Title:	Field Coding and MaxDpbSize constraints
Status:	Input Document to JCT-VC
Purpose:	Proposal

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Abstract

The current draft text (JCTVC-I1003[1]) proposes a fixed number of decoded picture buffers (DPB) as a simplification of the picture-size dependent definition in AVC. This value is currently defined to be identical for all levels. In the presence of field coding, which halves the picture height and doubles the picture rate, it may be desirable to increase the limit. A method is proposed by which to allow double the number of half-height pictures without increasing the DPB size or permitting a completely variable number of pictures.

Description

The concept of a half-height picture is relatively simple: a half-height picture is half the height of a normal picture. The DPB is defined to be limited to n full-height (MaxLumaFS) pictures. To enable twice the number of half-height pictures to be stored in the same sized buffer, we define the DPB to be limited to:

- either n full-height pictures,
- or n half-height picture pairs that do not exceed the size of n full-height pictures.

Or more simply, we rename the old definition of MaxDpbSize to MaxDpbSizeFS and define:

$$\text{MaxDpbSize} = \left\lfloor 3 - 2 * \frac{\text{PicSizeLuma}}{\text{MaxLumaFS}} \right\rfloor * \text{MaxDpbSizeFS}$$

Table 1 illustrates the impact on level 4 for HD sequences.

Table 1: Impact of revised MaxDpbSize definition

MaxLumaFS	Width	Height	LumaFS	MaxDpbSizeFS	MaxDpbSize
2,088,960	1920	1088	2,088,960	6	6
2,088,960	1920	544	1,044,480	6	12
2,088,960	1280	720	921,600	6	12

Draft text

Figure 1 proposes a modification to the definition of MaxDpbSize to achieve the aforementioned effect.

IPR declaration

To the best of our knowledge, the British Broadcasting Corporation does not have current or pending patent rights relating to the technology described in this contribution. If it has, conditioned on reciprocity, it 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).

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Figure 1: Proposed modification to draft text

A.4 Levels
A.4.1 General
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Bitstreams conforming to a profile at a specified level shall obey the following constraints:

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   f) sps_max_dec_pic_buffering[sps_max_temporal_layers_minus1] <= MaxDpbSize, where $MaxDpbSize = Floor(3 - 2 * PicSizeLuma/MaxLumaFS) * MaxDpbSizeFS$, and MaxDpbSizeFS is specified in Table A-10-1.

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Table A-10-1 – Level limits

Level	Max luma sample rate MaxLumaPR (samples/sec)	Max luma picture size MaxLumaFS (samples)	Max bit rate MaxBR (1000 bits/s)	Min Compression Ratio MinCR	MaxDpbSizeFS (full-size picture storage buffers)	Max CPB size (1000 bits)
1	552,960	36,864	128	2	6	350
…	…	…	…	…	…	…

References

[1] B. Bross, W.-J. Han, G. J. Sullivan, J.-R. Ohm, and T. Wiegand, "High Efficiency Video Coding (HEVC) text specification draft 7," document JCTVC-I1003, JCT-VC, Geneva, Switzerland, Apr. 2012.