

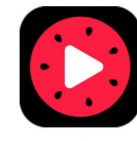
# JVET-X0141

## EE2-3.1-related: CIIP with template matching

Zhipin Deng, Kai Zhang, Li Zhang (Bytedance)

Xinwei Li, Ru-Ling Liao, Jie Chen, Yan Ye (Alibaba)

Yao-Jen Chang, Vadim Seregin, Marta Karczewicz (Qualcomm)



# Summary

- At the last JVET meeting, a combination of CIIP and template-based intra mode derivation (TIMD) was proposed => included in EE2-3.1b for further evaluation
- In ECM-2.0, inter template matching is included in different tools, such as TM AMVP, regular TM merge mode, GPM-TM mode, and ARMC
- Proposal
  - On top of EE2-3.1b CIIP combined with intra template matching, further allows CIIP with inter template matching
- Experimental Results (tool-off)

Over ECM-2.0	BD-rate Y	BD-rate U	BD-rate V	Enc T	Dec T
RA	-0.11%	-0.11%	0.00%	101%	100%
LB	-0.22%	-0.27%	-0.28%	101%	100%

# Proposal

- Replace the planar mode of CIIP intra part with an intra mode derived by template based intra mode derivation (TIMD)
  - Tested in EE2-3.1b
- Refine the motion vector of CIIP inter part with a template matching based method
  - A CIIP-TM merge candidate list is built
    - same as regular merge list construction but with just TWO candidates
  - The merge candidates are refined by template matching
    - same as regular TM mode but without BDMVR process
  - The merge candidates are also reordered by the ARMC method
    - Same as regular CIIP

# Experimental results (tool-off)

	Random access Main10				
	Over ECM-2.0				
	Y	U	V	EncT	DecT
Class A1	-0.11%	-0.18%	-0.06%	100%	99%
Class A2	-0.09%	-0.21%	-0.03%	100%	100%
Class B	-0.10%	-0.10%	-0.02%	102%	100%
Class C	-0.14%	0.00%	0.08%	102%	100%
Class E					
<b>Overall</b>	-0.11%	-0.11%	0.00%	101%	100%
Class D	-0.08%	-0.14%	0.17%	102%	100%
Class F	-0.03%	-0.13%	-0.14%	102%	100%
	Low delay B Main10				
	Over ECM-2.0				
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.20%	0.00%	-0.21%	100%	98%
Class C	-0.29%	-0.22%	0.02%	101%	99%
Class E	-0.15%	-0.76%	-0.80%	101%	102%
<b>Overall</b>	-0.22%	-0.27%	-0.28%	101%	100%
Class D	-0.11%	-0.27%	0.00%	100%	99%
Class F	-0.12%	0.13%	0.35%	102%	100%

# Conclusions

## ■ Benefits

- Straightforward extension for CIIP to allow template matching
- BD-rate gains in RA and LB, with minor run-time change

## ■ It is recommended to adopt the proposed method to ECM

Thank Canon for cross-checking!