**3GPP TSG-SA WG6 Meeting #55 S6-23xxxx**

**Berlin, Germany 22nd – 26th May 2023 (revision of S6-232217, S6-231797, S6-232075)**

**Source: China Mobile**

**Title: New SID on Application enabler for XR Services**

**Document for: Approval**

**Agenda Item: 10**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on Application enabler for XR Services

Acronym: FS\_AEXRS

Unique identifier:

Potential target Release: Rel-19

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | **X** |  |  |  |
| No |  |  | **X** |  | **X** |
| Don't know | **X** |  |  | **X** |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
| **X** | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

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| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  |  |  |  |
|  |  |  |  |
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|  |  |  |  |

### 2.3 Other related Work Items and dependencies

{List here other Work Items which relate to the proposed one, such as a Work Item in an earlier Release if further enhancing the feature from the previous Release)}

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 810006 | Study on eXtended Reality (XR) in 5G | SA4’s work about application layer support for XR and media services |
| 940068 | Study on architecture enhancement for XR and media services | SA2’s work about architecture enhancement for XR and media services |
| 980016 | (Stage 2 for XRM) Architecture Enhancements for XR (Extended Reality) and media service | SA2’s work about architecture enhancement for XR and media services |
| 950013 | Study on Smartly Tethering AR Glasses | SA4’s work about application layer support for Smartly Tethering AR Glasses |
| 950015 | Media Capabilities for Augmented Reality | SA4’s work about Media Capabilities for Augmented Reality |
| 960045 | Split Rendering Media Service Enabler | SA4’s work about Split Rendering Media Service Enabler |
| 930020  | Stage 1 of TACMM | SA1’s work about requirement for tactile and multi-modal communication service |

# 3 Justification

XR (Extended Reality) refers to a set of general services which leverage High Data Rate Low Latency (HDRLL), AR/VR, and tactile/multi-modality communication.

SA1 defines the requirement for XR (Extended Reality) relevant Services. In Release-18, SA1 defined the requirement for tactile and multi-modal communication service in the TS 22.261 clause 6.43, including the support to provide policy(ies) for flows associated with an application, and apply 3rd party provided policy(ies).

Based on these requirements, to support the XR (Extended Reality) Services, both SA2 and SA4 have related directions. In release 16, FS\_5GXR of SA4 studied XR and AR device types, use case, KPIs, device architectures, media formats, call flows, and more. In release 17, FS\_ 5GSTAR of SA4 studies the end-to-end encoding, rendering, functional framework, transmission interaction, and KPI of AR/MR glasses.

In release 18, more works including the MeCAR, SR\_MSE, FS\_SmarTAR are studied in SA4. The MeCAR focus on the media capabilities of an AR device. The SR\_MSE focus on the split rendering to enable UE to share rendering to edge (limited to the interface between the split-rendering EAS and the UE. The end-2-end application setup is out of this scope). FS\_5GRTP focuses on optimizing the use of RTP for the uni-directional and bi-directional transport of real-time immersive media. FS\_SmarTAR focus on the support of a specific device type, tethering AR glass.

XRM in SA2 studies the key issues, solutions and conclusions on the support of advanced media services, e.g. High Data Rate Low Latency (HDRLL) services, AR/VR/XR services, and tactile/multi-modality communication services. It has been concluded that the AF are supposed to provide common ID (indicator that specific service data flows belong to the same multimodal service), PDU Set related assistance information including PDU Set QoS parameters, Burst periodicity, Description of Service Protocol. Also, some network information is going to be exposed, including the congestion level information, Data rate, delay difference and round trip delay of QoS flow.

XRM in SA2 studies the key issues, solutions on how to support XR and advanced media services from 3gpp architecture perspective. SA4 focus more on the application layer interaction between the UE and vedio/audio media service. However, to enable a variety of XR services not limited to vedio/audio communications, specific support by network enabler layer based on the 3GPP system may be required.

# 4 Objective

To study how SA6 enablement layer can support the XR services to enhance the QoE, with the following objectives:

1. Identify architecture requirements and solutions for architecture enhancement of SEAL/SEALDD to support the XR services;
2. Identify key issues, and solution recommendations to enable capabilities for XR services including:
* Support for 3rd party policy provisioning and management to provide policy(ies) to the 5GC for flows associated with the XR services for information extraction and provisioning to the 5GC;(such as Multi-modal Service ID, PDU set identifier provisioning)
* Utilization of 3rd party provided policy(ies) for control of flows associated with an application (e.g., PDU/flows coordination, delay difference handling, QoS scheduling, transmission quality guarantee, buffering etc.)
* Support seamless XR streaming over 3GPP or non-3GPP access (e.g., device connecting to the 5G network directly or indirectly), and including aspects of data pre-processing, or triggering user plane management like MA-PDU session and/or Multi path utilization etc;
* Split computing, principle of computing task/content splitting, steering to enable split rendering, split modeling etc. (maybe based on the EDGEAPP architecture)
* KPI guarantee, and XR services related information measurement and exposure based on the enhancement of SEALDD(e.g. traffic periodicity, Packet Delay Variation among the associated flows etc.);

NOTE 1: Potential enhancement to transport layer may need to coordination with CT groups.

NOTE 2: Enhancements to existing SA6 defined enablers (e.g. SEAL, CAPIF, EDGEAPP) may be required.

# 5 Expected Output and Time scale

***{If this WID covers both stage 2 and stage 3, clearly indicate the different completion dates.}***

|  |
| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| TR | 23.xx | Study on Application enabler for XR Services | SA#103 (Mar 2024) | SA#104 (June 2024) | zheng, Shaowen, CMCC, zhengshaowen@chinamobile.com |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| {e.g. "22.281"} | {Possible values: - either free text (e.g. “CS aspects to be removed") - or “Specification to be withdrawn”} | {e.g. "TSG#89"} | {Free text, e.g. "This TS covers Stage 2" or "This TS covers Stage 3" or "This TS covers both stages 2 and 3"} |
| TS 23.434 | Enhancements for SEAL if indentified | SA#106 (Dec 2024) |  |
| TS 23.222 | Enhancements for CAPIF if indentified | SA#106 (Dec 2024) |  |
| TS 23.558 | Enhancements for EDGEAPP if indentified | SA#106 (Dec 2024) |  |
| TS 23.433 | Data Delivery enabler for vertical applications if identified | SA#106 (Dec 2024) |  |

# 6 Work item Rapporteur(s)

Zheng, Shaowen, CMCC, zhengshaowen@chinamobile.com

# 7 Work item leadership

SA6

# 8 Aspects that involve other WGs

SA2 for core network architecture aspects, SA3 for security aspect, SA4 for media aspects, SA5 for management aspect.

# 9 Supporting Individual Members

{At least 4 supporting Individual Members are needed. There is an expectation that these companies will provide resources to progress the work. Note that having 4 supporting companies is a necessary but not sufficient condition: the usual TSG approval process by consensus is needed for the WID approval}

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| Supporting IM name |
| CMCC |
| AsiaInfo |
| CATT |
| ZTE |
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| --- |
| Samsung |
| Lenovo |
| AT&T |
| VIVO |

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| InterDigital |
| Huawei |
| Hisilicon |
| Convida Wireless LLC |
| China Telecom |
| China Telecom |