**3GPP TSG SA WG4 #114e S4-210743**

**E-meeting, 18th – 29th May 2021**

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| --- |
| *CR-Form-v12.0* |
| **PSEUDO CHANGE REQUEST** |
|  |
|  | **26**.**955** | **CR** |  | **rev** |  | **Current version:** | **1.1.3** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network |  |

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|  |
| ***Title:***  | **Suggestion for codecs versioning in TR** |
|  |  |
| ***Source to WG:*** | Qualcomm Incoroporated |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** | 12/05/2021 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |   |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** |  |
|  |  |
| ***Summary of change:*** |  |
|  |  |
| ***Consequences if not approved:*** |  |
|  |  |
| ***Clauses affected:*** |  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

**===== CHANGE =====**

### 5.4.3 H.265/HEVC

For H.265/HEVC generated anchor bitstreams, H.265/MPEG-H HEVC reference software (HEVC Test Model) has been used.

HEVC reference software implementing H.265 (HEVC) Main Profile and H.265 (HEVC) Main-10 Profile called HM and and its versions can be downloaded from in the repository <https://vcgit.hhi.fraunhofer.de/jct-vc/HM-/tags/>.

HEVC reference software implementing H.265 (HEVC) Screen-Extended Main Profile is called SCM (Screen Content Coding Model) software and is available from [https://vcgit.hhi.fraunhofer.de/jct-vc/HM/-/tags/HM-16.21+SCM-8.8](https://vcgit.hhi.fraunhofer.de/jct-vc/HM/-/tags/HM-16.21%2BSCM-8.8).

Anchor bitstreams for Scenarios 1 and 2 have been produced with HM16.23. Anchor bitstreams for Scenarios 3, 4 and 5 have been produced with HM16.22 and SCM8.8.

**===== CHANGE =====**

##### 6.2.8.3.1 Overview

Table 6.2.8.3.1-1 provides an overview of the H.265/HEVC anchor tuples. Keys are identified to refer to the anchors in the context of the scenario.

Table 6.2.8.3.1-1 Anchor Tuple generation with H.265/HEVC for Full HD Scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Key | Clause | Reference Sequence | Reference Encoder | Configuration | Variations | Anchor Key |
| S1-A1-265 | 6.2.8.3.2 | S1-R1 | HM16.23 | HM-0x | QP = [22, 25, 28, 31, 34, 37] | S1-A1-265-<QP> |

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##### 6.3.8.3.1 Overview

Table 6.3.8.3.1-1 provides an overview of the H.265/HEVC anchor tuples. Keys are identified to refer to the anchors in the context of the scenario.

First, the legacy codec HEVC is tested to assess the relevance of what’s already in the 3GPP specification for this particular 4K-TV scenario. For this first test, two HEVC implementations are compared (x265 and reference software HM), according to encoding constraints derived from Table 6.3-2. For x265, encoding presets are selected to cover the desired encoding complexity contexts, for live and offline encoding. The tested rate-control modes are CBR and capped-VBR to fit with the possible delivery methods (single or multiple services inside a resource). In this first test, the HEVC reference implementation HM is evaluated with CBR rate-control on, at coding-tree-unit (CTU) granularity. In addition, fixed QP encoding is also carried out to provide additional anchor points aligned with formal MPEG/JVET common test conditions (potentially for future comparison with other codecs, if needed).

Table 6.3.8.3.1-1 Anchor Tuple generation with H.265/HEVC for 4K-TV Scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Key | Clause | Reference Sequence | Reference Encoder | Configuration | Variations | Anchor Key |
| S2-A1-265 | 6.3.8.3.2 | S2-R1 | HM16.23 | HM-0x | QP = [22, 25, 28, 31, 34, 37] | S1-A1-265-<QP> |

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##### 6.3.8.3.2 HM-0x

As reference software for HEVC, the following is used

- HM16.23 https://hevc.hhi.fraunhofer.de/svn/svn\_HEVCSoftware/tags/HM-16.23/

Configurations:

- SDR: HM\_UHD\_SDR\_cfg\_encoder\_randomaccess\_main10

- HDR: HM\_UHD\_HDR\_encoder\_randomaccess\_main10\_HDR\_YCbCr.cfg

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### 8.2.3 Test Configurations and Results for VVC

#### 8.2.3.1 Introduction

This clause provides test setups, configurations and results for VVC.

The reference software for H.266/MPEG-I VVC is called VTM (VVC Test Model). The VTM software is maintained and can be downloaded from the repository: <https://vcgit.hhi.fraunhofer.de/jvet/VVCSoftware_VTM>.

The VVC implementation provided for the tests depends on the scenario and is documented individually for each scenario.

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#### 8.2.3.4 Scenario 3: Screen Content Scenario

##### 8.2.3.4.1 Overview

Table 8.2.3.4.1-1 provides an overview of the H.266/VVC test tuples provided for this scenario. For provided bitstreams, reference H.266/VVC software implementation *VTM11.0* and corresponding encoder configuration have been used. Source code and utilized configuration files are available here: <https://vcgit.hhi.fraunhofer.de/jvet/VVCSoftware_VTM/-/releases/VTM-11.0>

The details are also provided here: <https://dash-large-files.akamaized.net/WAVE/3GPP/5GVideo/Bitstreams/Scenario-3-Screen/VTM/streams.csv>.

Table 8.2.3.4.1-1 Test Tuple generation with H.266/VVC for Screen Content Scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Key | Clause | Reference Sequence | Reference Encoder | Configuration | Variations | Anchor Key |
| S3-T01-VTM | 8.2.3.4.2.2 | S3-R01 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T01-VTM-<QP> |
| S3-T02-VTM | 8.2.3.4.2.2 | S3-R02 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T02-VTM-<QP> |
| S3-T03-VTM | 8.2.3.4.2.2 | S3-R03 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T03-VTM-<QP> |
| S3-T04-VTM | 8.2.3.4.2.2 | S3-R04 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T04-VTM-<QP> |
| S3-T05-VTM | 8.2.3.4.2.2 | S3-R05 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T05-VTM-<QP> |
| S3-T06-VTM | 8.2.3.4.2.2 | S3-R06 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T06-VTM-<QP> |
| S3-T07-VTM | 8.2.3.4.2.2 | S3-R07 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T07-VTM-<QP> |
| S3-T08-VTM | 8.2.3.4.2.2 | S3-R08 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T08-VTM-<QP> |
| S3-T09-VTM | 8.2.3.4.2.2 | S3-R09 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T09-VTM-<QP> |
| S3-T10-VTM | 8.2.3.4.2.2 | S3-R10 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T10-VTM-<QP> |
| S3-T11-VTM | 8.2.3.4.2.2 | S3-R11 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T11-VTM-<QP> |
| S3-T12-VTM | 8.2.3.4.2.2 | S3-R12 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T12-VTM-<QP> |
| S3-T13-VTM | 8.2.3.4.2.2 | S3-R13 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T13-VTM-<QP> |
| S3-T14-VTM | 8.2.3.4.2.2 | S3-R14 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T14-VTM-<QP> |
| S3-T15-VTM | 8.2.3.4.2.2 | S3-R15 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T15-VTM-<QP> |
| S3-T16-VTM | 8.2.3.4.2.2 | S3-R16 | VTM11.0 | S3-VTM-01 | QP=[22, 27, 32, 37, 42] | S3-T16-VTM-<QP> |
| S3-T17-VTM | 8.2.3.4.2.3 | S3-R01 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T17-VTM-<QP> |
| S3-T18-VTM | 8.2.3.4.2.3 | S3-R02 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T18-VTM-<QP> |
| S3-T19-VTM | 8.2.3.4.2.3 | S3-R03 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T19-VTM-<QP> |
| S3-T20-VTM | 8.2.3.4.2.3 | S3-R04 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T20-VTM-<QP> |
| S3-T21-VTM | 8.2.3.4.2.3 | S3-R05 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T21-VTM-<QP> |
| S3-T22-VTM | 8.2.3.4.2.3 | S3-R06 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T22-VTM-<QP> |
| S3-T23-VTM | 8.2.3.4.2.3 | S3-R07 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T23-VTM-<QP> |
| S3-T24-VTM | 8.2.3.4.2.3 | S3-R08 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T24-VTM-<QP> |
| S3-T25-VTM | 8.2.3.4.2.3 | S3-R09 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T25-VTM-<QP> |
| S3-T26-VTM | 8.2.3.4.2.3 | S3-R10 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T26-VTM-<QP> |
| S3-T27-VTM | 8.2.3.4.2.3 | S3-R11 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T27-VTM-<QP> |
| S3-T28-VTM | 8.2.3.4.2.3 | S3-R12 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T28-VTM-<QP> |
| S3-T29-VTM | 8.2.3.4.2.3 | S3-R13 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T29-VTM-<QP> |
| S3-T30-VTM | 8.2.3.4.2.3 | S3-R14 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T30-VTM-<QP> |
| S3-T31-VTM | 8.2.3.4.2.3 | S3-R15 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T31-VTM-<QP> |
| S3-T32-VTM | 8.2.3.4.2.3 | S3-R16 | VTM11.0 | S3-VTM-02 | QP=[22, 27, 32, 37, 42] | S3-T32-VTM-<QP> |

##### 8.2.3.4.2 Test Model and Configurations

###### 8.2.3.4.2.1 Common Parameters

To generate the anchor bitstreams, the following is applied:

* VTM Main 10 in low delay P configuration is used with screen content tools enabled.
* InternalBitDepth is 10 # codec operating bit-depth where all sequences (including 8 bit sequences) are coded with an internal bitdeph of 10 in accordance with [44] and metrics are calculated in 10 bits.
* Each source sequence is encoded with the following parameters: QP: [22, 27, 32, 37, 42]

###### 8.2.3.4.2.2 S3-VTM-01: Main 10 Profile with no fixed Intra

Each source sequence is encoded with the following configurations:

- The common parameters defined in clause 8.2.3.4.2.1.

- IntraPeriod with no fix interval

- GOPSize is equal to 8. Each P picture refers to up to 4 preceding pictures in display order

The detailed settings are defined in the attached configuration file s3-vtm-01.cfg.

###### 8.2.3.4.2.3 S3-VTM-02: Main 10 Profile with fixed Intra every second

Each source sequence is encoded with the following configurations:

- The common parameters defined in clause 8.2.3.4.2.1.

- IntraPeriod such that 1 second is achieved

- DecodingRefreshType: (2) IDR

- IntraQPOffset and QPoffsets are set equal to 0

- Each P picture refers to immediately preceding pictures in display order.

The detailed settings are defined in the attached configuration file s3-vtm-02.cfg.

##### 8.2.3.4.3 Test Results

VVC test streams are provided according to the key system here:

* https://dash-large-files.akamaized.net/WAVE/3GPP/5GVideo/Bitstreams/Scenario-3-Screen/VTM/

VVC test metrics are provided with the appropriate keys as defined in Table 8.2.3.4.1-1

* in the attached csv files
* https://dash-large-files.akamaized.net/WAVE/3GPP/5GVideo/Bitstreams/Scenario-3-Screen/VTM/Metrics/

Editor’s Note:

* Summary tables will be included.
* Please cross-check of the results latest until next SA4#113e meeting

**===== CHANGE =====**

#### 8.2.3.6 Scenario 5: Online Gaming

##### 8.2.3.6.1 Overview

Table 8.2.3.6.1-1 provides an overview of the H.266/VVC test tuples provided for this scenario. For provided bitstreams, reference H.266/VVC software implementation *VTM11.0* and corresponding encoder configuration have been used. Source code and utilized configuration files are available here: <https://vcgit.hhi.fraunhofer.de/jvet/VVCSoftware_VTM/-/releases/VTM-11.0>

The details are also provided here: https://dash-large-files.akamaized.net/WAVE/3GPP/5GVideo/Bitstreams/Scenario-5-Gaming/VTM/streams.csv.

Table 8.2.3.6.1-1 Test Tuple generation with H.266/VVC for Online Gaming Scenario

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Key | Clause | Reference Sequence | Reference Encoder | Configuration | Variations | Anchor Key |
| S5-A01-VTM | 8.2.3.6.2.2 | S5-R01 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A01-VTM-<QP> |
| S5-A02-VTM | 8.2.3.6.2.2 | S5-R02 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A02-VTM-<QP> |
| S5-A03-VTM | 8.2.3.6.2.2 | S5-R03 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A03-VTM-<QP> |
| S5-A04-VTM | 8.2.3.6.2.2 | S5-R04 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A04-VTM-<QP> |
| S5-A05-VTM | 8.2.3.6.2.2 | S5-R05 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A05-VTM-<QP> |
| S5-A06-VTM | 8.2.3.6.2.2 | S5-R06 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A06-VTM-<QP> |
| S5-A07-VTM | 8.2.3.6.2.2 | S5-R07 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A07-VTM-<QP> |
| S5-A08-VTM | 8.2.3.6.2.2 | S5-R08 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A08-VTM-<QP> |
| S5-A09-VTM | 8.2.3.6.2.2 | S5-R09 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A09-VTM-<QP> |
| S5-A10-VTM | 8.2.3.6.2.2 | S5-R10 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A10-VTM-<QP> |
| S5-A11-VTM | 8.2.3.6.2.2 | S5-R11 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A11-VTM-<QP> |
| S5-A12-VTM | 8.2.3.6.2.2 | S5-R12 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A12-VTM-<QP> |
| S5-A13-VTM | 8.2.3.6.2.2 | S5-R13 | VTM11.0 | S5-VTM-01 | QP=[22, 27, 32, 37] | S5-A13-VTM-<QP> |
| S5-A14-VTM | 8.2.3.6.2.3 | S5-R01 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A14-VTM-<QP> |
| S5-A15-VTM | 8.2.3.6.2.3 | S5-R02 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A15-VTM-<QP> |
| S5-A16-VTM | 8.2.3.6.2.3 | S5-R03 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A16-VTM-<QP> |
| S5-A17-VTM | 8.2.3.6.2.3 | S5-R04 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A17-VTM-<QP> |
| S5-A18-VTM | 8.2.3.6.2.3 | S5-R05 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A18-VTM-<QP> |
| S5-A19-VTM | 8.2.3.6.2.3 | S5-R06 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A19-VTM-<QP> |
| S5-A20-VTM | 8.2.3.6.2.3 | S5-R07 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A20-VTM-<QP> |
| S5-A21-VTM | 8.2.3.6.2.3 | S5-R08 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A21-VTM-<QP> |
| S5-A22-VTM | 8.2.3.6.2.3 | S5-R09 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A22-VTM-<QP> |
| S5-A23-VTM | 8.2.3.6.2.3 | S5-R10 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A23-VTM-<QP> |
| S5-A24-VTM | 8.2.3.6.2.3 | S5-R11 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A24-VTM-<QP> |
| S5-A25-VTM | 8.2.3.6.2.3 | S5-R12 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A25-VTM-<QP> |
| S5-A26-VTM | 8.2.3.6.2.3 | S5-R13 | VTM11.0 | S5-VTM-02 | QP=[22, 27, 32, 37] | S5-A26-VTM-<QP> |

##### 8.2.3.6.2 Test Model and Configurations

###### 8.2.3.6.2.1 Common Parameters

To generate the anchor bitstreams, the following is applied:

* VTM Main 10 in low delay B configuration is used with screen content tools enabled. In addition, to enable screen content tools, the following settings are set to 1: IBC, HashME, BDPCM.
* InternalBitDepth is 10 # codec operating bit-depth where all sequences (including 8 bit sequences) are coded with an internal bitdeph of 10 in accordance with [44] and metrics are calculated in 10 bits.
* Each source sequence is encoded with the following parameters: QP: [22, 27, 32, 37]

###### 8.2.3.6.2.2 VTM-03: Main 10 Profile with no fixed Intra

Each source sequence is encoded with the following configurations:

- The common parameters defined in clause 8.2.3.6.2.1.

- IntraPeriod with no fix interval

- GOPSize is equal to 8. Each B picture refers to up to 4 preceding pictures in display order

The detailed settings are defined in the attached configuration file s5-vtm-01.cfg.

###### 8.2.3.6.2.3 VTM-04: Main 10 Profile with fixed Intra every second

Each source sequence is encoded with the following configurations:

- The common parameters defined in clause 8.2.3.6.2.1.

- IntraPeriod such that 1 second is achieved

- DecodingRefreshType: (2) IDR

- IntraQPOffset and QPoffsets are set equal to 0

- Each B picture refers to immediately preceding pictures in display order.

The detailed settings are defined in the attached configuration file s5-vtm-02.cfg.

##### 8.2.3.6.3 Test Results

VVC test streams are provided according to the key system here:

* https://dash-large-files.akamaized.net/WAVE/3GPP/5GVideo/Bitstreams/Scenario-5-Gaming/VTM/

VVC test metrics are provided with the appropriate keys as defined in Table 8.2.3.6.1-1

* in the attached csv files
* https://dash-large-files.akamaized.net/WAVE/3GPP/5GVideo/Bitstreams/Scenario-5-Gaming/VTM/Metrics/

Editor’s Note:

* Summary tables will be included.
* Please cross-check of the results latest until next SA4#113e meeting

**===== CHANGE =====**

### 8.3.3 Test Configurations and Results for EVC

#### 8.3.3.1 Introduction

This clause provides test setups, configurations and results for EVC.

The reference software for MPEG-5 EVC is called is called ETM (EVC Test Model). The ETM software is maintained and can be downloaded from the repository: [http://mpegx.int-evry.fr/software/MPEG/Video/EVC/ETM. The ETM7.3](http://mpegx.int-evry.fr/software/MPEG/Video/EVC/ETM.%20The%20ETM7.3) version version of the software is also available from ISO website: <https://www.iso.org/standard/81633.html>

The EVC implementation provided for the tests depends on the scenario and is documented individually for each case.