**3GPP TSG RAN Meeting #90e RP-20xxxx**

**Electronic Meeting, Dec 7-11, 2020** (revision of RP-202649)

**Source: vivo, China Telecom, China Unicom**

**Title: New WID: Support for Multi-SIM devices for LTE/NR**

**Document for: Approval**

**Agenda Item: 9. 8.12**

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: Support for Multi-SIM devices for LTE/NR

## Acronym: LTE\_NR\_MUSIM

## Unique identifier: 860063

NOTE: For new WIs/SIs leave the Unique identifier empty and make a proposal for an Acronym.

 For a revised WI/SI: Take Unique identifier and acronym as shown in 3GPP workplan.

 If this is a RAN WID including Core and Perf. part, then Title, Acronym and Unique identifier refer to the feature WI.

 Please tick (X) the applicable box(es) in the table below:

 Either:

|  |  |
| --- | --- |
| **This WID includes a Core part** | **X** |
| **This WID includes a Performance part** |  |

 or:

|  |  |
| --- | --- |
| **This WID includes a Testing part** |  |
| **and it addresses the following 3GPP work area:** | **Radio Access** |  |
| **Core Network** |  |
| **Services** |  |

Potential target Release: Rel-17

Note that this field above indicates the proposed Release at the time of submission of the WID to TSG approval. It can later be changed without a need to revise the WID. The updated target Release is indicated in the Work Plan. In case of contradiction with the target dates of clause 5, clause 5 determines the target release.

## 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

This work item is a …

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

NOTE: Normally, Core/Perf./Testing parts in RAN WIDs are Building Blocks. Only if they are under an SA or CT umbrella, they are defined as work tasks. If you are in doubt, please contact MCC.

### 2.2 Parent Work Item

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  |  |  |  |

NOTE: RAN agreed some time ago, that it describes the feature WI + Core/Perf. part WI or Testing part WI in one WID. Therefore the table above should just include the feature WI data (In case the feature covers Core and Perf. part, please list under Working Group the leading WG of the Core part).

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
| 840040 | WID on Support for Multi-USIM Devices | *Rel-17 Work item on Support for Multi-USIM Devices in SA1.* |
| 820012 | Study on system enablers for multi-USIM devices | *Rel-17 Study Item on system enablers for multi-USIM devices in SA2.* |

NOTE: Also related or dependent WIs/SIs in other TSGs should be indicated.

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

## 3 Justification

Multi-USIM devices have been more and more popular in different countries. The user may have both a personal and a business subscription in one device or has two personal subscriptions in one device for different services (e.g. use one individual subscription and one “family circle” plan). However, support for multi-USIM within a device is currently handled in an implementation-specific manner without any support from 3GPP specifications, resulting in a variety of implementations and UE behaviours. Standardizing support for such UE’s can prove beneficial from a performance perspective in that network functionality can be based on predictable UE behaviour.

UE’s that are registered to more than one network need to be able to receive pages from more than one network. Dependent on UE capabilities (e.g., Rx and Tx capabilities) this can create situations in which a UE is occupied listening to pages from one network while pages from other networks also may be sent. Further UE’s may be actively communicating with one network while another network pages the UE. If a user switch between communications towards different networks, situations may occur when a UE/user can no longer receive data from a network it was recently communicating in. Such situations can have a negative impact on performance, e.g., if pages are sent and not properly received, or if users are scheduled while not being able to receive communication.

RAN should study the system impact and, specify potential enhancements to avoid performance degradations of the above-mentioned and other situations that may occur when UE’s can communicate with more than one system via Multi-SIM support.

The system impacts due to Multi-SIM devices to the 3GPP system is also addressed in SA2 (i.e., see SP-190248). Coordination with SA should be considered based on SA2 progress, i.e., study on system enablers for multi-SIM devices and the potential work item.

## 4 Objective

### 4.1 Objective of SI or Core part WI or Testing part WI

The detailed objectives of the Work Item are:

1. Specify, if necessary, enhancement(s) to address the collision due to reception of paging when the UE is in IDLE/INACTIVE mode in both the networks associated with respective SIMs [RAN2]
	* RAT Concurrency: Network A can be NR or LTE. Network B can either be LTE or NR.
	* Applicable UE architecture: Single-Rx/Single-Tx.
2. Specify mechanism for UE to notify Network A of its switch from Network A (for MUSIM purpose) [RAN2]:
	* RAT Concurrency: Network A is NR. Network B can either be LTE or NR.
	* Applicable UE architecture: Single-Rx/Single-Tx, Dual-Rx/Single-Tx
3. Unless SA2 find an alternative solution or decides otherwise, specify mechanism for an incoming page to indicate to the UE whether the service is voLTE/VoNR[ RAN2].
	* RAT Concurrency: Network A is either LTE or NR. Network B is either LTE or NR.
	* Applicable UE architecture: Single-Rx/Dual-Rx/Single-Tx

UE SIMs may belong to same or different operators.

USIM can be a physical SIM or eSIM.

Coordination with relevant WGs, such as SA2, should be considered where relevant.

 For objective 1, specification change should focus on NR side and the change on LTE side is only for IDLE mode (i.e. related to EPC enhancement in SA2)NOTE 1: Single Rx allows MUSIM UE to receive traffic from only one network at one time, Dual Rx allows MUSIM UE to simultaneously receive traffic from two networks. Single Tx allows MUSIM UE to transmit traffic to one network at one time, dual Tx allows MUSIM UE to simultaneously Transmit traffic to two networks. (The terms Single Rx/Tx and Dual Rx/Tx do not refer to a device type. A single UE may, as an example, uses Dual Tx in some cases but Single Tx in other cases)

NOTE 2: Co-ordination between involved operators is not expected.

### 4.2 Objective of Performance part WI

NOTE: Leave empty if the WI proposal does not contain a RAN performance part.

### 4.3 RAN time budget request (not applicable to RAN5 WIs/Sis)

NOTE: For all new RAN related Wis/Sis which are not led by RAN WG5 the WI/SI rapporteur has to fill out the attached Excel table to request time budgets for corresponding RAN WG meetings.
The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI.
One time unit (TU) corresponds to ~ 2 hours in the meeting.
If no TU is needed, then leave the field empty otherwise enter a number >0 in the field.

 For revisions of already approved WI/SI descriptions: Please remove the Excel table from the WID/SID’s zip file. The time budgets are already recorded. If you want to modify them, then this has to be done via the status report and not via a revised WID/SID.

 If this WID is covering Core and Performance part, then please fill out one line for each part in the attached Excel table.

**Additional comments to the time budget request in the attached Excel table:**

## 5 Expected Output and Time scale

|  |
| --- |
| **New specifications** *{One line per specification. Create/delete lines as needed}* |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Remarks |
|  |  |  |  |  |  |

NOTE: If this is a RAN WI including Core and Perf. Part, then all new Core part specs have to be listed first and then all new Perf. Part specs. Indicate “Core part” or “Perf. Part” under Remarks for each spec.
By default a new specs can only be new for one of both parts.

|  |
| --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| 38.300 | NR and NG-RAN Overall Description;Stage 2 | RAN 92 |  |
| 38.331 | NR Radio Resource Control (RRC) protocol specification | RAN 92 |  |
| 38.306 | NR User Equipment (UE) radio access capabilities | RAN 92 |  |
| 38.304 | NR User Equipment (UE) procedures in Idle mode and RRC Inactive state | RAN 92 |  |
| 36.300 | Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description;Stage 2 | RAN 92 |  |
| 36.304 | Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in Idle mode | RAN 92 |  |
|  |  |  |  |

NOTE: If this is a RAN WI including Core and Perf. part, then all new Core part specs have to be listed first and then all new Perf. part specs. Indicate "Core part" or "Perf. part" under Remarks for each spec.
If an existing spec is affected by both (Core part and Perf. part), then it has to be listed twice with appropriate approval dates.

## 6 Work item Rapporteur(s)

Xiaodong Yang

**Company:** vivo

**Email:**Yangxiaodong5g@vivo.com

## 7 Work item leadership

Primary responsible WG: RAN2

## 8 Aspects that involve other WGs

NOTE: For RAN WIs: Section 8 applies only toWGs outside of TSG RAN because RAN WG aspects have to be covered in section 4.

## 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| vivo |
| China Telecom |
| China Unicom |
| CMCC |
| CAICT |
| Charter Communications |
| Huawei Device |
| Huawei |
| HiSilicon |
| Samsung |
| Verizon |
| ZTE |
| Qualcomm Inc |
| intel |
| Apple |
| AT&T |
| Xiaomi |
| Lenovo |
| Motorola Mobility |
| Ericsson |
| Nokia |
| Nokia Shanghai Bell |
| Google Inc |
| Spreadtrum Communications |
| NEC |
| Vodafone Group |
| InterDigital |
| Futurewei |
| MediaTek |
| Sharp |
| III |
| CATT |
| Fraunhofer HHI |
| Fraunhofer IIS |