

Coefficient scanning and last position coding for TUs of greater than 32 width or height (JVET-M0257)

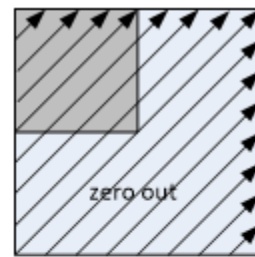
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Introduction

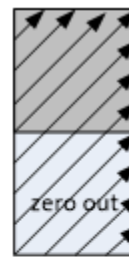
- Large TUs with width or height greater than 32 have zero-out region for
 $x \geq \min(\text{width}, 32), y \geq \min(\text{height}, 32)$
- VTM-3.0, coefficients in zero-out region are scanned
- Possible to have non-zero coded coefficients in zero-out region

Proposal

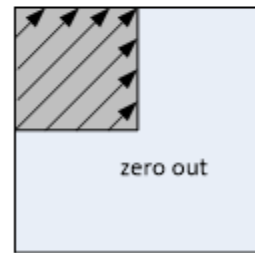
- Scan only the non zero-out region of large TUs
- Use last coefficient position coding for the non-zero out region size block



VVC 64x64



VVC 32x64



Proposed 64x64



Proposed 32x64

example: current and proposed zero-out case scan

Results (VTM-3.0 anchor)

	All Intra Main10					Random access Main10					Low delay B Main10				
	Over VTM 3.0					Over VTM 3.0					Over VTM 3.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	-0.01%	-0.02%	0.04%	100%	95%	-0.02%	0.11%	0.06%	97%	97%					
Class A2	-0.01%	0.02%	-0.04%	99%	97%	-0.01%	0.12%	0.08%	98%	98%					
Class B	0.00%	-0.05%	-0.06%	100%	97%	-0.02%	0.08%	0.03%	100%	100%	0.01%	-0.37%	-0.32%	99%	103%
Class C	0.01%	0.00%	-0.11%	100%	99%	0.02%	-0.05%	0.02%	100%	100%	0.02%	0.17%	0.20%	99%	99%
Class E	0.00%	-0.10%	-0.02%	100%	101%						-0.07%	0.25%	-0.04%	100%	98%
Overall	0.00%	-0.03%	-0.04%	100%	98%	-0.01%	0.06%	0.04%	99%	99%	-0.01%	-0.03%	-0.08%	100%	100%
Class D	0.01%	0.04%	-0.02%	100%	99%	-0.02%	-0.08%	0.05%	98%	97%	0.05%	-0.03%	0.42%	101%	104%
Class F	0.01%	0.07%	-0.05%	100%	100%	0.00%	-0.01%	-0.02%	99%	99%	-0.03%	0.25%	-0.37%	99%	100%

Conclusion

- [illegible]

Results (VTM-3.0 anchor)

	All Intra Main10				
	Over VTM 3.0			EncT	DecT
	Y	U	V		
Class A1	-0.01%	-0.02%	0.04%	100%	95%
Class A2	-0.01%	0.02%	-0.04%	99%	97%
Class B	0.00%	-0.05%	-0.06%	100%	97%
Class C	0.01%	0.00%	-0.11%	100%	99%
Class E	0.00%	-0.10%	-0.02%	100%	101%
Overall	0.00%	-0.03%	-0.04%	100%	98%
Class D	0.01%	0.04%	-0.02%	100%	99%
Class F	0.01%	0.07%	-0.05%	100%	100%

	Random access Main10				
	Over VTM 3.0			EncT	DecT
	Y	U	V		
Class A1	-0.02%	0.11%	0.06%	97%	97%
Class A2	-0.01%	0.12%	0.08%	98%	98%
Class B	-0.02%	0.08%	0.03%	100%	100%
Class C	0.02%	-0.05%	0.02%	100%	100%
Class E					
Overall	-0.01%	0.06%	0.04%	99%	99%
Class D	-0.02%	-0.08%	0.05%	98%	97%
Class F	0.00%	-0.01%	-0.02%	99%	99%

	Low delay B Main10				
	Over VTM 3.0			EncT	DecT
	Y	U	V		
Class A1					
Class A2					
Class B	-0.04%	0.12%	0.01%	97%	98%
Class C	0.02%	-0.01%	-0.29%	96%	96%
Class E	-0.15%	-0.13%	-0.24%	96%	95%
Overall	-0.04%	0.01%	-0.15%	96%	96%
Class D	0.04%	-0.38%	-0.14%	97%	93%
Class F	-0.07%	-0.44%	0.21%	96%	95%

Results (CE7 LC anchor)

	All Intra Main10				
	Over VTM 3.0				
	Y	U	V	EncT	DecT
Class A1	0.01%	-0.02%	-0.05%	100%	94%
Class A2	0.00%	0.00%	-0.03%	100%	97%
Class B	0.00%	-0.01%	0.00%	99%	95%
Class C	-0.01%	-0.03%	-0.01%	99%	98%
Class E	0.00%	-0.02%	-0.06%	99%	95%
Overall	0.00%	-0.02%	-0.03%	99%	96%
Class D	0.00%	0.12%	0.09%	99%	97%
Class F	0.00%	0.05%	0.06%	99%	97%

	Random access Main10				
	Over VTM 3.0				
	Y	U	V	EncT	DecT
Class A1	-0.03%	-0.35%	-0.02%	98%	98%
Class A2	-0.06%	-0.20%	-0.15%	98%	96%
Class B	0.00%	-0.01%	-0.05%	97%	95%
Class C	-0.01%	0.02%	-0.17%	97%	95%
Class E					
Overall	-0.02%	-0.11%	-0.09%	97%	96%
Class D	0.03%	-0.08%	0.00%	98%	97%
Class F	-0.04%	0.03%	0.07%	98%	96%

	Low delay B Main10				
	Over VTM 3.0				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.01%	-0.37%	-0.32%	99%	103%
Class C	0.02%	0.17%	0.20%	99%	99%
Class E	-0.07%	0.25%	-0.04%	100%	98%
Overall	-0.01%	-0.03%	-0.08%	100%	100%
Class D	0.05%	-0.03%	0.42%	101%	104%
Class F	-0.03%	0.25%	-0.37%	99%	100%