**3GPP TSG-RAN WG4 Meeting # 113** [**R4-2420100**](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_113/Inbox/R4-2420100.zip)

Orlando, US, 18th – 22nd November, 2024

**Agenda item:** 7.23.5

**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

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

**Issue 1-2-2: Periodicity for SSB based LP-WUR measurement delay requirements**

Agreement:

If LP-SS is not configured, periodicity for SSB based LP-WUR measurement delay requirements

* based on LO periodicity
  + FFS whether to define an upper bound
  + Note: DRX cycle and LO periodicity are the same based on RAN1 agreement.

Agreement:

When LP-SS is configured, apply the same agreement as for when LP-SS is not configured

* The above agreement applies if LO periodicity is equal to or larger than LP-SS periodicity, FFS if LO periodicity is smaller than LP-SS periodicity.

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

**Issue 1-3-1: MR RRM relaxation for serving cell/neighbour cell for case 3**

Agreement:

Scaling factor(s) is/are >= 4. Further down-select from

* Option 1: 1 fixed scaling factor
* Option 2: multiple values configured by NW
* Option 3: multiple values, scaling factor value depends on DRX cycle length (QC MTK apple xiaomi vivo)

|  |  |
| --- | --- |
| DRX cycle length [s] | Scaling factor |
| 0.32 | TBD |
| 0.64 | TBD |
| 1.28 | TBD |
| 2.56 | TBD |

**Issue 1-3-2: On Neighbour cell and serving cell relaxation factor**

Agreement:

Same relaxation factor(s) applies to serving and neighbour cell measurements in idle/inactivate state.

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

### Sub-topic 1-5 Others

# Topic #2: Agreement on simulation assumptions and results

# Topic #3: Open issues

Details on all open issues can be found in [1] and [2].

**Issue 1-1-1: Cases/states to be considered for RRM relaxation and serving cell measurement offloading**

*Recommendations:*

*Postpone the discussion until more RAN2 progress*

**Issue 1-1-3: Measurement requirements to be specified for LP-WUR**

*Recommendations:*

*Encourage company further check related RAN1’s agreements.*

**Issue 1-1-5: Criteria (entry/exit conditions) for fully offloading case and MR RRM measurement relaxation**

**Issue 1-1-6: Criteria (entry/exit conditions) for LP-WUS monitoring**

*Recommendations:*

*For both issue 1-1-5 and 1-1-6, criteria are up to RAN2’s consideration and close these issues.*

**Issue 1-1-8: LP-WUR operating carrier frequency**

* Proposals
* Option 1: Include RAN4 112bis RF session’s agreement in the reply LS, and RAN4 112bis RRM session’s agreement without FFS (Vodafone, Apple, QC, HW, Nokia, MTK, E///, LGE, CMCC - compromise)
  + *no specific RF work related to RAN1 LS.*
  + *From Rel-19 RAN4 RRM requirement of MR offloading and relaxation perspective, RAN4 assumed LR and MR are operating on the same carrier frequency as baseline.*
* Option 2: Include RAN4 112bis RF session’s agreement in the reply LS, and RAN4 112bis RRM session’s agreement with FFS: (ZTE, vivo, OPPO, CATT, CMCC)
  + *no specific RF work related to RAN1 LS.*
  + *From Rel-19 RAN4 RRM requirement of MR offloading and relaxation perspective, RAN4 assumed LR and MR are operating on the same carrier frequency as baseline.* 
    - *Option 2a: FFS for the case of MR and LR working on different carrier frequencies if it is supported in RAN1/2.*
    - *Option 2b: Note: FFS for the case of MR and LR working on different carrier frequencies if it is supported in RAN1/2.*
    - *Option 2c Include reference of RAN4 112bis RRM WF R4-2417112 or attach it in the reply LS.*
* Option 3: Include only RAN4 112bis RF session’s agreement in the reply LS (to be handled in RF session) (QC)
  + *no specific RF work related to RAN1 LS.*
* Option 4: Do not send a reply LS in RAN4#113. (ZTE, Apple, MTK, OPPO)

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

*Check the following:*

*LP-WUR is ON for serving cell measurement, but when, how to turn on LR and the duration of “ON” for serving cell measurement is up to UE implementation, and no LP-WUR requirement will be applied.*

**Issue 1-2-2-1: Lower bound on LP-SS measurement periodicity**

* Proposals
  + P1: RAN4 to define the lower limit for measurement delay requirements in case the periodicity of LP-SS are 80ms or 160ms. (xiaomi)

*Recommendations:*

*Consider whether to define lower bound on periodicity for OOK based LP-WUR requirements when LP-SS periodicity is 80ms or 160ms.*

**Issue 1-2-3: On requirements for LP-WUR for entry/exit criteria(threshold) evaluation**

*Recommendations***:**

*Encourage companies firstly to consider whether to differentiate requirements based on cases*

*Note: For entry condition evaluation requirements, requirements from legacy state to case 1 or case 3 or LP-WUS monitoring will be discussed separately.*

*If No*

Same requirements will be defined on entry criteria(threshold) evaluation from one case to the other case (excluding scenarios in the note).

Same requirements will be defined on exit criteria(threshold) evaluation from one case to the other case.

*If Yes, consider the following cases one by one*

Issue 1-2-3a: On requirements for entry/exit criteria(threshold) evaluation for Case 1

Issue 1-2-3b: On requirements for entry/exit criteria(threshold) evaluation for Case 3

Issue 1-2-3c: On requirements for entry/exit criteria(threshold) evaluation for LP-WUS monitoring

On detailed evaluation requirements, the following options are available

* Option 1: Evaluation requirements for entry/exit evaluation is the same as that of LP-WUR measurement period.
* Option 2: Evaluation requirements for entry/exit conditions is longer than that of LP-WUR measurement period.
* Option 3: Evaluation requirements for entry evaluation is longer than that of LP-WUR measurement period; evaluation requirements for exit evaluation is the same as that of the LP-WUR measurement period.

**Issue 2-1-6: On SCS in simulation**

*Recommendations:*

*Check whether only using SCS = 30KHz in the simulation is agreeable*

|  |  |
| --- | --- |
| *Subcarrier spacing* | *30KHz initially* |

**Issue 2-1-11: On simulation campaign**

*Recommendations:*

*Encourage to have email discussion on the table to align simulation results.*

# Reference

[1] R4-2418284, Topic summary for [113][226] NR\_LPWUS, vivo, RAN4 113

[2] [R4-2420117](ftp://10.10.10.10/ftp/tsg_ran/WG4_Radio/TSGR4_113/Inbox/R4-2420117.zip), Ad-hoc minutes for NR\_LPWUS, vivo, RAN4 113