3GPP TSG RAN5 Meeting #96-e R5-224146r4

**Electronic Meeting, 15 – 26Aug, 2022**

**3GPP TSG RAN Meeting #97-e RP-22zzzz**

**Electronic Meeting, 12 – 16 Sep, 2022**

**Source: Nokia, Apple**

**Title: New WID on UE Conformance – Further enhancements of NR RF requirements for frequency range 2 (FR2)**

**Document for: Endorsement**

**Agenda Item: 4.1**

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

Title: **UE Conformance – Further enhancements of NR RF requirements for frequency range 2 (FR2)**

Acronym: [NR\_RF\_FR2\_req\_enh2](https://www.3gpp.org/DynaReport/WiSpec--890059.htm)-UEConTest

Unique identifier:

Potential target Release: *Rel-17*

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  |  |  |  |  |
| 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 |

## 2.2 Parent Work Item

|  |  |  |  |
| --- | --- | --- | --- |
| Parent Work / Study Items | | | |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| NR\_RF\_FR2\_req\_enh2-Core | RAN4 | 890159 | Further enhancements of NR RF requirements for frequency range 2 (FR2) – Core Part |
| NR\_RF\_FR2\_req\_enh2-Perf | RAN4 | 890259 | Further enhancements of NR RF requirements for frequency range 2 (FR2) – Perf Part |

### 2.3 Other related Work Items and dependencies

|  |  |  |
| --- | --- | --- |
| Other related Work /Study Items (if any) | | |
| Unique ID | Title | Nature of relationship |
|  |  |  |

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

# 3 Justification

RAN5 has completed definition of several FR2 enhancement-based test requirements in Release 16. It is now critical to continue the work on further FR2 RF enhancements in RAN5 as part of Rel-17 scope.

Until RAN#96e, the core part of Rel-17 WI ‘Further enhancements of NR RF requirements for frequency range 2’ is 100% completed, and the performance part is 80% completed. It is justified to now start the work on the corresponding UE conformance test specifications in 3GPP RAN WG5 to meet the market requirements in time.

# 4 Objective

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

* Inter-band DL CA enhancements [RAN4 RF/RRM]
  + Agree a method how applicable IBM information is captured into specification for a particular CA configuration. Agree how it is decided whether a certain CA configuration is assuming IBM based requirements (for-example is applicability based on operator request or some general rule or are all CA configurations applicable for IBM).
  + Define test requirements for CA\_n258A-n260A and CA\_n257A-n259A based on IBM
  + Define UE RF test requirements for CA\_n258-n261 inter-band CA within the same freq. group (e.g. 28GHz + 28GHz) for (IBM)
  + Both RF and RRM requirement aspects are in scope for DL inter-band CA.
* Inter-band UL CA [RAN4 RF/RRM]
  + Specify requirements for inter-band UL CA for two bands between different frequency groups based on IBM.
  + Define test requirements for CA\_n257A-n259A and CA\_n260-n261 based on IBM
  + Both RF and RRM requirement aspects are in scope for UL inter-band CA.
* Test cases to measure performance gain due to UL gaps. Align with RAN4 defined UE specific and NW configured gap for UE Tx power management
* Define RAN5 test procedures that evaluate the RAN4 defined performance gain over the current baseline (Rel.16 requirements). Include any RAN4-provided definitions related to UE self-calibration and monitoring, impact of UE emissions during UL gap, if any.
* Align with RAN4 defined UL gap configuration(s), related UE capability and interruptions, Included definition of release independence aspects.
  + - Note: The work of FR2 UL gaps includes (NG) EN-DC, NE-DC, NR-DC and SA with leverage across the options suitably defined in the test specifications.
* Introduce new FR2 CA BW classes and related Rx requirements to support of contiguous downlink aggregated channel BW up to 1600 MHz [RAN4 RF]
* Specify DC location reporting scheme to cover intra-band UL CA with 2 CCs and more for FR1 and FR2, and intra-band DL CA for FR2. (RAN4, RAN2)
  + NOTE: No impact on Rel-16 method (uplinkTxDC-TwoCarrierReport-r16)

# 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# | Rapporteur |
|  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} | | | |
| TS/TR No. | Description of change | Target completion plenary# | Remarks |
| TS 38.508-1 | Definition of common environment for FR2 enhancements. | TSG RAN#102  (Dec-23) |  |
| TS 38.508-2 | Introduction of physical implementation capabilities for FR2 enhancements. | TSG RAN#102  (Dec-23) |  |
| TS 38.521-2 | Introduction of RF requirements for FR2 enhancements. | TSG RAN#102  (Dec-23) |  |
| TS 38.521-3 | Introduction of RF requirements for EN-DC FR2 enhancements. | TSG RAN#102  (Dec-23) |  |
| TS 38.522 | Introduction of test applicability for FR2 enhancements. | TSG RAN#102  (Dec-23) |  |
| TS 38.533 | Introduction of RRM requirements for FR2 enhancements. | TSG RAN#102  (Dec-23) |  |
| TR 38.903 | Derivation of test tolerances and measurement uncertainty for UE conformance test cases for FR2 enhancements. | TSG RAN#102  (Dec-23) |  |
| TR 38.905 | Derivation of test points for FR2 enhancements in radio transmission and reception UE conformance test cases. | TSG RAN#102  (Dec-23) |  |
|  |  |  |  |

# 6 Work item Rapporteur(s)

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# 7 Work item leadership

RAN5

# 8 Aspects that involve other WGs

None

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Apple |
| AT&T |
| HiSilicon |
| Huawei |
| Keysight Technologies |
| Nokia |
| Nokia Shanghai Bell |
| Qualcomm |
| Verizon |