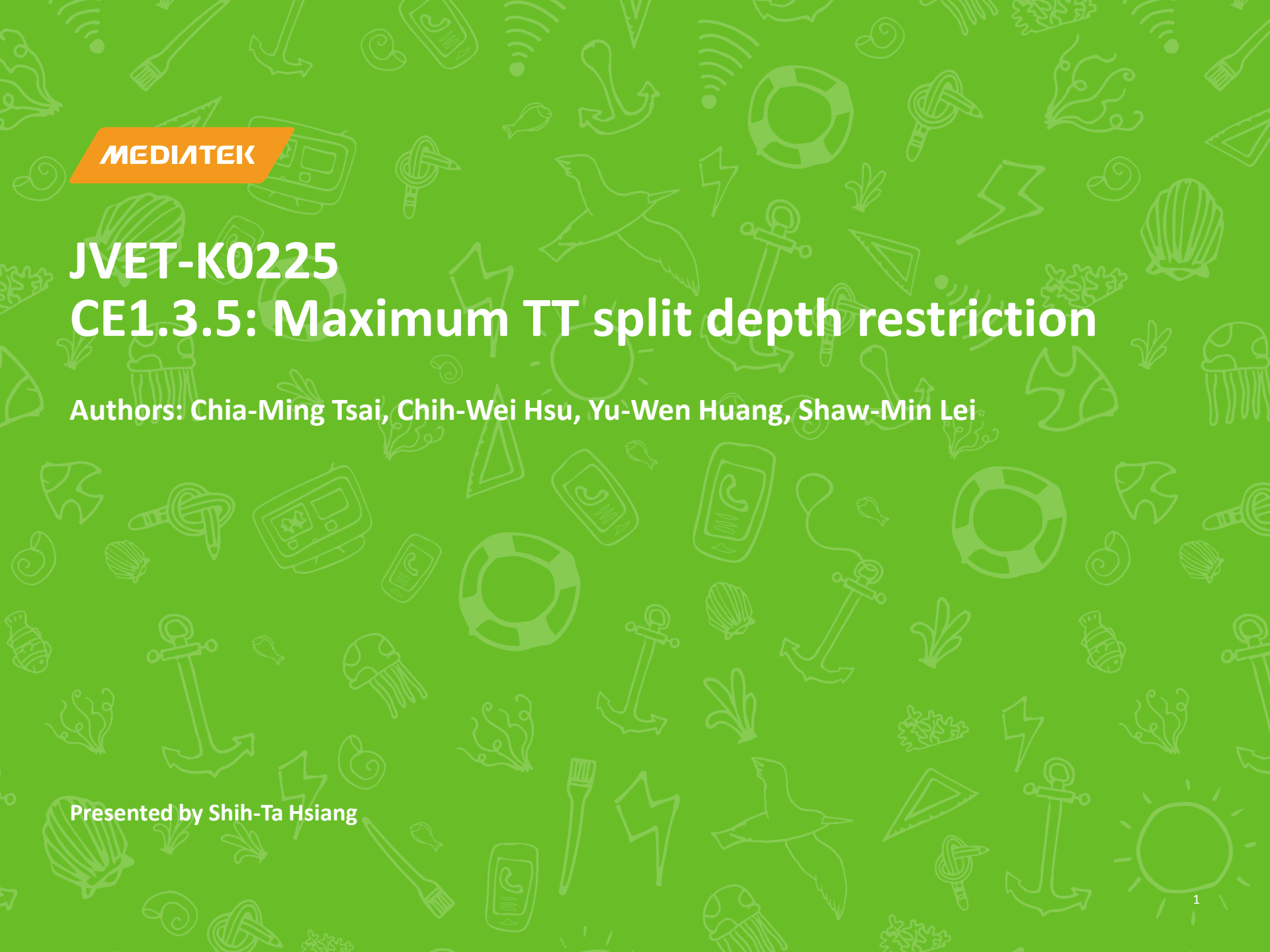


The background is a solid green color with a repeating pattern of white line-art icons. These icons include various nautical items like anchors, lifebuoys, and compasses, as well as outdoor and travel-related items like a backpack, a tent, a bird, and a sun. The icons are scattered across the entire slide.

MEDIATEK

JVET-K0225

CE1.3.5: Maximum TT split depth restriction

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Overall Summary

- Add SPS level syntax elements for restricting the maximum allowed TT depth (MaxTTDepth)
- Summary of BD rate and run time results
 - (MaxBTDepth = 3, MaxTTDepth = 2): encoding run time savings 21%, 21%, and 22%, and luma BD rate increases: 0.38%, 0.72%, and 0.78% for the AI, RA, and LB settings under the VTM-1.0 CTCs
 - (MaxBTDepth = 3, MaxTTDepth = 1): encoding run time savings 42%, 39%, and 41%, and luma BD rate increases: 0.83%, 1.56%, and 1.62% for the AI, RA, and LB settings under the VTM-1.0 CTCs

Proposed Method

- Add SPS level syntax elements for restricting the maximum allowed TT depth (MaxTTDepth)
 - $\text{MaxTTDepth} = \text{MaxBTDepth} - \text{Threshold}$
 - On/off flag, thresholds for intra-slice and inter-slice are added into SPS

Detailed Results

Set the TT depth threshold to 1 for configuring the maximum TT depth to 2

All Intra Main10										
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	0.24%	0.13%	0.13%	78%	100%	0.14%	0.08%	0.14%	78%	100%
Class A2	0.39%	0.56%	0.54%	79%	99%	0.30%	0.42%	0.50%	78%	100%
Class B	0.33%	0.42%	0.55%	79%	99%	0.27%	0.48%	0.49%	78%	99%
Class C	0.44%	0.62%	0.67%	78%	100%	0.35%	0.66%	0.75%	77%	100%
Class E	0.55%	0.73%	0.63%	81%	100%	0.47%	0.67%	0.56%	80%	100%
Overall	0.38%	0.49%	0.52%	79%	99%	0.31%	0.47%	0.50%	78%	100%
Class D	0.29%	0.67%	0.54%	78%	100%	0.26%	0.63%	0.76%	78%	100%

Random Access Main 10										
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	0.64%	0.68%	0.92%	76%	100%	0.61%	0.80%	0.93%	75%	98%
Class A2	0.88%	1.24%	1.25%	79%	100%	0.86%	1.09%	1.07%	79%	101%
Class B	0.71%	1.12%	0.94%	79%	99%	0.67%	1.07%	0.85%	78%	100%
Class C	0.68%	1.01%	1.04%	80%	100%	0.72%	1.29%	0.80%	78%	100%
Overall	0.72%	1.03%	1.02%	79%	100%	0.71%	1.08%	0.90%	77%	100%
Class D	0.55%	0.94%	0.86%	82%	100%	0.56%	0.75%	0.68%	80%	100%

Low delay B Main10										
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class B	0.66%	1.14%	1.32%	77%	100%	0.62%	0.49%	1.13%	78%	101%
Class C	0.69%	0.98%	1.02%	78%	99%	0.68%	0.80%	0.59%	80%	100%
Class E	1.07%	1.47%	1.44%	81%	98%	0.67%	1.04%	0.86%	84%	101%
Overall	0.78%	1.17%	1.25%	78%	99%	0.65%	0.73%	0.88%	80%	101%
Class D	0.45%	0.34%	0.48%	81%	100%	0.54%	0.93%	0.14%	82%	100%

Detailed Results

Set the TT depth threshold to 2 for configuring the maximum TT depth to 1

All Intra Main10										
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	0.58%	0.29%	0.39%	56%	98%	0.37%	0.30%	0.36%	56%	99%
Class A2	0.83%	1.21%	1.15%	58%	99%	0.68%	1.06%	1.14%	57%	99%
Class B	0.73%	0.91%	1.07%	58%	99%	0.61%	1.01%	1.06%	58%	99%
Class C	0.93%	1.48%	1.49%	57%	100%	0.78%	1.49%	1.70%	57%	100%
Class E	1.13%	1.49%	1.36%	61%	100%	0.98%	1.58%	1.31%	60%	100%
Overall	0.83%	1.08%	1.11%	58%	99%	0.68%	1.10%	1.14%	58%	99%
Class D	0.71%	1.30%	1.30%	57%	100%	0.56%	1.45%	1.46%	57%	101%

Random Access Main 10										
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class A1	1.37%	1.52%	1.87%	58%	99%	1.28%	1.68%	1.92%	55%	99%
Class A2	1.92%	2.83%	2.80%	62%	100%	1.88%	2.73%	2.56%	60%	100%
Class B	1.54%	2.24%	2.10%	61%	99%	1.46%	2.37%	2.25%	59%	101%
Class C	1.44%	2.19%	2.30%	61%	101%	1.49%	2.43%	2.07%	59%	99%
Overall	1.56%	2.20%	2.25%	61%	99%	1.52%	2.32%	2.20%	58%	100%
Class D	1.13%	1.87%	1.74%	64%	103%	1.17%	1.89%	1.89%	61%	100%

Low delay B Main10										
	Over VTM-1.0					Over BMS-1.0				
	Y	U	V	EncT	DecT	Y	U	V	EncT	DecT
Class B	1.42%	2.27%	2.38%	57%	100%	1.35%	1.88%	2.53%	58%	100%
Class C	1.35%	2.20%	2.33%	58%	100%	1.34%	2.17%	2.02%	59%	100%
Class E	2.28%	2.97%	3.15%	65%	100%	1.80%	2.87%	3.13%	69%	100%
Overall	1.62%	2.42%	2.56%	59%	100%	1.46%	2.22%	2.51%	61%	100%
Class D	1.07%	1.62%	1.41%	61%	102%	1.14%	1.67%	1.33%	62%	100%

Conclusions

- A maximum TT split depth restriction method by indicating a threshold value in SPS is proposed.
- About 20% encoding time saving with 0.7% - 0.8% BD-rate (RA & LB)
- About 40% encoding time saving with 1.5% - 1.6% BD-rate (RA & LB)



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