



MEDIATEK

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Cleanup for checking CTU row boundary location in CCLM

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Overall Summary

- In luma downsampling process of CCLM modes, one above luma line is used when the top position of the current chroma TB is at CTU row boundary
 - Check if the top position of the current chroma TB is a multiple of CTB size divided by 2
 - The condition is not valid for colour formats 4:2:2
- Proposed a bugfix to check the CTU row boundary location by
 - If the corresponding luma top position of the current chroma TB is a multiple of luma CTB size
- No BD-rate change
 - For colour formats 4:2:2, one above luma line is always used and the downsampling filter of above luma line is always $([1\ 2\ 1] + 2) \gg 2$

Detailed Results

- The simulations were conducted with 4:2:2 test sequences

Table 1. BD-rates over VTM7.0 under all intra configuration

	Y	U	V	EncTime	DecTime
EBUGraphics	0.00%	0.00%	0.00%	101%	90%
EBUHorse	0.00%	0.00%	0.00%	99%	93%
EBUKidSoccer	0.00%	0.00%	0.00%	101%	100%
EBUWaterRocksClose	0.00%	0.00%	0.00%	107%	102%
Kimono	0.00%	0.00%	0.00%	92%	100%
Seeking	0.00%	0.00%	0.00%	100%	99%
Traffic	0.00%	0.00%	0.00%	100%	98%
All	0.00%	0.00%	0.00%	101%	97%

Table 2. BD-rates over VTM7.0 under random access configuration

	Y	U	V	EncTime	DecTime
EBUGraphics	0.00%	0.00%	0.00%	100%	100%
EBUHorse	0.00%	0.00%	0.00%	100%	108%
EBUKidSoccer	0.00%	0.00%	0.00%	100%	104%
EBUWaterRocksClose	0.00%	0.00%	0.00%	100%	100%
Kimono	0.00%	0.00%	0.00%	101%	103%
Seeking	0.00%	0.00%	0.00%	100%	99%
Traffic	0.00%	0.00%	0.00%	100%	101%
All	0.00%	0.00%	0.00%	100%	102%

Proposed Spec Text Changes

8.4.5.2.13 Specification of INTRA_LT_CCLM, INTRA_L_CCLM and INTRA_T_CCLM intra prediction mode

Inputs to this process are:

- the intra prediction mode `predModeIntra`,
- a sample location (`xTbC`, `yTbC`) of the top-left sample of the current transform block relative to the top-left sample of the current picture,
- a variable `nTbW` specifying the transform block width,
- a variable `nTbH` specifying the transform block height,
- a variable `cIdx` specifying the colour component of the current block,
- chroma neighbouring samples `p[x][y]`, with $x = -1$, $y = 0..2 * nTbH - 1$ and $x = 0..2 * nTbW - 1$, $y = -1$.

Output of this process are predicted samples `predSamples[x][y]`, with $x = 0..nTbW - 1$, $y = 0..nTbH - 1$.

The current luma location (`xTbY`, `yTbY`) is derived as follows:

$$(xTbY, yTbY) = (xTbC \ll (SubWidthC - 1), yTbC \ll (SubHeightC - 1)) \quad (346)$$

...

The variable `bCTUboundary` is derived as follows:

$$bCTUboundary = (yTbC \& (1 \ll (CtbLog2SizeY - 1)) == 0) ? TRUE : FALSE. \quad (352)$$

...

CTU Row Boundary Position Check in CCLM Modes

top position of the current chroma TB

- $bCTUboundary = (yTbC \& (1 \ll (CtbLog2SizeY - 1) - 1) == 0) ? TRUE : FALSE$
- An example in 4:2:2 colour format:

