**3GPP TSG-S4 Meeting #113-e**S4-210578

**Electronic Meeting, 6th – 14th April 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **26.803** | **CR** |  | **rev** |  | **Current version:** | **1.1.0** |  |
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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 |  | Radio Access Network |  | Core Network |  |

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| ***Title:***  | Split Rendering Use Case Walkthrough |
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| ***Source to WG:*** | Qualcomm Inc. |
| ***Source to TSG:*** | S4 |
|  |  |
| ***Work item code:*** | FS\_EMSA |  | ***Date:*** | 31 March 2021 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-17 |
|  | *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 canbe 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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | Provides a mapping of the Split Rendering use case to the EMSA call flows. |
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| ***Summary of change:*** |  |
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| ***Consequences if not approved:*** |  |
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| ***Clauses affected:*** |  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **First Change** |

Annex <A> (informative):
Selected Use Case Mapping

# A.1 Split Rendering

The split rendering use case covers scenarios where heavy graphics rendering is performed at the edge with low latency. The device receives a pre-rendered representation of the viewport and may run some pose correction (e.g. Asynchronous Time Warp) to adjust the view to the current user’s viewport.

The use case realization can be roughly described by the following walkthrough:

1. An XR Device connects to the network and connects to an XR application,

a. Sends static device information and capabilities (supported decoders, viewport),

2. Based on this information, the XR server sets up encoders and formats,

3. Loop:

a. XR Device collects XR pose (or a predicted XR pose).

b. XR Pose is sent to XR Server.

c. The XR Server uses the pose to pre-render the XR viewport.

d. XR Viewport is encoded with 2D media encoders.

e. The compressed media is sent to XR device along with XR pose that it was rendered for.

f. The XR device decompresses video.

g. The XR device uses the XR pose provided with the video frame and the actual XR pose for an improved prediction using and to correct the local pose, e.g. using Aynchronous Time Warp.

Steps 1 and 2 relate to the session setup. Step 3 is about the operation of the service. Due to the nature of this use case, it is believed that the UE-management session establishment and control is more appropriate. The application is fully aware that the bulk of the rendering is to be performed on the edge with low latency and as such will request the necessary resources and the establishment of the edge session.

We break down step 1 and 2 to provide call flows for the session setup. In this call flow, we assume that the Application Provider provisions the 5GMSd AF with the processing configuration and resource needs prior to session setup. The 5GMSd AF is responsible for allocating the actual resources using the MnS function, when an actual session is started. Other variations of this walkthrough might be possible.



The steps are provided here in detail:

1. The provisioning step allows the Application Provider to configure required resources for its application sessions.

a. The Application Provider sends a request to the 5GMS AF to create a new Provisioning Session.

b. The 5GMS AF creates QoS and Compute resource templates. It may use services offered by the MnS-C and PCF.

2. The 5GMS-Aware Application is started on the UE, and it connects to the Application Provider to create a new application session.

3. The 5GMS-Aware Application informs the Media Session Handler about the starting session

4, The Media Session Handler creates a new session with the 5GMS AF. The Media Session Handler may provide EEC functionality to the 5GMS-Aware Application. The Media Session Handler provides information to the 5GMS AF about the required processing capabilities, application information, QoS requirements, etc.

NOTE: The Media Session Handler may throughout the lifetime of the session update the processing and network QoS requirements based on the application’s request and changing needs.

5. The 5GMS AF verifies that the requested QoS and compute resources are aligned with the templates provided in the Provisioning Session. It then checks for an already available 5GMS AS instance that can offer the required compute resources for the application. Acting as an EES, it starts by checking the EAS instances that registered with it. The 5GMS AF may offer EEC functionality to the Media Session Handler. If a suitable EAS is not found, the 5GMS AF may use the MnS-C interface to allocate a new EAS instance for the application.

6. The 5GMS AF confirms resource availability to the Media Session Handler.

7. The Media Session Handler uses the EEC functionality to discover the allocated EAS for the application. It then establishes a connection with the EAS instance offering 5GMS AS capability. Alternatively, the application may use DNS resolution to discover the assigned EAS.

The 5GMS-Aware Application connects to the discovered EAS and exchanges rendered viewport and pose information with the EAS.