**3GPP TSG-RAN WG4 Meeting #111 R4-241xxxx**

**Fukuoka City, Fukuoka, Japan, 20th – 24th May, 2024**

**Agenda item:** 10.4.3

**Source:** vivo

**Title:** WF for [111][338] TRP\_TRS\_MIMO\_OTA

**Document for:** Approval

# Introduction

This is the WF for Rel-19 OTA WI.

# Topic #1: General

**Issue 1-1-1: Reply LS to GCF CAG**

Agreements

* + **The reply LS to GCF CAG is agreed in R4-2409906.**

# Topic #2: XR OTA

### Sub-topic 2-1 XR test scnarios and configurations

**Issue 2-1-1: XR device type**

* Proposals
  + **Proposal 1: device types to be tested are limited to under [X] grams. (Huawei)**
  + **Proposal 2: RAN4 to discuss if head-worn XR devices with external 5G (e.g. XR5G-V1/V2/V3, XR5G-A1/A2/A5) are in scope or not. (Samsung)**
  + **Proposal 3: The defined test methodologies of TRP/TRS for FR1 non-Redcap XR devices shall be applied to all possible 5G XR device types except the XR device form-factors based on smartphone UE i.e. XR5G-P1 in figure 1. (Meta)**
  + **Proposal 4：It is suggested to separate the XR devices by type-A and type-B, which Type-A power class XR devices should have a higher output power level than Type-B power class XR devices. (Nokia)**
* Recommended WF
  + TBD.

**Proposed WF**

FFS The defined test methodologies of TRP/TRS for FR1 non-Redcap XR devices shall be applied to all possible 5G XR device types except the XR device form-factors based on smartphone UE i.e. XR5G-P1.

RAN4 further discuss prioritization of XR devices type, e.g.,

* Whether 1Tx XR device should be prioritized in Rel-19
* whether head-worn XR devices with external 5G (e.g. XR5G-V1/V2/V3, XR5G-A1/A2/A5) should be considered.

**Issue 2-1-3: How to identify 2Rx-XR device?**

Proposed WF

* + **RAN4 further check the following configuration for 2Rx XR:**
    - **The parameter cellBarred2RxXR-r18 (ENUMERATED) should be set to {false} during OTA tests for XR devices with 2Rx.**
    - **Use parameter supportOf2RxXR-r18 to identify XR devices with 2Rx.**

### Sub-topic 2-2 Testing time reduction for XR OTA

**Issue 2-2-1: alternative test configurations for Testing time reduction solutions**

Agreements based on online discussion

* + **RAN4 can consider low transmission power configuration (e.g., 13dBm) for XR device TRS testing if a Single Point Offset Test (SPOT) with maximum transmit power is performed and the end of the measurement to scale the TRS result.**

**Issue 2-2-2: Coarse measurement grids**

Agreements based on online discussion

* + **Legacy measurement grid can be baseline for XR devices TRP TRS measurement and measurement campaign used to derive performance requirements, RAN4 can further check and confirm coarse measurement grid based on measurement results and simulations.**
  + **MU analysis for coarse measurement grid is also needed.**

# Topic #3: NTN OTA

### Sub-topic 3-1 UE type and usage scenarios for NTN (NR-NTN and IoT-NTN)

**Issue 3-1-1: UE type for NR-NTN**

Agreements based on online discussion

* + **Prioritize Handheld UE and further study VSAT-like UE.**

**Issue 3-1-2:** **Alignment on understanding of VSAT-like UE for NR-NTN**

Agreements based on online discussion

* + **Encourage OEMs/Satellite Operators to provide more device information for VSAT-like device types, e.g., detailed definition, device size, weight, typical antenna patterns.**

**Issue 3-1-3: Power Class for NR-NTN devices**

Proposed WF

* + **Prioritize PC3.**

**Issue 3-1-4: UE type for IoT-NTN**

Proposed WF

* + **FFS detailed UE type for IoT-NTN.**

**Issue 3-1-5: Alignment on understanding of IoT-NTN devices**

Proposed WF

* + **Encourage OEMs/Satellite Operators to provide more device information for IoT-NTN device types, e.g., detailed definition, device size, weight, typical antenna patterns.**

**Issue 3-1-6: Usage scenarios for NR-NTN and IoT-NTN handheld UE**

Agreements based on online discussion

* + **RAN4 further discuss prioritized usage scenarios**
    - **Option 1: Prioritize the browsing mode (with hand phantom)**
    - **Option 2: Prioritize the browsing mode (with hand phantom) and Free Space**
    - **Option 3: Prioritize browsing mode (with hand phantom) and talk mode (Head+Hand)**
    - **Option 4: Prioritize Head+Hand talk mode, hand only browsing mode and talk mode (new positioning guideline), and Free Space**
    - **~~Option 5: Prioritize Free Space mode only~~**

### Sub-topic 3-2 UE performance metric

**Issue 3-2-1: Categorized performance metric for NR-NTN handheld**

Agreements based on online discussion

* RAN4 should not adopt direction 1, other directions are FFS
  + **~~Direction 1: Only single point performance metric, i.e., Peak EIRP/EIS~~**
  + **Direction 2: Single point + measured full sphere (integrated or CDF), e.g.,** 
    - **D2a, Peak EIRP/EIS+TRP/TRS,**
    - **D2b, Peak EIRP/EIS+ full Spherical coverage CDF**
  + **Direction 3: Single point + measured partial sphere (integrated or CDF), e.g.,** 
    - **D3a, Peak EIRP/EIS+ partial TRP/TRS (e.g., within selected 30, 60, 90, 180 degree** **range of angles),**
    - **D3b, Peak EIRP/EIS+ partial Spherical coverage CDF (e.g., within selected 30, 60, 90, 180 degree** **range of angles)**
  + **Direction 4: Only Full sphere (integrated TRP/TRS or Spherical coverage CDF)** **with/without weighting,** 
    - **D4a, Spherical Coverage with EIRP-CDF and EIS-CCDF at [>50%]-ile**
    - **D4b, TRP/TRS or Weighted metric, e.g., weighted TRP/TRS (with larger weight for declared hemisphere)**
  + **Direction 5: Only Partial sphere (integrated or CDF)** **(e.g., within selected 30, 60, 90, 180 degree range of angles),**

**Issue 3-2-3: Whether performance metric should be different for GEO and** **NGEO (including LEO and MEO)**

Agreements based on online discussion

* + **Do not define different metrics for GSO vs. NGSO**

**Issue 3-2-6: For Handheld UE, whether performance metric should be different for different scenarios concluded in Issue 3-1-6**

FFS

### Sub-topic 3-3 NTN OTA test methodologies

**Issue 3-3-2: CBW for NR-NTN bands**

Agreements based online discussion

* + **Due to limited spectrum resource for NTN, RAN4 further consider whether min test channel BW defined in RAN5 38.508-1 should be adopted for FR1 NTN OTA testing.**

**Issue 3-3-3: CBW and RBs for IoT-NTN bands**

FFS detailed test parameters for IoT-NTN

**Issue 3-3-4: Doppler parameter of NR-NTN UE**

Agreements based online discussion

* + **NR/IoT NTN radiated requirements shall be verified when Doppler conditions are set to zero and delay conditions are set to constant for all types of satellites**

**Issue 3-3-5: New positioning guideline of hand only talk mode**

Agreements based online discussion

* + **Consider a new position for hand only, i.e., DUT’s main display is aligned with vertical axis.**
    - **The need to define new positioning guidelines for testing depends on the metric selected for testing as per Issue 3-2-1. E.g. full sphere does not require new positioning guidelines.**

# Topic #4: FR1 dynamic MIMO OTA

### Sub-topic 4-1 Dynamic channel model generation and validation

**Issue 4-1-1: Alignment of dynamic channel model parameters in different SDOs**

Agreements based online discussion

* + **RAN4 adopt the UMa and the UMi dynamic channel models defined in CTIA. FFS whether minor modification is needed.**
  + **RAN4 develop few new channel models is not precluded.**

**Issue 4-1-3: Channel model validation methodology**

Proposed WF

* + **RAN4 adopt the similar channel model validation procedures as other SDOs**

### Sub-topic 4-2 Test system for FR1 dynamic MIMO OTA

**Issue 4-2-1: Test zone of test system for dynamic channel model**

Proposed WF

* + Define 30cm QZ for dynamic FR1 MIMO OTA testing. Dynamic channel model Test zone of UMi and UMa needs analysis and confirmation.

**Issue 4-2-2: Link adaption configuration for Dynamic FR1 MIMO OTA**

Agreements based online discussion

* + **RAN4 adopt dynamic link adaptation. FFS details, e.g.,**
    - **mapping tables between CQI and MCS for available rank values**

**Issue 4-2-3: Test system Dynamic-link-adaption verification**

Agreements based online discussion

* + **RAN4 should study a procedure to verify the consistency of different test equipment/test system on Scheduling Algorithm in dynamic channel model system. This can be considered as an additional aspect of system validation.**

**Issue 4-2-4: Environmental condition for RAN4 FR1 dynamic MIMO OTA**

Agreements based online discussion

* + **RAN4 adopt the full path loss model from TR 38.901 for the UE Noise-limited environment condition.**
  + **With understanding of noise-limited is baseline for dynamic MIMO OTA in RAN4, the study of Interference-limited environment condition for RAN4 FR1 Dynamic MIMO OTA is not precluded.**

**Issue 4-2-5: Noise floor of noise-limited system for FR1 dynamic MIMO OTA**

Agreements based online discussion

* + **Encourage system integrators to confirm the system noise floor levels.**

### Sub-topic 4-3 UE Performance metric

**Issue 4-3-1: UE measurement campaign to decide final performance metric**

Proposed WF

* + **To study/verify the UE performance metrics, RAN4 could use the UE throughput data collected during the measurement campaign**

**Issue 4-3-2: Potential UE performance metric for dynamic MIMO OTA testing**

Agreements

* FFS
  + **Proposal 1: 3GPP to adopt the same performance metrics of TMT and CTMT for 10%, 50% and 90%; whether to combine these three metrics into one or keep all three is FFS. (Keysight)**
  + **Proposal 2: RAN4 to confirm throughput instead of sensitivity as performance metric for dynamic MIMO OTA. (Samsung)**
  + **Proposal 3: The CTMT can be recorded and reported separately per UE orientation/rotation, but the pass/fail limits for requirements should be based on the average results of all orientations and rotations, i.e., the CDF of TMT with throughput results for all orientations and rotations included. (Samsung)**
  + **Proposal 4: The CDF of UE throughput could be considered as the starting point for performance metric of FR1 dynamic MIMO OTA testing. (Qualcomm)**

**Issue 4-3-3: UE orientations for dynamic MIMO OTA testing**

Proposed WF

* + **RAN4 further study and check whether the four device orientations DMP, DML (both left and right tilt), and DMSU and four rotations (0°, 90°, 180°, 270°) per orientation can be used.**

### Sub-topic 4-4 Draft TR skeleton

**Issue 4-4-1: Skeleton for FR1 dynamic MIMO OTA TR 38.8xy**

Agreements

* + **Agree the draft skeleton in R4-2407667.**