**3GPP TSG RAN Meeting #89 REV RP-201605**

**Electronic Meeting, Sept 14th - 18th, 2020**

**Source: Nokia, Nokia Shanghai Bell**

**Title: New WID on NR RF Enhancements for FR2**

**Document for: Approval**

**Agenda Item: 9.1.2**

3GPP™ Work Item Description

For guidance, see [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39; and [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm).
Information about Work Items can be found at <http://www.3gpp.org/Work-Items>

# Title: New WID on NR RF Enhancements for FR2

## Acronym:

## Unique identifier:

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

 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** | **X** |

 or:

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

## 1 Impacts

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

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

### 2.1 Primary classification

This work item is a

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

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

### 2.2 Parent and child Work Items

|  |
| --- |
| Parent and child Work Items  |
| Unique ID | Title | Nature of relationship |
|  | NR RF requirements for FR2 | Parent WID |

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 Unique ID and title.

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
|  |  | *{optional free text}*  |

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

## 3 Justification

RAN4 completed many FR2 NR features in Rel-16. Some of the original objectives were however down scoped during the WI phase hence it would be important to continue the work in Rel-17. There was also extensive email discussion on objectives in RAN drafts reflector RP-201609.

## 4 Objective

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

The purpose of this work item is to specify the following FR2 UE features and associated requirements:

* Inter-band DL CA enhancements [RAN4 RF/RRM]
	+ - Define UE requirements for both common and independent Beam Management between different freq. groups (e.g. 28GHz + 37GHz) based on requested band combinations: CA\_n258A-n260A and CA\_n257A-n259A.
		- Define UE requirements for inter-band CA within the same freq. group (e.g. 28GHz + 28GHz) for both common and independent beam management
		- Including RF and RRM requirement aspects
* Inter-band UL CA [RAN4 RF/RRM], on hold until there is operator request for uplink CA configuration in Basket WI
	+ - Study whether and how CBM and IBM are applied for inter-band UL CA
		- specify inter-band UL CA for two bands based on requested band combinations: CA\_n257A-n259A.
		- [study on non-simultaneous UL for inter-band]🡪 Lot of companies have indicated that this should not be studied therefore this should be removed as down scoping is necessary
* Beam Correspondence enhancements [RAN4 RF/RRM, RAN2?]
	+ - -CSI-RS based beam correspondence with P1 CSI-RS QCL relation configured with ‘none’ 🡪 in RAN1 LS R1-2007428, it is said "P1 CSI-RS without QCL-TypeD source is supported by specifications. While there are multiple companies which consider there is valid scenarios(s) that P1 CSI-RS has no QCL relation for Rel-16 (such as P1 beam alignment, and inter-cell cooperation)". we think it is necessary to define CSI-RS only beam correspondence.
		- [Further enhancements for beam correspondence when network signal is poor] (RRM only) 🡪 Only DL beam management requirements are specified in RRM
		- [Study BC enhancements and requirements for dynamic radio conditions, including localized beam sweep enhancement based on unified TCI framework for DL and UL beam indication specified in Rel-17 FeMIMO WI]🡪To be moved to RAN4 objective of FeMIMO WI if RAN1 confirms the objective
		- [Beam Correspondence enhancements for initial access i.e. based on SSB and based on PRACH power control] 🡪For initial access BC, all RF requirements including BC RF requirement are defined for all physical channles,
* gaps for self-calibration. [RAN4 RF/RRM, RAN2] Study and, if feasible, introduce UE specific and NW configured gap for general self-calibration and monitoring purposes including
	+ PA efficiency and power consumption
	+ Transceiver calibration due to temperature variation
		- [UE Tx power management] 🡪This calibration type has not been studied in Rel-15, we prefer to put it into other calibration issues with a study phase firstly.
	+ Others self-calibration and monitoring are not precluded
		- * **Phase 1:** Study and clearly identify the performance gain over the current baseline (Rel.16 requirements) and associated UL gap configuration. 🡪 no need to discuss the details in the WID
			* **Phase 2:** Specify the UL gap configuration(s) based on the identified performance gain in Phase 1 and UE fall back behaviour i.e. if gaps are not available for UE requesting gaps.

### 4.2 Objective of Performance part WI

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

Define relevant performance requirements for items above.

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

NOTE: For all new RAN related WIs/SIs which is 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 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  | Series | Title | For info at TSG#  | For approval at TSG# | Remarks |
| internal  |  | User Equipment (UE) Radio Frequency (RF) requirements for Frequency Range 2 (FR2 |  | RAN#94 | Core UE part |

NOTE: If this is a RAN WID 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 specification.
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 |
| 38.101-2 | NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone | RAN#94 | Core UE part |
| 38.307 | NR; Requirements on User Equipments (UEs)  |  | Performance UE part |
| 38.133 | NR; Requirements for support of radio resource management | RAN#94 | Core UE part |
| 38.306 | NR; User Equipment (UE) radio access capabilities | RAN#94 | impacted RAN2 specification, Core part |
| 38.321 | NR; Medium Access Control (MAC) protocol specification | RAN#94 | impacted RAN2 specification, Core part |
| 38.331 | NR; Radio Resource Control (RRC); Protocol specification | RAN#94 | impacted RAN2 specification, Core part |
| 38.300 | NR; Overall description; Stage-2 | RAN#94 | potentially impacted RAN2 specification, Core part |
| 38.133 | NR; Requirements for support of radio resource management | RAN#96 | Performance UE part |
|  |  |  |  |
|  |  |  |  |

NOTE: If this is a RAN WID 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)

Nokia

Petri Vasenkari (petri.j.vasenkari@nokia.com)

## 7 Work item leadership

Primary WG: RAN4

Secondary WGs: RAN1, RAN2

## 8 Aspects that involve other WGs

None

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

## 9 Supporting Individual Members

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| --- |
| Supporting IM name |
| Nokia |
| Nokia Shanghai Bell |
| Verizon |
| AT&T |
| T-Mobile USA |
| Softbank |
| Samsung |
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