**3GPP TSG RAN5#103 R5-243355**

**Fukuoka, Japan, May 20-24, 2024**

**3GPP TSG RAN Meeting #104 RP-24xxxx**

**Shanghai, China, June 17-20, 2024**

**Source: Qualcomm Inc, China Unicom, Mediatek**

**Title: New WID on UE Conformance - NR NTN (Non-Terrestrial Networks) enhancements plus CT aspects**

**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 – NR NTN (non-Terrestrial Networks) enhancements plus CT aspects

Acronym: NR\_NTN\_enh\_plus\_CT-UEConTest

Unique identifier:

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

Potential target Release: Rel-18

# 1 Impacts

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

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
|  | Normative work item |
|  | Stage 1 |
|  | Stage 2 |
|  | Stage 3 |
| X | Testing |

## 2.2 Parent Work Item

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| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| NR\_NTN\_enh |  | 941006 | NR NTN (Non-Terrestrial Networks) enhancements |
| NR\_NTN\_enh-Core | RAN4 | 941106 | Core part: NR NTN (Non-Terrestrial Networks) enhancements |
| NR\_NTN\_enh-Perf | RAN4 | 941206 | Perf. part: NR NTN (Non-Terrestrial Networks) enhancements |
| 5GSAT\_Ph2 | CT1 | 990024 | CT1 aspects of 5GSAT\_Ph2 |

### 2.3 Other related Work Items and dependencies

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

# 3 Justification

In Release 17, a work item was carried out to define solutions enabling NR and NG-RAN to support Non-Terrestrial Networks (NTN):

* Transparent payload based GSO and NGSO network scenarios addressing 3GPP power class 3 UE in both Earth fixed and/or moving cell configurations.

As part of Release 18, the parent work item proposed enhancements for NG-RAN based Non-Terrestrial Networks in order to:

* Support new scenarios to cover deployments in frequency bands above 10 GHz for VSAT UE
* Offer optimized performance especially when addressing handset terminals (including smartphones with more realistic assumptions on antenna gains instead of 0 dBi antenna gain with the specific realistic antenna gain assumption to be determined at the working group level) w.r.t. coverage considering the NTN characteristics such as large propagation delay and satellite movement.
* Provide mobility and service continuity enhancements considering the NTN characteristics such as large propagation delay and satellite movement.
* Address requirements, if needed based on the FS\_NR\_NTN\_netw\_verif\_UE\_loc study outcome, which mandate the network operator to cross check the UE location reported by the UE, which needs to be carried out in order to fulfil the regulatory requirements (e.g., Lawful intercept, emergency call, Public Warning System, …) regarding a network verified UE location i.e., to be able to check the UE reported location information (e.g. estimate UE location at the network side) and specify if needed mechanisms to fulfil the regulatory requirements.

# 4 Objective

The objective of this work item is to enable UE conformance testing for the Rel-18 NTN enhancements WI which includes analysing the requirements, creation of corresponding test cases by defining the test environment, special conformance testing function, test procedure, message contents, MU/TT analysis, associated PICS, applicability and updating the relevant conformance specifications.

The conformance testing aspects for this WI would consist of below areas:

* Protocol test cases for NR NTN enhancements
* UE RF test cases for NR NTN enhancements
* UE DEMOD test cases for NR NTN enhancements
* RRM test cases for NR NTN enhancements
* Functionality introduced by the CT1 WI on satellite access phase 2
* Procedures for determining and negotiating out-of-coverage period due to discontinuous coverage and for power saving during coverage gaps:
	+ Negotiation of “discontinuous coverage support” capability between the UE and the AMF
	+ Negotiation of “out-of-coverage period” between the UE and the AMF
	+ Indication of losing coverage by the UE
	+ AMF requesting the UE to perform Registration update upon return to coverage
* Handling signalling overload due to loss of coverage and return to coverage of many UEs at the same time.

# 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 NR NTN enhancements | TSG RAN#110(Dec-25) |  |
| TS 38.508-2 | Introduction of physical implementation capabilities for NR NTN enhancements. | TSG RAN#110(Dec-25) |  |
| TS 38.509 | Introduction of special conformance testing function for NR NTN enhancements | TSG RAN#110(Dec-25) |  |
| TS 38.521-5 | Introduction of UE RF and UE Demodulation requirements for NR NTN enhancements | TSG RAN#110(Dec-25) |  |
| TS 38.523-1 | Introduction of Protocol test cases for NR NTN enhancements | TSG RAN#110(Dec-25) |  |
| TS 38.523-2 | Applicability statements for Protocol test cases for NR NTN enhancements | TSG RAN#110(Dec-25) |  |
| TS 38.523-3 | Introduction of test model NR NTN enhancements test cases | TSG RAN#110(Dec-25) | Progress of TTCN development of the new protocol test cases is tracked in MCC TF160 reports to RAN5/RAN. |
| TR 38.903 | Derivation of test tolerances and measurement uncertainty for User Equipment (UE) conformance test cases | TSG RAN#110(Dec-25) |  |
| TR 38.905 | Derivation of test points for NR performance enhancement in radio transmission and reception User Equipment (UE) conformance test cases. | TSG RAN#110(Dec-25) |  |

# 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 |
| Qualcomm Inc |
| China Unicom |
| MediaTek |
| Thales |
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