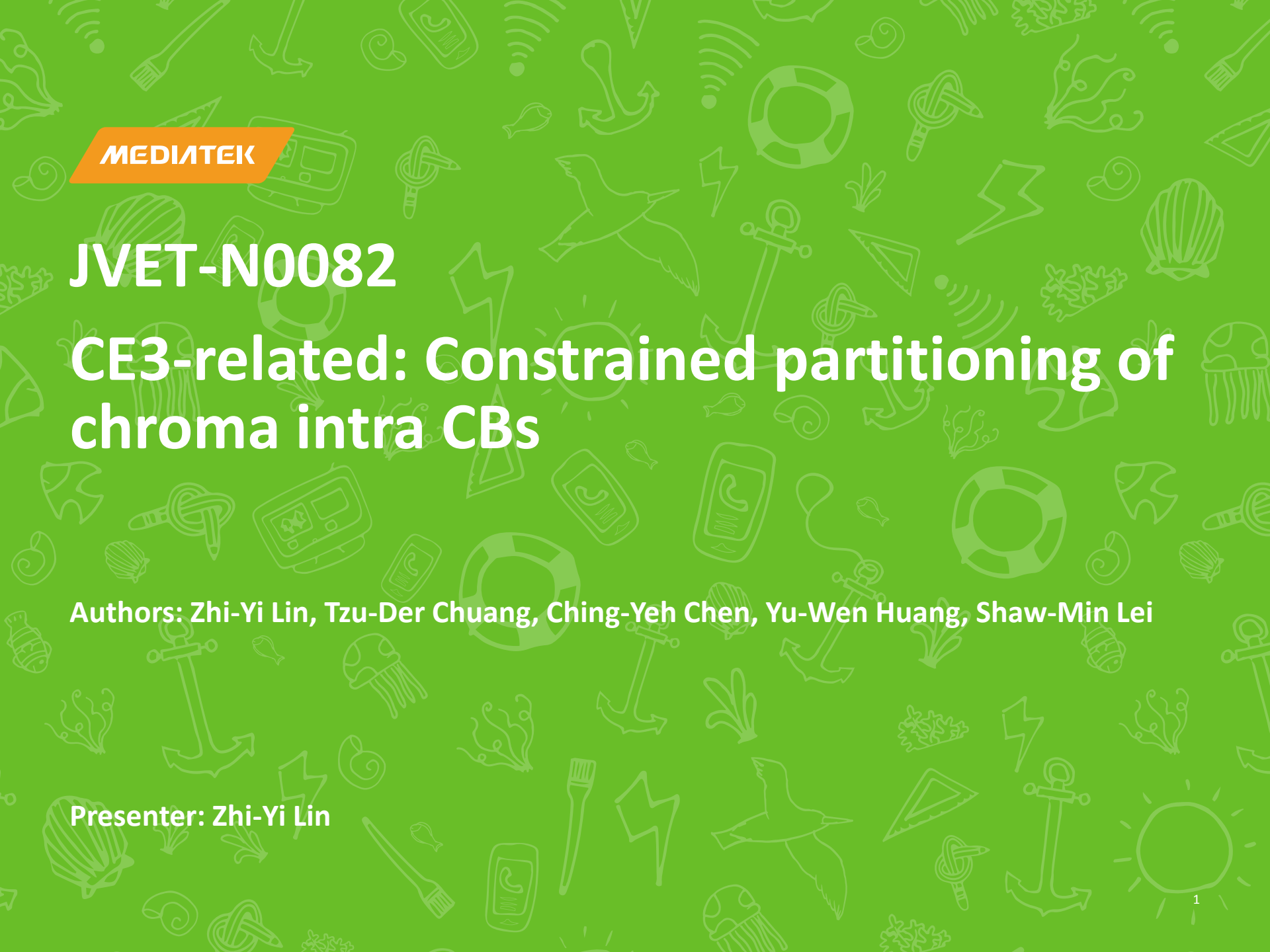




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JVET-N0082

CE3-related: Constrained partitioning of chroma intra CBs

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Overall Summary

- Propose to disallow intra blocks with size less than 16 luma/chroma samples
 - Dual tree: disable 2x2, 2x4, and 4x2 chroma blocks
 - Single tree: chroma components cannot be further split if the smallest intra prediction unit (SIPU) is intra/IBC predicted
- The processing throughput becomes the same as that of HEVC, and 4x of that in VTM-4.0

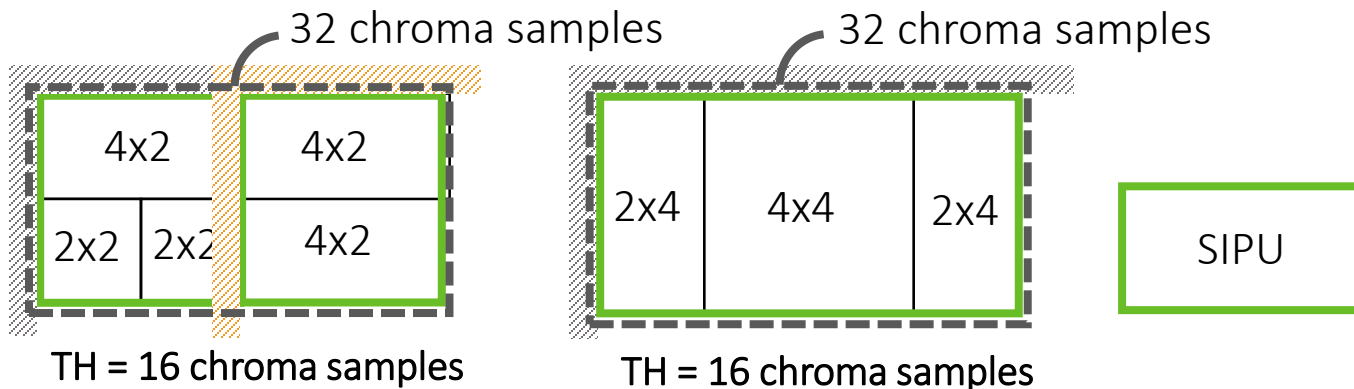
	AI			RA			LB		
	Y	U	V	Y	U	V	Y	U	V
Proposed Method	0.02%	0.37%	0.49%	0.31%	0.06%	0.25%	0.43%	-1.16%	-1.07%

Introduction

- Processing throughput drops when there are more small blocks, especially intra coded small blocks
 - Intra coded blocks have data dependency on neighbouring blocks and cannot be processed in parallel as inter coded blocks
 - Smallest intra block in HEVC is 4x4 luma/chroma block
 - Smallest intra block in VTM-4.0 is 2x2 chroma block
- The intra prediction becomes more complex after CCLM, 4-tap interpolation filters, PDPC, CIIP, and chroma residual scaling are adopted
- The processing throughput in VTM-4.0 is 1/4 of that in HEVC

Proposed Method

- In dual tree, small chroma blocks (2x2, 2x4, 4x2) are disabled
- In single tree, a smallest intra prediction unit (SIPU) with size equal to 16 or 32 chroma samples is defined
- All of the blocks within SIPU should have the same prediction mode
 - Inter prediction mode OR intra / IBC prediction mode
 - The prediction mode of the SIPU is the same as the first coding block's prediction mode



Proposed Method

- When a SIPU is intra/IBC predicted,
 - The chroma components cannot be further split
 - One syntax is used to indicate if the chroma block is intra prediction mode or IBC mode
 - The chroma residual scaling of the chroma block is disabled
- The size of the smallest intra prediction blocks becomes 16 luma/chroma samples
- The worst case processing throughput becomes the same as that in HEVC, and 4X of that in VTM-4.0

Results

All Intra Main10					
Over VTM-4.0					
	Y	U	V	EncT	DecT
Class A1	0.01%	0.16%	0.11%	100%	102%
Class A2	0.04%	0.39%	0.23%	99%	98%
Class B	0.00%	0.18%	0.29%	100%	103%
Class C	0.05%	1.06%	1.56%	100%	102%
Class E	-0.02%	-0.05%	0.05%	100%	103%
Overall	0.02%	0.37%	0.49%	100%	102%
Class D	0.12%	1.80%	2.48%	100%	102%
Class F	0.19%	1.56%	1.96%	100%	101%

Random access Main10					
Over VTM-4.0					
	Y	U	V	EncT	DecT
Class A1	0.09%	-0.07%	0.00%	101%	104%
Class A2	0.34%	0.06%	-0.03%	103%	104%
Class B	0.26%	-0.19%	0.01%	103%	101%
Class C	0.52%	0.50%	0.96%	105%	101%
Overall	0.31%	0.06%	0.25%	103%	102%
Class D	0.86%	1.19%	2.08%	108%	104%
Class F	0.55%	1.21%	1.67%	103%	100%

Low delay B Main10					
Over VTM-4.0					
	Y	U	V	EncT	DecT
Class B	0.29%	-1.98%	-1.66%	106%	101%
Class C	0.86%	-1.17%	-1.02%	108%	103%
Class E	0.09%	0.23%	-0.15%	102%	99%
Overall	0.43%	-1.16%	-1.07%	105%	101%
Class D	1.20%	-2.00%	-1.01%	112%	102%
Class F	0.77%	-0.05%	-0.01%	104%	102%

Conclusion

- Restrict chroma components partitioning within a SIPU when it is predicted by intra/IBC mode
- Guarantee that the size of the smallest processing unit for intra prediction will not be less than 16 luma/chroma samples
- The worst case processing throughput becomes the same as that in HEVC, and 4X of that in VTM-4.0
- Thank Canon for crosschecking!

	AI			RA			LB		
	Y	U	V	Y	U	V	Y	U	V
Proposed Method	0.02%	0.37%	0.49%	0.31%	0.06%	0.25%	0.43%	-1.16%	-1.07%

The background is a solid blue color with a repeating pattern of white line-art icons. These icons include various nautical items like anchors, lifebuoys, seashells, and fish, as well as outdoor and travel-related items like a compass, a map, a tent, a backpack, and a bird in flight. The icons are scattered across the entire page.

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Thank you!