**Source: Xiaomi**

**Title: Proposed Work Plan for MeCAR v1.0**

**Agenda Item: 9.5**

**Document for: Agreement**

1. Introduction
   1. General

During SA4#117-e the New Work Item on “Media Capabilities for Augmented Reality” (MeCAR) in S4-220332 was agreed and afterwards approved in by SA#95e in SP-220242.

The media capabilities of AR devices typically contribute to three main functionalities that are simple media rendering, split-rendering, for which a pre/scene-rendering of the scene and views is carried out in the cloud/edge and uplink streaming of sensor and device data to the network in order to support network-based processing of device sensor information

To support basic interoperability for AR applications in the context of 5G System based delivery, a set of well-defined media capabilities are essential to create the conditions of a successful ecosystem. Therefore, MeCAR work item defines those media capabilities for AR devices in a service-independent manner. In particular, the following objectives are considered:

* Define at least one AR device category that addresses the constraints of an EDGAR-type AR glass
  + Note: Additional device categories may be defined, but with lower priority.
* For each AR device category
  + Define a reference terminal architecture regarding media capability aspects for this AR device category
  + Define media types and formats produced and consumed by the AR device, including basic scene descriptions, audio, graphics and video as well as sensor information and metadata about user and environment.
  + Define the integration of the relevant existing 3GPP codecs into the reference terminal architecture
  + Define decoding capabilities, including support for multiple parallel decoders
  + Define encoding capabilities
  + Define security aspects related to the media capabilities
  + Define the required, recommended and optional media capabilities for this AR device category
* Integrate IVAS into suitable AR device categories, once IVAS is available
* Define capability exchange mechanisms based on complexity of AR media and capability of device to support EAS KPIs for provisioning of edge/cloud resources
  + Note: Identify a suitable existing capability framework, or if it does not exist, we need to work with the broader industry (e.g., IETF, KHRONOS, W3C, etc.) to get this done.
* Identify which QoE metrics from VR QoE metrics can be reused or enhanced for AR media (e.g., resolution per eye, Field of view (FOV), round-trip interaction delay, etc.) and define relevant KPIs that are dedicated to AR/MR
* Specify additional relevant KPIs and simple QoE Metrics for AR media
* Specify encapsulations into RTP, ISOBMFF and CMAF
* Specify the relevant codec-level parameters for session setup and negotiation of the media delivery and provide instantiations for SDP and DASH MPD
* Enable AR media in 5G Media Streaming by defining suitable 5GMS profiles based on AR media capabilities
* Define typical traffic characteristics for AR media
  1. Depending Work Items

The MeCAR work is envisioned to be relevant for other SA4 Work Items. For instance, it is anticipated that the MeCAR Work Item will produce specifications which other Work Items will reference. In addition, some other Work Items may be building on MeCAR work without referencing its specification explicitly but using MeCAR as a starting point. Both types of depending Work Items may be run in different SWGs than the Video SWG. Therefore, it appears useful to raise the awareness in the SA4 group about the proposed MeCAR Time and Work Plan by listing those depending Work Items here below in order to ensure the sufficient group-level coordination for aligning the work schedule in MeCAR with those of the related Work Items.

As of now, the Work Items identified to depend on MeCAR specifications are:

* Ongoing Work Items:
  + immersive Real-time Communication for WebRTC (iRTCW)
* Anticipated Work Items:
  + 5G media delivery architecture extensions for real-time and AR/MR experience (5G\_AREA)
  + Split Rendering Media Service Enabler (SR\_MSE)
  + IMS-based AR Conversational Services (IBACS)

1. Proposed Time and Work Plan

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| **Meeting** | **Media Capabilities for Augmented Reality - #950015** |
| **SA4#117-e (14 – 23 Feb 2022, e-meeting)** | * Agree New Work Item “Media Capabilities for Augmented Reality” in S4-220332 |
| **SA#95-e (15 – 24 Mar, 2022, e-meeting)** | * Approve New Work Item “Media Capabilities for Augmented Reality” in SP-220242 |
| **SA4#118-e (06 – 14 Apr 2022, e-meeting)** | * Agree Specification skeleton and Scope for TS 26.119 * Agree initial Work Plan * Update the Permanent Document to reflect the progress * Initiate work on:   + Reference terminal architecture for EDGAR-type |
| **SA4#119-e (11 – 20 May 2022, e-meeting)** | * Update the Permanent Document to reflect the progress * Initiate work on:   + Media types and formats for EDGAR-type * Progress work on:   + Reference terminal architecture for EDGAR-type |
| **SA4#120 (22 – 26 Aug 2022, Malaga, ES)** | * Update the Permanent Document to reflect the progress * Initiate work on:   + Encoding/Decoding capabilities for EDGAR-type * Progress work on:   + Media types and formats for EDGAR-type * Complete work on:   + Reference terminal architecture for EDGAR-type |
| **SA4#121 (14 – 18 Nov 2022, e-meeting, US)** | * Update the Permanent Document to reflect the progress * Initiate work on:   + Capability exchange mechanisms to support edge provisioning   + Typical traffic characteristics for AR media   + Addition of AR Media Capabilities for 5G Media Streaming   + AR Audio Capabilities * Progress work on:   + Encoding/Decoding capabilities for EDGAR-type * Complete work on:   + Media types and formats for EDGAR-type   *NOTE Edge provisioning may imply liaisons with external organizations which requires an early start and a long span in the work plan while not being a significant part of the work* |
| **SA4#122 (20 Feb – 01 Mar 2023, e-meeting, TBD)** | * Update the Permanent Document to reflect the progress * Initiate work on:   + Integration of 3GPP codecs in the EDGAR-type architecture   + Security aspects related to the media capabilities of the EDGAR-type   + Encapsulations into RTP, ISOBMFF and CMAF   + Codec-level parameter for SDP and DASH * Progress work on:   + Encoding/Decoding capabilities for EDGAR-type   + Capability exchange mechanisms to support edge provisioning   + Typical traffic characteristics for AR media   + Addition of AR Media Capabilities for 5G Media Streaming   + AR Audio Capabilities * Agree on Draft TS 26.119 v1.0.0 to be sent to SA plenary for information * Communicate with other 3GPP working groups and external organizations, if necessary |
| **SA#99 (22 – 24 March 2023, TBD, EU)** | * Present Draft TS 26.119 v1.0.0 for information |
| **SA4#123 (17 – 21 Apr 2023, e-meeting, TBD)** | * Update the Permanent Document to reflect the progress * Progress work on:   + Integration of 3GPP codecs in the EDGAR-type architecture   + Security aspects related to the media capabilities of the EDGAR-type   + Encapsulations into RTP, ISOBMFF and CMAF   + Codec-level parameter for SDP and DASH   + Capability exchange mechanisms to support edge provisioning   + Addition of AR Media Capabilities for 5G Media Streaming   + AR Audio Capabilities   + Advanced Media Capabilities for AR media * Complete work on:   + Encoding/Decoding capabilities for EDGAR-type   + Typical traffic characteristics for AR media, documented into TR 26.925 |
| **SA4#124 (22 – 26 May 2023, e-meeting, TBD)** | * Update the Permanent Document to reflect the progress * Initiate work on:   + KPIs and simple QoE Metrics for AR media * Progress work on:   + AR Audio Capabilities   + Advanced Media Capabilities for AR media * Complete work on:   + Integration of 3GPP codecs in the EDGAR-type architecture   + Security aspects related to the media capabilities of the EDGAR-type   + Media capabilities profile for EDGAR-type   + Encapsulations into RTP, ISOBMFF and CMAF   + Codec-level parameter for SDP and DASH   + Addition of AR Media Capabilities for 5G Media Streaming * Agree on TS 26.119 v2.0.0 to be sent to SA plenary for approval |
| **SA#100 (14 – 16 June 2023, Australia, AU)** | * Present TS 26.119 v2.0.0 for approval * Present Typical traffic characteristics for AR media CR for approval * Present AR Media Capabilities for 5G Media Streaming CR for approval |
| **SA4#125 (16 – 25 Aug 2023, e-meeting, TBD)** | * Update the Permanent Document to reflect the progress * Progress work on:   + KPIs and simple QoE Metrics for AR media   + AR Audio Capabilities   + Advanced Media Capabilities for AR media * Complete work on:   + Capability exchange mechanisms to support edge provisioning |
| **SA4#126 (08 – 17 Nov 2023, e-meeting, TBD)** | * Complete work on:   + KPIs and simple QoE Metrics for AR media   + AR Audio Capabilities   + Advanced Media Capabilities for AR media * Complete all remaining open issues raised for completion of the Work item * Endorse work item summary |
| **SA#102 (13 – 15 Dec 2023, TBD, US)** | * Present Advanced Media Capabilities for AR media CR for approval * Present AR Audio Capabilities CR * Present work item summary |

1. Proposal

We propose to agree on the work plan described in clause 2.