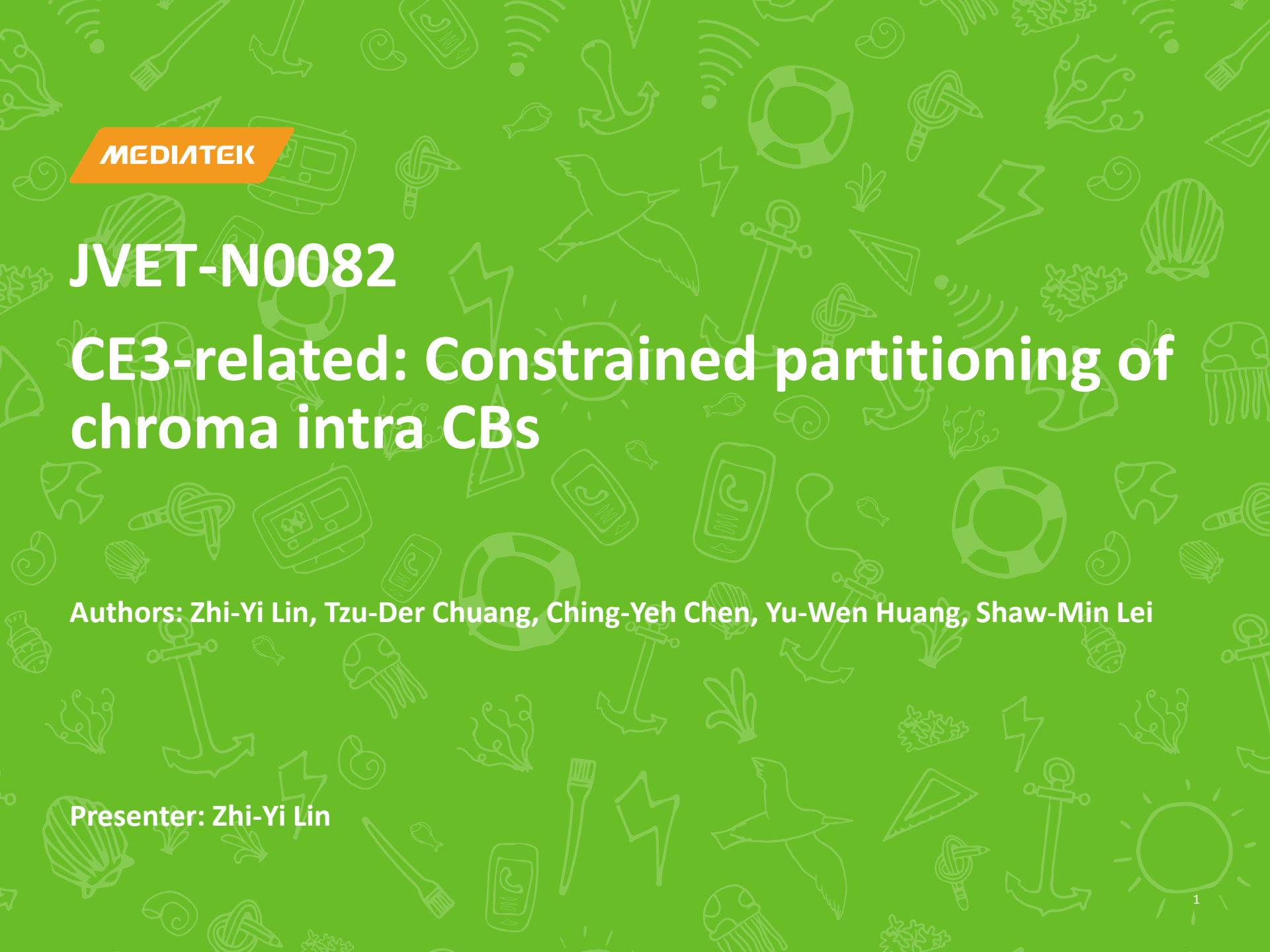




MEDIATEK

JVET-N0082

CE3-related: Constrained partitioning of chroma intra CBs

Authors: Zhi-Yi Lin, Tzu-Der Chuang, Ching-Yeh Chen, Yu-Wen Huang, Shaw-Min Lei

Presenter: Zhi-Yi Lin

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

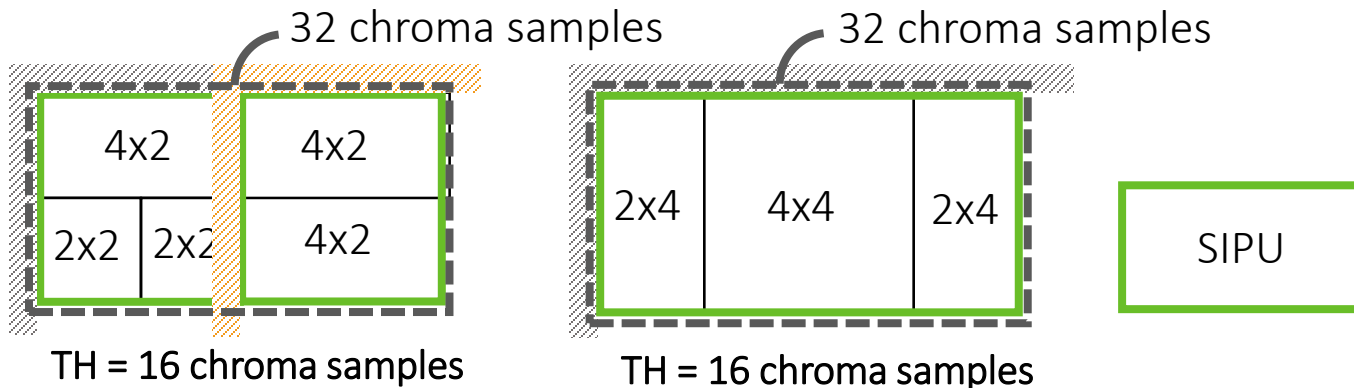
	AI			RA			LB		
	Y	U	V	Y	U	V	Y	U	V
Proposed Method	0.02%	0.37%	0.49%	0.07%	0.62%	0.65%	-	-	-

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	0.01%	0.14%	0.13%	101%	98%
Class A2	0.05%	0.32%	0.29%	102%	98%
Class B	0.04%	0.56%	0.49%	103%	103%
Class C	0.16%	1.28%	1.51%	106%	102%
Overall	0.07%	0.62%	0.65%	103%	101%
Class D	0.38%	2.28%	2.95%	108%	101%
Class F	0.32%	1.46%	1.78%	103%	105%

Low delay B Main10					
Over VTM-4.0					
	Y	U	V	EncT	DecT
Class B	#VALUE!	#VALUE!	#VALUE!	#NUM!	#NUM!
Class C					

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 cross-checking!

	AI			RA			LB		
	Y	U	V	Y	U	V	Y	U	V
Proposed Method	0.02%	0.37%	0.49%	0.07%	0.62%	0.65%	-	-	-

The background is a solid green color with a repeating pattern of white line-art icons. These icons include various nautical items like anchors, lifebuoys, seashells, and jellyfish, as well as outdoor and travel items like a compass, a map, a tent, a backpack, and a bird in flight. There are also symbols for weather like a sun and a lightning bolt, and other items like a camera and a bottle.

MEDIATEK

Thank you!