

JVET-00630

Non-CE4: DMVR on merge mode

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Problem statement

- In VVC draft 5, DMVR is always applied to a CU when all of the following is true:
 - the CU is predicted using regular merge or CIIP mode
 - BCW is not applied to the CU
 - CU width ≥ 8
 - CU height ≥ 8
 - CU size ≥ 128
 - the CU is bi-predicted with equal distance from current picture to two reference pictures
- There is no option to turn off DMVR at CU-level

➡ A flag is proposed to turn on/off DMVR

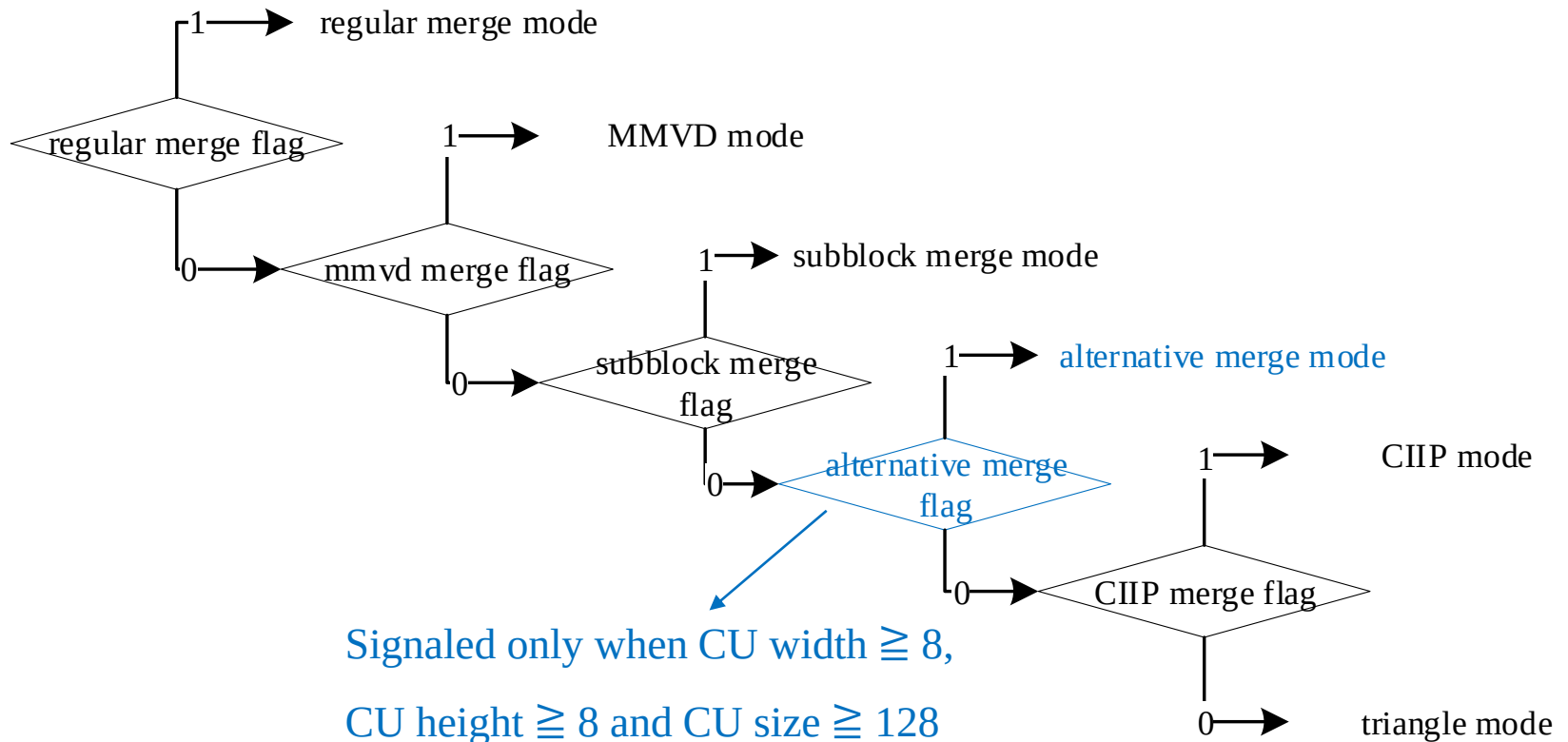
Proposed methods

- Ability to control DMVR on/off at CU-level
 - An alternative merge mode is proposed
 - A CU-level DMVR on/off flag is proposed
- The DMVR conditions are modified as follows:
 - the CU is predicted using regular merge, CIIP or alternative merge mode
 - BCW is not applied to the CU
 - CU width ≥ 8
 - CU height ≥ 8
 - CU size ≥ 128
 - the CU is bi-predicted with equal distance from current picture to two reference pictures
 - the CU-level DMVR on/off flag is on



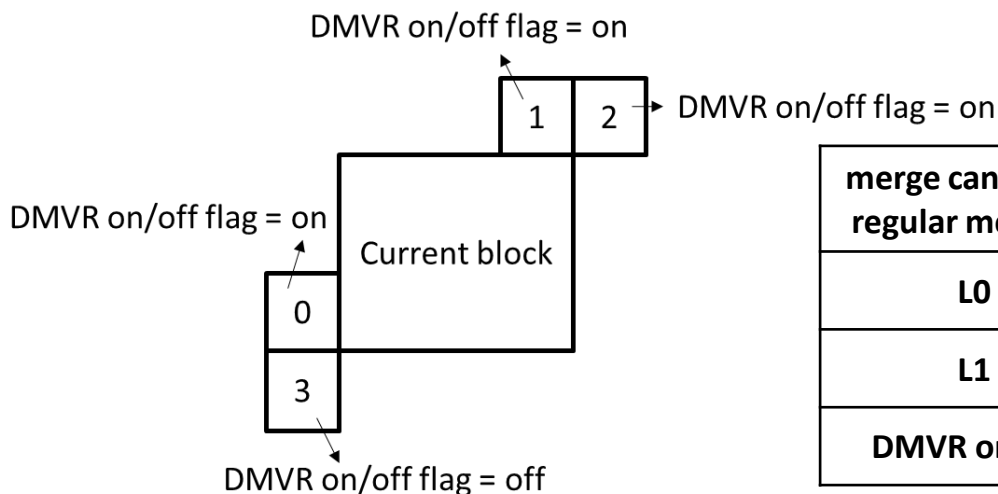
Proposed syntax

- An alternative merge flag is signaled before CIIP flag



Merge candidates for regular merge mode

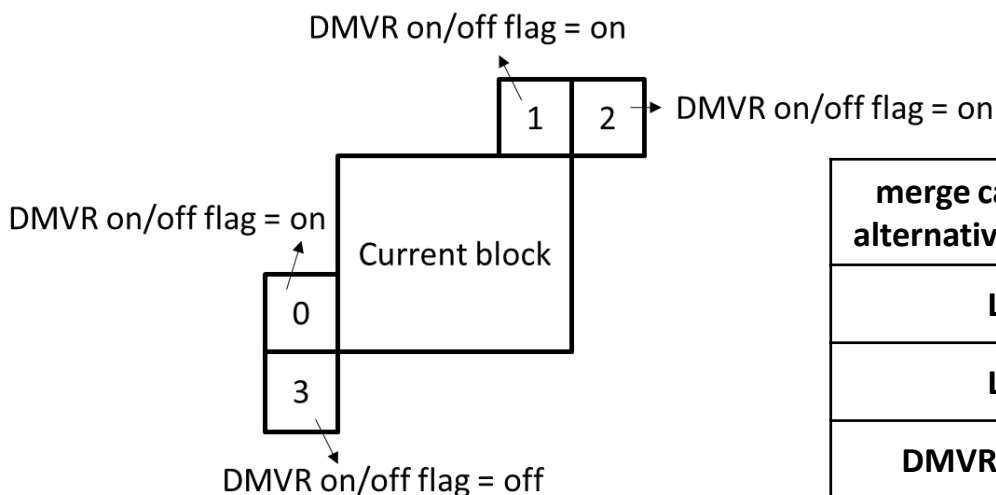
- For regular merge and CIIP modes, the DMVR on/off flag is inherited from its neighboring block



merge candidates for regular merge mode	0	1	2	3	...
L0 Mv	Mv1	Mv3	Mv4	Mv6	...
L1 Mv	Mv2	X	Mv5	Mv7	...
DMVR on/off flag	on	on	on	off	...

Merge candidates for alternative merge mode

- For alternative merge mode, the candidates are derived from the candidates for regular merge mode
 - Bi-predicted candidate is copied with the DMVR on/off flag inverted
 - Uni-predicted candidate is converted to bi-predicted with the DMVR on/off flag set to on



merge candidates for alternative merge mode	0	1	2	3	...
L0 Mv	Mv1	Mv3	Mv4	Mv6	...
L1 Mv	Mv2	Mv2	Mv5	Mv7	...
DMVR on/off flag	off	on	off	on	...

CU-level DMVR on/off flag

- The CU-level DMVR on/off flag is set after decoding for each CU
 - If a CU is predicted using regular merge, CIIP or alternative merge mode, the flag is set to be the same as the DMVR on/off flag of the current CU
 - Otherwise, the flag is set to be true

Simulation results

- 0.07% coding gain with no impact on encoding and decoding time

	Over VTM-5.0				
	Random Access				
	Y	U	V	EncT	DecT
Class A1	-0.06%	-0.09%	-0.01%	101%	99%
Class A2	-0.08%	-0.04%	-0.02%	101%	99%
Class B	-0.07%	0.00%	-0.03%	100%	99%
Class C	-0.08%	-0.05%	-0.08%	100%	98%
Overall	-0.07%	-0.04%	-0.04%	100%	99%
Class D	-0.11%	-0.09%	0.02%	100%	97%
Class F	-0.05%	0.04%	0.00%	100%	99%

Conclusion

- A CU-level flag is proposed to turn off DMVR for regular merge mode
- 0.07% coding gain with no impact on encoding and decoding time
- Thanks to Qualcomm for cross-checking

