

Non-CE2: alternative solutions for reducing the luma-chroma latency

JVET-O0524

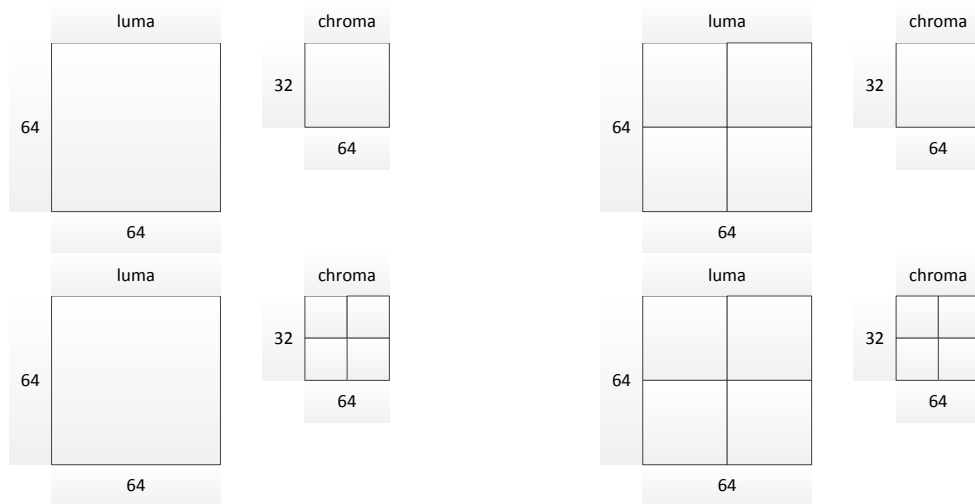


Problem

- Chroma-to-luma dependency in CCLM and Chroma Residual Scaling (CRS)
- Dual Tree case: maximum latency to reconstruct chroma is **one 64x64 luma block**.
- Solutions in CE2 not fully solve the problem.
- In this proposal an alternative solution is proposed, resulting in a maximum latency of **one 32x32 luma block**.

Proposal

- Normative partitioning restrictions: in Dual Tree, BT and TT split disabled at VDPU level (64x64 luma / 32x32 chroma)
- → Latency reduced from one 64x64 luma block to **one 32x32 luma block**



Tests

	CRS in dual tree	CRS in single tree
Test1	No	Using coloc pred luma samples
Test2	Using coloc reco luma samples	Using coloc pred luma samples
Test3	Using coloc neighbor luma samples	Using coloc pred luma samples

Results SDR

	AI			RA			LDB		
	Y	U	V	Y	U	V	Y	U	V
SDR test1	0.17%	2.35%	2.30%	0.04%	0.77%	0.78%	0.04%	0.57%	0.50%
SDR test2	0.18%	2.11%	1.86%	0.07%	0.15%	0.18%	0.03%	0.04%	0.28%
SDR test3	0.18%	2.09%	1.84%	0.07%	0.15%	0.17%	0.01%	0.03%	0.06%

Results HDR PQ

	AI					RA				
	DE100	PSNRL	wY	wU	wV	DE100	PSNRL	wY	wU	wV
HDR Test1	5.82%	0.24%	0.23%	5.89%	8.70%	4.70%	0.48%	0.13%	3.21%	4.73%
HDR LMCS	14.36%	-1.84%	-1.41%	20.50%	17.61%	10.94%	-1.69%	-1.51%	17.77%	11.81%
HDR Test2	6.42%	-1.48%	-1.03%	9.70%	4.40%	4.54%	-1.46%	-1.24%	8.18%	1.70%
HDR Test3	6.52%	-1.47%	-1.01%	9.72%	4.72%	4.79%	-1.45%	-1.23%	8.16%	1.80%

Conclusion

- Proposal:
 - Normative partitioning restrictions: in Dual Tree, BT and TT split disabled at VDPU level (64x64 luma / 32x32 chroma)
 - Chroma reconstruction latency reduced from one 64x64 luma block to **one 32x32 luma block**
 - Reasonable coding efficiency impact, especially in inter configurations
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- Thanks to MediaTek for the cross-check
 - Thanks to Broadcom, RealTek and MediaTek for the fruitful discussions and suggestions

