flag</b>	u(1)
}	

**sps\_inter\_layer\_mfm\_enable\_flag** equal to 1 specifies the motion field mapping process is applied as part of the resampling process for reference pictures specified in subclause G.8.1.2.

sps\_inter\_layer\_mfm\_enable\_flag equal to 0 specifies that the motion field mapping processing is not applied. When not present, the value of sps\_inter\_layer\_mfm\_enable\_flag is inferred to be equal to 0. When avc\_base\_layer\_flag is equal to 1, sps\_inter\_layer\_mfm\_enable\_flag shall be equal to 0. When sps\_inter\_layer\_mfm\_enable\_flag is equal to 0, the inter-layer reference picture shall not be specified as collocated picture for TMVP derivation. When sps\_inter\_layer\_mfm\_enable\_flag is equal to 1, only inter-layer reference pictures shall be used as collocated picture for TMVP derivation.

# Proposals

## □ Proposal 2

### ❖ Approach 2

- Add a flag in SPS extension to constrain the collocated picture for TMVP, when motion field mapping is enabled as follows.
  - When `sps_temporal_mvp_constraint_flag` is equal to 1
    - the only inter-layer reference picture can be used as collocated picture for TMVP derivation.
  - When `sps_temporal_mvp_constraint_flag` is equal to 0
    - both temporal reference pictures and the inter-layer reference pictures can be used as the collocated picture for TMVP derivation.

	Descriptor
<code>sps_extension() {</code>	
<code>  if( sps_temporal_mvp_enabled_flag ) {</code>	
<code>    <b>sps_inter_layer_mfm_enable_flag</b></code>	<code>u(1)</code>
<code>    if( sps_inter_layer_mfm_enable_flag )</code>	
<code>      <b>sps_temporal_mvp_constraint_flag</b></code>	<code>u(1)</code>
<code>  }</code>	
<code>}</code>	

`sps_temporal_mvp_constraint_flag` equal to 1 specifies that collocated picture for TMVP derivation is constrained in the CVS. When `sps_temporal_mvp_constraint_flag` is equal to 1, only inter-layer reference pictures shall be used as the collocated picture for TMVP derivation.

When `sps_temporal_mvp_constraint_flag` is equal to 0, both reference pictures with the same layer index as the current picture and the inter-layer reference pictures can be used as the collocated picture for TMVP derivation. When `sps_temporal_mvp_constraint_flag` is not present, it is inferred to be equal to 0.

# Conclusion

1. **Signal the syntax ‘sps\_inter\_layer\_mfm\_enable\_flag’ depending on the syntax ‘sps\_temporal\_mvp\_enabled\_flag’**
  - When TMVP is enabled, signal the syntax ‘sps\_inter\_layer\_mfm\_enable\_flag’
2. **Constrain collocated picture for TMVP derivation to be inter-layer reference picture for reducing the memory requirement of storing motion information of reference pictures.**