**3GPP TSG-RAN WG4 Meeting #112 R4-2414309**

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

**Agenda item:** 8.22.5

**Source:** Moderator (vivo)

**Title:** WF on LP-WUS UE RF requirements

**Document for:** Approval

# Introduction

This WF capture the agreements for Rel-19 LP-WUS UE RF.

# Topic #1: General and system parameters

### Sub-topic 1-1 General

**Issue 1-1-1: New RAN4 TR to capture simulation and analysis of LP-WUS receiver and requirements**

Agreement:

* RAN4 suggest having a new RAN4 TR to capture the simulations and analysis for LP-WUS RF.

**Issue 1-1-2: Performance metric for Rx RF requirements**

**Agreement:**

* **1% MDR for evaluation [and core requirements]**
* **FFS on the testability issue.**

**Issue 1-1-3: Performance metric for Demodulation requirements**

**Agreement:**

* **[1% or 0.1%] FAR as assumption for MDR result calibration.**

**Issue 1-1-6: Specify FR2 LP-WUS RF requirements**

Agreements:

Wait to RAN1 progress on FR2 LP-WUS work.

### Sub-topic 1-2 System parameters

**Issue 1-2-1: Channel raster for LP-WUR**

Agreements:

* + **RAN4 can further discuss and align understandings on whether new channel raster is needed for LP-WUS.**
  + **RAN1 and RAN2 status on how to indicate the centre operation frequency of LP-WUS will be helpful.**

**Issue 1-2-3: number of RBs for LP-WUS with 15kHz SCS**

Agreements:

* + **Leave RAN1 to make decision.**
  + **RAN4 can discuss assumption of RBs under 15kHz SCS for simulation**

**Issue 1-2-5: Whether need to define CBW for LP-WUR?**

Agreements:

* + **no need to define BW for LP-WUR**

# Topic #2: REFSENS, ASCS and ACS requirements

### Sub-topic 2-1 SNR simulation and values

**Issue 2-1-1: Channel model to specify LP-WUS RF requirements**

**Agreement:**

* **For Channel model to specify LP-WUS RF requirements**
  + Follow typical RF requirements approach, AWGN should be selected.

**Issue 2-1-2: Target SNR simulation condition**

Agreement:

* **Target SNR simulation condition** 
  + Follow similar approach of MR NR, no repetition should be used when simulate target SNR.

**Issue 2-1-3: Whether RAN4 should conclude a target SNR first**

**Agreement:**

* Target SNR is the basis for many Rx requirements discussion. Group should conclude SNR definition and SNR values first.
* Options for SNR definition:
  + SNR is the ratio of the total signal energy in one coded bit of LPWUS to the total noise energy in the BW occupied by the LPWUS over the same period
  + Others not precluded

**Issue 2-1-4: Target SNR value**

Agreements:

* + **RAN4 further discuss target SNR value for LP-WUS**
  + **FFS single SNR for OOK-based and OFDM-based receiver**

### Sub-topic 2-2 NF and REFSENS requirements

**Issue 2-2-2: Baseline architecture for OOK-based LP-WUS**

**Agreement:**

* **use zero-IF receiver as a baseline architecture for envelop based LP\_WUR**

**Issue 2-2-3: Baseline architecture for OFDM-based LP-WUS**

Agreements:

* + **Wait for RAN1’s conclusion on the OFDM-based LP-WUR.**

**Issue 2-2-4: whether different NF for OOK-based and OFDM-based**

**Agreement:**

* Differentiate NF for OOK-based and OFDM-based receiver.

**Issue 2-2-9: MDR value for REFSENS test case**

Agreements:

* + **FFS the MDR for conformance testing should be aligned with the value for RF requirement.**

### Sub-topic 2-3 ASCS simulation and requirements

**Issue 2-3-1: ASCS requirements value**

Agreements:

* + **RAN4 further discuss how to specify ASCS requirement based on simulation outcome.**

**Issue 2-3-2: Required number of guard RB for ASCS**

Agreements:

* + **RAN4 further discuss the required number of guard RBs for ASCS requirement based on simulation outcome.**

**Issue 2-3-3: Test parameters for ASCS**

Agreements:

* + **RAN4 further discuss the test parameters for ASCS requirement.**

### Sub-topic 2-4 ACS simulation and requirements

**Issue 2-4-2: ACS requirements value**

Agreements:

* + **RAN4 further discuss how to specify ACS requirements based on simulation outcome.** 
    - **FFS same as MR, or further relaxed**

**Issue 2-4-3: Required guard RB for ACS requirements**

Agreements:

* + **RAN4 further discuss the number of guard RBs for ACS requirement based on simulation outcome.**

**Issue 2-4-4: Test parameters for LP-WUR ACS case**

Agreements:

* + **RAN4 further discuss the test parameters for ACS requirement.**

# Topic #4: Testability issues

### Sub-topic 4-1 Testability for UE RF requirements

**Issue 4-1-1: General framework on LP-WUS testing**

Agreements:

* + **RAN4 further discuss the high-level approach on how to achieve LP-WUS performance verification.** 
    - **The flowing issues could be considered in the high level framework, others are not precluded:**
      * **Whether test mode should be considered**
      * **Whether tests for both RRC\_IDLE/INACTIVE and RRC\_CONNECTED modes should be considered**
      * **Whether MR should be waken up and provide feedback to TE for each MDR test**