**3GPP TSG SA WG4#122 S4-230092**

**Athens, Greece, 20th – 24th February 2023**

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| *CR-Form-v12.0* | | | | | | | | |
| **PSEUDO CHANGE REQUEST** | | | | | | | | |
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|  | **26**.**119-PD** | **CR** | **pseudo** | **rev** | **-** | **Current version:** | **4.0.0** |  |
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| *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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | **[MeCAR] Interoperability Points for Visual and Audio** | | | | | | | | | |
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| ***Source to WG:*** | Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | **MeCAR** | | | | |  | ***Date:*** | | | 14/02/2023 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | 18 |
|  | *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 can be 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)* | |
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| ***Reason for change:*** | |  | | | | | | | | |
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| ***Summary of change:*** | |  | | | | | | | | |
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| ***Consequences if not approved:*** | |  | | | | | | | | |
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| ***Clauses affected:*** | | 5.1 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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

## 5.1 Interoperability Points for Visual and Audio

Figure 13 provides multiple interoperability points and interfaces that may or may not be relevant for the MeCAR specification.



**Figure 13 – Interoperability points and Interfaces of interest for TS 26.119**

Note that the interfaces align with operation points in TS 26.118.

Discussion for each interface is provided in the following in terms of functionalities as well relevancy for the TS 26.119 specification in Table 4.

**Table 4 – Interfaces of relevance for TS 26.119**

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| --- | --- | --- | --- |
| IF | Name | Summary of functionalities | Specification (normative, reference) |
| 1 | XR Runtime API | The functionalities of the API include what is documented in clause 4.2.2 predominantly, namely   * Creation of a XR Session * Providing controller and pose information to support immersive and 6DoF based rendering * Visual composition through swap chains including associated timing and predicted pose information and adapted to the latest pose and the output peripheries * Audio composition to through buffers including associated timing and predicted pose information and adapted to the pose and the output peripheries * Synchronization of audio-visual output * Collection of audio and video sources provided to the XR source management * Query of optional processing and rendering capabilities, for example projection formatsTbd | Specification of reference system with the capabilities. A detailed agreement is documented in S4-221624.  As reference system API, Open XR APIs are provided with possibly a subset of specifications.  For Video rendering, it is based on OpenGL ES.  For Audio rendering, it is based on OpenSL ES and TS 26.118  Any XR System that fulfils the functionalities is sufficient.  This API is similar and an extension to the VR-API in TS 26.118.Tbd |
| 2 | XR Source management API | The functionalities of this API include the configuration on how to access the data from the XR run-time and pre-process in order to serialize the data for delivery. | The configuration is conceptually relevant in order to select that sources of the device to delivered upstream.  However, the detailed API will not be specified in the TS26.119 |
| 3 | XR Source media and metadata formats | The functionalities of this interface include to collect information from the XR Runtime that then may then be sent and encoded   * Viewer pose and projection parameters needed to render using the xrLocateViews function to render each view for use in a composition projection layer. * Camera output * Microphone output * Other sensor and haptics dataTbd | The semantics and syntax of the viewer pose need to be specified as a reference to OpenXR.  Other capturing and sensor if not directly related to AR is out of scope.Tbd |
| 4 | MeCAR media formats | This is the core network interfaces to support media delivery in the downlink and uplink including QoS support and media session handling.  The functionality includes:   * Scene Description delivery and updates * Audio and video decoding for multiple buffers * Audio and video encoding for multiple buffers * Coding and delivery of pose information * Media Session Handling and QoS * Metadata delivery * 5GMS based Content Delivery protocol based on DASH/CMAF * RTP-based delivery * Encryption and security * Rate controlTbd | Core of the specification for TR 26.119  This API is equivalent to the 3GPP VR OP as defined in TS 26.118.  The DASH API is not defined as the entry point is the Scene Description.Tbd |
| 5 | Media Session Handling | This functions allows to support integration into the 5G System to support 5G Network functionalities such as session establishment, QoS, QoE reporting, discovery and establishment of edge capabilities, etc. | This aspect is outside of MeCAR, but is included in 3GPP system specs that adds MeCAR capabilities to the system.  Example for such systems are IMS, 5G Media Streaming, etc. |
| 6 | Internal Interprocess communicationMedia Session Handler API | The application may have access to control the runtime and the sources in order to configure the work flow.Tbd | This is outside of the scope of the specificationTbd |
| 7 | MAF-API | A functionality to configure and control the media access and delivery by the scene manager, the XR source manager and/or the application in order to set up media delivery pipelines. The API is rich enough to support configuration of   * Downlink access for media * Downlink access of scene description * Uplink delivery for media * Uplink delivery for metadata   The information may include for example dynamic information such as updated pose information, etc.Tbd | A reference API should be specified for the MAF in order to configure the pipelines. While this API may not be mandatory, it is a reference to support the functionalities  This part is included in the VR-API as defined in TS 26.118.Tbd |
| 8 | Application network communication | The application may connect to the network to identify entry points or deal with XR Runtime specific data. Tbd | Basic functions may be supported, but do not have to be specified in TS26.119.Tbd |
| 9 | Scene Information and buffers formats | The functionality of this interface is to define a set of primitive buffers for different media types that can be rendered by the Visual and Audio renderer. In combination with the Scene description, the information can be used to render 3D and immersive scenes by the Scene manager and the presentation engine  The combination of the scene description information, possibly generated from the application or in a scene description delivery document, as well as the primitive buffers provide sufficient information to the presentation engine in order create an immersive audio-visual experienceTbd | A reference scene description format based on glTF2.0 as a reference.  The scene description is specified as one way to support it, but equivalent application functions may be defined. A proper subset of glTF2.0 with possible extensions need to be defined.  This information is similar to what was defined as VR Scheme in the context of TS 26.118Tbd |
| 10 | Scene Manager API | This interface allows to configure the scene manager |  |