**3GPP TSG-RAN5 Meeting #99 *R5-23xxxx***

**Incheon, South Korea, May 22– 26, 2023**

**3GPP TSG RAN Meeting #100 RP-23xxxx**

**Taipei, June 12-14, 2023**

**Source: Huawei, HiSilicon, China Telecom, China Mobile**

**Title: Revised WID on UE Conformance - UE RF requirements for Transparent Tx Diversity (TxD) for NR**

**Document for: Approval**

**Agenda Item: 7.4.2**

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 - UE RF requirements for Transparent Tx Diversity (TxD) for NR

## Acronym: NR\_RF\_TxD-UEConTest

## Unique identifier: 940092

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

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\_TxD | R4 | 920070 | UE RF requirements for Transparent Tx Diversity (TxD) for NR |
| NR\_RF\_TxD-Core | R4 | 920170 | Core part: UE RF requirements for Transparent Tx Diversity (TxD) for NR |
| NR\_RF\_TxD-Perf | R4 | 920270 | Perf. part: UE RF requirements for Transparent Tx Diversity (TxD) for NR |

### 2.3 Other related Work Items and dependencies

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

## 3 Justification

Transparent Tx diversity (TxD) support is needed for multiple WIs. In RAN4 quite a few WIs were completed assuming TxD requirements are in place but TxD introduction was delayed:

1. Rel-16 PC1.5 (LTE\_NR\_B41\_Bn41\_PC29dBm) (completed)
	* DCI 0\_0 UE behavior and requirement relies on TxD
2. Rel-16 Enhanced MIMO with UL MIMO Full power modes (NR\_eMIMO) (completed)
	* Enabling ULFPTx with TxD is part of this WI objective. FFS which modes of ULFPTx
3. Rel-17 PC1.5 for n77 and n78 (HPUE\_PC1\_5\_n77\_n78)
4. Rel-17 High power UE (power class 1.5) for NR band n79 (RP-210843)

In addition, there are features being planned to be enhanced once baseline TxD requirements are agreed, such as V2X WI, Rel-17 FR1 enhancement, NR-Unlicensed, Rel-17 additional NR bands for UL-MIMO, etc.

The RAN4 WI for UE RF requirements for transparent Tx Diversity (TxD) aims to introduce the generic requirements for UEs configured for single antenna port but when UE implements transparent Tx Diversity, i.e. uses two PAs to come up with output power. The RAN4 WI output in Rel-17 focused on TxD implementation in NR standalone mode.

In RAN#93, RAN4 big CR is agreed which introduced the complete RF requirements for transparent TxD for all power classes excluding the requirements already introduced by PC1.5 WIs, such as MOP and MPR for PC1.5, etc. The WI now achieved 50% completion. There are still remaining issues such as discussion on release independency, whether and how to enable TxD capable UEs to support SRS antenna switching and ULFPTx etc. It’s expected these remaining issues could be handled by update to test applicabilities, therefore have little impact on RAN5 conformance testing. Given the key requirements definition is already completed, it’s already a good time for RAN5 to start considering the conformance testing aspect of the TxD requirements.

## 4 Objective

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

The objective of this work item is to define the UE conformance test aspects for generic RF requirements for transparent TxD, including test cases and associated test environment, test applicability, test point analysis, etc.

## 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 |
|  |  |  |  |  |  |

|  |
| --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| 38.521-1 | Introduction of new test cases or test configurations for NR transparent TxD. | TSG RAN#101(Sep-23) |  |
| 38.905 | Documentation of test points analysis for NR transparent TxD test cases. | TSG RAN#101(Sep-23) |  |
| 38.508-1 | Definition of common test environment for NR transparent TxD. | TSG RAN#101(Sep-23) |  |
| 38.508-2 | Introduction of common implementation conformance statement (ICS) for NR transparent TxD. | TSG RAN#101(Sep-23) |  |
| 38.522 | Applicability statements of the new NR transparent TxD test cases. | TSG RAN#101(Sep-23) |  |
| 38.523-1 | Introduction of UE TxD capability check | TSG RAN#101(Sep-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

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| --- |
| Supporting IM name |
| Huawei |
| HiSilicon |
| China Telecom |
| China Mobile |
| China Unicom |
| Oppo |
| Nokia |
| Verizon |
| Orange |
| Ericsson |
| Vodafone |