3GPP TSG-WG SA2 Meeting #143E e-meeting *S2-2100713r02*

Elbonia, February 24 – March 09, 2021

**Source: Huawei, HiSilicon**

**Title: KI#7: Conclusion update for the left EN**

**Document for: Approval**

**Agenda Item: 8.9.1**

**Work Item / Release: FS\_5MBS / Rel-17**

*Abstract: This contribution proposes to resolve the left EN in the conclusion of KI#7.*

1. Introduction

In S2#142E e-meeting, four ENs are left in KI#7 conclusion. Those EN are related to RAN work and need their feedback. Per the latest RAN progress (S2-2100110/S2-2100142), this document proposes to address these ENs and update the conclusion accordingly.

1. Discussion

Editor's note: It will be determined during the normative work whether the mapping information is also provided towards the UE.

This issue is on whether the mapping information between the QoS flow of MBS session and the QoS flow of the unicast PDU session need be provided to the UE.

If the UE join the MBS session via the NG-RAN not supporting 5MBS, 5GC Individual MBS traffic delivery method is used. So the SMF includes the mapping unicast QoS flow related information in N1/N2 SM container to the NG-RAN and the UE. Thus if the individual delivery method is used, the UE receives the mapped unicast QoS flow information. If the UE join the MBS session via NG-RAN supporting 5MBS, the 5GC Shared MBS traffic delivery method is used. So the SMF includes the multicast QoS flow related information in N1/N2 SM container to the NG-RAN and the UE. So the UE receives the multicast QoS flow related information.

Per RAN3 feedback, the mapping information should be provided to NG-RAN as early as possible, preferably at Joining. So the left question is on whether the mapping information should also be included in the N1 SM container and provide to UE when the UE join the MBS session? As mentioned in S2-2100110, when the UE moves from the source NG-RAN supporting 5MBS to the target NG-RAN not supporting 5MBS, the switching from shared delivery method to the individual delivery method is happed during the path switch procedure. If the UE does not obtain the mapping information before handover, it is impossible to do the delivery mode switch during the handover procedure.

Therefore, in light of the above discussion, if the 5GC individual MBS traffic delivery method need be used, the mapping information between the multicast QoS flow and the unicast QoS flow should be provided to UE when the UE join the MBS session.

**Proposal 1: If the 5GC individual MBS traffic delivery method need be used, the mapping information between the multicast QoS flow and the unicast QoS flow should be provided to UE when the UE join the MBS session.**

Editor's note: How 5GC Shared MBS delivery is enabled for the UE will be developed with RAN WGs.

The issue is that during the mobility procedure how the 5GC determine whether the shared delivery or individual delivery is to be used at the target NG-RAN node.

When the 5GC choose the delivery method, the 5MBS capability of UE and NG-RAN node need be considered. The 5MBS capability of UE can be obtained by SMF via the MBS session joining procedure. As mentioned in S2-2100110, the delivery mode switch is happened during the handover procedure. How 5GC know the NG-RAN node 5MBS capability, the following approach can be utilized:

* During the MBS session joining procedure, after the SMF retrieves the multicast QoS information from MB-SMF, the SMF generates the counterpart unicast QoS information. The SMF includes the multicast QoS profile, the counterpart unicast QoS profile, and the mapping information between the multicast QoS flow and the unicast QoS flow to the NG-RAN. If the NG-RAN support 5MBS, the accepted multicast QFI are included in the N2 SM response message from the NG-RAN, otherwise only the accepted unicast QFI are included in the N2 SM response message.
* For the N2 based handover (from supporting to non-supporting NG-RAN node), similar as the MBS session joining procedure, the SMF includes the multicast QoS profile, the counterpart unicast QoS profile, and the mapping information between the multicast QoS flow and the unicast QoS flow to the target NG-RAN in the N2 handover request message. Based on the accept QFI information included in the handover request acknowledge message from the target NG-RAN, the SMF is aware whether the target NG-RAN node support 5MBS or not.
* For the Xn based handover (from supporting to non-supporting NG-RAN node), based on the accept QFI information included in the path switch request, the SMF know whether the target NG-RAN node support 5MBS or not.

After the SMF get the target NG-RAN 5MBS capability, the shared or individual delivery path can be established as described in solution#27.

For the N2/Xn based handover (from non-supporting to supporting NG-RAN node), from the RAN feedback the procedure is FFS. However to support the delivery mode switch, the 5MBS capability of target NG-RAN node need be aware by the SMF. This information can be included within the handover request ACK or path switch request message.

**Proposal 2: The SMF obtain the 5MBS capability of UE via the MBS session joining procedure.**

**Proposal 3: During the handover procedure from 5MBS supporting to 5MBS non-supporting NG-RAN node, the delivery path is established as following:**

* **For the N2/Xn based handover, the SMF is aware the 5MBS capability of target NG-RAN node via the accepted QFI information within the handover required ACK or path switch request message respectively.**
* **Based on the 5MBS capability of target NG-RAN node, the SMF determine which MBS Traffic delivery method is used.**

**Proposal 4: When the source NG-RAN does not support 5MBS and the target NG-RAN supports 5MBS, the 5MBS capability of target NG-RAN node need be aware by the SMF.**

Editor's note: It is FFS whether the support for lossless handover with data forwarding from source NG-RAN supporting 5MBS to the target NG-RAN not supporting 5MBS is needed, which needs confirmation by RAN.

Per the response from RAN3 minimization of data loss should be targeted for the scenario the source NG-RAN supporting 5MBS and the target NG-RAN not supporting 5MBS. There are candidate solutions documented in TR 23.757 to alleviate/avoid the MBS data lost during handover procedure, which can further evaluated by RAN3. It is suggested to agree that lossless handover with data forwarding from source NG-RAN supporting data 5MBS to the target NG-RAN not supporting 5MBS is needed and remove this EN.

Editor's note: Whether any assistance information from CN is needed, e.g. for PTP/PTM delivery method decision and switching, needs further confirmation when the relevant conclusion is reached in RAN WGs.

Per RAN2/RAN3 feedback, no assistance information is foreseen to assist NG-RAN to do the PTP/PTM delivery method decision and switching. It is suggested to remove this EN.

# 3. Text Proposal

It is proposed to capture the following changes VS. TR 23.757.

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

8 Conclusions

8.7 Key Issue #7: Reliable delivery method switching between unicast and multicast

For delivery method switching due to mobility, the following principle are agreed,

- When the UE moves from a NG-RAN node that supports 5MBS to a RAN node that does not support 5MBS, the network and UE shall support switch from 5GC Shared MBS traffic delivery method to 5GC Individual MBS traffic delivery method.

- When the UE moves from a RAN node that does not support 5MBS to a NG-RAN node that supports 5MBS, the network and UE shall support switch from 5GC Individual MBS traffic delivery method to 5GC Shared MBS traffic delivery method.

- When the UE joins an MBS session and handover to NG-RAN nodes not supporting 5MBS is required, mapping information about multicast QoS flows is provided to the NG-RAN node, which enables data forwarding of the MBS session during handover from 5MBS-capable RAN node to non-5MBS-capable RAN node.

NOTE 1: The mapping information between the unicasts QoS flow and multicast QoS flows provided to the RAN and UE to assist the lossless handover requires confirmation from RAN WG.

- To support handover to an NG-RAN node not supporting 5MBS, the N3 tunnel of the PDU Session, which is used for 5GC Individual MBS traffic delivery, need to be activated.

- During the handover from RAN not supporting 5MBS to NG-RAN supporting 5MBS, PDU sessions, including the one associated with the MBS session and used for 5GC Individual MBS traffic delivery, are handed over to target RAN. After the UE camps in the target cell, the 5GC triggers the switch from 5GC Individual MBS traffic delivery method to 5GC Shared MBS traffic delivery method.

NOTE 2: Whether the 5GC triggers the switch or the way that 5GC triggers the switch is specified in normative phase.

- During the mobility from NG-RAN supporting 5MBS to NG-RAN not supporting 5MBS, the 5GC triggers the switching from 5GC Shared MBS traffic delivery method to 5GC Individual MBS traffic delivery method based on the information received from target NG-RAN.

- During the inter supporting 5MBS NG-RAN node handover, minimization of data loss should be supported, e.g. by data forwarding, details for RAN WGs to decide.

NOTE 2: Using data forwarding to minimize data loss for handover from source NG-RAN supporting 5MBS to the target NG-RAN not supporting 5MBS requires confirmation from RAN WG.

- It is commonly understood that if service requirements result in applying 'lossless handover' (see TS 38.300), UEs receiving MBS traffic of that MBS session need to be in CM-CONNECTED with RRC-CONNECTED state.

For delivery method switching not due to mobility, the following principle are agreed,

- Switching between PTP and PTM delivery methods for 5GC Shared MBS traffic delivery shall be supported. NG-RAN is the decision point for of switching the PTP and PTM delivery methods.

- If the NG-RAN node supports 5MBS, the network shall use the 5GC Shared MBS traffic delivery method for MBS Session packet transfer.

Switching between multicast delivery and unicast delivery using individual UE and application server addresses is not specified in normative work.

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