

JVET-Q0504

CE2-related: Palette mode for non 4:4:4 color format

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Introduction

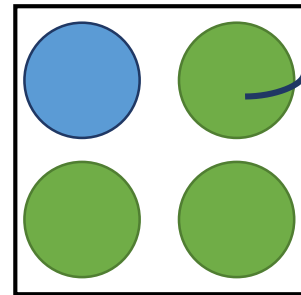
- 4:2:0 color format is widely used in video conferencing, and screen sharing is a critical functionality in this application
- HEVC SCC already supports palette mode for 4:2:0 color format
- Extension of the palette mode to 4:2:0 color format is necessary
 - To improve the coding efficiency for screen sharing
 - To allow VVC having the same functionality as HEVC SCC

Palette for 4:2:0 color format

- Two modifications are made to VVC draft 7
 - Escape value signaling (only spec fix, no change in the S/W)
 - Palette predictor update for local dual tree blocks

Escape value signaling

- Same as HEVC SCC, only luma value of a sample is signaled if the sample only contains luma component and is coded using escape mode

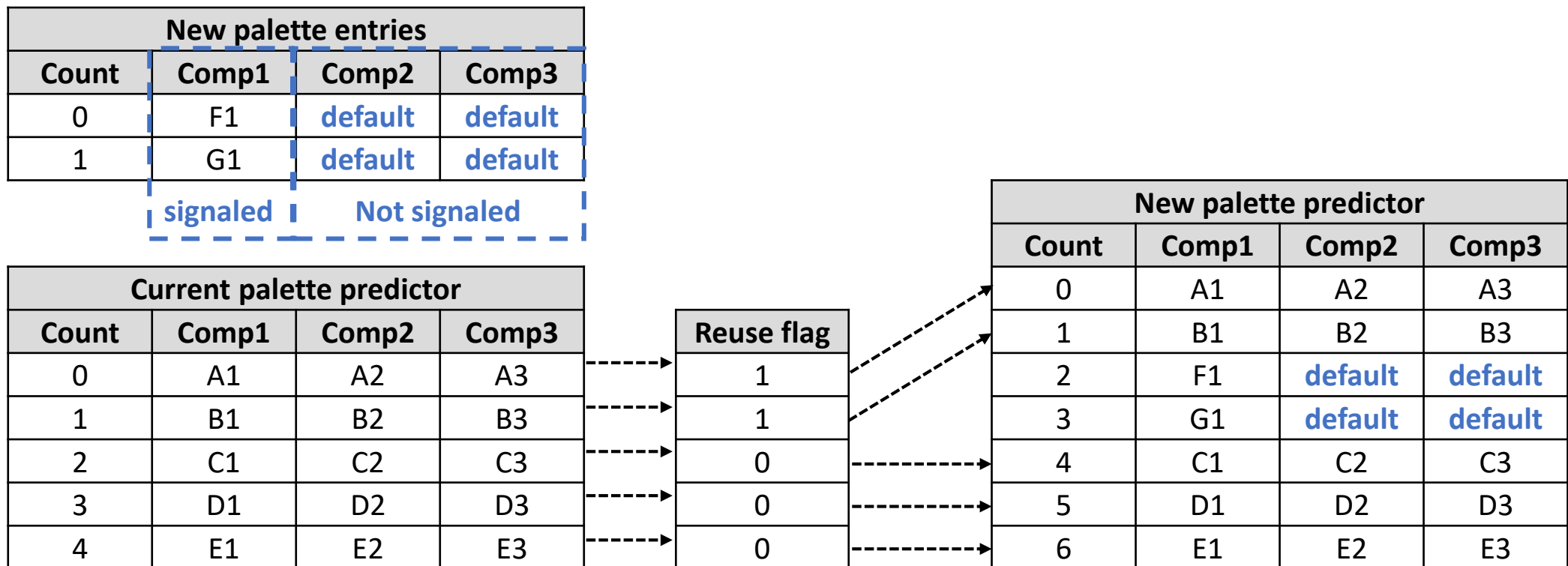


only luma value is signaled

2x2 luma samples

Palette predictor update for local dual tree blocks

- Same as single tree blocks, all three components are used in predictor update
- a default is set to the new palette entry before predictor reordering
 - Default value = $(1 \ll (\text{component bit depth} - 1))$



Palette for non 4:4:4 color format

- For monochrome color format, the number of components is set to 1
 - Current:

palette_coding(x0, y0, cbWidth, cbHeight, treeType) {	Descriptor
startComp = (treeType == DUAL_TREE_CHROMA) ? 1 : 0	
numComps = (treeType == SINGLE_TREE) ? 3 : (treeType == DUAL_TREE_CHROMA) ? 2 : 1	

- Fixed:

palette_coding(x0, y0, cbWidth, cbHeight, treeType) {	Descriptor
startComp = (treeType == DUAL_TREE_CHROMA) ? 1 : 0	
numComps = (treeType == SINGLE_TREE) ? (ChromaArrayType != 0 ? 3 : 1) : (treeType == DUAL_TREE_CHROMA) ? 2 : 1	

Simulation results

- Anchor: VTM-7.0

	All Intra Main10				
	Y	U	V	EncT	DecT
Class F	-1.24%	-0.68%	-0.66%	106%	98%
Class SCC	-6.35%	-6.21%	-5.88%	102%	92%

	Random access Main10				
	Y	U	V	EncT	DecT
Class F	-1.35%	-0.55%	-0.56%	106%	100%
Class SCC	-3.96%	-3.68%	-3.53%	104%	97%

	Low delay B Main10				
	Y	U	V	EncT	DecT
Class F	-0.64%	-1.05%	-0.11%	109%	101%
Class SCC	-1.42%	-1.28%	-1.27%	107%	100%

Conclusion

- To improve the coding efficiency of SCC and allow VVC having the same functionality as HEVC
- We propose to enable palette mode for non 4:4:4 color format
- It provides 6.35% BD rate reduction for SCC in AI condition
- We suggest to adopt this proposal to VVC
- We thank Kwai for cross-checking