**3GPP TSG-WG SA4 Meeting #130 *S4-241936***

**Orlando, USA, 18th – 22nd Nov, 2024**

Title: [DRAFT] LS Reply on multi-modality awareness

Response to: LS (S4-241802/R2-2409272)

Release: Release 19

Work Item: NR\_XR\_Ph3-Core

Source: SA4

To: RAN2, RAN3, SA2

Cc:

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Attachments: none

**1. Overall Description:**

SA4 thanks RAN2 LS in S4-241810/R2-2409272 on multi-modality awareness, and would like to provide the feedback as following.

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| * RAN2 considers that based on multi-modal information: * **The gNB may perform joint admission control. Details can be left up to RAN3 in potential WI phase.** * **The gNB may consider this information during QoS flow to DRB mapping (up to gNB implementation)** |

**Answer**: From the SA4 perspective, for joint admission control, it is recommended that gNB should try to grant all associated QoS Flows. However, only the application layer can determine how to handle the case when the QoS flow for one modality cannot be established e.g. due to RAN resource limitations. For instance, it may be acceptable to an application if the QoS flow for video cannot be established but it may not be acceptable if the QoS flow for audio cannot be established. The conditions under which particular QoS flows are considered essential for an application to continue are application specific and cannot be determined by 5GS. As a result, if one QoS flow is established, gNB should try to establish the associated QoS Flows. If gNB cannot guarantee all the associated QoS flows been established successfully, it could behave as legacy.

If SA2 intends to go ahead with joint admission control, then given that different applications have different requirements, the application needs to explicitly request joint admission (or give its consent) to 5GS to do joint admission control.

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| * For DL, whether traffic synchronization (on a per packet basis) can be achieved depends on whether packet level synchronization information can be provided from CN to RAN. * RAN2 thinks PDU Set discard across QoS flows of the same multi-modal service based on the dependency information between the mutli-modal flows can only be achieved in case the synchronization information can be available at the UE which is up to SA2/SA4. |

**Answer:** For DL, from application perspective, there are well-defined mechanisms to support synchronized playout among different media flows, e.g. RTP timestamps, jitter buffering mechanism in the RTP client. However, these mechanisms guarantee the frame level synchronization while do not provide packet level synchronization among different media flows. 5GS per packet inter-modal synchronization may be not needed for XR services in such case, as the very low round trip latency requirements will prevent the system from introducing unacceptable inter-modal skew. [However, for buffer-limited device or conversational XR services, it may be helpful for the network to assist to do the synchronization.]

Regarding PDU Set discard, receiving packets for some modalities may be better than receiving none at all as this enables the application to use the received modalities to better manage the user experience from application point of view (e.g., pause the video while rendering received audio packets, or render received video packets while concealing an audio packet drop). For the UL, it might be feasible for the UE application layer to get the synchronization information, however, it is unclear for SA4 whether any detailed and practical method is available for a UE implementation to determine the synchronization information among multi-modal flows from application layer to UE modem.

**2. Actions:**

**To RAN2, RAN3, SA2 group.**

**ACTION:** SA4 asks RAN2, RAN3 and SA2 group to take the above into account and provide feedback if any.

**3. Date of Next TSG SA WG4 Meetings:**

TSG-SA4 Meeting #131 17th – 21st Jan, 2025 Geneva, CH

TSG-SA4 Meeting #131-bis-e 11th – 17th Apr, 2025 Online