**3GPP TSG-WG SA2 Meeting #154 *S2-220xxxx***

**Toulouse, France, November 14 – 18, 2022 (revision of S2-220xxxx)**

**Source: Huawei, HiSilicon**

**Title: KI#1: Update of the Conclusion**

**Document for: Approval**

**Agenda Item: 9.19**

**Work Item / Release: FS\_XRM / Rel-18**

*Abstract: This document updates KI#1 conclusion agreed in the previous meeting.*

# 1. Introduction/Discussion

KI#1 will study how to delivery multiple streams for an application to the user at a similar time:

*- Whether and how to enable, for a single UE, policy enhancements for delivering* ***related*** *tactile and multi-modal data (e.g. audio, video and haptic data related to a specific time) for an application to the user at a similar time (e.g. QoS policy coordination).*

For 5GS to satisfy the goal of KI#1, some enchancements are needed for 5GS:

1) **Make sure network resources are allocated successfully for data flows together**. If some of the data flows are allocated with network resource succefully, but others are failed to be allocated with network resource, then there is no way to delivery data flows to the user at a similar time.

2) **PDBs for each data flows should be aligned**. E.g. if PDB for data flow#1 being increased, then PDB for data flow#2 could also be increased (in case bad network condition), or if PDB for data flow #1being decreased, then PDB for data flow #2 could also be decreased (in case network condition becomes better again). It shoud be aware that assign the same PDB to each data flow is not a workable way, because different data flows usually have different delay requirements.

Also In SA#96, WT1 for FS\_XRM was revised as following in SP-220705, which doesn’t forbid sending parameters to NG-RAN.

“WT#1: Enhancements for supporting multi-modality service:

- Study whether and how to enable delivery of related tactile and multi-modal data (e.g., audio, video and haptic data related to a specific time) with an application to the user at a similar time, using only control plane enhancements (i.e. QoS policy coordination, PCC enhancement for the 5GS). No N3/N9 user plane impact.

NOTE 1: Any parameters provided by 5GC to NG-RAN via the Control plane need to have a clear explanation about how they are intended to be used by NG-RAN.”

**The conclusions of KI#1 are proposed to be updated with the following bullets based on the above analysis:**

1. Joint admission for the related data flows.

Admission control for the related data flows together, e.g. admitting the data flows successfully together. It’s also possible refuse to admit any data flows in case some of the flows are failed to be admitted, but just in case if application providing an indicating explicitly.

2. Fulfill the QoS requirements of the related data flows together.

During traffic delivery, 5GS shall fulfill the QoS requirements of the related service flow together

3. AQP-based PDB alignment among data flows.

E.g. In case the PDB of one data flow changes and RAN refers to an AQP, then RAN refers to AQPs that can be fullfilled for other data flows accordingly.

Application normally doesn’t know which AQPs for other data flows can be fullfilled, so it is not a good way to let application make the adjustment based on QNC.

SA2#153e agrees that

*“Normative impact to AF and NEF/PCF: extend the existing Nnef\_AFsessionWithQoS service to allow the AF to provide, at the same time, service requirements, a common ID and any additional requirements for multiple IP data flows associated to a multi-modal (XRM) application.”*

While the additional requirements are not clearly described. This makes the sentence below unclear.

*“ -These policies above are enforced only according to the AF provided explicit requirements.”*

This document discusses:

1. what are the “additional requirements”
2. how they are mapped to the related policies.

Therefore, it is proposed to capture the following as additional requirements from the application in the conclusion:

* The additional requirements include:
	+ Admit the related data flows together.
	+ Fulfill the QoS requirements of the related data flows together.
	+ Use aligned alternative QoS requirements for the related data flows in case the QoS requirements of one of the related data flow could not be fulfilled.

The correspondent policy would be:

* + Joint admission for the related data flows.
	+ Joint QoS fulfillment for the related data flows.
	+ Align the AQP in case of QoS unfulfillment of one of the related data flows.

The description on the related policy would show clearly how QoS enforcement could be done based on existing procedure in the normative phase. Therefore, it is proposed to capture these as well in the conclusion.

PCF sends the above policy to SMF, and then SMF provides RAN with the corresponding information. The information provided to RAN will be used as additional assistance information for admission control and AQP ajustment, and how RAN to use the information is implementation specific.

# 2. Text Proposal

It is proposed to capture the following changes vs. TR 23.700-60.

\* \* \* \* First change \* \* \* \*

## 8.X Conclusions for Key issue#1

The following aspects are concluded as principles for the normative work:

For Key issue#1, single UE case,

The following aspects are concluded as principles for the normative work:

* Those data streams that are closely related and require strong application coordination are transmitted in a single PDU session by a single UE. However, those data streams that contribute to the immersive experience, but may still be valid stand-alone, may be transmitted over separate PDU sessions from multiple UEs. In order to ensure that the UE selects the correct DNN/S-NSSAI combination for the XRM traffic, the existing URSP Rule evaluation framework can be reused. A traffic descriptor (e.g. an FQDN) for the XRM session will be used during URSP rule.
* The procedure for AF session setup with required QoS, is reused for XRM applications (untrusted AFs) interacting with NEF. However, current Nnef\_AFsessionWithQoS service shall be extended to allow the AF to provide information for multiple medias.
	+ Normative impact to AF and NEF/PCF: extend the existing Nnef\_AFsessionWithQoS service to allow the AF to provide, at the same time, service requirements, a common ID and any additional requirements for related multiple IP data flows associated to a multi-modal (XRM) application.
* The additional requirements include:
	+ Admit the related data flows together.
	+ Fulfill the QoS requirements of the related data flows together.
	+ Use aligned alternative QoS requirements for the related data flows in case the QoS requirements of one of the related data flow could not be fulfilled.

PCF generates policies to support the above requirements, which include:

* + Joint admission for the related data flows.
	+ Joint QoS fulfillment for the related data flows.
	+ Align the AQP in case of QoS unfulfillment of one of the related data flows.

- PCF has the following roles:

- PCF performs the flow authorization

- PCF provisions QoS information considering the requirements provided by the AF for related data flows associated to a multi-modal (XRM) application..

- PCF enforces the group level policy for the related data flows.

- These policies above are enforced only according to the AF provided explicit requirements.

PCF sends the coordinated policy rules to SMF.

NG-RAN performs admission control/resource allocation and QoS fulfilment following the current procedures assisted by the group flow treatment policy information, e.g. when NG-RAN performs admission control or QoS fulfilment for one QoS flow, the NG-RAN will also take information of other QoS flows into consideration according the group flow treatment policy.

\* \* \* \* End of changes \* \* \* \*