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| *Title:* | **On parallel processing schemes** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Proposal | | |
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# Abstract

Lots of concerns regarding different possible combinations of tiles, wavefront parallel processing (WPP), and entropy slices were reportedly heard during the previous JCT-VC meeting. In response to those concerns, this document proposes to disallow the combinations of more than one of tiles, wavefront parallel processing (WPP), and entropy slices.

WPP is simplified and considered as one mode of tiles. Entropy slices associated with a particular regular slice are contained in one NAL unit instead of their own individual NAL units. A unified entry point byte offset signaling is used for all the three parallel processing schemes. Byte alignment bits padding is based on the first CU address in a partition (tile or entropy slice).

The required text changes are included in an attachment of this document, based on HEVC WD5d2 in JCTVC-G1103\_d2.

More discussions on the proposed changes specific for entropy slices are also found in JCTVC-H0515, and more discussions on the proposed changes specific for WPP are also found in JCTVC-H0517.

# Summary of the proposals

1. On combinations of tiles, WPP and entropy slices: no combination of two or more of the three allowed, only one can applied in a coded video sequence
2. On WPP and tiles
   1. There are three modes of tiles
      1. Mode 0 – only one tile in a picture
      2. Mode 1 – the uniformly-spaced tile mode, wherein column boundaries and likewise row boundaries are distributed uniformly across a picture
      3. Mode 2 – the non-uniformly-spaced tile mode, wherein column boundaries and likewise row boundaries may not be distributed uniformly across the picture but signaled explicitly using the syntax elements column\_width[ i ] and row\_height[ i ]
      4. Mode 3 – the wavefront tile mode, wherein each LCU row forms a tile, a specific memorization process is invoked after decoding 2 LCUs of a line of LCUs in a picture, a specific synchronization process is invoked before decoding the first LCU of a line of LCUs in a picture, and a specific CABAC state re-initialization process of internal variables is invoked when the right vertical picture boundary is reached
   2. Inside a coded slice NAL unit, tile boundaries are always byte-aligned, and the byte offset for each tile (except for the first one) is signaled in the slice header
   3. Some simplifications of WPP (i.e., tile mode 3 in this document) are proposed in JCTVC-H0517
      1. Bitstream reordering, which breaks bitstream causality, is disallowed
      2. Fixed entropy synchronization point
      3. Mandatory CABAC flushing after each LCU row
      4. Mandatory byte alignment after each LCU row
3. On entropy slices
   1. Multiple entropy slices associated with one “parent” slice are encapsulated in one coded slice NAL unit (this proposal piece is included in JCTVC-H0515)
   2. Inside a coded slice NAL unit, entropy slice boundaries are always byte-aligned, and the byte offset for each entropy slice (except for the first one) is signaled in the slice header, using the same syntax as for tiles (this proposal piece is included in JCTVC-H0515)
   3. Byte alignment in the slice\_data() syntax structure is based on the starting CU address signalled for each entropy slice (except for the first one) in the slice header (this proposal piece is not included in JCTVC-H0515)

# Patent rights declaration(s)

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