ISO/IEC JTC 1/SC 29/WG 03 N0658

**ISO/IEC JTC 1/SC 29/WG 03  
MPEG Systems   
Convenorship: KATS (Korea, Republic of)**

**Document type:** Output Document

**Title:** WD of ISO/IEC 23001-11 AMD 1 Energy-efficient media consumption (green metadata) for EVC

**Status:** Approved

**Date of document:** 2022-08-02

**Source:** ISO/IEC JTC 1/SC 29/WG 03

**No. of pages:** 1 (with cover page)

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**Committee URL:** <https://isotc.iso.org/livelink/livelink/open/jtc1sc29wg3>

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**ISO/IEC JTC 1/SC 29/WG 03 MPEG SYSTEMS**

**ISO/IEC JTC 1/SC 29/WG 03 N0658**

**August 2022, Virtual**

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| **Status** | **Approved** |
| **Serial Number** | **21787** |

**X. Syntax and semantics for complexity metrics**

**X.1 Overview**

As shown in Figure 1, EVC baseline profile is quite a simple codec in terms of structure and the tools supported. So, the proposed complexity metrics has been designed to be simple and easy to parse and understand.

Even though one NAL unit contains one slice, which is actually a picture, proposed syntax can separately indicate complexity metrics for slice and NAL unit to support the use case NAL units are delivered in a different order than decoding order. In addition, this period type definition could be sued for EVC main profile later.

**X.2 EVC baseline profile CM syntax**

The syntax for the EVC baseline profile CMs is as follows:

|  |  |
| --- | --- |
|  | **Descriptor** |
| **period\_type** | u(8) |
| if (period\_type = = 0 || period\_type == 2 || period\_type == 4) { |  |
| **num\_non\_zero\_4\_cus** | u(16) |
| **num\_non\_zero\_8\_cus** | u(16) |
| **num\_non\_zero\_16\_cus** | u(16) |
| **num\_non\_zero\_32\_cus** | u(16) |
| **num\_non\_zero\_64\_cus** | u(16) |
| **portion\_fractional\_prediction\_sample** | u(8) |
| } else if (period\_type = = 1 || period\_type == 3 || period\_type == 5) { |  |
| **num\_count** | u(16) |
| for (t=0; t<num\_count; t++ ) { |  |
| **num\_non\_zero\_4\_cus [t]** | u(16) |
| **num \_non\_zero\_8\_cus [t]** | u(16) |
| **num \_non\_zero\_16\_cus [t]** | u(16) |
| **num \_non\_zero\_32\_cus [t]** | u(16) |
| **num \_non\_zero\_64\_cus [t]** | u(16) |
| **portion\_fractional\_prediction\_sample [t]** | u(8) |
| } |  |
| } |  |

**X.3 EVC baseline profile CM semantics**

**period\_type** specifies the type of upcoming period over which the complexity metrics are applicable and is defined in the Table 5.

**Table 5 – specification of period\_type for EVC**

|  |  |
| --- | --- |
| **Value** | **Description** |
| 0x0 | complexity metrics are applicable to a single picture |
| 0x1 | complexity metrics are applicable over a specified number of pictures counted in decoding order |
| 0x2 | complexity metrics are applicable to a single slice |
| 0x3 | complexity metrics are applicable to a specified number of slices counted in decoding order |
| 0x4 | complexity metrics are applicable to a single NAL unit |
| 0x5 | complexity metrics are applicable to a specified number of NAL units counted in receiving order |
| 0x6-0xF | user-defined |

**num\_non\_zero\_4\_cus** indicates the number of coding units whose width and height are 4 samples and have non-zero transform coefficients values in the period complexity metrics is applied.

**num\_non\_zero\_8\_cus** indicates the number of coding units whose width and height are 8 samples and have non-zero transform coefficients values in the period complexity metrics is applied.

**num\_non\_zero\_16\_cus** indicates the number of coding units whose width and height are 16 samples and have non-zero transform coefficients values in the period complexity metrics is applied.

**num\_non\_zero\_32\_cus** indicates the number of coding units whose width and height are 32 samples and have non-zero transform coefficients values in the period complexity metrics is applied.

**num\_non\_zero\_64\_cus** indicates the number of coding units whose width and height are 32 samples and have non-zero transform coefficients values in the period complexity metrics is applied.

**portion\_fractional\_prediction\_sample** indicates the portion of the samples requires fractional sample interpolation process applied in the period complexity metrics is applied. It is defined as follows:

(0‑1)

**num\_count** indicates the number of pictures, slices or NAL units over which the complexity metrics is applicable when period\_type is 1, 3, or 5.

When period\_type is 1, then num\_count indicates the number of pictures in decoding order. When period\_type is 3, then num\_count indicates the number of slices in decoding order. When period\_type is 5, then num\_count indicates the number of NAL unites in receiving order.

**num\_non\_zero\_4\_cus [t]** indicates the number of coding units whose width and height are 4 samples and have non-zero transform coefficients values in the period (t+1)th complexity metrics is applied. When period\_type is 1, the period this metrics applied is tth picture in decoding order. When period\_type is 3, the period this metrics applied is tth slice in decoding order. When period\_type is 5, the period this metrics applied is tth NAL unit in receiving order.

**num\_non\_zero\_8\_cus [t]** indicates the number of coding units whose width and height are 8 samples and have non-zero transform coefficients values in the period (t+1)th complexity metrics is applied. When period\_type is 1, the period this metrics applied is (t+1)th picture in decoding order. When period\_type is 3, the period this metrics applied is (t+1)th slice in decoding order. When period\_type is 5, the period this metrics applied is (t+1)th NAL unit in receiving order.

**num\_non\_zero\_16\_cus [t]** indicates the number of coding units whose width and height are 16 samples and have non-zero transform coefficients values in the period (t+1)th complexity metrics is applied. When period\_type is 1, the period this metrics applied is (t+1)th picture in decoding order. When period\_type is 3, the period this metrics applied is (t+1)th slice in decoding order. When period\_type is 5, the period this metrics applied is (t+1)th NAL unit in receiving order.

**num\_non\_zero\_32\_cus [t]** indicates the number of coding units whose width and height are 32 samples and have non-zero transform coefficients values in the period (t+1)th complexity metrics is applied. When period\_type is 1, the period this metrics applied is (t+1)th picture in decoding order. When period\_type is 3, the period this metrics applied is (t+1)th slice in decoding order. When period\_type is 5, the period this metrics applied is (t+1)th NAL unit in receiving order.

**num\_non\_zero\_64\_cus [t]** indicates the number of coding units whose width and height are 64 samples and have non-zero transform coefficients values in the period (t+1)th complexity metrics is applied. When period\_type is 1, the period this metrics applied is (t+1)th picture in decoding order. When period\_type is 3, the period this metrics applied is (t+1)th slice in decoding order. When period\_type is 5, the period this metrics applied is (t+1)th NAL unit in receiving order.

**portion\_fractional\_prediction\_sample [t]** indicates the portion of the samples requires fractional sample interpolation process applied in the period (t+1)th complexity metrics is applied. When period\_type is 1, the period this metrics applied is (t+1)th picture in decoding order. When period\_type is 3, the period this metrics applied is (t+1)th slice in decoding order. When period\_type is 5, the period this metrics applied is (t+1)th NAL unit in receiving order.