**3GPP TSG-RAN WG4 Meeting #109 R4-2321932**

**Chicago, USA, 13th November – 17th November 2023**

**Source: ZTE Corporation, China Telecom**

**Title: Revised WID: Rel-18 4Rx for NR bands for FWA (Fixed Wireless Access) UEs (<2.6GHz) and handheld UEs (1GHz to 2.6GHz)**

**Document for: Approval**

**Agenda Item: 7.28.1**

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](http://www.3gpp.org/ftp/Specs/html-info/21900.htm) [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

# Title: Rel-18 4Rx for NR bands for FWA (Fixed Wireless Access) UEs (<2.6GHz) and handheld UEs (1GHz to 2.6GHz)

## Acronym: 4Rx\_NR\_bands\_R18

## Unique identifier: 981042 *{A number to be provided by MCC at the plenary}*

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** | **X** |

Potential target Release: Rel-18

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. NOTE: 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 |  |  |  |
| **No** | X |  | 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 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) |
| NR\_newRAT | R1 | 750067 | New Radio Access Technology |

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

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

|  |
| --- |
| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
| 941013 | 4Rx support for NR band n8 | *{optional free text}*  |

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

## 3 Justification

To provide higher throughput and better coverage, the 4Rx UE requirements had been introduced based on the operator and market demand in the previous release. Currently some low/mid/high FR1 bands have already supported 4Rx implementation with the consideration of a variety of 5G UE devices with different sizes for different form factors:

* For some high frequency bands such as band n41/n77/n78/n79, 4Rx shall be the mandatory feature for these operating bands except for two Rx vehicular UE and RedCap UE.
* For some medium frequency bands such as band n1, although 4Rx requirements have already been specified, it is optional and it could be used for smart phone.
* For some low frequency bands such as band n28/n71, although 4Rx requirements have already been specified, it is optional and mainly targeted for FWA form factor due to the large antenna size in low frequency.

However, there are some other bands smaller than 2.6GHz in the specification which do not support 4Rx implementation. It could be foreseen that more and more new NR FR1 bands will be requested by operators to support 4Rx implementation.

Therefore, a basket WI should be created to include the corresponding 4Rx requirements for NR FR1 bands (<2.6GHz) in the RAN4 specifications in Rel-18 for the benefit of the WID management.

## 4 Objective

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

#### 4.1.1 Objective

* Specify the 4Rx REFSENS requirement for NR FR1 bands
	+ Support of 4Rx for the bands <2.6GHz added in this WI is optional
	+ Note 1: for operating frequency less than 1GHz, only FWA is considered.

#### 4.1.2 Way of working

The new request adding 4Rx for the FR1 bands smaller than 2.6GHz should be submitted on RAN4 reflector before tdoc submission deadline to the next RAN4 meeting (1 week before the meeting).

The basket WI will then be updated with the new requests (section 4.1.3, Table 4.1.3-1) and submitted to next RAN4 meeting for endorsement, before submission to RAN meeting for approval.

When the work is completed, all draft CRs related to one request will be submitted in the same RAN4 meeting to check consistency. If they are endorsed, the basket WI Rapporteur will merge all draft CRs from all requests in big CRs (one per TS specification).

After the RAN4 meeting preceding a RAN meeting, those big CRs will be sent on RAN4 reflector for email approval (1 week) and, if agreed, they will be submitted to following RAN meeting.

#### 4.1.3 Requests overview

Table 4.1.3-1: Requests tracking for 4Rx

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Band** | **Contact name, company** | **Contact email** | **Other supporting companies** | **Additional information** | **status** |
|  |  |  | *Note: minimum 3* | *Note: any specific technical challenge should be triggered and highlighted here* |  |
| n5 | Lei GAO, China Telecom | gaol8@chinatelecom.cn | ZTE, Sanechips, vivo | 4 Rx operation is targeted for FWA form factor | Completed |
| n25 | Bill Shvodian, T-Mobile USA | bill.shvodian@t-mobile.com | Nokia, Ericsson, Deutsche Telekom |  | Completed |
| n85 | Bill Shvodian, T-Mobile USA | bill.shvodian@t-mobile.com | Nokia, Ericsson, Deutsche Telekom | 4 Rx operation is targeted for FWA form factor | Completed |
| n26 | Alex, Telstra | Alex.Bladenis@team.telstra.com, | Nokia, LGE, Oppo | 4 Rx operation is targeted for FWA form factor | Ongoing |
| n13 | yuanyuan Zhang, Samsung | tina55.zhang@samsung.com | Bell Mobility, TELUS, ZTE | 4 Rx operation is targeted for FWA form factor | Completed |

### 4.2 Objective of Performance part WI

This Perf. Part WI is to specify the Perf. Part requirements:

* Required changes to be added to release independence TS 38.307 if any.

### 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 |
| *38.101-1* | *Add 4Rx related RF core requirements for NR FR1 bands* | *RAN #102* | *Core part* |
| *38.307* | *Define 4Rx operation as release independent feature, if necessary.* | *RAN #102* | *Perf. part* |

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)

*Wubin, Zhou, ZTE, zhou.wubin@zte.com.cn*

*Lei, Gao, China Telecom, gaol8@chinatelecom.cn*

## 7 Work item leadership

RAN WG4

## 8 Aspects that involve other WGs

*None*

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

## 9 Supporting Individual Members

*{At least 4 supporting Individual Members are needed. There is an expectation that these companies will provide resources to progress the work. Note that having 4 supporting companies is a necessary but not sufficient condition: the usual TSG approval process by consensus is needed for the WID approval.}*

|  |
| --- |
| Supporting IM name |
| China Mobile |
| China Telecom |
| China Unicom |
| CHTTL |
| ZTE |
| Sanechips |
| Xiaomi |
| T-Mobile USA |
| vivo |
| OPPO |
| Telstra |
|  |