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

**[Bengaluru](https://www.3gpp.org/Specification-Groups/%22%20%5Ct%20%22_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.

FFS on the measurement periodicity after wake up.

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

# 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: Issues to be closed

**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

# Topic #4: Recommendation for open issues

Continue discussion on issues in performance part.

**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

# 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