3GPP TSG-RAN WG4 Meeting #97-e draft R4-2017024

Electronic Meeting, 2 – 13 November 2020

**Agenda item:** 6.1.2, 6.1.3

**Source:** Moderator (Ericsson)

**Title:** Email discussion summary for [97e][225] LTE\_eMTC5\_RRM

**Document for:** Information

# Introduction

This email discussion targets to discuss the Rel-16 eMTC RRM core part maintenance and test cases.

Candidates target of email discussion for 1st round and 2nd round:

* 1st round:
  + Discuss the remaining open issues on Rel-16 eMTC RRM core parts
  + Review the test cases for Rel-16 eMTC RRM requirements.
* 2nd round:
  + Agree with the correction CR(s) for Rel-16 eMTC RRM core requirements.
  + Agree with the test cases for Rel-16 eMTC RRM requirements.

# Topic #1: RRM Core requirements maintenance

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

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015778 | Huawei, HiSilicon | Proposal 1: For non-DRX in Connected mode and rmax\*G >= 80ms case, the RSS measurement period is defined as Max(rmax\*G, TRSS ) x N.  Proposal 2: Update the RSS measurement condition related to MG to “There are at least 2 consecutive RSS subframes available outside measurement gaps (if configured) in the window of [n-6, n-2]”.  Proposal 3: Send LS to ask RAN2 to remove RSRQ evaluation in S criterion if the cell is measured based on RSS.  Proposal 4: Add another condition for RSS based measurement for Connected mode that RSRQ is not configured as trigger quantity or report quantity for intra-frequency measurement.  Proposal 5: UE performs neighbor cell RSS measurement in the radio frame w.r.t. neighbor cell timing that is closest to the derived serving cell radio frame offset.  Proposal 6: For neighbour cell RSS measurement, UE may assume the BL/CE DL subframe configuration of neighbor cells is same as serving cell.  Proposal 7: For eMTC in Inactive mode, the Idle mode requirements apply except   * The WUS and PUR requirement do not apply * The reselection requirements for eDRX, which should be defined without considering PTW and considering the new DRX cycles of 5.12s and 10.24s   Observation: RSRQ is used in S criterion that is used for cell selection and cell reselection.  Observation: The derived radio frame offset for neighbour cell RSS according to 36.331 should be w.r.t. serving cell timing. |
| R4-2016141 | Ericsson | * Not see any particular reason to distinguish between the eDRX requirements in IDLE and INACTIVE states. * For all the requirements that do apply for UEs in RRC\_INACTIVE state and are identical to those in RRC\_IDLE state |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 1-1

Remaining issues on RSS measurement requirements

**Issue 1-1-1: RSS measurement period**

* Proposals
  + Option 1: For non-DRX in Connected mode and rmax\*G >= 80ms case, the RSS measurement period is defined as Max(rmax\*G, TRSS) x N
  + Option 2:
* Recommended WF
  + Need discussion.

**Issue 1-1-2: Time relation between MG and RSS**

* Proposals
  + Option 1: Update the RSS measurement condition related to MG to “There are at least 2 consecutive RSS subframes available outside measurement gaps (if configured) in the window of [n-6, n-2]”
  + Option 2:
* Recommended WF
  + Need discussion

**Issue 1-1-3: RSS-based RSRQ measurements in IDLE mode**

* Proposals
  + Option 1: Define RSS based RSRQ measurement
  + Option 2: Remove Squal > 0 in S criterion if the cell is measured based on RSS.
    - Send LS to ask RAN2 to remove RSRQ evaluation in S criterion if the cell is measured based on RSS.
  + Option 3:
* Recommended WF
  + Need discussion

**Issue 1-1-4: RSS-based RSRQ measurement in CONNECTED mode**

* Proposals
  + Option 1: Add another condition for RSS based measurement for Connected mode that RSRQ is not configured as trigger quantity or report quantity for intra-frequency measurement
  + Option 2:
* Recommended WF
  + Need discussion

**Issue 1-1-5: Measurement timing of RSS in neighbor cell**

* Proposals
  + Option 1: UE takes the derived serving cell radio frame offset for measuring the neighbor cell. This means RSS measurement requirements apply when frame timing between serving and neighbour cell are aligned, e.g. within 3us.
  + Option 2: UE performs neighbor cell RSS measurement in the radio frame w.r.t. neighbor cell timing that is closest to the derived serving cell radio frame offset.
  + Option 3:
* Recommended WF
  + Need discussion

**Issue 1-1-6: Assumption of BL/CE DL subframe configuration for RSS measurements in the neighbor cell**

* Proposals
  + Option 1: Serving cell provides the BL/CE DL subframe configuration of each neighbor cell to be measured with RSS
  + Option 2: UE assumes BL/CE DL subframe configuration of each neighbor cell is same as serving cell
  + Option 3:
* Recommended WF
  + Need discussion

### Sub-topic 1-2

eMTC measurement requirements in RRC\_INACTIVE

**Issue 1-2-1: eMTC measurement requirements in RRC\_INACTIVE**

* Proposals
  + Option 1: eMTC IDLE mode requirements apply except:
    - WUS and PUR requirements
    - Reselection requirements for eDRX, which should be defined without considering PTW and considering the new DRX cycles of 5.12s and 10.24s
  + Option 2: All the requirements that do apply for UEs in RRC\_INACTIVE state and are identical to those in RRC\_IDLE state
* Recommended WF
  + Need discussion

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| XXX | Sub topic 1-1-1:  Sub topic 1-1-2:  Sub topic 1-1-3:  Sub topic 1-1-4:  Sub topic 1-1-5:  Sub topic 1-1-6:  Sub topic 1-2-1:  ….  Others: |
| Ericsson | Sub topic 1-1-1: Support option 1.  Sub topic 1-1-2: We don’t think it is necessary. This condition limits the RSS scheduling flexibility on the network.  Sub topic 1-1-3: In our understanding, the reason RAN1 does not apply RSS to RSRQ measurements is because of the very limited bandwidth of RSS. We don’t want to change RAN1 specification. On the other hand, we understand RAN2 cell selection criterion S requires RSRQ measurement results in RRC\_IDLE.  Since the both options require to change the spec (e.g., TS36.214 for option 1 and TS36.304 for option 2) but the core part has already completed, we are wondering if we take alternative way e.g., adding applicability in RAN4 spec. We need to think this issue carefully.  Sub topic 1-1-4: Similar comment to 1-1-3; we need to think this issue carefully.  Sub topic 1-1-5: We don’t think such a clarification is necessary, because UE should know the exact timing of the measured neighboring cell at this stage.  Sub topic 1-1-6: we understand the issue. Option 1 requires the RAN2 signaling updates and we don’t want it because the core part has completed.  We are ok with option 2, but we would like to make sure this assumption is applicable only when UE performs the RSS measurements in the neighboring cell. This means UE should NOT assume the BL/CE DL subframe configuration of the neighboring cell is same when UE does NOT perform RSS measurement in the neighboring cell.  Sub topic 1-2-1:  We have confirmed RAN2 agreed PUR/WUS is not applicable for eMTC with RRC\_INACTIVE. We are fine to exclude them.  As we discussed in R4-2016141, we do not see any reason to distinguish between the eDRX requirements in IDLE and INACTIVE states.  For the requirements, we prefer to specify the requirements one by one as same approach as normal LTE UE like TS36.133 clause 4A.1 to avoid confusion. |
| Qualcomm | Sub topic 1-1-1: While we understand the motivation behind this proposal, we would like more time to check the correctness of the specific change being proposed.  Sub topic 1-1-2: Same comment as for sub-topic 1-1-1.  Sub topic 1-1-3: Both options would require some effort. Should we remove RSRQ from the S criterion without studying/understanding the implications to mobility? If we believe that RSRQ is not needed for RSS-based measurements, then is it beneficial for CRS-based measurements? Needs further discussion.  Sub topic 1-1-4: Pending resolution of sub-topic 1-1-3.  Sub topic 1-1-5: Not sure we agree with either option. Our understanding is that the UE determines RSS SFN timing offset for each neighbor cell based on RSS-Config-r15 and RSS-ConfigCarrierInfo-r16 as described in TS 36.331.To determine absolute RSS timing the UE needs to acquire timing for each neighbor cell. If this understanding is correct then neither option is needed.  Sub topic 1-1-6: If we go with option 2 then we should ensure it is specified as an applicability condition for RSS-based neighbor measurement requirements.  Sub topic 1-2-1: We agree that eMTC RRC\_IDLE requirements apply to RRC\_INACTIVE except for WUS and PUR. |
| Huawei | Sub topic 1-1-1: support option 1.  Sub topic 1-1-2: support option 1.  To Ericsson, the current requirement on the time relation between RSS and MG is  - If measurement gaps are configured, the measured subframes containing RSS are available before or after the measurement gaps and UE shall measure RSS outside the gaps,  In our understanding, the term “measured subframes” is unclear, and which subframes are measured are up to UE implementation, so we suggest to update the requirement as in option 1, which describes the timing relation between RSS and MG without independent of UE implementation. We do not see the additional NW restriction compared to the existing requirements.  Sub topic 1-1-3:  We agree with the observation from Ericsson and QC that either option has efforts in other WG, and we are also open to other proposals to address the issue.  To Ericsson, for Connected mode we could work on the applicability as we proposed in Issue 1-1-4, as it is only about RAN4 requirements. For Idle mode, as the cell reselection is a procedure defined by RAN2, so far we do not find a good way to address it within RAN4, but we are open to hear other views.  To QC, we understand the concern, and we are open to further check the impact of not having RSRQ. If it proves to be a big issue, then we think it may be better to go with option 1.  Sub topic 1-1-4: support option 1, with this applicability, we can address the issue within RAN4, but again we are open to hear other opinions.  Sub topic 1-1-5: support option 2.  To Ericsson/QC, we understand the SFN timing offset derived based on RSS-Config-r15 and RSS-ConfigCarrierInfo-r16 is w.r.t. serving cell timing. We have same understanding as QC that to determine absolute RSS timing the UE needs to acquire timing for each neighbor cell, and by PSS/SSS UE can get the frame timing of the neighbour cell. Now UE has an SFN (e.g. frame n in the figure) w.r.t. serving cell timing, and timing of frame boundaries w.r.t. neighbour cell timing (e.g. m-2, m-1, m, m+1 in the figure).  If the SFN boundaries are not aligned between serving and neighbour cell, there will be 2 frames w.r.t. neighbour cell timing (frame m-1 and frame m) that are overlapping with the serving cell target frame (frame n). From UE side, there is ambiguity which one contains the RSS, and we understand what UE can do is to take the frame w.r.t. neighbour cell timing that is closest to the target frame w.r.t. serving cell timing. Otherwise, the RSS measurement can only work for sync NW.    Sub topic 1-1-6: also prefer option 2 to avoid signaling impact.  To Ericsson/QC, we agree to both   * this assumption is applicable only when UE performs the RSS measurements in the neighboring cell * it (same BL/Ce subframe configuration) is specified as an applicability condition for RSS-based neighbor measurement requirements   We can work on the exact wording in the CR.  Sub topic 1-2-1: support option 1.  On eDRX requirements, in our view the measurement requirements should be aligned with the UE behavior for monitoring paging. It is noted that UE behavior for monitoring paging is different in Idle and Inactive.  For Idle mode, as shown in above figure, UE only monitor paging within PTW of the eDRX cycle.  For Inactive mode, as shown in above figure, UE only monitor paging outside the PTW, and actually PTW is not applicable for Inactive mode.  Therefore, we do not see the reason to apply the Idle mode eDRX requirements to Inactive. |
| Nokia | Sub topic 1-1-3: We share the concerns expressed by Ericsson and Qualcomm in regard to impact to core specifications. We agree RAN4 should specify applicability in RAN4 spec, i.e. RSS cannot be used for RSRQ measurements. |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015779 (Huawei, HiSilicon) | Ericsson: It depends on the conclusion from issues 1-1. |
| Qualcomm: Pending resolution of sub-topic 1-1. |
|  |
| R4-2015780 (Huawei, HiSilicon) | Ericsson: Need more discussion in the applicability of the requirements in RRM\_INACTIVE (Issue 2-1) |
| Qualcomm: Would prefer more compact requirements that refer to existing RRC\_IDLE requirements. Agree that all requirements except PUR and WUS should be included. |
| Huawei: We are trying to make references to existing RRC\_IDLE requirements as much as possible. The requirements explicitly specified in the new sections are for eDRX, for which we think the Idle mode requirements cannot be reused (as discussed in sub-topic 1-2). |
| R4-2016142 (Ericsson) | Ericsson: Need more discussion in the applicability of the requirements in RRM\_INACTIVE (Issue 2-1) |
| Qualcomm: We agree with Huawei that WUS requirements do not apply to eMTC UE in RRC\_INACTIVE. |
|  |
| R4-2016143 (Ericsson) | Qualcomm: The CR is agreeable. Should be merged with R4-2016587. |
| Nokia: The CR is agreeable. We agree, it should be merged with our CR below. |
|  |
| R4-2016547 (Qualcomm) | Ericsson: Need more discussion in the applicability of the requirements in RRM\_INACTIVE (Issue 2-1) |
| Huawei: in 4A.2 it states the applicability condition that  - the UE is not configured with eDRX  - the UE is not configured with *highSpeedEnhancedMeasFlag*  We think the highlighted one is not needed, i.e. we should define Inactive requirements for UE configured with eDRX. For the second one on high speed support, we need more time to check. |
|  |
| R4-2016587 (Nokia, Nokia Shanghai Bell) | Qualcomm: The correction in Table 4.7.2.1.2-1 should be made. The clarification about RSS occasion referring to the measured cell would be beneficial.Should be merged with R4-2016143. |
| Nokia: Yes, should be merged with the Ericsson CR above. |
|  |

## 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.*

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

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

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| --- | --- |
| **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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: RRM Performance requirements

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

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015841 | Ericsson | Proposal 1: Introduce new Out-of-synch test cases for MPDDCH performance improvement with FD-FDD/HD-FDD/TDD for BL UE CE Mode A.  Proposal 2: Introduce new Early out-of-synch test cases for MPDDCH performance improvement with FD-FDD/HD-FDD/TDD for BL UE CE Mode B.  Proposal 3: Set SNR2/SNR3 1dB lower compared with the existing out-of-synch/early out-of-synch test cases. |
| R4-2016144 | Ericsson | Proposal: Serving cell measurement relaxation test is introduced only for normal coverage |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 2-1

Test case design

**Issue 2-1-1: Test scope of RLM with MPDCCH performance improvement**

* Proposals
  + Option 1:
    - Introduce new Out-of-synch test cases for MPDDCH performance improvement with FD-FDD/HD-FDD/TDD for BL UE CE Mode A
    - Introduce new Early out-of-synch test cases for MPDDCH performance improvement with FD-FDD/HD-FDD/TDD for BL UE CE Mode B
  + Option 2:
* Recommended WF
  + Need discussion.

**Issue 2-1-2: Test point of RLM with MPDCCH performance improvement**

* Proposals
  + Option 1: Set SNR2/SNR3 1dB lower compared with the existing out-of-synch/early out-of-synch test cases
  + Option 2:
* Recommended WF
  + Need discussion.

**Issue 2-1-3: Serving cell measurement relaxation test**

* Proposals
  + Option 1: Serving cell measurement relaxation test is introduced only for normal coverage
  + Option 2:
* Recommended WF
  + Need discussion.

**Issue 2-1-4: Review the test cases**

* Directly provide comments, if any, in section 2.3.2.

## Companies views’ collection for 1st round

### Open issues

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| --- | --- |
| **Company** | **Comments** |
| XXX | Sub topic 2-1-1:  Sub topic 2-1-2:  Sub topic 2-1-3:  ….  Others: |
| Ericsson | Sub topic 2-1-1: Support Option 1.  Sub topic 2-1-2: Support Option 1.  Sub topic 2-1-3: Support Option 1. |
| Qualcomm | Sub topic 2-1-1: We agree to introduce new test cases as agreed in WF R4-2012192.  Sub topic 2-1-2: We would consider a smaller change in SNR. Needs discussion.  Sub topic 2-1-3: |
| Huawei | Sub topic 2-1-1: OK with Option 1.  Sub topic 2-1-2: OK with Option 1.  Sub topic 2-1-3: OK with Option 1. |

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

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| **CR/TP number** | **Comments collection** |
| R4-2015781 (Huawei, HiSilicon) | Ericsson: Need to sort out the subclause number. Since Ericsson CR (R4-2016145) uses A.4.2.41-43, we suggest this CR uses subclause number from A.4.2.44 if Huawei is ok. |
| Huawei: We are of course fine to follow the suggestion from Ericsson, but we are wondering if we need to give exact section numbers for now. We understand that we can leave X/Y/Z in section numbers in the CR, and MCC will allocate the actual section number when implementing the CR in case multiple CRs are adding new subsections to the same section. Could moderator please clarify? |
|  |
| R4-2015842 (Ericsson) | Company A |
| Company B |
|  |
| R4-2016145 (Ericsson) | Moderator: It should be draft CR. |
| Qualcomm: If this is a cell reselection test, could it be combined with one of the tests in R4-2015781? |
|  |
| R4-2016552 (Qualcomm) | Moderator: It should be draft CR. |
| Company A |
| Company B |

## 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:* |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

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

|  |  |
| --- | --- |
| **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)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |