

JVET-N0389: Chroma residual scaling with separate luma/chroma tree



Relates to luma-dependent chroma residual scaling (LDCRS) used in the in-loop reshaping design

VTM-4.0: LDCRS disabled when separate luma/chroma partitioning is active (Intra-tile groups) - while In Inter-tile groups, LDCRS enabled

- Due to latency issue for processing chroma samples depending on collocated luma samples

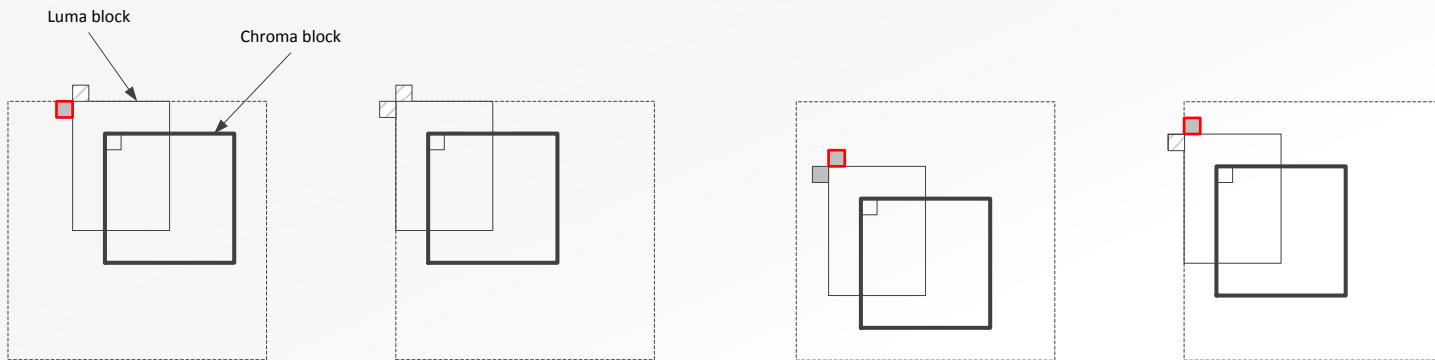
**Different behaviour between intra CUs in Intra and Inter tile groups
& Chroma coding penalty, in particular for HDR PQ**

Goal of this proposal

- enabling LDCRS with SepT
- while controlling the structural delay involved by the luma-dependency of chroma residual scaling

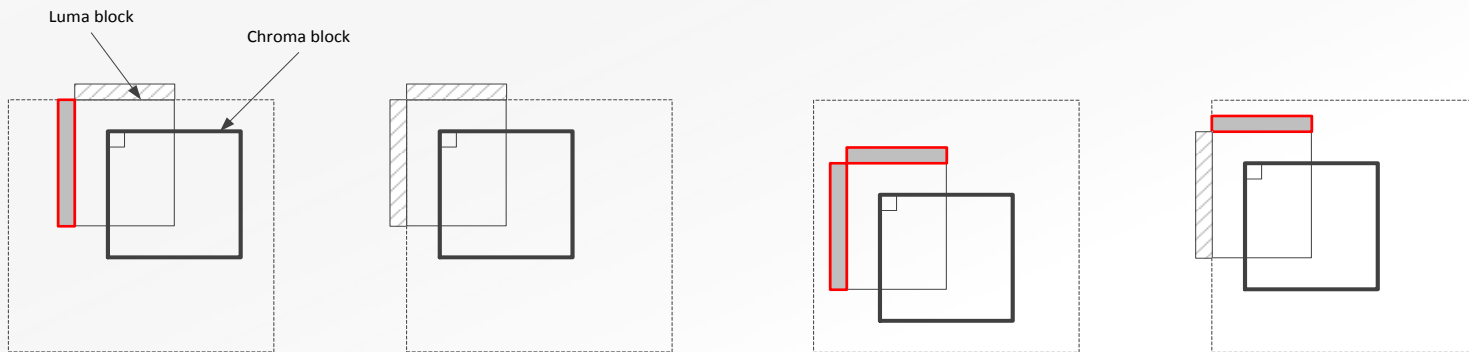
Proposal Option 2 (Preferred)

- Scaling factor derived from the **top or left** luma sample neighboring the luma block co-located with the top-left sample of the chroma block
- When no sample available, no scaling



Proposal Option 3

- Scaling factor derived from the **average value** of the luma samples neighboring the luma block co-located with the top-left sample of the chroma block
- When no sample available, no scaling



Compared to VTM4.0 with reshaper On

SDR	AI			RA		
	PsnrY	PsnrU	PsnrV	PsnrY	PsnrU	PsnrV
Option 2	0.0%	-0.0%	-0.2%	0.0%	-0.8%	-0.7%
Option 3	0.0%	0.1%	-0.1%	0.0%	-0.8%	-0.8%
Option 2 in N0220	0.1%	-0.5%	-0.6%	0.0%	-0.7%	-0.6%
Option 3 in N0220	0.0%	-0.5%	-0.5%	0.0%	-0.7%	-0.7%

HDR PQ	AI			RA		
	wPsnrY	wPsnrU	wPsnrV	wPsnrY	wPsnrU	wPsnrV
Option 2	0.5%	-3.6%	-2.2%	0.3%	-4.4%	-2.2%
Option 3	0.4%	-4.2%	-3.1%	0.3%	-4.4%	-3.0%
Option 2 in N0220	0.5%	-5.3%	-5.2%	0.3%	-5.5%	-4.9%
Option 3 in N0220	0.4%	-5.3%	-5.4%	0.3%	-5.8%	-5.2%

Compared to VTM4.0 with reshaper Off, adaptive luma dQP On

	AI					RA				
	DE100	L100	wPsnrY	wPsnrU	wPsnrV	DE100	L100	wPsnrY	wPsnrU	wPsnrV
VTM4.0 reshaping on	10.0%	-2.2%	-1.8%	10.3%	11.5%	7.7%	-1.9%	-1.8%	11.0%	12.8%
Option 2 in N0220	5.2%	-1.7%	-1.3%	3.2%	2.5%	3.7%	-1.5%	-1.4%	3.8%	5.4%

Proposal

- enabling Chroma residual scaling in Dual tree
- Preferred option (option 2): scaling factor derived from top-left sample outside the luma block collocated with the top-left sample of the chroma block

In general, better luma/chroma quality balance

In HDR case: reduces the chroma loss observed with

- VTM4.0, reshaper On, luma dQP Off vs
- VTM4.0, reshaper Off, luma dQP On

