3GPP TSG SA WG2 Meeting #140-e S2-2005689r`12

Electronic, 19 Aug – 02 Sep, 2020

**Title: LS on System support for Multi-USIM devices**

**Response to:**

**Release: Rel-17**

**Work Item: FS\_MUSIM**

**Source: SA2**

**To: RAN2, RAN3**

**Cc: -**

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**Attachments:** None

# 1 Overall description

SA2 would like to inform RAN2 and RAN3 that they have progressed the study on FS\_MUSIM (TR 23.761) and are discussing **interim** conclusions on all three key issues.

SA2 point out that these **interim** conclusions are subject to further revision taking into account feedback received from other WGs.

The table below lists the principles that are considered for further study and have RAN impact or require RAN feedback. The table also contains the applicability to key issues in TR 23.761, as well as questions to RAN WGs.

As a reminder, these are the KIs in SA2 study:

- Key Issue #1: Handling of Mobile Terminated service with Multi-USIM device (related to Objective #3 in RAN WID)

- Key Issue #2: Enabling Paging Reception for Multi-USIM Device (related to Objective #1 in RAN WID)

- Key Issue #3: Coordinated leaving for Multi-USIM device (related to Objective #2 in RAN WID)

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| **Solution principle for further study in SA2** | **Applicability to Key Issues** | **Question to RAN WGs** |
| Paging Cause (as in Solution #1) | SA2’s KI#1. | Q1: Please confirm feasibility of sending a Paging Cause in [Uu] Paging message for EPS and for 5GS. **[RAN2, RAN3]**  Q2: Please indicate whether adding the paging cause in the paging message would reduce the number of paging records that could be included in a single paging message, and if so by what magnitude.  Q3: Please indicate how the paging cause is expected to be supported in RAN nodes (e.g. per PLMN, per TA, per node, per cell) |
| Busy indication (as in Solution #3) | SA2’s KI#1. | Q4: Please indicate whether it is desirable that the UE always responds to paging to stop paging escalation from the CN or needless repetition in the RAN. **[RAN2, RAN3]**  Q5: Please indicate an order of magnitude (tens of ms? Hundreds of ms?) of the expected scheduling gap required to by the proposed (NAS) Busy Indication for one USIM **[RAN2]**  Q6: Solution 3 proposes to send the Busy Indication as a NAS message which requires an RRC connection. Please provide feedback if it is feasible (and secure) if the Busy Indication is sent at RRC instead i.e. without requiring an RRC connection **[RAN2, RAN3, SA3]**  Q7: If answer to Q6 is “feasible” please indicate whether mandating sending such Busy Indication at RRC achieves significant time savings (order of magnitude) **[RAN2]** |
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| RRC-based leaving and returning with the following assumptions:  A)  - Leaving is always triggered by the UE with an RRC request to the network. The UE leaves either upon explicit acknowledgement by the network, or by a given time if no acknowledgement is received by the network.  - When leaving the UE is released to RRC Inactive. The UE may return while still in RRC Inactive using RRC signaling (i.e. Resume the RRC connection). However if the UE does not return for an extended time period, it autonomously enters RRC Idle.  NOTE 1: the duration of the extended time period is subject to RAN decision  B)  - In addition to the above, gaps while RRC Connected are considered, to allow the UE to leave temporarily without interrupting the RRC Connection.  NOTE 2: This is considered an Access-Stratum only solution, subject to RAN decision only. Whether the gaps are negotiated or not and their duration is FFS.  - The UE uses the above to perform a MO procedure (e.g. periodic mobility registration, keep-alive message, sending busy indication, etc.) or a MT procedure (e.g. pick-up an SMS, inspect a MT service invite, respond to a network-initiated C-plane procedure, etc.) in the other network.  - | SA2’s KI#1 and KI#3. | Q8: Please indicate whether it is feasible and desirable to define an RRC-based leaving and returning procedure in 5GS as per A. **[RAN2, RAN3]**  Q9: Please indicate whether it is feasible and desirable to define gaps in RRC Connected in 5GS as per B) and if so their maximum duration and whether negotiated or not **[RAN2]**  Q9: Please let us know whether changes to 5GS/E-UTRA (Option 5) to support A) and/or B) may be considered in view of the current RAN Work Item. **[RAN2, RAN3]** |

SA2 would also like to point out that TR 23.761 also contains several solutions to KI#2 requiring RAN’s feedback. The solution principles in these solutions can be categorized as follows:

- UE -requested 5G-GUTI reassignment using the Mobility Registration Update procedure (as in Sol#14 and Sol#20). The 5G-GUTI is systematically reassigned by the network during the Mobility Registration Update procedure (as of Rel-15) requires. Proposed for 5GS only.

- Changes related to the UE\_ID (UE Identity Index) that is used for calculation of PF/PO. In EPS the UE Identity Index is provided by the MME to the eNB as part of the paging message. In 5GS the UE Identity Index value is provided by the AMF in the RRC-Inactive Assistance information but not in the paging message:

- Calculation of PF/PO by using an Alternative UE\_ID which is not derived from either the UE’s GUTI or IMSI. The UE ID sent in the paging message is not impacted by this Alternative ID that is only used for PO/PF calculations (Sol#15). Proposed for both EPS and 5GS.

- Calculation of PF/PO by using an UE\_ID which is derived from IMSI+offset value. The offset value is negotiated between UE and MME (Sol#16). Proposed for EPS only.

- Calculation of PF/PO based on MUSIM Assistance Information (Sol#17).

- Paging on consecutive POs as in Sol#18. For this solution SA2 was not clear whether the network requires an explicit MUSIM capability so that a different paging strategy can be applied to MUSIM- and non-MUSIM capable devices.

- Implementation-based solution to address overlapping POs (Sol#19).

- Access Stratum-based solution with scheduling gap (Sol#21).

Q10: SA2 would like to ask RAN2 whether Solutions #14 to #20 are feasible for effective avoidance of paging collision in the 5GS.

Qx: Solution 18 increases the use of paging resources especially for UE with idle mode mobility. SA2 would like to ask RAN2 to provide feedback on the increased use of paging resources in the system for MuSIM devices.

Qxx: SA2 would like to ask RAN2 and RAN3 to take these solutions into consideration and provide any other feedback or recommendation on the applicability of these solutions, or any other Access Stratum-based solutions for KI#2.

# 2 Actions

**To RAN2, RAN3**

**ACTION:** SA2 kindly asks RAN2 and RAN3 to take into consideration the information above and provide answers to questions as indicated in the table and to the questions on paging collision avoidance.

# 3 Dates of next TSG SA WG 2 meetings

SA2#141E 12-23 October Electronic meeting

SA2#142E 16-20 November Electronic meeting