

JVET-R0334

AHG11:

Disabling chroma CU palette mode under local dual tree

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Introduction

- Palette mode for local dual-tree partition in VVC draft 8
 - Step One: Generation of luma palette table
 - Step Two: Update the palette predictor with luma palette
 - Step Three: Generation of chroma palette table
 - Step Four: Update the palette predictor with chroma palette
- Complexity issues
 - Computation complexity: Palette generation and palette predictor update needs to be performed for luma and chroma sequentially
 - Decoding latency: Chroma palette CU cannot be decoded until all the luma palette CUs under the same dual-tree are decoded
 - **Become the worst case of the palette mode**

Proposal

- Proposing to disable palette mode for chroma CU under local dual-tree

if(CuPredMode[chType][x0][y0] == MODE_INTRA && sps_palette_enabled_flag && cbWidth <= 64 && cbHeight <= 64 && cu_skip_flag[x0][y0] == 0 && modeType != MODE_TYPE_INTER && (cbWidth* cbHeight > (treeType != DUAL_TREE_CHROMA? 16:16* SubWidthC* SubHeightC)) && (! (modeType == MODE_TYPE_INTRA && treeType == DUAL_TREE_CHROMA)))	
pred_mode_plt_flag	ae(v)
}	

Proposal

8.4.5.3 Decoding process for palette mode

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When localDualTree is equal to 1, the following applies:

- If treeType is equal to DUAL_TREE_LUMA, the following applies for $i = 0..num_signalled_palette_entries[startComp] - 1$:
 - CurrentPaletteEntries[1][NumPredictedPaletteEntries + i] = 1 << (BitDepth - 1) (450)
 - CurrentPaletteEntries[2][NumPredictedPaletteEntries + i] = 1 << (BitDepth - 1) (451)
- Otherwise (if treeType is equal to DUAL_TREE_CHROMA), the following applies for $i = 0..num_signalled_palette_entries[startComp] - 1$:
 - CurrentPaletteEntries[0][NumPredictedPaletteEntries + i] = 1 << (BitDepth - 1) (452)

.....

When one of the following conditions is true:

- cIdx is equal to 0 and numComps is equal to 1;
- cIdx is equal to 0 and localDualTree is equal to 1;
- cIdx is equal to 2 and localDualTree is not equal to 1;

the value PredictorPaletteSize[startComp] and the array PredictorPaletteEntries are derived or modified as follows:

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Simulation results

- Anchor: VTM-8.0 + palette mode

All Intra Main10					
Over VTM-8.0					
	Y	U	V	EncT	DecT
Class F	0.00%	0.00%	0.00%	100%	99%
Class SCC	0.00%	0.00%	0.00%	100%	101%

Random access Main10					
Over VTM-8.0					
	Y	U	V	EncT	DecT
Class F	0.00%	-0.01%	0.12%	100%	100%
Class SCC	0.03%	0.04%	0.02%	101%	100%

Low delay B Main10					
Over VTM-8.0					
	Y	U	V	EncT	DecT
Class F	-0.01%	-0.13%	0.33%	99%	100%
Class SCC	-0.02%	-0.02%	-0.05%	99%	100%

Additional results

- Anchor: VTM-8.0 + palette mode (Dual Tree Off)

All Intra Main10					
Over VTM-8.0					
	Y	U	V	EncT	DecT
Class F	0.00%	0.00%	-0.06%	100%	100%
Class SCC	-0.06%	0.46%	0.47%	100%	101%

Random access Main10					
Over VTM-8.0					
	Y	U	V	EncT	DecT
Class F	0.03%	0.13%	0.03%	100%	100%
Class SCC	-0.04%	0.19%	0.15%	100%	100%

Low delay B Main10					
Over VTM-8.0					
	Y	U	V	EncT	DecT
Class F	0.02%	0.00%	0.40%	100%	100%
Class SCC	-0.09%	-0.03%	0.01%	100%	100%

Summary

- This contribution proposes to disable palette mode for chroma CU under local dual-tree
 - Negligible BD-rate changes when dual-tree is ON and OFF
- It is recommended to adopt the proposed method into the VVC working draft
- Thanks Qualcomm for cross-checking