|  |  |
| --- | --- |
| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11**  11th Meeting: Shanghai, China, October 10-19, 2012 | Document: JCTVC-K0201  M26528 |

|  |  |  |  |
| --- | --- | --- | --- |
| *Title:* | **AHG9: on number of slices constraint** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Proposal | | |
| *Author(s) or Contact(s):* | Minhua Zhou Texas Instruments Inc., USA | Tel: Email: | +1-214-480-3816 [zhou@ti.com](mailto:zhou@ti.com) |
| *Source:* | Texas Instruments Inc; | | |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Abstract

In the current Main Pofile level specification, the slice rate (number of slices per second) for a level is unbounded, because only the max number of slices per picture (MaxSlicePerPicture) constraint is defined for each level. For a same level of constraints, the worst case slice rate can go up dramatically when picture size goes down and frame-rate goes up. For example, for level 5.0 with MaxSlicePerPicture of 200 slices/picture, the slice rate is 6000 slices/sec for 4K x2K@30, 24000 slices/sec for 1080p@120 and 48000 slices/sec for 720p@240, etc. To avoid unnecessary burden on real-time decoder implementation, it is proposed to add additional constraints in section A.4.2 of the spec to make either the slice rate constant for a level, or the number of slices per luma sample constant for a level.

# CD text

in section A.4.2 (Variant 1, constant [instantaneous](http://www.google.com/search?hl=en&safe=active&biw=1011&bih=562&sa=X&ei=qQtpUI_ZHeri2AWWt4HwBg&ved=0CBoQvwUoAQ&q=instantaneous&spell=1) slice rate for a level)

This variant requires that [instantaneous](http://www.google.com/search?hl=en&safe=active&biw=1011&bih=562&sa=X&ei=qQtpUI_ZHeri2AWWt4HwBg&ved=0CBoQvwUoAQ&q=instantaneous&spell=1) slice rate (number of slices per second) be less than or equal to MaxSlicesPerPicture\*MaxLumaSR/MaxLumaPS.

**Text changes:**

replace

1. In bitstreams conforming to the Main profile, the number of slices in a picture is less than or equal to MaxSlicesPerPicture, where MaxSlicesPerPicture is specified in .

With

1. In bitstreams conforming to the Main profile, the removal time of access unit 0 shall satisfy the constraint that the number of slice in picture 0 is less than or equal to Min(MaxSlicesPerPicture\*MaxLumaSR/MaxLumaPS\*( tr( 0 ) − tr,n( 0 )) + MaxSlicesPerPicture\* PicSizeInSamplesY /MaxLumaPS, MaxSlicesPerPicture ), for the value of PicSizeInSamplesY of picture 0, where MaxSlicesPerPicture, MaxLumaSR and MaxLumaPS are the values specified in that apply to picture 0.
2. 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 slices in picture n is less than or equal to Min( MaxSlicesPerPicture\*MaxLumaSR/MaxLumaPS\*( tr( n ) − tr( n − 1 )),  MaxSlicesPerPicture ) , where MaxSlicesPerPicture, MaxLumaSR and MaxLumaPS are the values specified in that apply to picture n.

in section A.4.2 (Variant 2, constant max slices per luma sample for a level)

replace

1. In bitstreams conforming to the Main profile, the number of slices in a picture is less than or equal to MaxSlicesPerPicture, where MaxSlicesPerPicture is specified in .

with

1. In bitstreams conforming to the Main profile, the number of slices in picture n (n≥0) shall be less than or equal to *MaxSlicesPerPicture\**PicSizeInSamplesY*/MaxLumaPS* for the value of PicSizeInSamplesY of picture n, where MaxSlicesPerPicture and MaxLumaPS are vaules specified in .

# References

[1] F. Bossen, “Common test conditions and software reference configurations,” JCT-VC Document, JCTVC-J1100, Stockholm, Sweden, July 2012.

[2] [B. Bross](mailto:benjamin.bross@hhi.fraunhofer.de), [W.-J. Han](mailto:wjhan.han@samsung.com), [J.-R. Ohm](mailto:ohm@ient.rwth-aachen.de), [G. J. Sullivan](mailto:garysull@microsoft.com), [T. Wiegand](mailto:thomas.wiegand@hhi.fraunhofer.de) “High Efficiency Video Coding (HEVC) Test Model 8 (HM 8) Encoder Description” JCT-VC Document, JCTVC-J1003, Stockholm, Sweden, July 2012.

# Patent rights declaration(s)

**Texas Instruments, Inc. may have IPR relating to the technology described in this contribution and, conditioned on reciprocity, is prepared to grant licenses under reasonable and non-discriminatory terms as necessary for implementation of the resulting ITU-T Recommendation |ISO/IEC International Standard (per box 2 of the ITU-T/ITU-R/ISO/IEC patent statement and licensing declaration form).**