

**JVET-AB0104**  
**EE2-related : On directional planar prediction**

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# Summary

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- Proposal
  - On new planar prediction modes (Horizontal / vertical planar modes, EE2-1.15)
    - Method #1 : To map the new planar modes to horizontal mode or vertical mode
    - Method #2 : To determine the direction of the planar modes using DIMD mode
  
- Experimental results
  - Method #1 : -0.12%, -0.02%, -0.05% (Y, U, V AI), 116%, 100% (EncT, DecT)
  - Method #2 : -0.08%, -0.05%, -0.04% (Y, U, V AI), 108%, 101% (EncT, DecT)  
-0.05%, 0.02%, -0.09% (Y, U, V RA), 101%, 100% (EncT, DecT)
  
- Thank Qualcomm for crosscheck (JVET-AB0253)

# Proposed method #1

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- The horizontal planar and vertical planar modes are considered as horizontal mode and vertical mode, respectively.
  - Transform kernel is selected as done for horizontal / vertical mode.
  - No reference sample smoothing (as what is done for horizontal / vertical mode)
  
- PDPC is applied as done for planar mode
  
- The coded bin for determining the direction is bypass-coded, instead of being context-coded.

## Proposed method #2

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- The directional bin is inferred using the DIMD mode
  - When the current block mode is planar and it is NOT conventional planar mode,
  - DIMD mode is less than 34 → Horizontal planar mode
  - Otherwise → Vertical planar mode
  
- Method 2 is implemented on top of method 1

# Experimental results

- Method #1

	All Intra Main 10				
	Over ECM-6.0				
	Y	U	V	EncT	DecT
Class A1	-0.11%	-0.12%	0.02%	115%	100%
Class A2	-0.09%	-0.03%	-0.07%	115%	100%
Class B	-0.10%	0.04%	0.03%	117%	100%
Class C	-0.10%	0.00%	-0.05%	116%	100%
Class E	-0.20%	-0.03%	-0.22%	117%	100%
<b>Overall</b>	-0.12%	-0.02%	-0.05%	116%	100%
Class D	-0.06%	-0.08%	-0.04%	116%	101%
Class F	-0.10%	-0.03%	0.12%	108%	101%

	Random Access Main 10				
	Over ECM-6.0				
	Y	U	V	EncT	DecT
Class A1	-0.09%	0.05%	0.00%	103%	100%
Class A2	#VALUE!	#VALUE!	#VALUE!	#NUM!	#NUM!
Class B	-0.05%	0.23%	-0.11%	103%	100%
Class C	-0.02%	0.00%	0.13%	101%	99%
Class E					
<b>Overall</b>	#VALUE!	#VALUE!	#VALUE!	#NUM!	#NUM!
Class D	-0.03%	-0.01%	-0.09%	101%	99%
Class F	-0.04%	-0.26%	-0.29%	101%	101%

- Method #2

	All Intra Main 10				
	Over ECM-6.0				
	Y	U	V	EncT	DecT
Class A1	-0.09%	-0.12%	-0.08%	108%	100%
Class A2	-0.06%	-0.03%	-0.08%	108%	100%
Class B	-0.07%	0.00%	-0.02%	109%	100%
Class C	-0.07%	0.03%	0.08%	108%	100%
Class E	-0.13%	-0.21%	-0.17%	109%	100%
<b>Overall</b>	-0.08%	-0.05%	-0.04%	108%	100%
Class D	-0.03%	0.04%	-0.13%	108%	101%
Class F	-0.06%	-0.11%	0.00%	104%	100%

	Random Access Main 10				
	Over ECM-6.0				
	Y	U	V	EncT	DecT
Class A1	-0.07%	-0.02%	-0.13%	101%	100%
Class A2	-0.06%	0.05%	-0.02%	101%	100%
Class B	-0.06%	0.05%	-0.26%	102%	100%
Class C	-0.02%	-0.03%	0.09%	100%	98%
Class E					
<b>Overall</b>	-0.05%	0.02%	-0.09%	101%	100%
Class D	-0.01%	0.09%	0.13%	99%	98%
Class F	-0.04%	-0.06%	0.25%	101%	100%

# Conclusion

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- Improved horizontal and vertical planar prediction methods are proposed.
- From the result of method #2, the coding performance is maintained while the encoding complexity is reduced by half, compared to EE2-1.15.
- It is suggested that method #2 is adopted to the next version of ECM.

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Thank you