**SA WG2 Meeting #149e** **S2-220xxxx**

**February 14th – 25th, 2022; Elbonia (revision of S2-220)**

**Source: Nokia, Nokia Shanghai Bell**

**Title:**  **Key Issue for Multi-modality service and policy enhancements**

**Document for: Approval**

**Agenda Item: 9.19**

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

*Abstract of the contribution: This paper proposes a KI to address Work Tasks #1 and #2.1*

# Discussion

The FS\_XRM SID contains the following Work Tasks:

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, focusing on the need for policy control enhancements (e.g. QoS policy coordination).

WT#2: Enhancements of network exposure to support interaction between 5GS and application：

WT#2.1: Study whether and how interaction between AF and 5GS is needed for application synchronization and QoS policy coordination among multiple UEs or between multiple QoS flows per UE.

WT#2.2: Study exposure of 5GS QoS information (e.g., QoS capabilities) and network conditions to the Application to enable quick codec/rate adaptation help to provide desired QoE (e.g. such as assist in alleviating 5GS congestion).

NOTE1: Parameters for exposure may coordinate with RAN and SA4.

WT#1 and WT#2.1 are both related to a scenario where multiple correlated media streams are sent to or from one or multiple UEs as part of an overall application operation.

WT#1 considers a multi-modal application where the endpoints (one or both running on UE devices) exchange audio, video and haptic data streams that need to be presented or actuated to the user in a synchronized manner, for instance so that any haptic feedback is synchronized with audio and video. The related media or haptic streams may be sent or received by the same UE or by multiple UEs.

WT#2.1 similarly considers in general QoS coordination and synchronization among application streams that may be sent or received by the same UE or by multiple UEs.

There may be many ways how the 5GS can optimize the handling of the application streams if it knows which streams are related to each other and what the application policy is wrt. their correlated treatment. The optimizations may apply especially to QoS (especially in the face of congestion or bad radio coverage) and mobility (handovers). Thus, it is useful for the 5GS to get the stream correlation information and policy from an AF or from an UE.

For the exact synchronous delivery of the synchronized streams, it should be studied on which granularity the network (5GS) should feasibly do it, and in which granularity it should be left for the application endpoints to take care of. When multiple endpoints/UEs are involved, they may need to be synchronized to the same clock. 3GPP Release 17 includes many methods how the 5G Clock or an external Clock can be delivered to the UEs or any Endpoints via the 5GS. By this enabler the endpoints can take care of the extremely precise synchronization between different streams even across different UEs.

# 2 Proposal

**It is proposed to update TR 23.700-60** **as follows**

\* \* \* \* First change (all new text)\* \* \* \*

## x.1 Key Issue #X: Key issue for Multi-modality service and policy enhancements

x.1.1 Description

The objective of this Key Issue is to study how to enhance 5GS to better support the coordinated delivery of application traffic streams that are part of a common application context, i.e., in some way related to each other. The common application context can for instance be a multi-modal communication session consisting of audio, video, and haptic data traffic streams. The streams may be sent to or from the same UE or different UEs.

From the application perspective the streams may be related to each other in multiple ways and the application may also have different policies how the streams should be treated relative to each other. For instance:

* The streams need to be provided to the consumer (human or machine) in a synchronous manner. While the exact synchronization may be done at the endpoints, also the network may need to provide streams to the recipient UEs with similar enough timing.
* Depending on the type of application, streams should be treated either as equally as possible, i.e., if one of the streams fails also the others are no longer relevant, or as independently as possible, i.e., if one of the streams fails the others become even more important to deliver.
* Streams could in general have different relative priority

For the purpose of the improved handling of the related application traffic streams in the 5GS, the following should be studied:

* What information should an application provide to the 5GS regarding the relationships of specific traffic streams that are sent or received by the same UE or different UEs?
* What information should an application provide regarding its policies, i.e., how the related traffic streams should be treated with respect to each other?
* How the application provided information regarding stream relationship and policy for different streams for a given UE or multiple UEs be used within 5GS.
  + How they are translated to 5GS concepts such as policy rules or QoS flow related assistance information?
  + What are the entities within 5GS that should enforce the corresponding policy rules and/or QoS assistance based on information provided by the application?