

CE7-related: Support of signalling default and user-defined scaling matrices

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Overall Summary

It is proposed to add syntax to support signalling of default and user-defined scaling matrices on top of VTM4.0 conforming to following

- three modes for scaling matrices: OFF, DEFAULT, and USER_DEFINED
- bigger size range for the blocks (4×4 to 64×64 for luma, 2×2 to 32×32 for chroma)
- rectangular transform blocks (TBs)
- dependent quantization
- multiple transform selection (MTS)
- large transforms with zeroing-out high frequency coefficients
- intra subblock partitioning (ISP)
- intra block copy (IBC, also known as current picture referencing, CPR)
- DEFAULT scaling matrices are flat for all TB sizes, with the default value 16
- Scaling matrices shall NOT be applied for
 - TS for all TB sizes
 - secondary transform (not yet in the SW)

Obtaining QMs for Rectangular TBs

When generating a scaling matrix for rectangular TBs, two cases are considered:

1. $H > W$ - height of the rectangular matrix H is greater than width W , then scaling matrix ScalingMatrix for rectangular TB of size $W \times H$ is defined from the reference scaling matrix ScalingList of size $baseL \times baseL$ as follows:

$$\text{ScalingMatrix}(i, j) = \text{ScalingList}[\text{baseL} \cdot \text{int}\left(\frac{j}{\text{ratioH}}\right) + \text{int}\left(\frac{i \cdot \text{ratioHW}}{\text{ratioH}}\right)] \quad (1)$$

for $i = 0:W - 1, j = 0:H - 1$ and $\text{ratioH} = \frac{H}{baseL}, \text{ratioHW} = \frac{H}{W}$

$\text{int}(x)$ is modifying value of x by truncating the fractional part.

ScalingList

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63



0	4
8	12
16	20
24	28
32	36
40	44
48	52
56	60

Obtaining QMs for Rectangular TBs

When generating a scaling matrix for rectangular TBs, two cases are considered:

2. $H > W$ - height of the rectangular matrix H is less than width W , then scaling matrix ScalingMatrix for rectangular TB of size $W \times H$ is defined from the reference scaling matrix of size $baseL \times baseL$ as follows:

$$\text{ScalingMatrix}(i, j) = \text{ScalingList}[\text{baseL} \cdot \text{int}\left(\frac{j \cdot \text{ratioWH}}{\text{ratioW}}\right) + \text{int}(W)] \quad (2)$$

for $i = 0:W - 1, j = 0:H - 1$, and $\text{ratioW} = \frac{W}{baseL}, \text{ratioWH} = \frac{W}{H}$.

Here $\text{int}(x)$ is modifying value of x by truncating the fractional part.

ScalingList

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48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63



0	1	2	3	4	5	6	7
32	33	34	35	36	37	38	39

Thank you.