

AHG9: on number of tiles constraint

JCTVC-K0202

Minhua Zhou

(Texas Instruments Inc., USA)

Problem statement

1. In HEVC Main profile only maximum number of tiles per picture (i.e. MaxTileCols and MaxTileRows) and min tile size of 256x64 are defined
2. MaxTileCols and MaxTileRows were derived by using tile size of 384 x 192
3. The worst case tile rate (number of tiles per second) can be 4.5x of intended limit
 - Level 5.0 for example, MaxTileCols = 10 and MaxTileRows = 11
 - 4K x2K@30 => 3300 tiles/sec
 - 1080p@120 => 13200 tiles/sec
 - 720p@240 => 13500 tiles/sec (limited by 256x64 min tile size)
4. Additional constraints are needed to restrict tile rate

Proposed solution 1 (constant #tile per second)

- g) In bitstreams conforming to the Main profile, the removal time of access unit 0 shall satisfy the constraint that the number of tiles in picture 0 is less than or equal to

$$\text{Min}(\text{MaxTileCols} * \text{MaxTileRows} * \text{MaxLumaSR} / \text{MaxLumaPS} * (t_r(0) - t_{r,n}(0)) + \text{MaxTileCols} * \text{MaxTileRows} * \text{PicSizeInSamplesY} / \text{MaxLumaPS}, \text{MaxTileCols} * \text{MaxTileRows}),$$

for the value of PicSizeInSamplesY of picture 0, where MaxTileCols, MaxTileRows, MaxLumaSR and MaxLumaPS are the values specified in Table A-1 that apply to picture 0.

- g) In bitstreams conforming to the Main profile, the difference between consecutive removal time of access units n and n - 1 (with n > 0) shall satisfy the constraint that the number of tiles in picture n is less than or equal to

$$\text{Min}(\text{MaxTileCols} * \text{MaxTileRows} * \text{MaxLumaSR} / \text{MaxLumaPS} * (t_r(n) - t_r(n - 1)), \text{MaxTileCols} * \text{MaxTileRows}),$$

where MaxTileCols, MaxTileRows, MaxLumaSR and MaxLumaPS are the values specified in Table A-1 that apply to picture n.

Proposed solution 2 (constant #tile per sample)

- g) In bitstreams conforming to the Main profile, the number of tiles in picture n ($n \geq 0$) shall be less than or equal to

$$\text{MaxTileCols} * \text{MaxTileRows} * \text{PicSizeInSamplesY} / \text{MaxLumaPS}$$

for the value of PicSizeInSamplesY of picture n , where MaxTileCols , MaxTileRows and MaxLumaPS are the values specified in Table A-1.