**3GPP TSG-RAN WG4 Meeting #112bis R4-2417112**

**Hefei China, 14th – 28th Oct, 2024**

**Agenda item:** 6.23.5

**Source:** vivo

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

**Document for:** Approval

# Introduction

This is WF for Rel-19 LP-WUS UE RF.

# Topic #1: General and system parameters

### Sub-topic 1-1 General

**Issue 1-1-1: draft skeleton for LP-WUS RF TR 38.774**

Agreements:

* + **the draft skeleton for TR 38.774 in R4-2415778 is endorsed.**

**Issue 1-1-2: Consideration on RAN1 LS R4-2414909**

Agreements:

* + **no specific RF work related to RAN1 LS.**

**Issue 1-1-3: MDR value for RF requirements**

Agreements:

* + **1% MDR. Same for requirements and conformance testing.**

**Issue 1-1-4: FAR assumption for MDR evaluation**

Agreements:

* + **Use </=1% FAR as evaluation assumption for RF**

### Sub-topic 1-2 System parameters

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

Agreements:

* + **Companies directly bring the specification impact if any and those will be discussed instead of whether a channel raster is required or not.**

**Issue 1-2-2: considerations on LP-WUS allocation**

Agreements:

* + **RAN4 to assume PRB grid alignment between LP-WUS and NR.**
  + **RAN4 to assume the LP-WUS RBs can be flexibly allocated within the wider NR carrier.**

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

Agreements:

* + **Follow RAN1 agreement for number of RBs for LP-WUS with 15KHz SCS, i.e., 11RBs.**

# Topic #2: REFSENS, ASCS and ACS requirements

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

**Issue 2-1-1: Alignment of FR1 SNR calculation/definition in simulation**

Agreements:

* + **SNR is defined as the ratio of average energy of the LP-WUS signal per sub carrier over the average energy of Noise per sub carrier, over all the LP-WUS RBs.** 
    - **Consider the sub-carriers allocated to LP-WUS excluding Guard RBs.**

**Issue 2-1-2: FR1 SNR reference point**

Agreements:

* + **similar SNR reference point as MR, i.e., baseband**

**Issue 2-1-3: Target FR1 SNR value for LP-WUS/WUR**

Agreements:

* + **RAN4 can further discuss target SNR for OOK-based and OFDM-based receivers.**

**Issue 2-1-5: Link level simulation assumption for FR2 LP-WUR**

Agreements:

* + **RAN4 can further discuss simulation assumption for FR2 LP-WUS next meeting.**

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

**Issue 2-2-1: Baseline architecture for FR1 OFDM-based LP-WUS**

Agreements:

* + **use zero-IF receiver as a baseline RF architecture for OFDM based LP-WUR.**

**Issue 2-2-3: REFSENS, NF, IM, SNR aspects for FR1 OOK-based and OFDM-based LR**

Agreements:

* + **Collect input on REFSENS with values for each element（NF, IM, SNR） in the table next meeting. The value for each element can be discussed.**
  + **Encourage companies to also input the justification for each element.**

**Issue 2-2-10: Baseline architecture for FR2 OOK-based and OFDM-based LP-WUR**

Agreements:

* + **Companies to study baseline architecture for FR2 LP-WUS.**

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

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

Agreements:

* + **Confirm ASCS RF requirements is needed for LP-WUS/WUR.**

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

Agreements:

* + **RAN4 further discuss required guard RBs for ASCS requirements.**

**Issue 2-3-3: Whether Test case for ASCS should be defined in RAN4**

Agreements:

* + **Detailed test case for ASCS should be defined.**

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

**Issue 2-4-1: Phase noise for simulation assumption**

Agreements:

* + **Phase noise can be considered in LLS simulation analysis.** 
    - **Phase noise used in R4-2415201, R4-2415780, and R4-2309204 could be considered as a reference. Other profiles are not precluded.**
  + **Number of guard RBs will be further discussed until Feb meeting. Encourage companies to provide simulation results with phase noise modelling.**

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

Agreements:

* + FFS**.**

**Issue 2-4-5: Required guard RB for ACS requirements**

Agreements:

* + **RAN4 further discuss the required number of guard RBs for ACS requirements**

**Issue 2-4-7: Test parameters for LP-WUR ACS case**

Agreements:

* + **Further discuss test parameters for LP-WUS ACS**

**Issue 2-4-8: whether limit ADC bit for ACS requirements**

Agreements:

* + **No limiting to a specific ADC bit for ACS requirements.**

# Topic #3: Other RF requirements

**Issue 3-2-2: Maximum input level requirements**

Agreements:

* + **The same maximum input power of [-25 dBm] could be starting point for LP-WUR.**
  + **FFS whether this value should be scaled-down based on the number of LP-WUS RBs.**

**Issue 3-2-3: Reference channel for LP-WUR requirements**

Agreements:

* + **RAN4 should define reference measurement channel for LP-WUR RF requirements.**
  + **FFS details.**

# Topic #4: Testability issues

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

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

Way forward: FFS

**Issue 4-1-2: Separate RF test case for idle and connection mode**

Way forward: FFS

**Issue 4-1-3: How to get feedback from LP-WUR during the test**

Way forward: FFS

**Issue 4-1-4: detailed Test procedure**

Way forward: FFS

**Issue 4-1-5: UE test mode for LP-WUR**

Agreements:

* + **FFS A UE test mode for LP-WUR is needed.**

**Issue 4-1-6: whether a LS to RAN5 on test issue**

Way forward: FFS