

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-Q0189**

## **CE4-related: Reducing GEO modes**

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# Introduction

- In the current version of CE4 description
  - In CE4-1, it is proposed to reduce the number of split modes down to 64, still preserving most of the coding gain
    - Angle index is quantized with fixed step 11.25 degrees around 360 degrees
    - Distance index is quantized into 4 steps
    - Angle indexes indicating horizontal and near-horizontal splits with all distances are removed
    - 4, 12, 20, and 28, which indicate 45 or 135 degrees with all distances are also removed
    - The fourth distance index for horizontal and vertical angles (0, 8, 16, 24) are removed

# Proposal

- Proposed to reduce the number of supported modes from 82 to 54
  - Remove angles which have slope equal to 4 or  $1/4$ , with all related distances
  - Consequently, the look-up table Dis for derivation of GEO partitioning distance can be reduced
  - Binarization of the `merge_geo_partition_idx[ ][ ]` is updated

# Syntax Updates

Modified specification of the angleIdx and distanceIdx values based on the geo\_partition\_idx value, supporting 54 modes

geo_partition_idx	0	1	2	3	4	5	6	3	4	5	6	7	8	9	10	11	12	13
angleIdx	0	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4
distanceIdx	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2
geo_partition_idx	14	19	20	21	22	15	16	17	26	27	28	29	18	19	20	21	22	23
angleIdx	4	5	5	5	5	6	6	6	7	7	7	7	8	8	8	8	9	9
distanceIdx	3	0	1	2	3	1	2	3	0	1	2	3	0	1	2	3	0	1
geo_partition_idx	24	25	26	27	28	29	42	43	44	45	30	31	32	49	50	51	33	34
angleIdx	9	9	10	10	10	10	11	11	11	11	12	12	12	13	13	13	14	14
distanceIdx	2	3	0	1	2	3	0	1	2	3	1	2	3	1	2	3	1	2
geo_partition_idx	33	36	37	38	39	40	41	61	62	63	42	43	44	67	68	69	45	46
angleIdx	14	15	15	15	16	16	16	17	17	17	18	18	18	19	19	19	20	20
distanceIdx	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2
geo_partition_idx	47	48	49	50	51	52	53	79	80	81								
angleIdx	20	21	21	21	22	22	22	23	23	23								
distanceIdx	3	1	2	3	1	2	3	1	2	3								

# Syntax Updates

**Modified look-up table Dis for derivation of GEO partitioning distance**

idx	0	1	2	3	4	5	6	7	8	9	10	11
Dis[idx]	8	8	8	4	4	2	0	-2	-4	-4	-8	-8
idx	12	13	14	15	16	17	18	19	20	21	22	23
Dis[idx]	-8	-8	-8	-4	-4	-2	0	2	4	4	8	8

**Syntax elements and associated binarizations**

merge_geo_partition_idx[ ][ ]	TB	cMax = 6453
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# Simulation Results of Proposed Method

(over CE4 common base GEO  
software, inaccurate runtime data)

	Random access Main10				
	Over CE4 common base				
	Y	U	V	EncT	DecT
Class A1	0.02%	-0.08%	-0.01%	136%	130%
Class A2	0.05%	0.19%	-0.05%	136%	128%
Class B	-0.02%	-0.03%	0.07%	138%	130%
Class C	0.02%	0.21%	0.10%	136%	130%
Class E					
<b>Overall</b>	0.01%	0.07%	0.04%	137%	130%
Class D	-0.01%	0.04%	0.09%	137%	120%
Class F	-0.01%	0.06%	0.03%	135%	131%

	Low delay B Main10				
	Over CE4 common base				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.00%	0.04%	0.23%	136%	121%
Class C	-0.02%	0.16%	-0.13%	130%	109%
Class E	0.21%	-0.06%	0.01%	128%	113%
<b>Overall</b>	0.04%	0.06%	0.06%	132%	115%
Class D	-0.02%	-0.10%	0.00%	131%	111%
Class F	-0.02%	-0.20%	-0.21%	127%	111%

# Summary

- Proposed to reduce the number of supported modes from 82 to 54
  - Remove angles which have slope equal to 4 or  $1/4$ , with all related distances
- It is suggested to adopt this modification into the next version of VVC Specification Draft.