On Sample Adaptive Band Value

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HEVC: SAO Band Offset

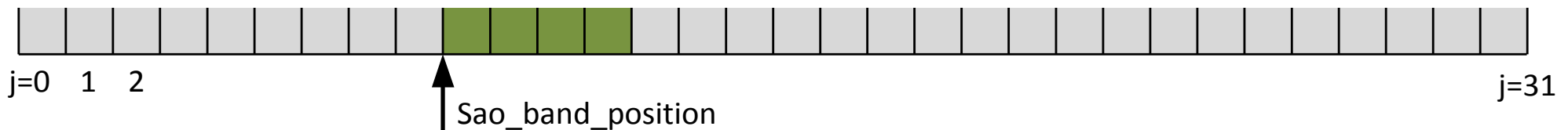- Filtering principle:
  - For all P_i of a band j :
  - $P'_i = P_i + O_j$
- Oj transmitted for all j
  - Unary code

- 4 consecutive bands:
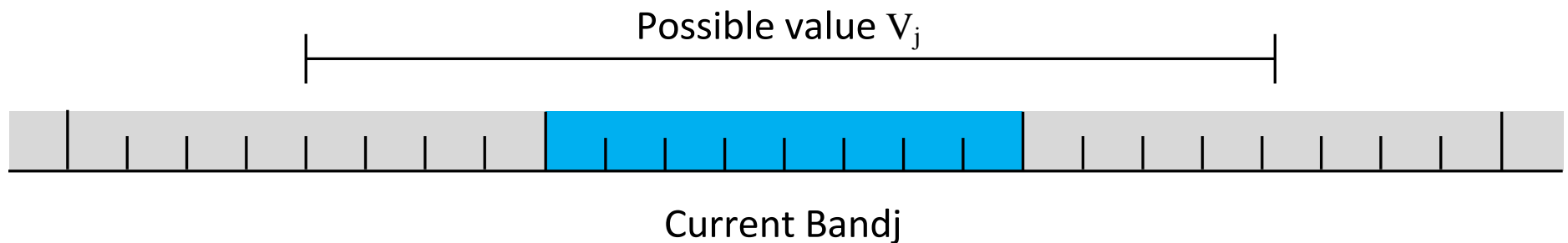 - Signaling by the Sao_band_position

j=0 1 2   j=31

Sao_band_position

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Proposal: SAO Band Value

- **Filtering principle:**
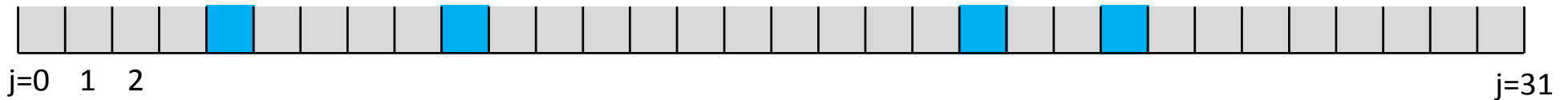 - For all P_i of a band j :
  - $P'_i = V_j$
- **Vj transmitted for all j**
  - 4 bits
  - Vj inside the current band and the half of the neighboring bands

Possible value V_j

Current Bandj

Proposal: SAO Band Value

- **4 independent bands:**
  - 4 SAO_band_value transmitted

j=0 1 2   j=31

- **Band Value is competing to Band Offset and Edge offset at encoder side.**

Experimental results

■ **Anchor: SCM1.0:**

■ **Full frame**

- Same results for 2CTBs

■ **BDR 1080p text & Graphics:**

- **–2,5%**

■ **BDR Average:**

- **–1%**

	All Intra		
	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	-2,1%	-2,5%	-2,4%
RGB, text & graphics with motion,720p	-0,8%	-1,3%	-1,0%
RGB, mixed content, 1440p	-0,2%	-0,2%	-0,3%
RGB, mixed content, 1080p	-0,8%	-0,6%	-0,8%
RGB, Animation, 720p	0,0%	0,0%	0,0%
RGB, camera captured, 1080p	0,0%	0,0%	0,0%
YUV, text & graphics with motion, 1080p	-3,0%	-2,2%	-1,9%
YUV, text & graphics with motion,720p	-1,1%	-0,2%	-0,5%
YUV, mixed content, 1440p	-0,5%	-0,3%	-0,2%
YUV, mixed content, 1080p	-1,1%	0,0%	-0,1%
YUV, Animation, 720p	0,0%	0,0%	0,0%
YUV, camera captured, 1080p	0,0%	0,0%	0,0%
Enc Time[%]	101%		
Dec Time[%]	98%		

	Random Access			Low delay B		
	G/Y	B/U	R/V	G/Y	B/U	R/V
RGB, text & graphics with motion, 1080p	-2,2%	-3,3%	-3,2%	-2,3%	-3,1%	-3,0%
RGB, text & graphics with motion,720p	-1,1%	-1,9%	-1,8%	-1,3%	-1,6%	-1,6%
RGB, mixed content, 1440p	-0,4%	-0,4%	-0,6%	-0,4%	-0,4%	-0,6%
RGB, mixed content, 1080p	-1,0%	-0,7%	-1,1%	-1,3%	-0,6%	-1,2%
RGB, Animation, 720p	0,0%	0,0%	0,0%	0,0%	0,1%	0,0%
RGB, camera captured, 1080p	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
YUV, text & graphics with motion, 1080p	-2,8%	-2,0%	-2,2%	-2,5%	-1,7%	-1,9%
YUV, text & graphics with motion,720p	-1,2%	-0,3%	-0,5%	-1,3%	-0,3%	-1,0%
YUV, mixed content, 1440p	-0,6%	-0,5%	-0,3%	-0,8%	-0,7%	-0,4%
YUV, mixed content, 1080p	-1,1%	-0,3%	-0,2%	-1,0%	-0,7%	-0,3%
YUV, Animation, 720p	0,0%	0,0%	0,0%	0,0%	-0,4%	-0,1%
YUV, camera captured, 1080p	0,0%	0,1%	0,0%	0,0%	0,1%	-0,1%
Enc Time[%]	100%			100%		
Dec Time[%]	105%			105%		

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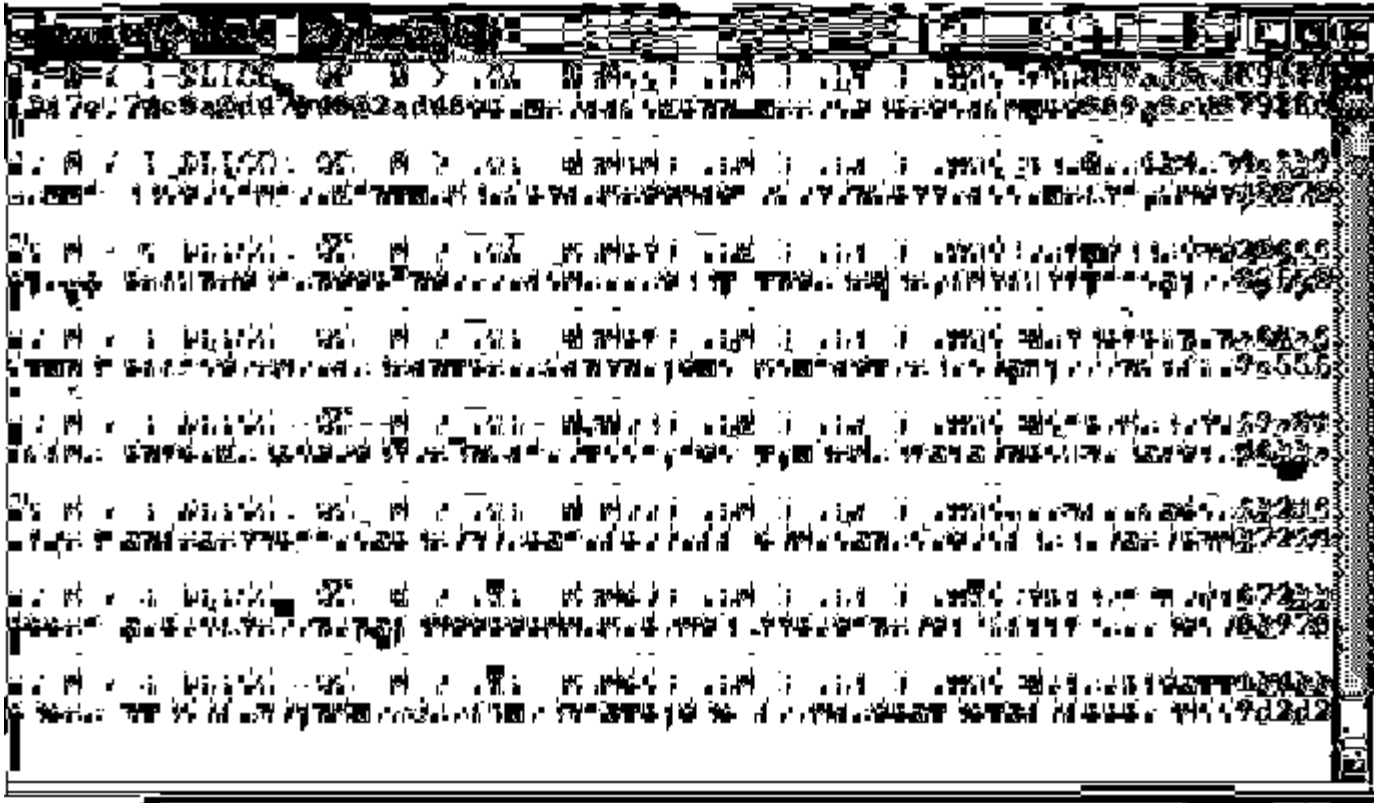
Visual results: SCM1.0

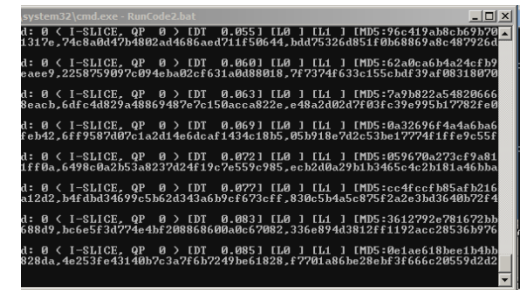■ Binary difference: □ Decoded = Original

■ Decoded ≠ Original

Sc_consol
AI QP 22

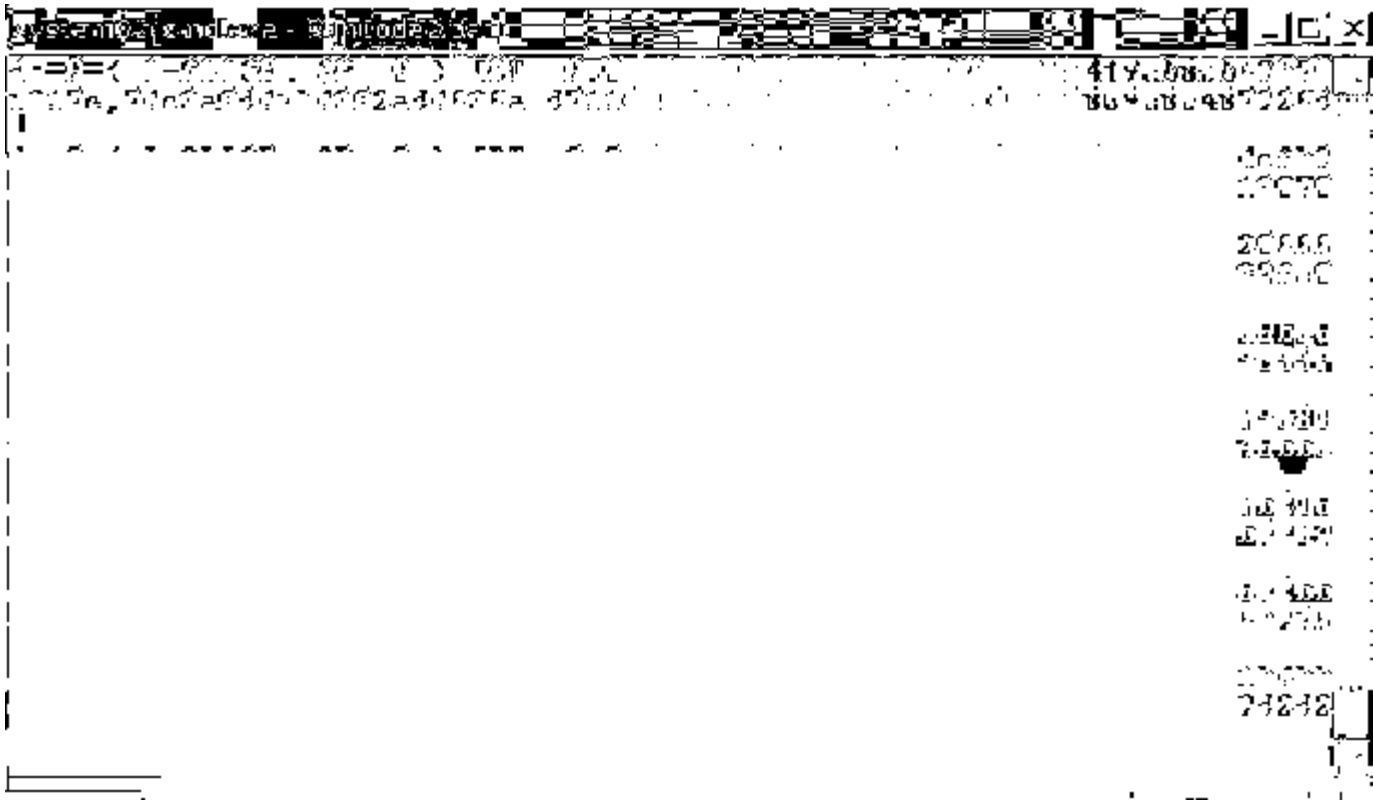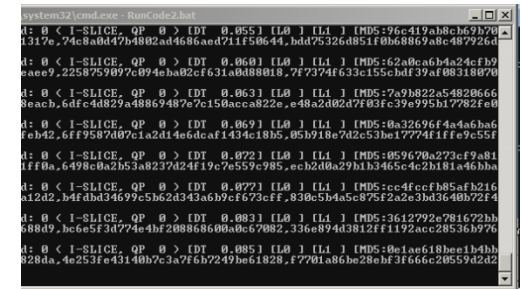# Visual results: SAO Band value

■Binary difference:

□ Decoded = Original

■ Decoded ≠ Original

Sc_consol
AI QP 22

Visual results: SCM1.0

■ Binary difference:

☐ Decoded = Original

■ Decoded ≠ Original

Sc_desktop
AI QP 22

Visual results: SAO Band value

■ Binary difference:

☐ Decoded = Original

■ Decoded ≠ Original

r dependent slice segments. The right side of the figu
slices in the first tile and one slice in the second tile.

rectangular. A tile always contains an integer number o
more than one slice. Similarly, a slice may consist of

onditions shall be fulfilled for each slice and tile:

slice belong to the same tile.

Sc_desktop
AI QP 22

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Conclusion

- Simple modification of SAO Band Offset.
- Interesting results on top of SCM1.0 full frame for AI, RA, LDB
  - BDR 1080p text & Graphics:−2,5%
  - BDR Average: −1%

- Recommend to adopt SAO Band Value for Screen Content Coding.

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