**3GPP TSG-CT WG1 Meeting #133-eC1-217230**

**Electronic meeting, 11th – 19th November 2021**Revision of C1-216636, CP-212102

**3GPP TSG-CT WG4 Meeting #107-eC4-216141**

**Electronic meeting, 15th – 23rd November 2021**Revision of CP-212102

**Source: Intel**

**Title: Revised WID on CT aspects of Enabling Multi-USIM devices**

**Document for: Agreement**

**Agenda item: 17.1.1 (CT1), 5 (CT4)**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

# Title: CT aspects of Enabling Multi-USIM Devices

## Acronym: MUSIM

## Unique identifier: 910063

Potential target Release: Rel-17

## 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | UICC apps | ME | AN | CN | Others (specify) |
| **Yes** |  | X |  | X |  |
| **No** | X |  | X |  |  |
| **Don't know** |  |  |  |  | X |

## 2 Classification of the Work Item and linked work items

### 2.1 Primary classification

|  |  |
| --- | --- |
|  | Feature |
| X | Building Block |
|  | *Work Task* |
|  | Study Item |

### 2.2 Parent Work Item

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| MUSIM | SA2 | 900013 | System enablers for Multi-USIM devices |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
| 840040 | Stage 1 of MUSIM | Rel-17 Work item on Support for Multi-USIM Devices in SA1. |
| 820012 | Study Item on system enablers for multi-USIM devices | SA2 Study Item |
| 900017 | Study on the security of the system enablers for devices having multiple Universal Subscriber Identity Modules (USIM) | SA3 Study Item |
| 860163 | Support for Multi-SIM devices for LTE/NR | Rel-17 Work item on Support for Multi-SIM devices in RAN. |

**Dependency on non-3GPP (draft) specification**:

None

## 3 Justification

With the increased complexity of 5G-capable UEs and with growing demand for multi-USIM devices in the market, it becomes urgent for 3GPP to consider system enhancements that would allow for more cost-efficient implementations in such devices. As such, as part of Rel-17, SA2 is conducting a study on enabling multi-USIM devices.

The stage 1 work of MUSIM finished at SA#84 with the completion of the SA1 WID on MUSIM (SP-190309). The SA1 service requirements are captured in TS 22.278 and TS 22.101. The SA1 use cases are captured in TR 22.834.

The stage 2 work of MUSIM started at SA#87e with the SA2 study item on *System Enablers for Multi-USIM devices* (FS\_MUSIM) (SP-200297). The conclusions of the SA2 study are captured in TR 23.761 and provides a good overview of what is to be continued in normative phase and their impacts on other working groups.

Furthermore, TSG SA approved the work item " *System Enablers for Multi-USIM devices* " (MUSIM) for SA2 normative work (SP-210091).

SA3 is studying enhancements of security support for devices with multiple USIM under study item (SP-201131) " *Study on the security of the system enablers for devices having multiple Universal Subscriber Identity Modules* " (FS\_MUSIM\_SEC). The study is captured in 3GPP TR 33.873.

In addition, TSG RAN approved a new WID on "*Support for Multi-SIM devices for LTE/NR*" (LTE\_NR\_MUSIM) (RP-210316) which is expected to conclude in Rel-17 timeframe.

Considering the above, impacts on protocols and interfaces under CT WGs' responsibilities are foreseen. The CT WGs need to carry out stage-3 work in Rel-17 to satisfy the normative requirements arising out of stage-2 work.

Based on progress in SA2, SA3 and RAN WGs, this WID will be updated as needed.

## 4 Objective

The objective of this work item is to specify the CT aspects of MUSIM in 5GS and EPS. The stage-3 work shall be started only after the applicable normative stage-2 requirements in SA2 are available.

The stage-3 aspects may include the following (non-exhaustive, additional areas can be identified based on progress in SA3 and in normative work in SA2):

For CT1:

- Update the NAS procedures and message(s) to support MUSIM for EPS or 5GS as follows:

a) Possible update to Attach and TAU (for EPS) and Registration procedure (for 5GS) allowing the UE to indicate the support of individual MUSIM capabilities and allow the network to indicate its supported MUSIM capabilities based on network support and network preference to the UE.

b) Possible updates to NAS procedures depending on how the UE responds to network triggered SR procedure with paging cause meaning "voice" (MMTel voice or CS domain voice) (for both EPS and 5GS).

c) The device in idle mode can decide to not accept the core network paging by providing a NAS busy indication (for both EPS and 5GS). In addition to the NAS busy indication the UE may provide assistance information regarding MT data/signalling handling (e.g. paging restrictions).

d) The device in 5GMM-CONNECTED mode with RRC inactive indication can decide to not accept the RAN paging by requesting NAS signalling connection release. In addition to the NAS busy indication the UE may provide paging restriction information regarding MT data/signalling handling.

e) When the UE detects a paging collision, possible updates to ATTACH and TAU procedure for the UE and MME to negotiate an IMSI offset that is used for future calculation of paging occasions (in case of EPS)

f) When the UE detects a paging collision, possible updates to trigger Registration procedure for the UE to request a new 5G-GUTI assignment (in case of 5GS).

g) For co-ordinated leaving, possible updates to NAS procedures to indicate request to leave the connected mode and optionally include the relevant assistance information (in case of EPS and5GS).

- Potential update of AT commands to support MUSIM (for both EPS and 5GS).

For CT4:

- Update the procedures and message(s) to support MUSIM in EPS and 5GS as follows:

a) For co-ordinated leaving, potential updates to provide MT data handling information based on Release assistance information from UE to S-GW (in case of EPS).

b) For paging restrictions, potential updates to N1N2MessageTransfer and MT\_EnableUEReachability service operation to indicate that the UE is not reachable.

## 5 Expected Output and Time scale

|  |
| --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| 24.501 | Updates to Registration procedure, Paging procedure and Service Request procedure and messages to support MUSIM in 5GS.  | TSG CT#95 (Mar 2022) | CT1 Responsibility |
| 24.301 | Updates to Attach procedure, Paging procedure, TAU and Service Request procedure and messages to support MUSIM in EPS. | TSG CT#95 (Mar 2022) | CT1 Responsibility |
| 27.007 | Possible update of AT commands to support MUSIM in 5GS and EPS | TSG CT#95 (Mar 2022) | CT1 Responsibility |
| 29.274 | Potential updates to S11 interface to support MUSIM in EPS | TSG CT#95 (Mar 2022) | CT4 Responsibility |
| 29.518 | Potential updates to N1N2MessageTransfer and MT\_EnableUEReachability service operation for supporting paging restrictions | TSG CT#95 (Mar 2022) | CT4 Responsibility |

## 6 Work item Rapporteur(s)

Thomas Luetzenkirchen, Intel, (thomas.luetzenkirchen@intel.com)

## 7 Work item leadership

CT1

## 8 Aspects that involve other WGs

SA3 for any security aspects.

RAN2 and RAN3 for access stratum related aspects.

## 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Intel |
| InterDigital Inc. |
| vivo |
| NEC |
| LG Electronics |
| Charter Communications |
| Lenovo |
| Motorola Mobility |
| Convida Wireless |
| Samsung |
| Cisco |
| OPPO |
| Nokia |
| Nokia Shanghai Bell |
| ZTE |
| Apple |
| Cable Labs |
| Qualcomm Incorporated |
| MediaTek |
| Ericsson |
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