

JVET-Q0504

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

R.-L. Liao, M. Sarwer, J. Chen, Y. Ye, J. Luo (Alibaba)

Y.-H. Chao, C.-H. Hung, W.-J. Chien, V. Seregin, M. Karczewicz (Qualcomm)

# 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

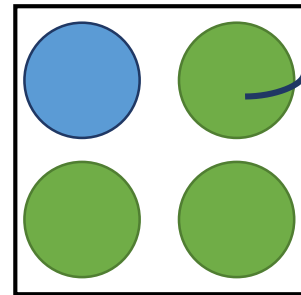
---

- 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

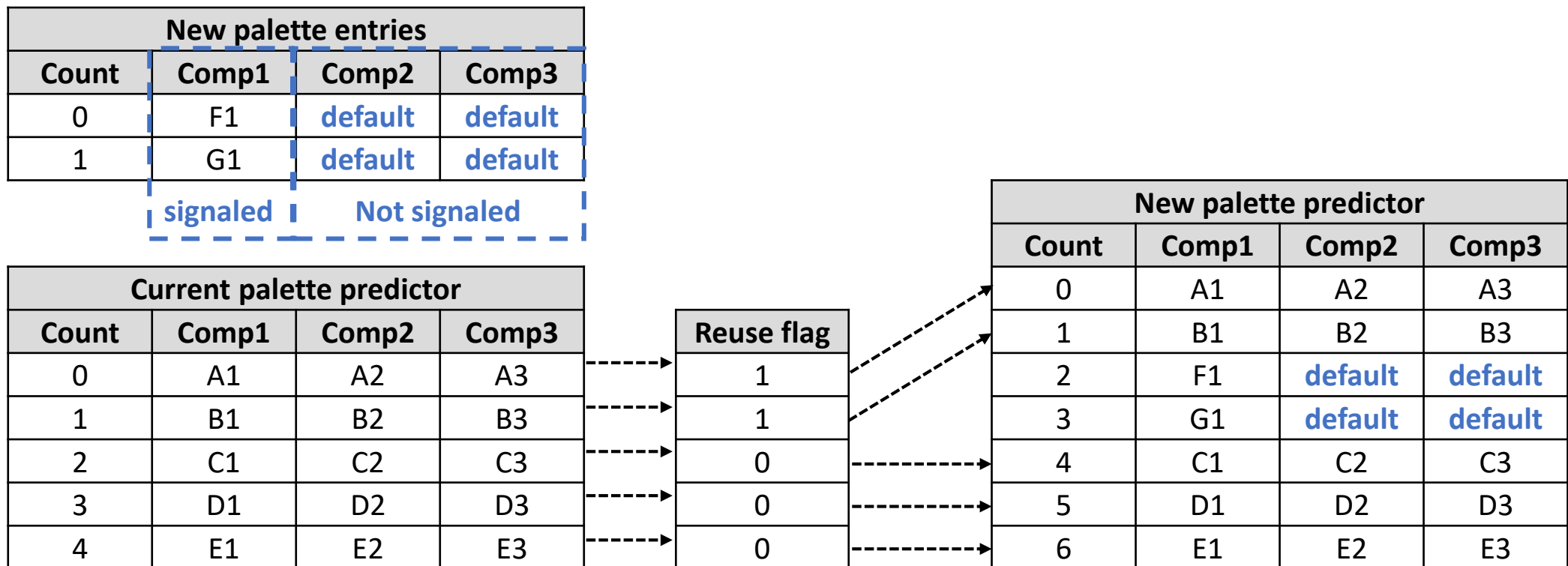


only luma value is signaled

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 ) ? <b>3</b> : ( 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 ) ? ( <b>ChromaArrayType != 0 ? 3 : 1</b> ) : ( 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