**3GPP TSG-RAN WG4 Meeting # 116 R4-2512139**

**[Bengaluru](https://www.3gpp.org/Specification-Groups/" \t "_blank), India, 25 August – 29 August, 2025**

**Agenda item:** 7.24.1

**Source:** Moderator (vivo)

**Title:** WF on RRM requirements for NR\_LPWUS

**Document for:** Approval

# Topic #1: Agreement on RRM core requirements for LP-WUS/WUR

### Sub-topic 1-1 General aspects

**Issue 1-1-14: LP-WUR operation with eDRX**

No RAN4 RRM requirements for LP-WUR operation with eDRX with PTW window in Rel-19.

For LP-WUR operation with eDRX without PTW (i.e., for eDRX cycles <=10.24s)

No RAN4 RRM requirements

**Issue 1-1-15 LP-WUR operation with RedCap**

Specify LP-WUR related idle/inactive requirements including requirement on serving cell offloading, RRM relaxation and higher priority frequency layer search for Redcap UE.

* Existing requirements for MR offloading, RRM relaxation and higher priority frequency layer search will be reused for Redcap UE
  + Confirm the MR wake up delay will apply for 2 Rx Redcap

**Issue 1-1-16: LP-WUR operation with EMR**

Agreement:

When both Rel-16 EMR and Rel-19 LP-WUR are configured:

When T331 is running

* + When Case#1 (RRM offloading) conditions are met:
    - The UE shall search for NR inter-frequency layers configured for idle mode CA/DC measurements by following the higher priority frequency measurement requirements (i.e., based on 60s).
    - Higher priority NR inter-frequency layers follow the higher priority frequency measurement requirements (i.e., based on 60s).
  + When Case#3 (RRM relaxation) conditions are met:
    - If Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ
      * The UE shall search for NR inter-frequency layers configured for idle mode CA/DC measurements by following the higher priority frequency measurement requirements (i.e., based on 60s).
      * Higher priority NR inter-frequency layers follow the higher priority frequency measurement requirements (i.e., based on 60s).
    - if Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ
      * the UE shall search for NR inter-frequency layers configured and not configured for idle mode CA/DC measurements by following the legacy measurement requirements (no relaxation)

when T331 is not running,

* + Serving cell, intra-frequency and NR inter-frequency layers not configured for idle mode CA/DC measurements and NR inter-frequency layers configured for idle mode CA/DC measurements and mobility measurement follow corresponding agreed requirements defined in case 1 and case 3 when they are satisfied.

### Sub-topic 1-2 Detail LP-WUR requirements at RRC\_IDLE/INACTIVE state

**Issue 1-2-1-1: Detail on LR accuracy and side conditions requirements**

Use 2.5 dB as the RF impairment margin for LP-RSRP accuracy requirements*.*

*Remove [] in agreements in RAN4 114bis and the final agreements are as:*

For FR1:

* + - ±3.5 dB is used for core requirements for LP-RSRQ accuracy and ±6 dB is used for core requirements for LP-RSRP accuracy, under the side conditions Ês/Iot = -3 dB
    - ±3.5 dB is used for core requirements of SSB based RSRQ accuracy and ±6 dB is used for core requirements for SSB based RSRP accuracy, under the side conditions Ês/Iot = -3 dB

**Issue 1-2-4-2-3: On how to define LR evaluation requirements**

Agreement:

Using x1=2\*x and y1=2\*y for the evaluation requirement.;

y = 2;

For x, x= 3;

**Issue 1-2-9: LP-WUR status at legacy case (not at LP-WUS monitoring case/fully offloading(case 1) case/RRM relaxation (case 3) case)**

Agreement:

* + No LR measurement and evaluation requirements apply at the legacy state, i.e., for the following cases: from legacy case to LP-WUR monitoring, from legacy case to RRM measurement fully offloading (case 1), and from legacy case to RRM measurement relaxation (case 3).
  + At legacy state, when both MR and LR entry thresholds are configured, the UE shall evaluate both MR and LR thresholds at least once before entering relaxation / offloading

**Issue 1-2-11: RRM requirements for FR2**

On the SSB based LR FR2 requirement

|  |
| --- |
| **LO periodicity [s] Note 1** |
| **FR2 (Scaling factor N1)** |
| 0.32 | 8 |
| 0.64 | 5 |
| 1.28 | 4 |
| 2.56 | 3 |

No requirement for the FR2 LP-SS based LR

For SSB based FR2 LR,

* the target measurement accuracy for FR2 SS-RSRP is 7.5 dB.
* the target measurement accuracy for FR2 SS-RSRQ is 3.5dB.

For MR-based relaxed serving and neighbour cell measurements in FR2, reuse the measurement relaxation factor of 16 as agreed for FR1.

Note: No RF margin for RSRQ accuracy requirement, and 4dB RF margin for FR2 RSRP requirement.

**Issue 1-2-12: UE behaviro when both Rel-16 relaxation and Rel-19 LP-WUR offloading/relaxation are satisfied; or when both Rel-17 relaxation for Redcap and Rel-19 LP-WUR offloading/relaxation are satisfied**

Agreement:

UE is allowed to follow the most relaxation requirements when only Rel-16 not at cell edge is configured, and Rel-16 not at cell edge and Rel-19 LP-WUR offloading/relaxation are both satisfied and Rel-16 EMR is not configured or Rel-16 EMR is configured and T331 is not running.

### Sub-topic 1-3 MR RRM relaxation

### Sub-topic 1-4 LP-WUR CONNECTED mode

**Issue 1-4-1: LP-WUR at CONNECTED mode**

Agreement: No RRM impact for connected mode in this WI.

### Sub-topic 1-5 Others

**Issue 1-5-3: MR wake up delay after exiting case 1 due to offloading conditions cannot be met**

Agreement: When exiting case 1 due to exiting conditions of offloading is met, MR reuse the existing wake up delay.

# Topic #2: Agreement on simulation assumptions and results

### Sub-topic 2-1 On simulation assumptions and parameters

### Sub-topic 2-2 Simulation results alignment and summary

# Topic #3: Other Issues in core part

**Issue 1-1-13: Spec impact**

Close this issue

**Issue 1-1-18 UE capability**

Close this issue

**Issue 1-2-2-2: Upper bound on SSB-based LP-WUR measurement periodicity**

Close this issue

**Issue 1-2-4-0: On LR measurement requirement**

Discuss in the CR directly, close this issue

**Issue 1-2-4-2-1: On applicability LR evaluation requirements**

Discuss in the CR directly, close this issue

**Issue 1-2-5-1: On applicability MR evaluation requirements**

Discuss in the CR directly, close this issue

**Issue 1-2-8-1: Accuracy for normal or relaxed MR serving cell measurement**

Discuss in the CR directly, close this issue

**Issue 1-2-8-2: Accuracy for relaxed MR neighbour cell measurement**

Discuss in the CR directly, close this issue

**Issue 1-2-10: Higher priority frequency layer measurement requirements**

Close this issue

**Issue 1-2-13: Transition period**

Combined with issue 1-5-3, close this issue

**Issue 2-1-5: On ideal RSRP/RSRQ in simulation**

Close this issue

**Issue 2-1-10: General aspects on simulation procedure**

Close this issue

**Issue 2-1-12: Others on simulation assumptions and campaign**

Close this issue

**Issue 2-2-1: Summary on number of samples for OOK based LR and OFDB based LR based on simulation results**

Close this issue

**Issue 1-1-2: Threshold for switch between different cases**

Contribution driven

**Issue 1-1-17: LP-WUR operation with SDT**

Contribution driven

**Issue 1-2-14: Others**

Contribution driven

**Issue 1-5-4: LR based RRM when stationary or low-mobility criteria is configured for power saving feature**

Contribution driven

**Issue 2-1-8: On LP-SS with overlaid OFDM sequences**

Contribution driven

**Issue 1-5-3: MR wake up delay after exiting case 1 due to offloading conditions cannot be met**

Discuss on the measurement periodicity after wake up.

Discuss on whether the wake up delay apply in the scenario when exiting from case 3.

# Topic #4: Recommendation for performance part

Continue discussion on issues in performance part.

# Reference

[1] R4-2509065 Topic summary for [116][222] NR\_LPWUS, vivo, RAN4 116

[2] R4-2512138, Ad hoc minutes for NR\_LPWUS, vivo, RAN4 116