

The background is a solid red color. Overlaid on this are various faint, semi-transparent white and light red graphics. On the left side, there are icons resembling a code editor with a '</>' symbol, a waveform graph, and some binary code (0s and 1s). In the center and right, there are complex network diagrams with nodes (small circles) connected by lines, and some circular patterns that look like radar or target sights. The overall aesthetic is high-tech and digital.

# AHG9: Signalling of constant parameter values

**JVET-Q0482**

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## Signalling constant parameter values

- Motivation was to avoid redundant slice header parameters, especially for pictures with many slices
- Concept was adopted prior to adoption of picture header
  - Parameters can now be sent once per picture independent of #slices
- Constant parameter feature error prone/easy to use incorrectly
  - JVET-P0152, JVET Bug #575, JVET Bug #691
- Unclear PPS signalling needed with PH signalling available
  - Cleaner design
  - Eliminate testing/verification with different combinations
  - Avoid errors when used improperly

## Background

- constant\_slice\_header\_params\_enabled\_flag in the PPS signals presence or absence of 7 subsequent syntax elements

|                                                          | Descriptor |
|----------------------------------------------------------|------------|
| pic_parameter_set_rbsp() {                               |            |
| ...                                                      |            |
| constant_slice_header_params_enabled_flag                | u(1)       |
| if( constant_slice_header_params_enabled_flag ) {        |            |
| pps_dep_quant_enabled_idc                                | u(2)       |
| for( i = 0; i < 2; i++ )                                 |            |
| pps_ref_pic_list_sps_idc[ i ]                            | u(2)       |
| pps_mvd_l1_zero_idc                                      | u(2)       |
| pps_collocated_from_l0_idc                               | u(2)       |
| pps_six_minus_max_num_merge_cand_plus1                   | ue(v)      |
| pps_max_num_merge_cand_minus_max_num_triangle_cand_plus1 | ue(v)      |
| }                                                        |            |
| ...                                                      |            |
| }                                                        |            |

## constant\_slice\_header\_params\_enabled\_flag

- Using this one bit flag only saves 11 bits per PPS (compared to explicitly transmitting 0 for the other syntax elements)
- Propose removal as this does not appear significant enough to include this flag in the standard

|                                                          | Descriptor | Bits when coding syntax element to be 0 |
|----------------------------------------------------------|------------|-----------------------------------------|
| pps_dep_quant_enabled_idc                                | u(2)       | 2                                       |
| pps_ref_pic_list_sps_idc[ 0 ]                            | u(2)       | 2                                       |
| pps_ref_pic_list_sps_idc[ 1 ]                            | u(2)       | 2                                       |
| pps_mvd_l1_zero_idc                                      | u(2)       | 2                                       |
| pps_collocated_from_l0_idc                               | u(2)       | 2                                       |
| pps_six_minus_max_num_merge_cand_plus1                   | ue(v)      | 1                                       |
| pps_max_num_merge_cand_minus_max_num_triangle_cand_plus1 | ue(v)      | 1                                       |
| TOTAL                                                    |            | 12                                      |

## Dependent PPS syntax elements

- These signal the presence of absence of related syntax elements in the picture header and/or slice header
- Contend limited benefit to have a PPS flag and a PH flag and that a PH flag seems sufficient

|                                                          | Presence of<br>PH Syntax Element                   | Presence of<br>SH Syntax Element |
|----------------------------------------------------------|----------------------------------------------------|----------------------------------|
| pps_dep_quant_enabled_idc                                | pic_dep_quant_enabled_flag                         |                                  |
| pps_ref_pic_list_sps_idc[ i ]                            | pic_rpl_sps_flag[ i ]                              | slice_rpl_sps_flag[ i ]          |
| pps_mvd_l1_zero_idc                                      | mvd_l1_zero_flag                                   |                                  |
| pps_collocated_from_l0_idc                               |                                                    | collocated_from_l0_flag          |
| pps_six_minus_max_num_merge_cand_plus1                   | pic_six_minus_max_num_merge_cand                   |                                  |
| pps_max_num_merge_cand_minus_max_num_triangle_cand_plus1 | pic_max_num_merge_cand_minus_max_num_triangle_cand |                                  |

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## Proposal

- Remove `constant_slice_header_params_enabled_flag` and the 7 dependent syntax elements from the PPS
  - Create a `pic_collocated_from_l0_idc` syntax element in the picture header that implements the current functionality of the `pps_collocated_from_l0_idc`
- This provides a clean and consistent design where constant slice header parameters are controlled in the picture header



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