**3GPP TSG-RAN4 Meeting #116bis *R4-251xxxx***

**Prague, Czech Republic, 13th – 17th October, 2025**

**Agenda item:** 8.12

**Source:** Feature lead (vivo)

**Title:** WF for [116bis][110] 6G testability and OTA

**Document for:** Approval

# Introduction

This Way Forward captures the agreements of 6G OTA in RAN4.

# Topic #1: **Improved testability of Conducted Requirements**

### Sub-topic 1-1 Antenna assumption of FR1 transmitter and receiver

**Issue 1-1-1: Whether RAN4 should consider a More realistic antenna efficiency assumption for FR1**

* Proposals
  + **Proposal 1:** Discuss a more realistic assumption on antenna efficiency for FR1 band tests, e.g. -5.5 dB**.**

Agreements:

* *move this discussion to general RF/UE RF from next meeting.*

### Sub-topic 1-2 Improve traditional conducted test to OTA

**Issue 1-2-1: Whether it is valuable to improve some conducted requirements to be verified via OTA approach**

Agreements:

* + RAN4 can further study the testability limitations of some conducted test cases, consider the following aspects as starting point, e.g.,
    - FR1 conducted test cases already consider antenna-performance impacts but not verified via radiated approach in a case-by-case manner, e.g. MSD
    - FR1 test case simplification with both conducted and radiated considered, e.g., spurious emission
    - Discuss which conducted conformance testing could either yield testability issues, e.g., lack of physical Tx/Rx ports, and/or highly dynamic nature of multiple Tx/Rx operation, including antenna tuning for impedance and/or pattern.

# Topic #2: **New test methodologies for new 6GR frequencies**

### Sub-topic 2-1 Testability for new 6GR frequency

**Issue 2-1-1: Testability for New Frequencies between FR1 and FR2**

Agreements:

RAN4 study the testability including conducted testing and radiated testing for the new frequencies. The following aspects can be considered:

* The frequency range definition will be discussed under the spectrum agenda.
* For conducted test, use existing test method as a starting point
* For OTA test,
  + Further study potential test methodologies including the full-package, i.e., supported frequency range, test setup, configuration, positioning, procedure, validation/calibration, quiet-zone/test zone, MU, testing time reduction

# Topic #3: **OTA test methods for Multi-Tx and CA**

### Sub-topic 3-1 OTA for 6GR multi-carrier

**Issue 3-1-1: OTA test methodology for FR1 CA**

Agreements:

RAN4 consider the study of testability for single carrier (with single or multi-Tx/Rx) as 1st priority.

# Topic #4: **Testability for different Device types**

### Sub-topic 4-1 OTA testability for different device types

**Issue 4-1-1: OTA testability applicability for different UE types in 6GR day-1**

Agreements:

RAN4 consider the study of OTA test system to better accommodate different UE types, new feature/functionalities, new performance metrics and test cases.

* The UE types and form factor considered in testability can be further discussed in this SI.
* RAN4 study the feasibility of developing a single system to cover above aspects.

# Topic #5: **AI/ML OTA testability**

### Sub-topic 5-1 Enhanced OTA test method for 6GR AI/ML cases

**Issue 5-1-1: RAN4 study on enhancement of AI/ML testability for 6GR**

Agreements:

The corresponding test method including both OTA and conducted, to verify the AI/ML features (FFS details) should be studied in RAN4 in 6G SI.

* The methodologies identified in 5G will be considered as the starting point for both conducted and OTA.

# Topic #6: **Harmonized testing for TN and NTN**

### Sub-topic 6-1 Harmonized OTA test methodologies for TN and NTN

**Issue 6-1-1: Harmonized OTA test methodologies for TN and NTN**

Way Forward

* + Targeting a harmonized test system/test method for TN and NTN devices.

# Topic #7: **Improved test methods and metric for SISO OTA**

### Sub-topic 7-1 Enhanced OTA test method for TRP/TRS

**Issue 7-1-1: Enhanced OTA test method for TRP/TRS**

Agreements:

* RAN4 further study the feasibility of incorporating real-world usage scenarios more closely into the 6GR OTA testing methodology.
  + FFS on OTA configurations/parameters to reflect real-world scenarios, e.g., support antenna switching, and other aspects.

# Topic #8: **Improved test methods and metric for DL MIMO OTA**

### Sub-topic 8-1 MIMO OTA for 6GR

**Issue 8-1-1: RAN4 consider MIMO OTA for 6GR day-1**

Agreements：

RAN4 will study the dynamic MIMO OTA (at least dynamic channel model and link adaptation) for 6G. static MIMO is not precluded. The following can be considered as starting point:

* 2D or 3D channel model
* FFS phantom involved testing
* FFS multi-TRP
* FFS focus on FR1 as first priority
  + FR2 and new frequency range may also be considered

# **Efficiency improvement (Test and requirements)**

### Sub-topic 9-1 Improvement of OTA testing efficiency

**Issue 9-1-1: Improve OTA test efficiency in 6GR**

Agreements:

6G OTA testability study should consider system complexity and test time reduction.

# Topic #10: **Testability for BS requirements**

### Sub-topic 10-1 BS related testability

**Issue 10-1-1: Study on BS testability**

* Proposals
  + **Proposal 1:** RAN4 should study the improvement of BS OTA test methods for FR3. (vivo)
* Recommended WF
  + TBA.

**FL: check with BS session whether any issue of testability should be discussed in 6G SI.**

# Topic #11: **Others**

### Sub-topic 11-1 New requirements/metric for OTA

**Issue 11-1-1: new Energy Efficiency performance under OTA metric**

* Proposals
  + **Proposal 1:** Discuss Energy Efficiency evaluation under OTA performance metric. (Xiaomi)
* Recommended WF
  + TBA.

**FL: keep it Open for further discussion.**

**Issue 11-1-2: new OTA metric for SBFD**

* Proposals
  + **Proposal 1:** Study OTA testing for SBFD**. (E///)**
* Recommended WF
  + TBA.

**FL: keep it Open for further discussion.**

### Sub-topic 11-3 General procedure on introducing alternative test method in RAN4

**Issue 11-3-1: General procedure on introducing alternative test method in RAN4**

Agreements:

* *RAN4 could work on a general principle on introducing alternative methods*.