**3GPP TSG-SA Meeting #101 SP-231163**

**Bangalore, India, September 11-15, 2023** **(revision of SP-231136)**

**Source: Nokia, Nokia Shanghai Bell (Moderator)**

**Title: New SID on 5GS XRM Ph2**

**Document for: Approval**

**Agenda Item: 7.4**

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 Architecture enhancement for XRM Ph2

Acronym: FS\_XRM Ph2

Unique identifier: TBD

Potential target Release: Rel-19

# 1 Impacts

{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | x | x | x |  |
| No |  |  |  |  |  |
| 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

{"Parent" Work Item refers to the related, earlier-Stage, Work Item, e.g. the related Stage 1 Work Item shall be indicated here when a Stage 2 normative Work Item or Study Item is presented. "Parent" Work Item can also refer to the related preceding Study Item e.g. the related Study Item and the earlier-stage Work Item shall be indicated here when a normative-work Work Items is started. List here all parent Work Items of which requirements are either fully or partially covered by the proposed Item. }

{This section is mandatory to be filled out by the rapporteur. This section is to be filled with care: it indicates to the companies monitoring the parent Work Item that it will be addressed in this study/work item.}

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

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  | SA1 | 950005 | Study on Localized Mobile Metaverse Services |

### 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 |
|  |  | {optional free text}  |

# 3 Justification

Rel-18 also introduced the support for power saving optimizations based on dynamic End of Data Burst indication in addition to more static periodicity and burst size information. This, as well as the PDU Set based handling, could further be enhanced to support adaptive applications.

In Rel-18, SA2 did not have sufficient time to introduce any potential new 5QIs (as needed), consider Alternative PDU Set based QoS handling and/or PDU Set based QoS handling for DSCP marking over N3/N9. In addition, it is also assumed that the application may not require all the PDUs within a PDU Set thus content ratio could be considered as part of the study.

SA2 specifications do not have a solution for multiplexed data flows. Also, dynamic change in traffic characteristics was not considered sufficiently in the earlier releases.

SA2 also did not consider support for non-3GPP access for XRM features in the earlier releases. SA2 may need to consider additional exposure aspects from 5GS towards application for XRM features.

The study also investigates gaps and the requirements already specified for the 5G system.

# 4 Objective

The following aspects will be studied:

WT1 Enhancement for PDU Set based QoS handling.

1.1 Study whether and how to enhance PDU Set related (e.g. new standardized 5QI, enhancements to Alternative QoS profiles, FEC) and PDU Set information (including Control Plane and/or User plane information provided by the AF/AS) and the corresponding PDU Set QoS handling enhancement.

NOTE 1: this will require close coordination between SA4 and SA2.

1.2 Support QoS control and PDU Set identification for XR stream with e2e encryption (e.g. fully encrypted header, partially encrypted header). This is applicable for PDUs received at N6 for DL.

1.3 Enhancements to support PDU Set based QoS handling in uplink direction.

NOTE 2: need for this work task depends on Rel-18 progress.

1.4 Study whether and how to leverage PDU Set QoS information for DSCP marking over N3/N9 in the transport network (i.e. to enable differentiated handling of PDU Sets within QoS Flow).

WT2 QoS handling enhancement for XRM services.

2.1 Study whether and what enhancements are needed for traffic detection and QoS Flow mapping for different media types multiplexed data flows within a single end-to-end transport connection.

2.2 Study whether and how to support dynamic change (via user plane) in traffic characteristics (e.g. burst related parameters), provided by the application in the DN.

NOTE 3: this will require close coordination between SA4 and SA2.

2.3 Study whether and how to identify traffic flows and study QoS handling enhancement for the UE with the Tethered devices (for example, traffic from tethered devices mapped to different QoS Flows enabling QoS differentiation e.g. PDU Set based QoS flows for XR traffic for device 1 vs PDU based QoS flows for eMBB traffic for device 2).

WT3 Further enhancement to support XR based on non-3GPP access.

3.1 Study how to support L4S for non-3GPP access networks and intermediate 5GS nodes (N3IWF, TNGF and W-AGF) to perform ECN marking for L4S.

- Support L4S in untrusted/trusted access (e.g. N3IWF, TNGF).

- Support L4S in wireline access (e.g. W-AGF).

3.2 Study how PDU Set QoS Control mechanisms can be extended to non-3GPP access networks.

- Support PDU Set QoS in untrusted/trusted access (e.g. N3IWF, TNGF)

- Support PDU Set QoS in wireline access (e.g. W-AGF).

NOTE 4: It is limited to re-using existing control plane and user plane between 5GC and non-3GPP access networks. Assumptions on W-AGF functionality are to be verified with BBF and CableLabs.

WT4 Network exposure Study whether and how XR related network capability/information (e.g. if the QoS profile requested by AF cannot be met, network can indicate the alternative QoS profile) can be exposed towards the application layer.

NOTE 5: alignment and coordination with RAN work will be needed for the study.

## TU estimates and dependencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Work Task ID | TU Estimate(Study) | TU Estimate(Normative) | RAN Dependency(Yes/No/Maybe)  | Inter Work Tasks Dependency  |
| WT#1 | 3.0 | 2.5 |  | WT#1 is self-contained |
| WT#1.1 | 1.25 | 1.25 | Yes |  |
| WT#1.2 | 1.0 | 0.5 | No |  |
| WT#1.3 | 0.5 | 0.5 | May be |  |
| WT#1.4 | 0.25 | 0.25 | No |  |
| WT#2 | 2.5 | 2.0 |  | WT#2 is self-contained |
| WT#2.1 | 1.0 | 0.75 | No |  |
| WT#2.2 | 1.0 | 0.75 | Yes |  |
| WT#2.3 | 0.5 | 0.5 | No |  |
| WT#3 | 1.0 | 1.0 |  | WT#3 is self-contained |
| WT#3.1 | 0.5 | 0.5 | No |  |
| WT#3.2 | 0.5 | 0.5 | No |  |
|  |  |  |  |  |
|  |  |  |  |  |
| WT#4 | 1 | 1 | May be | WT#4 is self-contained |

Total TU estimates for the study phase: 7.5

Total TU estimates for the normative phase: 6.5

Total TU estimates: 7.5 + 6.5 = 14

# 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 |
| Internal TR | TR 23.xxx | Study on 5GS XR enh | SA#103 (March 2024) | SA#104 (June 2024) |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
|  |  |  |  |
|  |  |  |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

Potential RAN impact to be covered by RAN WGs.

Potential security impact to be covered by SA3.

Potential charging and OAM impact to be covered by SA5.

Potential multimedia and codecs aspects to be covered by SA4.

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Nokia |
| Nokia Shanghai Bell |
| Charter Communications, Inc |
| CableLabs |
| China Mobile |
| Tencent |
| Xiaomi |
| Broadcom |
| Cisco |
| Samsung |
| Meta USA |
| CATT |
| ZTE |
| FirstNet |
| Telefonica |
| AT&T |
| FutureWei |
| Lenovo |
| Huawei |
| HiSilicon |
| Matrixx |
| LG Uplus |
| BT Plc |
| MATRIXX Software |
| DISH Networks |
| Deutsche Telekom |