3GPP TSG-SA WG4 Meeting #124 S4-231072

Berlin, Germany, 22 – 26 May 2023

Source: Apple, Dolby Laboratories Inc., Fraunhofer HHI, Nokia, ATEME, AT&T, InterDigital Communications, Qualcomm Incorporated

Title: New Feasibility Study on new HEVC profiles and operating points

Document for: Approval

Agenda Item: 9.10

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>   
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Feasibility Study on new HEVC profiles and operating points

Acronym: FS\_HEVC\_Profiles

Unique identifier: 9500xy

Potential target Release: Rel-18

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | X |  | X |  |
| No | X |  | X |  |  |
| Don't know |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
|  | Feature |
|  | Building Block |
|  | Work Task |
| X | Study Item |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

|  |  |  |  |
| --- | --- | --- | --- |
| Parent Work / Study Items | | | |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| FS\_5Gvideo | SA4 | 870011 | Study on 5G Video Codec Characteristics |

### 2.3 Other related Work Items and dependencies

|  |  |  |
| --- | --- | --- |
| Other related Work /Study Items (if any) | | |
| Unique ID | Title | Nature of relationship |
|  |  |  |
|  |  |  |
|  |  |  |

# 3 Justification

The results of the SA4 Study on 5G Video Codec Characteristics (FS\_5Gvideo), which was documented in TR 26.955, showed that the HEVC coding standard demonstrated satisfactory performance to fulfil existing video service needs. It also recommended that "3GPP consider upgrading specifications to support profiles, levels, and possibly features available in HEVC. Features may include better support for screen content and computer-generated content, XR/AR type of services, as well as low and very low latency services." There hasn't been work done in SA4 after this study to include such new features, while significant advancements have been made in services and applications that would benefit from them.

For example,

* there has been renewed interest in the distribution, including streaming, of 3D movie content, as evident by media coverage of recent 3D movie releases.
* On the other hand, there are applications that could benefit from the distribution of 4:4:4 video, such as screen sharing, gaming, and even for new immersive applications that utilize the new V3C family of standards.
* Finally, the use of scalability could further enhance multi-bitrate systems such as video conferencing, or adaptive streaming, but may also provide additional benefits to end user devices, such as power adaptation.

HEVC may be suitable to cater and enable such applications. This study aims to define these emerging applications for video coding, gather evidence whether specific new tools can provide advantage for specific services and applications, and conclude on these aspects.

# 4 Objective

This study aims to:

1. Identify and gather the opportunities for improving HEVC-based services. This will include documentation of motivating use cases and scenarios. Use cases and scenarios include (listed in priority):
2. Potentially improving compression performance to tackle the resurgence of stereoscopic 3D video content, in the context of recent successful 3D movie releases.
3. Potentially improving network performance related to exploding adaptive streaming traffic.
4. Addressing the demands for very high-quality image/video prosumer applications and gaming/screen content sharing.
5. Gather HEVC based solutions to address each opportunity. This will also include relevant existing HEVC profiles that are not included in 3GPP specifications today. In particular, the following solutions, in order of priority, have been identified and will be studied:
   1. HEVC Multiview profiles,
   2. HEVC Scalable profiles, and
   3. HEVC 4:4:4 (up to 10 bits) capable profiles.

Other solutions may also be included, if identified, at a later stage.

Each solution will also identify relevant interoperability and system level aspects to potentially support such new profiles.

1. Define a methodology to investigate and document the pros and cons of the proposed solutions for each key issue including performance results, complexity and implementation aspects, etc. Two of the possibilities are:
   1. Reusing existing suitable performance results for this purpose.
   2. If there is need to do a tool characterization work on the lines of TR 26.955, this will be done using the Scenario Template provided in Annex A of TR 26.955.
2. Conclude on the relevancy of each solution for the key issues and propose a way forward, also identifying if any new normative work would be justified.

This study will be done in collaboration with other organizations as needed, e.g. MPEG, CTA WAVE, 5G-MAG, DASH-IF etc.

# 5 Expected Output and Time scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| New specifications | | | | | |
| Type | TS/TR number | Title | For info  at TSG# | For approval at TSG# | Editor |
| TR | 26.9xx (New) | Evaluation of new HEVC coding tools | SA#102 (Dec 2023) | SA#103 (March 2024) | Waqar Zia |

|  |  |  |  |
| --- | --- | --- | --- |
| Impacted existing TS/TR | | | |
| TS/TR No. | Description of change | Target completion plenary# | Remarks |
| TR 26.955 | Potential video tool characterization work. | SA#103 (March 2024) |  |

# 6 Work item Rapporteur(s)

Waqar Zia (waqar\_zia (at) apple.com)

# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

None

# 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Apple |
| Dolby Laboratories Inc. |
| Fraunhofer HHI |
| Nokia Corporation |
| ATEME |
| AT&T |
| InterDigital Communications |
| Qualcomm Incorporated |
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