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| **Joint Collaborative Team on Video Coding (JCT-VC)**  **of ITU-T SG16 WP3 and ISO/IEC JTC1/SC29/WG11**  6th Meeting: Torino, IT, 14-22 July, 2011 | Document: JCTVC-F015 |

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| *Title:* | **JCT-VC AHG report: High-level syntax (AHG 15)** | | |
| *Status:* | Input Document to JCT-VC | | |
| *Purpose:* | Report | | |
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| *Source:* | High-level syntax AHG | | |

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# Abstract

This report summarizes the activities of the high-level syntax ad hoc group between the 5th JCT-VC meeting held in Geneva in March 2011 and the current meeting in Torino. The ad hoc group recommends to review the related input documents according to the categorization provided in this report, and within each topic or sub-topic, the documents are reviewed in the order listed. The ad hoc group further recommends (with a brief suggested plan) that an action is taken during this JCT-VC meeting towards fixing the high-level syntax mismatches between the WD and the HM.

# Mandates

* Study NAL unit header, sequence parameter set, picture parameter set, proposed additional types of parameter sets, and slice header syntax designs
* Study and identify needs for SEI messages and VUI
* Study possible improvements to the reference picture list construction processes
* Study possible simplifications and improvements to reference picture marking process (e.g., the need of the processes for generating and handling of "non-existing" pictures)
* Study the hypothetical reference decoder behaviour
* Assist in software development and text drafting for the high-level syntax in the HEVC design

# Reflector activity and analyses of WD and HM mismatches

A discussion on high-level syntax mismatches between the WD and the HM was initiated by Frank Bossen, and participated by a number of JCT-VC experts. There was no other activity on the e-mail reflector related to high-level syntax.

Analyses of high-level syntax mismatches between the WD and the HM can be found in the following documents (they are partly overlapping):

* JCTVC-F004
* JCTVC-F523
* JCTVC-F714

The following experts kindly offered help for software implementations to fix the mismatches – these offers are greatly appreciated:

* Virginie Drugeon (Panasonic)
* Keiichi Chono (NEC)
* Ying Chen (Qualcomm)
* Qiu Shen (Huawei)

# Related contributions

The following high-level syntax related contributions have been submitted to this JCT-VC meeting, listed according to the topics.

**On NAL unit header syntax and semantics:**

CDR picture

* JCTVC-F381, “Clean decoding refresh definition and decoding process”, TK Tan, A. Fujibayashi (NTT DOCOMO)
* JCTVC-F464, “On CDR picture”, Y.-K. Wang (Huawei), M. M. Hannuksela (Nokia), Y. Chen (Qualcomm)
* JCTVC-F604, “Detection of CDR for random access”, Y. Park, K. P. Choi, C. Kim (Samsung)

Other NAL unit header topics

* JCTVC-F201, “High-level syntax: temporal information decoding refresh”, B. Li (USTC), J. Xu (Microsoft), H. Li (USTC)
* JCTVC-F463, “On NAL unit header”, Y.-K. Wang (Huawei)
* JCTVC-F491, “High level syntax for scalability support in HEVC”, T. Rusert, R. Sjöberg, P. Fröjdh, Z. Wu (Ericsson)

**On parameter sets and VUI syntax and semantics:**

Tiles

* JCTVC-F335, “Tiles”, A. Fuldseth (Cisco), M. Horowitz, S. Xu (eBrisk), A. Segall (Sharp), M. Zhou (TI)
* JCTVC-F140, “Support of very low delay coding in Tile”, K. Kazui, S. Shimada, J. Koyama, A. Nakagawa (Fujitsu)

Other parameter sets and VUI topics

* JCTVC-F187, “Comments on slice common information sharing”, M. Li, P. Wu (ZTE)
* JCTVC-F503, “Results on slice header modifications”, N. Ouedraogo, P. Onno (Canon)
* JCTVC-F523, “Improvements of SPS syntax”, V. Drugeon, T. Wedi (Panasonic)
* JCTVC-F289, “On VUI syntax parameters”, M. Haque, A. Tabatabai, T. Suzuki (Sony)
* JCTVC-F291, “On picture orientation information”, D. Hong, J. Boyce, S. Wenger (Vidyo)
* JCTVC-F541, “Syntax to express a constraint on reordering latency”, G. J. Sullivan (Microsoft)

**On slice header syntax and semantics:**

* JCTVC-F377, “Arithmetic coding in high level syntax”, T. Suzuki (Sony)
* JCTVC-F131, "Modifications to slice header termination for low delay encoding", V. Sze, M. Budagavi, A. Osamoto (TI)
* JCTVC-F174, "Signaling of Max and Min QP in slice", K. Sugimoto, S. Sekiguchi (Mitsubishi)
* JCTVC-F469, “Syntax improvement for fine granularity slices”, C. Kim, Y, Park (Samsung)

**On reference picture list construction:**

* JCTVC-F433, “Reference Lists For Low Delay Settings”, C. S. Lim, S. M. T. Naing (Panasonic)
* JCTVC-F460, “Getting rid of non-existing pictures”, Q. Shen, Y.-K. Wang (Huawei)
* JCTVC-F461, “Reference picture loss/error detection”, Y.-K. Wang, Q. Shen (Huawei)
* JCTVC-F549, “Coding with a single, unified reference picture list”, David Flynn, Nikola Šprljan, Marta Mrak (BBC)
* JCTVC-F573, “The Construction of Combined List for HEVC”, S. Fang, Y. Yu (Motorola)

**On reference picture marking:**

* JCTVC-F462, “On reference picture marking”, Y.-K. Wang (Huawei), Y. Chen (Qualcomm)
* JCTVC-F546, “Sliding Window Improvement for Temporal Scalability”, Y. Chen, P. Chen, M. Karczewicz (Qualcomm)
* JCTVC-F493, “Absolute signaling of reference pictures”, R. Sjöberg, J. Samuelsson (Ericsson)

**On mismatches between WD and HM:**

* JCTVC-F714, “High-level syntax mismatches between WD and HM”, Q. Shen, Y.-K. Wang (Huawei)

# Recommendations

The high-level syntax ad hoc group makes the following recommendations:

* It is recommended that the related documents are reviewed, according to the above categorization, and within each topic or sub-topic, the documents are reviewed in the order listed.
* It is recommended that, during this JCT-VC meeting, the following actions are taken towards fixing the high-level syntax mismatches between the WD and the HM:
  + To draft one integrated document that includes all identified issues, taking to account the related inputs in JCTVC-F004, JCTVC-F523, and JCTVC-F714, preferably through a break-out group meeting;
  + To formulate a plan to address all the identified issues, preferably with HM coordinators, including allocation of implementation tasks and assignment of the tasks to individuals, taking into account the current list of volunteers.