**Source:** China Unicom

**Title:** Discussion on the AR/MR architecture for QoE collection

**Document for** Discussion and Agreement

**Agenda item:** 9.8- FS\_ARMRQoE (Feasibility Study on AR and MR QoE Metrics)

# Introduction

The AR/MR QoE study item has collected the related QoE information at SA4#121 meeting. To start and proceed the AR/MR QoE identification and definition work, a metrics observation architecture for AR/MR QoE needs to be discussed and defined.

This contribution proposes the reference model for AR/MR QoE measurement, and tries to define a number of observation points to make QoE-related information available to be collected.

# AR/MR QoE reference model

According to the clause 4.1.2 of MeCAR PD [1], a defined AR/MR QoE framework and the observation points can be reused as baseline for the AR QoE reference model, which is illustrated in Figure 2.1.1.

NOTE: The observation points can also be used to identify the advanced AR/MR QoE metrics.



**Figure 2.1.1: AR/MR QoE reference model and Metrics Observation Points [1]**

It’s also noted that the above observation points may be further updated based on the agreements of the AR/MR QoE metrics identification and definition.

## Observation point 1

XR Runtime is a set of functions that interface with a platform to perform commonly required operations, such as accessing the controller/peripheral state, getting current and/or predicted tracking positions, performing spatial computing, and submitting rendered frames to the display processing unit. The XR Runtime provides the viewer pose and projection parameters needed to render each view for use in a composition projection layer.

XR Source Management addresses the management of data sources provided through the XR runtime such as microphones, cameras, trackers, etc. The XR Source Management may expose information to the application or may provide a subset to the media access function to be sent remote.

Presentation Engine is a set of composite renderers, rendering the component of the scenes, based on the input from the Scene Manager. The Scene Manager together with the Presentation Engine that includes functions such as scene composition and possible complex audio or visual rendering.

Observation point 1 is derived from the XR Runtime API which exchanges information between XR Runtime and XR Source Management/Presentation Engine and is defined to monitor:

- Viewer pose

- Projection parameters

- Camera information

- Gesture

- Body action

- Tracking position prediction error

- Mapping latency for reconstructing the surrounding space

Editor’s Note: Additional parameters to be monitored in OP1 are FFS.

## Observation point 2

Scene Manager is a set of functions that supports the application in arranging the logical and spatial representation of a multisensorial scene based on support from the XR Runtime. XR Scene Manager has access to the latest pose and tracking information from the XR Runtime which is then provided. Based on this information, the Scene Manager may for example determine the objects visible to the user at a given point in time or more generally the objects that may be needed to be rendered in the next rendering cycles.

Media Access Function is a set of functions that enables access to media and other XR-related data that is needed in the Scene manager or XR Runtime to provide an XR experience. The media access function accesses the network resources or sends data to the network using the established media pipelines.

Observation point 2 is derived from the API which exchanges information between Scene Manager and Media Access Function and is defined to monitor:

- Scene update latency

- FOV

- Viewport

- Viewport error for rendered objects

Editor’s Note: Additional parameters to be monitored in OP2 are FFS.

## Observation point 3

Observation point 3 is derived from the API which exchanges information between Media Access Function and 5G System and is defined to monitor:

- Media resolution

- Media codec

- Media decoding time

- Average throughput

Editor’s Note: Additional parameters to be monitored in OP3 are FFS.

## Observation point 4

Observation point 4 is derived from the API which exchanges information between XR Source Management and Metrics Access Functions and is defined to monitor:

- Poses

- Sensor information

Editor’s Note: whether observation point 4 shares the same information with the observation point 1 is FFS.

Editor’s Note: Additional parameters to be monitored in OP4 are FFS.

# Proposal

We propose to agree the : AR/MR QoE reference model and the corresponding observation points and capture Section 2 into the TR 26.812.

# References

1. S4-221567 MeCAR Permanent Document v4.0.0