**Agenda item:** 10.6

**Source:** ZTE Corporation, Samsung

**Title: [IBACS] AR** rendering on UE

**Document for** Discussion andAgreement

# Introduction

At last SA4#123 meeting, we discussed AR rendering for IMS AR communication, and agreed that two optional AR rendering methods can be selected based on UE’s capacity, status, etc., including UE rendering and split rendering. This contribution is proposed to: 1) update AR rendering over IMS in section 2.3 of latest IBACS PD；2) introduce a generic call flow for UE rendering.

# **Proposed updates on IBACS PD**

## AR rendering over IMS

### AR rendering types

Based on UE’s capacity, status, size of AR media, etc., UE can decide media rendering methods for IMS-based AR communication services as follow.

**UE rendering**, UE independently render AR content based on AR specific data, when the media processing capability of UE meets the requirements of AR communication. The UE performs local rendering based on the media obtained locally or sent by the peer.

**Split rendering**, UE and IMS network collaborate to implement rendering for AR content, When the media processing capability of UE cannot meet AR communication requirements. IMS performs AR media rendering based on AR media received from the calling or the called users. Note that UE can decide and change the split ratio of the rendering tasks based on its status.

### Network function for AR rendering

IMS AR communication architecture is enhanced for supporting split rendering within IMS network, including the following network nodes and their functions:

- **AR Application Server**, responsible for AR service control related to AR communication, including AR session media controlling, AR media rendering negotiation and AR service handling.

- **ARMF**, responsible for AR communication media transmission and media rendering function, including AR Rendering Logic control and 3D Rendering Engine for rendering the scenes, virtual human models and 3D object models according to the field of view, posture, position.

NOTE 1: ARMF is a logic network function element, it can be deployed together with other media functions such as DCMF.

Media interface for IMS AR communication and AR rendering is as follow:

- **DC4:** Service based reference point between the AR Application Server and the DCSF for AR service handling and AR session media control.

DC4 is used to media resource allocation for AR rendering in IMS network.

- **MDC2:** Reference point of data channel media between the AR Application Server and DCMF for AR media rendering negotiation.

- **Mb:** The media interface for audio/video media stream transmission and/or data media stream transmission, including AR media and AR specific data.

# 3 Generic UE rendering call flow

In UE centric AR communication, AR media traffic is transparent to the IMS network and exchanged between the two peer UEs via the deployed media functions (e.g., IMS AGW/TrGW).

Figure 4.1.X.1 shows a typical procedure to establish a UE centric AR IMS session from UE-A perspective.



Figure 4.1.X.1 Basic AR Call Flow

1. UE-A initiates an IMS communication with UE-B, including establishment of bootstrap data channel.

2. The user of UE-A upgrades the IMS session with AR experience.   
UE-A initiates a re-INVITE adding media descriptors required by the AR application to be established E2E, e.g. RTP and/or application data channels. Application data channel may be anchored in the MF/MRF.

3. UE-A obtains AR media and AR specific data (e.g. pose and viewport information), and encodes AR media. If needed, UE-A can pre-process AR media locally before encoding, such as format conversion, packing.

4. UE-A sends the AR media and AR specific data to the peer through the established media connection(s) including application data channel.

Note 1: UE-A may perform locally AR rendering in some cases, such as AR media is static, recommendation viewport is used.

Note 2: UE-A may send AR media via application data channel, if AR media is non-real-time.5. UE-A receives AR media and AR specific data from the peer through established media connection(s).

6. UE-A decodes and displays the received AR media on its screen. If needed, UE-A can render received AR media based on AR specific data,

In Step 2, a scene description can be generated and distributed by the MF/MRF using an application data channel of the AR application. The distribution of the scene description using a scene description data channel using “mpeg-sd” sub-protocol, as scene description-based overlay for ITT4RT, is FFS.

# 4 Proposal

We propose to include the proposed updates in section 2 and call flow in section 3 into the IBACS PD.

# 5 References

[1] S4-230705, “IBACS Permanent Document “, v0.3.0, SA4#123, April 2023.