**3GPP TSG-RAN WG4 Meeting #112 R4-2413535**

**Maastricht, Netherlands, August 19th – August 23rd, 2024**

**Agenda item:** 8.12.4

**Source:** Moderator (vivo)

**Title:** WF for [112][333] TRP\_TRS\_MIMO\_OTA

**Document for:** Information

# Introduction

This summary covers the discussions for Rel-19 OTA WI.

# Topic #1: General

### Sub-topic 1-1 General for WI

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

Agreements:

* + **Reply LS to GCF CAG in R4-2413537, is agreed.**

**Issue 1-1-2: Updated WP for Rel-19 OTA WI**

Agreements:

* + **Updated Workplan of Rel-19 OTA WI in R4-2412056 is agreed.**

# Topic #2: XR OTA

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

**Issue 2-1-1: Discussions on Reply LS from CTIA on XR OTA test phantom**

Agreements:

* + Two types of XR, i.e., glasses and head mounted display are prioritized in this WI.
  + Need to send this two XR types to CTIA for phantom positioning and MU study.

**Issue 2-1-4: Whether WI should focus on the XR devices those connected to gNB directly**

Agreements:

* + Only test XR devices with 5G link to gNB in networks, not those with side link connections.

**Issue 2-1-6: Prioritize 1Tx XR devices?**

Agreements:

* + Prioritize 1Tx XR

**Issue 2-1-7: How to identify 2Rx XR devices?**

Agreements:

* + Consider at least the following approach to identify 2Rx XR device
    - Use UE capability supportOf2RxXR-r18 to identify XR devices with 2Rx.
      * FFS device can set IE correctly; FFS TE can display this IE information.
    - Based on UE declaration

**Issue 2-1-8: TRP TRS requirements for XR**

Agreements:

* + Performance metric for XR OTA can be discussed, but Requirements work discussion can be postponed until device and phantom are available.

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

**Issue 2-2-1: Coarse measurement grids**

Agreements:

The following Options can be further discussed next meeting:

**Option 1:** Stop the measurement in the middle and charge the battery, carefully re-place the XR device into the Chamber to continue the test.

**Option 2**: Test TRP at [X] dB below the maximum transmit power and scale up [X] dB to obtain TRP at maximum transmit power.

**Options 3**:

* Measure TRP: Averaging the measurement results from 4 of interpolated 62-points measurement grids by

to achieve the same accuracy level of using 266-points measurement grids during OTA tests.

(Define 4 of 62-points interpolated measurement grids based on 266-points measurement grids at the same time, the locations of each four of 62-points interpolated measurement grids is different from each other on the sphere, they can be considered orthogonal to each other.)

* Measure Peak EIPR: Full sphere coarse girds measurement + partial fine grids measurement

(For example, using 62-points measurement grids in OTA test to measure peak EIPR first, then based on the direction of peak EIPR, apply corresponding sectors (pre-defined 8 or 16 sectors) of 266-points measurement grids to measure the peak EIPR again to increase the accuracy of measured peak EIRP)

# Topic #3: NTN OTA

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

**Issue 3-1-1: Usage scenarios for NR-NTN mobile handheld UE**

Agreements:

* + **Prioritize hand only and head+hand**
  + **Other usage scenarios are not precluded**

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

Agreements:

* + **For IoT-NTN test method development, RAN4 can consider handheld UE type as 1st priority.**

**Issue 3-1-5: Usage scenarios for IoT-NTN handheld UE**

Agreements:

* + **Same prioritized usage scenarios as NR-NTN handheld UE**

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

**Issue 3-2-1: Whether full sphere or partial sphere (including half sphere) should be measured?**

Agreements:

* + **For test methods development, consider both full sphere and partial sphere test procedure**
    - **FFS further down-selection or not**

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

**Issue 3-3-1: CBW for NR-NTN bands**

Agreements:

* + **Select 5MHz CBW for NR FR1 NTN OTA testing.**

**Issue 3-3-2: detailed test parameters for NR-NTN bands**

Agreements:

* + **Adopt the Table 1 and Table 2 test parameters for NR-NTN OTA testing.**
* Table 1: NR FR1 NR-NTN TRP measurement parameters

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band | CBW [MHz] | SCS (kHz) | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  (LCRB @ RBstart) | DL configuration |
| n256 | 5 | 15 | DFT-s-OFDM  QPSK | Low | 396500 | 1982.5 | 434500 | 2172.5 | 12@6 | N/A |
| Mid | 399000 | 1995 | 437000 | 2185 |
| High | 401500 | 2007.5 | 439500 | 2197.5 |
| n255 | 5 | 15 | DFT-s-OFDM  QPSK | Low | 325800 | 1629 | 305500 | 1527.5 | 12@6 | N/A |
| Mid | 328700 | 1643.5 | 308400 | 1542 |
| High | 331600 | 1658 | 311300 | 1556.5 |

* Table 2: NR FR1 NR-NTN TRS measurement parameters

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR Band | CBW (MHz) | SCS (kHz) | DL modulation | UL modulation | Range | UL Carrier centre  [ARFCN] | UL Carrier Center (MHz) | DL Carrier centre  [ARFCN] | DL Carrier Center (MHz) | UL RB Allocation  (LCRB @ RBstart) | DL Configuration (FULL RB, LCRB @ RBstart) |
| n256 | 5 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 396500 | 1982.5 | 434500 | 2172.5 | 25@0 | 25@0 |
| Mid | 399000 | 1995 | 437000 | 2185 |
| High | 401500 | 2007.5 | 439500 | 2197.5 |
| n255 | 5 | 15 | CP-OFDM QPSK | DFT-s-OFDM  QPSK | Low | 325800 | 1629 | 305500 | 1527.5 | 25@0 | 25@0 |
| Mid | 328700 | 1643.5 | 308400 | 1542 |
| High | 331600 | 1658 | 311300 | 1556.5 |

**Issue 3-3-3: test parameters for IoT-NTN**

Agreements:

* + **RAN4 should further discuss test parameters for IoT-NTN OTA.**

**Issue 3-3-4: How to resolve UE antenna circular polarization issue**

Agreements:

* + **FFS RAN4 how to accommodate different UE polarization implementations, i.e., either circular polarization or cross polarization.**

# Topic #4: FR1 dynamic MIMO OTA

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

**Issue 4-1-1: TR skeleton**

Agreements:

* + **Approve the TR skeleton in R4-2411573.**

**Issue 4-1-3: On adopting Umi and Uma channel models**

**Agreements:**

* + **3GPP RAN4 to initially adopt the work done by CTIA on MIMO Multi-Probe Anechoic Chamber (MPAC) dynamic Channel Model as starting point.**
  + **The starting point should include both UMa and UMi. TE vendors confirm that UMa and UMi test can either be carried out separately or in sequence, then put the measurement data together to produce a single CDF.**
  + **RAN4 develops few new channel models is not precluded.**

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

**Issue 4-2-1: Link adaption configuration for Dynamic FR1 MIMO OTA**

Agreements:

* + **Adopt the mapping table between CQI and MCS used for demodulation in** Table A.4-2 and Table A.4-3 in the annex of **TS 38.101-4 for dynamic MCS adaption.**

**Issue 4-2-3: Test parameters for FR1 dynamic MIMO OTA**

Agreements:

* + **Set the maximum number of HARQ transmissions to [x] for FR1 dynamic MIMO OTA.**

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

**Issue 4-3-1: UE measurement results collection**

Agreements:

* + **Collect measurement throughput data from different UEs during the measurement campaign to study FoM, benchmarking Throughput vs. Noise-limited and Throughput vs. Interference-limited environmental conditions**
  + **Channel model validation is needed.**

# Topic #5: Rel-19 FR1 OTA requirements

### Sub-topic 5-1 FR1 TRP TRS requirements

**Issue 5-1-1: 1Tx requirements for TRP TRS**

Agreements:

* + **No need to perform further lab alignment testing in Rel-19.**

**Issue 5-1-2: 2Tx requirements for TRP TRS**

Agreements:

* + **AC lab alignment for non-coherent UL MIMO at n41/n78 should be done in Rel-19, the framework can be similar to Rel-18, encourage test labs to join this activity.**

**Issue 5-1-3: Size 2 TRP TRS requirements (PDA hand)**

Agreements:

* + **RAN4 further discuss how to specify size 2 UE TRP TRS requirements.**

### Sub-topic 5-2 FR1 MIMO OTA requirements

**Issue 5-2-1: Further FR1 MIMO OTA lab alignment activity**

Agreements:

* + **no need to perform static MPAC lab alignment activities in Rel-19.**