

CE6-related: Harmonization of CE6 Tests A4, A5, and A6

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Overall Summary

- **Objective**

Harmonization of related proposals CE6 Tests A4, A5, and A6 for entropy coding syntax **palette_run**

- **Proposed method**

A.4 (JCTVC-S0163) but using the context selection method of A.5 (JCTVC-S0039) for coding bin 0 in INDEX_MODE

- Average Y BD bitrate savings for YUV 1080p videos

– 1.9%, 1.0%, and 0.8% for AI, RA, LB

Comparison of Tests A.4 and A.6 in Binarization

- A.4 using msb index + refinement bits
 - Truncated unary code for prefix and truncated binary code for suffix
- A.6 using 1-bit TU + Truncated EG-0 code
- Both methods use the truncation code for both prefix and suffix with the max run value determined by the number of the uncoded pixels in the current CU.
- **Leading to exactly the same bin string after binarization**

	A.4		A.6		
d	msb_plus_one	refinement bins	TU prefix	EG0 prefix	EG suffix
0	0	-	0	-	-
1	10	-	1	0-	-
2	110	0	1	10	0
3	110	1	1	10	1
4	1110	00	1	110	00
5	1110	01	1	110	01
6	1110	10	1	110	10
7	1110	11	1	110	11

Comparison of A.4 and A.5 in Context Selection

- Both A.4 & A.5 have context selection for bin 0 in INDEX_MODE depending on index

index	Ctx-0	Ctx-1	Ctx-2
A.4	0-1	2-7	>7
A.5	0	1-2	>2

- Context mapping tables

A.4 8ctxs	bin index	0	1	2	3	4	> 4
	context index for COPY_ABOVE_MODE	0	1	1	2	2	bypass
	context index for INDEX_MODE	0,1,2	3	3	4	4	bypass
A.5 8 ctxs	bin index	0	1	2	> 2		
	context index for COPY_ABOVE_MODE	0	1	2	bypass		
	context index for INDEX_MODE	0,1,2	3	4	bypass		

Harmonized solution

- Test A.4 (JCTVC-S0163) but using the context selection method of Test A.5 for coding bin0 in INDEX_MODE

index	Ctx-0	Ctx-1	Ctx-2
A.4	0-1	2-7	>7
A.5	0	1-2	>2

- Context mapping tables

A.4
8ctxs

bin index	0	1	2	3	4	> 4
context index for COPY_ABOVE_MODE	0	1	1	2	2	bypass
context index for INDEX_MODE	0,1,2	3	3	4	4	bypass

- Context selection is conditioned on the coded palette index in INDEX_MODE

Experimental Results

- Lossy coding under SCC CTCs
 - Anchor: SCM-2.0, full-frame IBC
 - Test: Proposal, full-frame IBC
- Thank Sony for cross check (JCTVC-S0289)

	All Intra			Random Access			Low delay B		
	G/Y	B/U	R/V	G/Y	B/U	R/V	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	-1.6%	-1.6%	-1.6%	-0.8%	-0.9%	-0.9%	-0.9%	-1.0%	-0.9%
RGB, text & graphics with motion, 720p	-0.9%	-1.0%	-0.9%	-0.7%	-0.7%	-0.7%	-0.6%	-0.7%	-0.7%
RGB, mixed content, 1440p	-0.3%	-0.4%	-0.4%	-0.2%	-0.3%	-0.4%	-0.3%	-0.3%	-0.3%
RGB, mixed content, 1080p	-0.4%	-0.4%	-0.4%	-0.3%	-0.4%	-0.4%	-0.3%	0.1%	-0.3%
RGB, Animation, 720p	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.2%	-0.1%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
YUV, text & graphics with motion, 1080p	-1.9%	-1.9%	-1.9%	-1.0%	-1.1%	-1.2%	-0.8%	-1.1%	-1.1%
YUV, text & graphics with motion, 720p	-1.0%	-1.0%	-1.3%	-0.7%	-0.8%	-1.0%	-0.6%	-0.7%	-1.2%
YUV, mixed content, 1440p	-0.4%	-0.8%	-0.8%	-0.2%	-0.4%	-0.4%	-0.2%	-1.1%	-0.7%
YUV, mixed content, 1080p	-0.5%	-0.8%	-0.9%	-0.3%	-0.7%	-0.4%	-0.2%	0.0%	-0.5%
YUV, Animation, 720p	0.0%	-0.3%	-0.3%	0.0%	-0.2%	-0.2%	0.1%	-0.5%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.2%	-0.1%	0.0%	-0.1%	-0.1%
Enc Time[%]	99%			99%			99%		
Dec Time[%]	102%			101%			100%		

Experimental Results

- Lossy coding under SCC CTCs
 - Anchor: SCM-2.0, full-frame IBC

	This Proposal			JCTVC-S0163		
	AI	RA	LB	AI	RA	LB
RGB, text & graphics with motion, 1080p	-1.6%	-0.8%	-0.9%	-1.5%	-0.8%	-0.8%
RGB, text & graphics with motion, 720p	-0.9%	-0.7%	-0.6%	-0.9%	-0.6%	-0.7%
RGB, mixed content, 1440p	-0.3%	-0.2%	-0.3%	-0.3%	-0.1%	0.0%
RGB, mixed content, 1080p	-0.4%	-0.3%	-0.3%	-0.4%	-0.2%	-0.3%
RGB, Animation, 720p	0.0%	-0.1%	-0.1%	0.0%	0.0%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p	-1.9%	-1.0%	-0.8%	-1.8%	-0.9%	-0.8%
YUV, text & graphics with motion, 720p	-1.0%	-0.7%	-0.6%	-1.0%	-0.7%	-0.7%
YUV, mixed content, 1440p	-0.4%	-0.2%	-0.2%	-0.5%	-0.3%	-0.2%
YUV, mixed content, 1080p	-0.5%	-0.3%	-0.2%	-0.5%	-0.4%	-0.2%
YUV, Animation, 720p	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Enc Time[%]	99%	99%	99%	100%	99%	100%
Dec Time[%]	102%	101%	100%	102%	100%	100%

Conclusion

- Propose a harmonized solution for related CE6 Tests to run coding in palette mode
- Improved coding efficiency experimentally
- Recommend to be adopted into the SCC draft