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JCTVC-U0066: CE1-related: Row-based Copy Pixel from Neighbouring CU

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Overview Summary

- Proposed to a row-based copy pixel from neighbouring CU in palette mode
  - A simplified method of CE1 Test-A1 and A2
  - A NumCopyPixelRow is signalled to indicate the number of rows copied from the neighbouring CU
  - The rest of rows in the CU are coded by the original palette index map coding in SCM-4.0

| Lossy coding BD-rate	AI	RA	LB
YUV, text & graphics with motion	-1.8%	-1.3%	-1.0%

Introduction

- The extended COPY_ABOVE_MODE for the first line is proposed in CE1 Test-A1 and A2
  - Allows the COPY_ABOVE_MODE in first row
  - Directly copy pixel value from the above CU
- Pixel-based copy pixel from neighboring CU
  - The palette index signalling for the orange pixels is different from other pixels


CU boundary
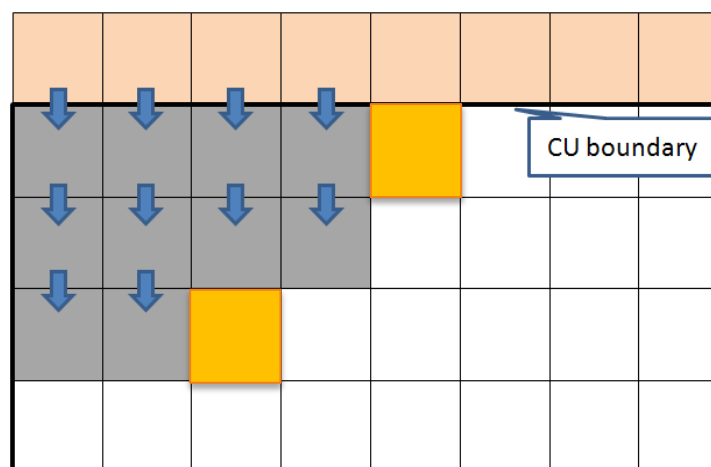
Proposed Row-based Copy Pixel from Neighbouring CU

- A NumCopyPixelRow is signalled to indicate the number of rows copied from the neighbouring CU

- For the rest of rows, the palette index map coding in SCM-4.0 is used
  - The same scan order except the first row position is changed
  - No COPY_ABOVE_MODE in the first row as SCM-4.0
  - No change in palette index signalling
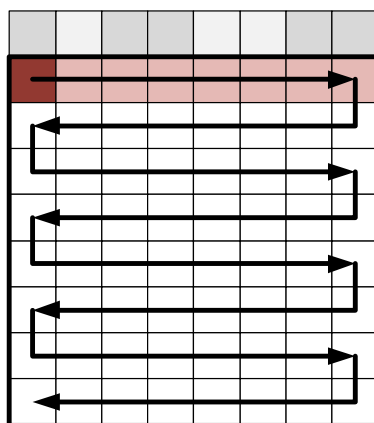
The same as SCM-4.0
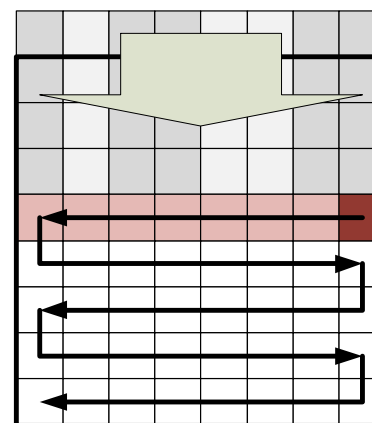
Start the SCM-4.0 index map coding from the 3rd row

NumCopyPixelRow = 0   **NumCopyPixelRow = 3**

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Lossy 444 Coding Result

- Anchor: SCM-4.0, Full-frame IBC
- Test: Proposed Row-based copy pixel from neighbouring CU
- Up to 1.8/1.3/1.0% gains are shown in AI/RA/LB

	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 & 720p	-1.4%	-1.4%	-1.5%	-0.9%	-1.0%	-1.1%	-1.0%	-0.9%	-0.9%
RGB, mixed content, 1440p & 1080p	-0.6%	-0.7%	-0.8%	-0.3%	-0.4%	-0.5%	-0.1%	-0.3%	-0.2%
RGB, Animation, 720p	-0.1%	-0.2%	-0.2%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%
YUV, text & graphics with motion, 1080p & 720p	-1.8%	-2.0%	-2.0%	-1.3%	-1.3%	-1.4%	-1.0%	-0.9%	-0.9%
YUV, mixed content, 1440p & 1080p	-0.8%	-1.1%	-1.4%	-0.6%	-1.1%	-1.5%	-0.4%	-0.1%	-0.7%
YUV, Animation, 720p	-0.1%	-0.7%	-0.6%	-0.2%	-0.5%	-0.4%	-0.1%	-0.1%	-0.3%
YUV, camera captured, 1080p	0.0%	-0.1%	-0.1%	0.0%	-0.2%	-0.1%	-0.1%	0.0%	0.0%
Enc Time[%]	101%			100%			100%		
Dec Time[%]	99%			101%			100%		

Thanks Qualcomm for cross-checking

Lossy 420 Coding Result

- Anchor: SCM-4.0, Full-frame IBC
- Test: Proposed Row-based copy pixel from neighbouring CU
- Up to 1.5/1.3/0.9% gains are shown in AI/RA/LB

	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
YUV, text & graphics with motion, 1080p & 720p	-1.5%	-1.2%	-1.3%	-1.3%	-1.0%	-0.9%	-0.9%	-1.1%	-0.9%
YUV, mixed content, 1440p & 1080p	-0.7%	-1.1%	-1.3%	-0.5%	-0.8%	-1.1%	-0.4%	-0.9%	-0.4%
YUV, Animation, 720p & 768p	-0.3%	-0.6%	-0.6%	-0.3%	-0.1%	-0.4%	-0.4%	-0.6%	-0.2%

Conclusion

- Proposed to a row-based copy pixel from neighbouring CU in palette mode
  - A NumCopyPixelRow is signalled to indicate the number of rows copied from the neighbouring CU
  - The rest of rows in the CU are coded by the original palette index map coding in SCM-4.0

Lossy coding BD-rate	AI	RA	LB
YUV, text & graphics with motion	-1.8%	-1.3%	-1.0%

Comparison

	CE1 Test-A1			CE1 Test-A1			Row-based Copy Pixel		
All Intra	G/Y	B/U	R/V	G/Y	B/U	R/V	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p & 720p	-1.5%	-1.6%	-1.6%	-1.4%	-1.5%	-1.5%	-1.4%	-1.4%	-1.5%
RGB, mixed content, 1440p & 1080p	-0.5%	-0.7%	-0.7%	-0.5%	-0.6%	-0.7%	-0.6%	-0.7%	-0.8%
RGB, Animation, 720p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.2%	-0.2%
RGB, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p & 720p	-1.9%	-1.9%	-2.0%	-1.7%	-1.9%	-1.9%	-1.8%	-2.0%	-2.0%
YUV, mixed content, 1440p & 1080p	-0.7%	-1.2%	-1.3%	-0.6%	-1.1%	-1.2%	-0.8%	-1.1%	-1.4%
YUV, Animation, 720p	0.0%	-0.1%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	-0.7%	-0.6%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%
Random Access	G/Y	B/U	R/V	G/Y	B/U	R/V	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p & 720p	-0.9%	-1.0%	-1.0%	-0.9%	-1.0%	-1.0%	-0.9%	-1.0%	-1.1%
RGB, mixed content, 1440p & 1080p	-0.4%	-0.5%	-0.5%	-0.4%	-0.5%	-0.4%	-0.3%	-0.4%	-0.5%
RGB, Animation, 720p	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	-0.1%
RGB, camera captured, 1080p	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
YUV, text & graphics with motion, 1080p & 720p	-1.1%	-1.2%	-1.4%	-1.0%	-1.2%	-1.4%	-1.3%	-1.3%	-1.4%
YUV, mixed content, 1440p & 1080p	-0.6%	-1.1%	-1.4%	-0.5%	-0.9%	-1.1%	-0.6%	-1.1%	-1.5%
YUV, Animation, 720p	-0.1%	-0.3%	-0.1%	-0.1%	-0.2%	-0.1%	-0.2%	-0.5%	-0.4%
YUV, camera captured, 1080p	0.0%	0.0%	0.0%	0.1%	0.0%	-0.1%	0.0%	-0.2%	-0.1%
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 & 720p	-0.9%	-0.8%	-0.8%	-0.8%	-0.8%	-0.9%	-1.0%	-0.9%	-0.9%
RGB, mixed content, 1440p & 1080p	-0.2%	-0.4%	-0.3%	-0.2%	-0.5%	-0.2%	-0.1%	-0.3%	-0.2%
RGB, Animation, 720p	0.0%	0.0%	0.1%	-0.1%	0.0%	0.0%	-0.1%	-0.1%	0.0%
RGB, camera captured, 1080p	0.0%	-0.1%	0.0%	-0.1%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%
YUV, text & graphics with motion, 1080p & 720p	-1.0%	-1.1%	-1.1%	-0.9%	-1.0%	-1.1%	-1.0%	-0.9%	-0.9%
YUV, mixed content, 1440p & 1080p	-0.2%	-0.7%	-1.1%	-0.1%	-0.6%	-0.8%	-0.4%	-0.1%	-0.7%
YUV, Animation, 720p	0.0%	0.4%	0.3%	0.0%	-0.4%	0.1%	-0.1%	-0.1%	-0.3%
YUV, camera captured, 1080p	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	-0.1%	0.0%	0.0%

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