3GPP TSG-RAN WG4 Meeting # 99-e R4-210xxxxx

Electronic Meeting, May. 19-27, 2021

**Agenda item:** 11.9.4

**Source:** Moderator (Huawei)

**Title:** Email discussion summary for [99-e][240] NB\_IOTenh4\_LTE\_eMTC6\_RRM

**Document for:** Information

# Introduction

Companies are encouraged to identify the impact on RRM requirements of Rel-17 NB\_IOTenh4\_LTE\_eMTC6 and have initial discussion on identified issues.

1st round:

Companies provide comments on the scope of RRM impact of Rel-17 NB\_IOTenh4\_LTE\_eMTC6 and have initial discussion on identified issues.

2nd round:

Keep discussing the scope of RRM impact of Rel-17 NB\_IOTenh4\_LTE\_eMTC6 and identified issues if needed.

# Topic #1: Title

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2110275 | Nokia, Nokia Shanghai Bell | **Observation 1: The support of 16 QAM unicast in DL will require extensions to channel quality reporting specified in TS 36.133 for NB-IoT presumably using existing subclauses. This work needs to be coordinated with RAN1 and RAN2.**  **Observation 2: The support of neighbour cell measurements prior to RLF for NB-IoT will require measurement support specified in TS 36.133 presumably using a separate clause. This work needs to be coordinated with RAN2.**  **Observation 3: Support of power reduction for PRACH, PUCCH, and full-PRB PUSCH for LTE-MTC will not impact RRM core requirements.**  **Proposal 1: RAN4 scope of the RRM work for Additional enhancements for NB-IoT and LTE-MTC is on defining channel quality reporting for 16-QAM unicast in DL based on RAN1 and RAN2 agreements and measurement requirements for support of neighbour cell measurements in RRC Connected state prior to RLF based on RAN2 agreements. Therefore, work should proceed in tight coordination with RAN1 and RAN2.** |
| R4-2110346 | Huawei, HiSilicon | **Proposal 1: For Rel-17 additional enhancements for NB-IoT and LTE-MTC WI, discuss the following RRM requirements:**   * **Neighbour cell measurement in CONNECTED state of NB-IoT before RLF**   **Observation 1: Up to RAN2 to decide the triggering and the stopping mechanism. If any issue is identified in RAN2, RAN2 will further check with RAN4 if necessary.**  **Observation 2: From the perspective of enabling the neighbour cell measurement before RLF, UE should start the measurement earlier than OOS for the following reasons:**   * **OOS indication implies that the channel condition is already extremely low for a certain period of time.** * **Large number of repetitions are needed for transmission and reception which leaves few opportunities for measurement on other frequency layers.** * **Time could be used for neighbour cell measurement before RLF is insufficient.**   **Observation 3: The minimum length of a measurement occasion and maximum interval shall be considered when defining the RRM requirements for neighbour cell measurement on carrier frequency which is different from the serving cell.**  **Proposal 2: When the target frequency carrier is different from the serving carrier, the maximum interval between two occasions shall be less than 5 seconds and the minimum length of as measurement occasion shall be at least 400 ms for normal coverage.**  **Observation 4: Neighbour cell measurement in connected state is not “routine measurement”, which could only be triggered when the channel condition is deteriorating and the RLF and RRC re-establishment is going to happen, and UE shall utilize the limited the measurement occasions wisely to find a suitable cell before RLF.**  **Observation 5: The neighbour cell measurement in enhanced coverage shall be deprioritized for the following reasons:**   * **Time needed for detection/measurement of a cell in enhanced coverage is extremely longer than what is needed for a cell in normal coverage.** * **UE may fails to find a suitable cell as the measurement occasions are limited before RLF and the cell detection of a cell in enhanced coverage will occupy almost all occasions.** * **UE needs to start neighbour cell measurement long before RLF when the channel condition may haven’t change at all.**   **Proposal 3: The neighbour cell measurement of a cell in enhanced coverage shall be deprioritized from RAN4’s perspective.**  **Proposal 4: For neighbour cell measurement in connected state, UE shall be able to monitoring at least the carrier which is same as the serving carrier and at least two carriers which are different from the serving carrier. Then detection/measurement delay shall be scaled by the number of carriers.** |
| R4-2111250 | Ericsson | **Proposal #1:** RAN4 shall wait for RAN2 conclusions on the exact conditions for starting and stopping CONNECTED mode neighbour cell measurements.  **Proposal #2:** Release 17 intra-frequency and inter-frequency neighbor cell measurement requirements are introduced in section 8.14 of TS 36.133.  **Proposal #3:** Consider the example in Figure 1 for defining the release 17 neighbor cell measurement requirements.  **Observation 1:** No impact on NRSRP/NRSRQ measurement accuracy sections. |

## Open issues summary

### Sub-topic 1-1 RRM Work scope

**Issue 1-1-1: RRM requirements for neighbour cell measurements in RRC Connected state before RLF for NB-IoT**

* Proposals
  + Option 1: Define RRM requirements for neighbour cell measurements in RRC Connected state before RLF (Nokia P1, Huawei P1, Ericsson)
* Recommended WF
  + Can we agree on option 1?

**Issue 1-1-2: RRM requirements for channel quality reporting for 16-QAM for NB-IoT**

* Proposals
  + Option 1: Define channel quality reporting for 16-QAM unicast in DL based on RAN1 and RAN2 agreements. (Nokia P1)
* Recommended WF
  + Moderator: According to the approved work plan R4- 2107255, the channel quality reporting to support 16-QAM will be discussed in Demod session starting from RAN4#101.

**Companies views’ collection for 1st round for Sub-topic 1-1**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Issue 1-1-1**  **Issue 1-1-2** |
| YYY |  |

### Sub-topic 1-2 Issues related to neighbour cell measurements in RRC Connected state before RLF for NB-IoT

*Sub-topic description*

*Open issues and candidate options before e-meeting:*

**Issue 1-2-1: Ways to organize the specification to capture the RRM requirements for neighbour cell measurements**

* Proposals
  + Option 1: Capture the neighbour cell measurements requirements in a separate clause (Nokia O2)
  + Option 2: Capture the neighbour cell measurement requirements in clause 8.14 which will include measurements requirements for intra-frequency measurements on serving cell (legacy) and intra/inter frequency neighbour cell measurements (Ericsson P2/P3)
* Recommended WF
  + Need more discussion

**Issue 1-2-2: Starting and stopping triggering of CONNECTED mode neighbour cell measurement**

* Proposals
  + Option 1: RAN4 shall wait for RAN2 conclusions on the exact conditions for starting and stopping CONNECTED mode neighbour cell measurements. (Ericsson P1)
* Recommended WF
  + Can we agree on option 1?

**Issue 1-2-3: Conditions for CONNECTED mode neighbour cell measurement when the target frequency carrier is different from the serving carrier**

* Proposals
  + Option 1: When the target frequency carrier is different from the serving carrier, the maximum interval between two occasions shall be less than 5 seconds and the minimum length of measurement occasion shall be at least 400 ms for normal coverage. (Huawei P2)
* Recommended WF
  + Need more discussion

**Issue 1-2-4: Neighbour cell measurement of a cell in enhanced coverage**

* Proposals
  + Option 1: The neighbour cell measurement of a cell in enhanced coverage shall be deprioritized from RAN4’s perspective. (Huawei P3)
* Recommended WF
  + Need more discussion

**Issue 1-2-5: Multiple carriers operation**

* Proposals
  + Option 1: UE shall be able to monitoring at least the carrier which is same as the serving carrier and at least two carriers which are different from the serving carrier. Then detection/measurement delay shall be scaled by the number of carriers. (Huawei P4)
* Recommended WF
  + Need more discussion

**Issue 1-2-6: Measurement accuracy**

* Proposals
  + Option 1: No impact on NRSRP/NRSRQ measurement accuracy sections. (Ericsson O1)
* Recommended WF
  + Need more discussion

**Companies views’ collection for 1st round for Sub-topic 1-2**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | **Issue 1-2-1**  **Issue 1-2-2**  **Issue 1-2-3**  **Issue 1-2-4**  **Issue 1-2-5**  **Issue 1-2-6** |
| YYY |  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic #1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

# Recommendations for Tdocs

## 1st round

**New tdocs**

|  |  |  |
| --- | --- | --- |
| **Title** | **Source** | **Comments** |
| WF on … | YYY |  |
| LS on … | ZZZ | To: RAN\_X; Cc: RAN\_Y |
|  |  |  |

**Existing tdocs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
|  |  |  |  |  |
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Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tdoc number** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-210xxxx | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-210xxxx | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-210xxxx | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |

Notes:

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   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents