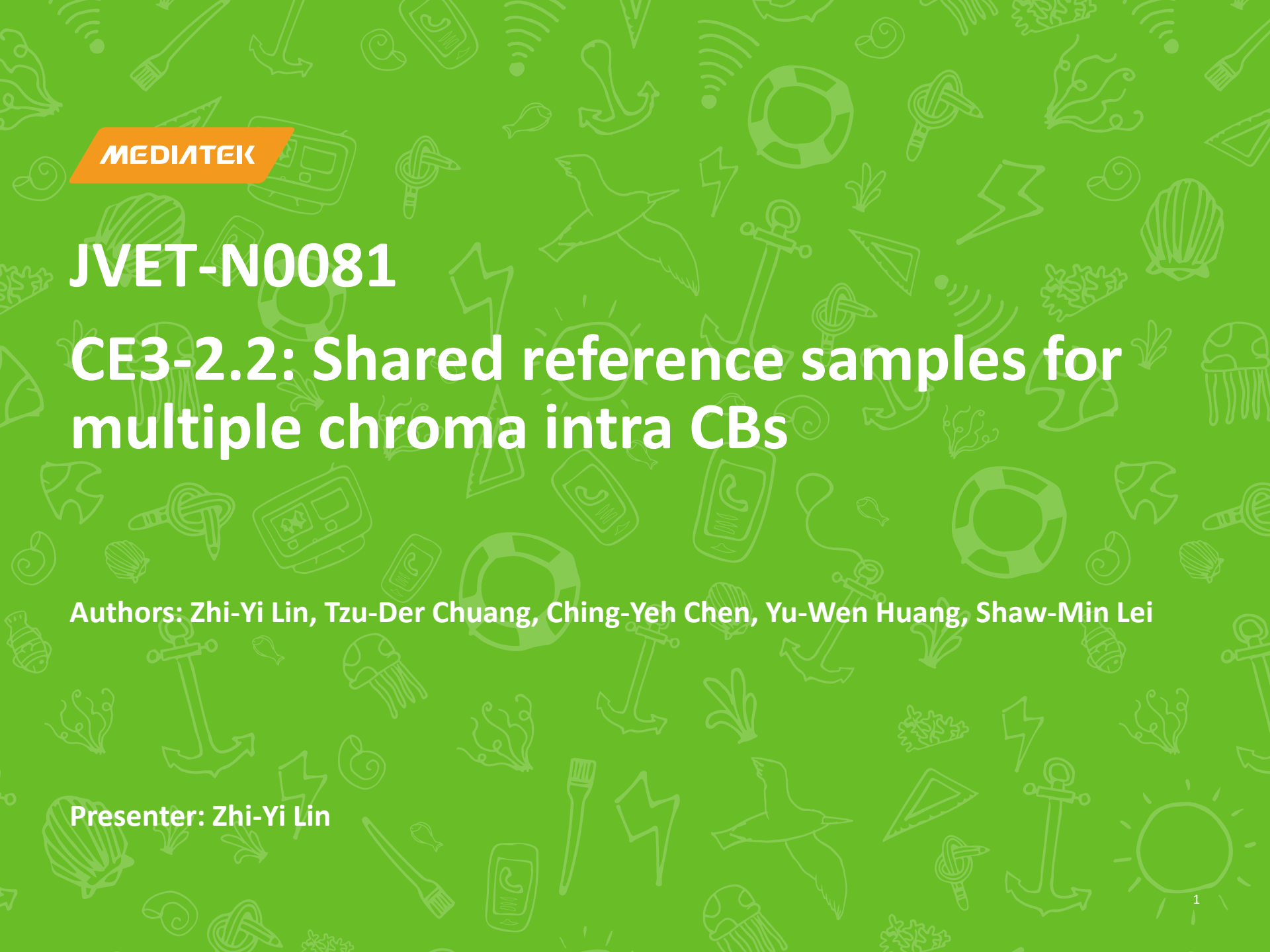




MEDIATEK

JVET-N0081

CE3-2.2: Shared reference samples for multiple 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

- Proposed to share reference samples for chroma intra coded blocks within a parallel region
 - The size of parallel region
 - 16 chroma samples: four 2x2 chroma blocks or two 2x4/4x2 chroma blocks
 - 32 chroma samples: a special case of ternary split
- The processing throughput becomes the same as that of HEVC, and 4x of that in VTM-4.0

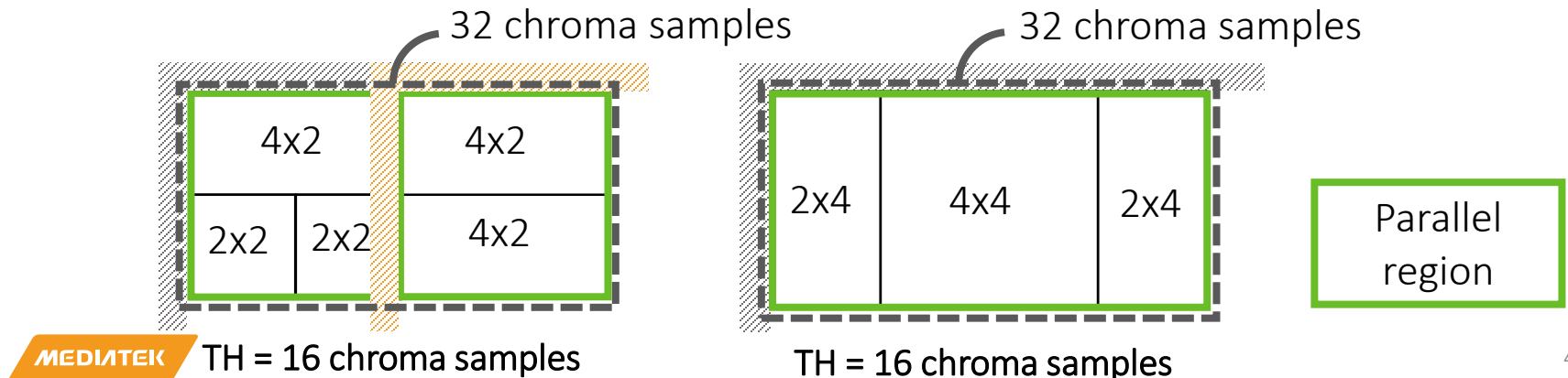
	AI			RA			LB		
	Y	U	V	Y	U	V	Y	U	V
Proposed Method	0.03%	0.30%	0.33%	0.06%	0.29%	0.48%	0.02%	0.43%	-0.20%

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, and CIIP are adopted
- The processing throughput in VTM-4.0 is 1/4 of that in HEVC

Proposed Method

- A parallel region is defined, the size of the parallel region is equal to 16 chroma samples or 32 chroma samples (a special case of ternary split)
 - All of the chroma intra blocks within the same parallel region use the boundary reconstructed samples of the parallel region as the reference samples
- The data dependency between the chroma intra blocks within the parallel region is removed, and hence can be processed in parallel
- The worst case processing throughput becomes the same as that in HEVC, and 4X of that in VTM-4.0



Simulation Results

All Intra Main10					
Over VTM-4.0					
	Y	U	V	EncT	DecT
Class A1	0.02%	0.17%	0.07%	100%	97%
Class A2	0.05%	0.34%	0.13%	100%	97%
Class B	0.01%	0.18%	0.24%	100%	103%
Class C	0.08%	0.74%	1.02%	101%	103%
Class E	0.02%	0.02%	0.01%	101%	103%
Overall	0.03%	0.30%	0.33%	100%	101%
Class D	0.13%	1.10%	1.20%	101%	102%
Class F	0.14%	0.81%	1.03%	103%	102%

Random access Main10					
Over VTM-4.0					
	Y	U	V	EncT	DecT
Class A1	0.04%	0.04%	0.21%	101%	102%
Class A2	0.03%	0.19%	0.31%	100%	103%
Class B	0.04%	0.21%	0.31%	100%	101%
Class C	0.14%	0.65%	1.04%	101%	100%
Class E					
Overall	0.06%	0.29%	0.48%	101%	101%
Class D	0.16%	1.18%	1.34%	101%	101%
Class F	0.15%	0.66%	0.70%	101%	100%

Low delay B Main10					
Over VTM-4.0					
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.00%	-0.02%	-0.57%	100%	102%
Class C	0.04%	0.75%	0.21%	101%	101%
Class E	0.04%	0.75%	-0.12%	100%	96%
Overall	0.02%	0.43%	-0.20%	100%	100%
Class D	0.06%	0.31%	0.20%	101%	101%
Class F	-0.10%	0.14%	-0.21%	101%	100%

Conclusion

- Enable parallel chroma intra block processing in a parallel region
 - All chroma blocks within the same parallel region use the boundary reconstructed samples of the parallel region
 - The size of the parallel region is set equal to 16 or 32 chroma samples
- Guarantee that the size of the smallest processing unit for intra prediction will not be less than 16 chroma samples
- The worst case processing throughput becomes the same as that in HEVC, and 4X of that in VTM-4.0

	AI			RA			LB		
	Y	U	V	Y	U	V	Y	U	V
Proposed Method	0.03%	0.30%	0.33%	0.06%	0.29%	0.48%	0.02%	0.43%	-0.20%

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 fish, as well as outdoor and travel-related items like a compass, a map, a tent, a lightning bolt, and a sun. The icons are scattered across the entire page.

MEDIATEK

Thank you!