

JVET-Q0321

Non-CE1: Deblocking filter decision simplification

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Introduction

In VVC draft 7, three checks for luma and chroma deblocking filter decision are shown below:

Luma:

- 1) dpq is less than $(\beta \gg 2)$,
- 2) $sp + sq$ is less than $sThr$,
- 3) spq is less than $(5 * tC + 1) \gg 1$

Wherein

- $dpq = 2 * dpq0L$ or $2 * dpq3L$
- $sp = sq0$ or $sq3$
- $spq = spq0$ or $spq3$

Chroma:

- 1) dpq is less than $(\beta \gg 2)$,
- 2) $Abs(p3 - p0) + Abs(q0 - q3)$ is less than $(\beta \gg 3)$
- 3) $Abs(p0 - q0)$ is less than $(5 * tC + 1) \gg 1$

Wherein

- $dpq = 2 * dpq0$ or $2 * dpq1$

Proposal

Simplification applied to the deblocking filter decision is shown as high-lighted below:

Luma:

- 1) dpq is less than $(\beta \gg 2^3)$,
- 2) $sp + sq$ is less than $sThr$,
- 3) spq is less than $(5 * tC + 1) \gg 1$

Wherein

- $dpq = 2^* dpq0L$ or $2^* dpq3L$
- $sp = sq0$ or $sq3$
- $spq = spq0$ or $spq3$

Chroma:

- 1) dpq is less than $(\beta \gg 2^3)$,
- 2) $Abs(p3 - p0) + Abs(q0 - q3)$ is less than $(\beta \gg 3)$
- 3) $Abs(p0 - q0)$ is less than $(5 * tC + 1) \gg 1$

Wherein

- $dpq = 2^* dpq0$ or $2^* dpq1$

Remove unnecessary multiplications

Objective results SDR (Proposal)

All intra					
Over VTM-7.0					
	Y	U	V	EncT	DecT
Class A1	0.00%	0.00%	-0.01%	98%	97%
Class A2	0.00%	-0.01%	0.00%	100%	99%
Class B	0.00%	0.00%	-0.01%	103%	96%
Class C	0.00%	0.00%	0.00%	108%	104%
Class E	0.00%	0.00%	0.00%	101%	98%
Overall	0.00%	0.00%	0.00%	102%	99%
Class D	0.00%	0.00%	0.00%	105%	101%
Class F	0.00%	0.00%	0.00%	106%	103%

Low-delay B					
Over VTM-7.0					
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	-0.01%	0.06%	-0.06%	-0.01%	0.06%
Class C	0.01%	-0.01%	0.00%	0.01%	-0.01%
Class E	0.01%	0.08%	-0.33%	0.01%	0.08%
Overall	0.00%	0.04%	-0.11%	0.00%	0.04%
Class D	0.00%	0.04%	0.03%	0.00%	0.04%
Class F	-0.06%	-0.01%	0.01%	-0.06%	-0.01%

Random access					
Over VTM-7.0					
	Y	U	V	EncT	DecT
Class A1	-0.01%	0.01%	-0.02%	107%	99%
Class A2	0.00%	0.01%	0.02%	101%	96%
Class B	0.00%	0.03%	0.00%	97%	101%
Class C	0.01%	-0.02%	-0.01%	98%	99%
Class E					
Overall	0.00%	0.01%	-0.01%	100%	99%
Class D	0.00%	0.01%	-0.01%	101%	99%
Class F	0.01%	-0.02%	-0.01%	86%	100%

Low-delay P					
Over VTM-7.0					
	Y	U	V	EncT	DecT
Class A1					
Class A2					
Class B	0.00%	0.06%	-0.13%	114%	118%
Class C	0.02%	-0.01%	-0.19%	118%	116%
Class E	0.01%	-0.04%	0.14%	115%	129%
Overall	0.01%	0.01%	-0.08%	116%	120%
Class D	0.01%	-0.01%	0.02%	112%	103%
Class F	-0.04%	-0.01%	0.05%	110%	121%

*Coding times are not reliable as different clusters were used for simulations.

Conclusion

- Proposed to simplify checks for deblocking filter decision.
 - Reduces complexity by removing unnecessary multiplications.
 - Negligible BDR impact.
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- It is proposed include this modification for next version of VVC.

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