**3GPP TSG-RAN WG4 Meeting # 97-e R4-2017282**

**Electronic Meeting, 2nd – 13th Nov., 2020**

**Agenda item:** 7.6.1 & 7.6.2

**Source:** Moderator (CATT)

**Title:** Email discussion summary for [97e][212] NR\_UE\_pow\_sav\_RRM

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion and provide some guidelines for email discussion if necessary.*

This document is the summary of the email discussion for Rel-16 NR UE Power saving RRM requirements in agenda items 7.6.1 & 7.6.2, with the email thread "[97e][212] NR\_UE\_pow\_sav\_RRM".

It contains the following topics:

Topic #1: RRM core requirements maintenance

Topic #2: RRM measurement relaxation-Performance part

The targets of email discussion for 1st round and 2nd round are listed as below:

* 1st round:
  + Discuss the open issues for power saving RRM test cases
  + Review company contribution in the first round
* 2nd round:
  + Endorse initial CR drafts in the second round, TBD is allowed for some value
    - * Depending on the progress on individual draft CRs, consider whether to merge into single big CR in the end.

# 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** |
| [**R4-2014408**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014408.zip) | CATT | CR for TS38.133, Remove duplication definition for measurement requirements for power saving |
| [**R4-2014527**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014527.zip) | vivo | **Proposal 1 Remove EMR carrier related description in 38.133..**  **Proposal 2 Capture triggering conditions of low mobility in 38.304 and remove related descriptions in 38.133.**  **Proposal 3 Capture triggering conditions of not-at-cell-edge in 38.304 and remove related descriptions in 38.133.**  **Proposal 4 Capture the requirements on UE behaviour when both criterions are met in 38.304, and remove the related clauses in 38.133, i.e. remove 4.2.2.9.4, 4.2.2.10.4, 4.2.2.11.4 in 38.133.**  **Proposal 5 The requirements on UE behaviours when Srxlev > SnonIntraSearchP, Squal > SnonIntraSearchQ and UE is configured with highPriorityMeasRelax are captured in 38.304, and the related descriptions in 38.133 are removed.** |
| [**R4-2014528**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014528.zip) | vivo | CR on RRM relaxation in R16 UE power saving |
| [**R4-2015482**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015482.zip) | Huawei, HiSilicon | Correction CR to Rel-16 UE power saving requirements |
| [**R4-2015574**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015574.zip) | ZTE | CR to 38.133: Correction to relaxed measurement requirements |
| [**R4-2016066**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016066.zip) | Qualcomm Incorporated | CR for correcting wrong requirement for UE fulfilling not-at-cell edge criterion for measurement relaxation |
| **[R4-2016146](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016146.zip)** | Ericsson | Corrections to UE power saving requirements |

## Open issues summary

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

**Background**:

Some requirements and conditions are defined duplicately between RAN2 and RAN4 specifications which may lead to misalignment.

**Issue 1-1: How to avoid duplications between 38.304 and 38.133 about EMR measurement?**

* Proposals
  + Option 1: Yes: Remove EMR related description in 38.133, refer to 38.304 (CATT, vivo)
  + Option 2: No
* Recommended WF
  + Need more discussion

**Issue 1-2: Do you think subclause 4.2.2.9.4 and 4.2.2.10.4 should be removed from 38.133 given the measurement relaxation requrements when both low mobility and not-at-cell-edge criteria are fulfilled has been defined in 38.304?**

* Proposals
  + Option 1: Yes, remove (CATT, vivo)
  + Option 2: No
* Recommended WF
  + Need more discussion

**Issue 1-3: If HighpriorityRelax is configured and UE fulfils low mobility criterion, whether to remove the descriptions on requirements on UE behaviours when Srxlev > SnonIntraSearchP, Squal > SnonIntraSearchQ in subclause 4.2.2.10.2 and 4.2.2.11.2 of 38.133?**

* Proposals
  + Option 1: Yes, remove (vivo)

Since it would be very difficult to define test cases for the “1 hour” requirements, it would be better to capture such requirements on UE behaviour in RAN2 spec. Therefore the description about “1 hour” can be removed. On the other hand, it seems still necessary to clarify that the requirement for higher priority search remains unchanged if HighpriorityRelax is not configured.

* + Option 2: No
* Recommended WF
  + Need more discussion

## Companies views’ collection for 1st round

### Open issues

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| --- | --- |
| **Company** | **Comments** |
| Ericsson | Issue 1-1: Support option 2. This is not duplication rather this is based on RAN4 agreement (see slide 5 in the approved WF in R4-2009265), which forms the basis of the requirements. The main issue is no relaxation is allowed when is doing EMR measurements.  Issue 1-2: Support option 2. 38.133 states that the UE is not required to meet requirements. RAN2 spec does not define any requirements rather procedure.  Issue 1-3: Support option 2. We do not understand the logic of removing the requirements because testing time is very long. We can agree not to have any RRM test to verify this requirement. The requirement allows the UE to relax higher priority search when Srxlev > SnonIntraSearchP, Squal > SnonIntraSearchQ.  ….  Others: |
| Vivo | In summary the intention of vivo’s CR is only to remove duplicated part between RAN2/RAN4 specs without any change on any previous RAN4’s agreements on UE power saving requirements. As indicated in our discussion tdoc R4-2014527, all removed parts at TS38.133 have already been captured by TS38.304. Removing duplicated parts will make specs more concisely and easier for maintenance.  In addition RAN2 get conclusions in this meeting that:  =>  No changes to RAN2 specifications for duplication.  Any RAN4 modifications can be suggested to RAN4 with normal procedures (company CRs)  Issue 1-1  Option 1.  To Eric:  As indicated we have the following agreement in R4-2009265   * Measurements on EMR carriers should not be relaxed if T331 is running   We are fully aware this agreement. As indicated in our contribution, the following has been captured in TS38.304, the update does not change the former agreement. it is not necessary to have duplicated descriptions:  “The above relaxed measurements and no measurement are not applicable for frequencies that are included in *VarMeasIdleConfig*, if configured and for which the UE supports dual connectivity or carrier aggregation between those frequencies and the frequency of the current serving cell.”  Issue 1-2  Prefer option 1.  Issue 1-3  Option 1. Yes. As indicated in LS R2-2005858, the one hour period since measurements for cell selection/reselection were last performed will be captured by TS38.304 |
| Huawei | Issue 1-1 and Issue 1-2: No strong view on the two issues. One way is to provide the full conditions which is aligned with 38.304 in RRM specific, and another way is directly refer to 38.304. In current 133 specification, two ways are applied for different features.  Issue 1-3: option 2.  From integrity of requirements perspective, the requirement for UE fulling low mobility and not at cell edge criteria is better to be remained. Otherwise requirements for this scenario seems missing in RAN4 RRM. |
| CATT | **Issue 1-1: How to avoid duplications between 38.304 and 38.133 about EMR measurement?**  Prefer option 1. The applicability of relaxed measurement requirements for EMR is defined clearly in TS38.304.  **Issue 1-2: Do you think subclause 4.2.2.9.4 and 4.2.2.10.4 should be removed from 38.133 given the measurement relaxation requrements when both low mobility and not-at-cell-edge criteria are fulfilled has been defined in 38.304?**  Prefer option 1.  **Issue 1-3: If HighpriorityRelax is configured and UE fulfils low mobility criterion, whether to remove the descriptions on requirements on UE behaviours when Srxlev > SnonIntraSearchP, Squal > SnonIntraSearchQ in subclause 4.2.2.10.2 and 4.2.2.11.2 of 38.133?**  This description in 4.2.2.10.2 and 4.2.2.11.2 cannot be removed from 38.133 because we think there will be one issue between 38.304 and modified 38.133.  In 38.304 5.2.4.9.0:  For the highlighted text in yellow, no issue.  But for the highlighted text in blue, it introduces different behaviors from current design.  When the UE is required to perform measurements of intra-frequency or NR inter-frequencies or inter-RAT frequency cells according to the measurement rules in clause 5.2.4.2:  - if *lowMobilityEvaluation* is configured and *cellEdgeEvaluation* is not configured; and  - if the UE has performed normal intra-frequency, NR inter-frequency, or inter-RAT frequency measurements for at least TSearchDeltaP after (re-)selecting a new cell; and  - if the relaxed measurement criterion in clause 5.2.4.9.1 is fulfilled for a period of TSearchDeltaP:  - the UE may choose to perform relaxed measurements for intra-frequency cells according to relaxation methods in clauses 4.2.2.9 in TS 38.133 [8];  - if the serving cell fulfils Srxlev > SnonIntraSearchP and Squal > SnonIntraSearchQ:  - for any NR inter-frequency or inter-RAT frequency of higher priority, if less than 1 hour has passed since measurements of corresponding frequency cell(s) for cell (re-)selection were last performed; and,  - if *highPriorityMeasRelax* is configured with value *true*:  - the UE may choose not to perform measurement on this frequency cell(s);  - else (i.e. the serving cell fulfils Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ):  - the UE may choose to perform relaxed measurements for NR inter-frequency or inter-RAT frequency cells according to relaxation methods in clauses 4.2.2.10, and 4.2.2.11 in TS 38.133 [8];  - if *cellEdgeEvaluation* is configured and *lowMobilityEvaluation* is not configured; and  - if the relaxed measurement criterion in clause 5.2.4.9.2 is fulfilled:  - the UE may choose to perform relaxed measurements for intra-frequency cells according to relaxation methods in clauses 4.2.2.9 in TS 38.133 [8];  - if the serving cell fulfils Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ:  - the UE may choose to perform relaxed measurements for NR inter-frequency or inter-RAT frequency cells according to relaxation methods in clauses 4.2.2.10, and 4.2.2.11 in TS 38.133 [8];  - if both *lowMobilityEvaluation* and *cellEdgeEvaluation* are configured:  - if the UE has performed normal intra-frequency, NR inter-frequency, or inter-RAT frequency measurements for at least TSearchDeltaP after (re-)selecting a new cell; and  - if the relaxed measurement criterion in clause 5.2.4.9.1 is fulfilled for a period of TSearchDeltaP; and  - if the relaxed measurement criterion in clause 5.2.4.9.2 is fulfilled:  - for any intra-frequency, NR inter-frequency, or inter-RAT frequency, if less than 1 hour has passed since measurements of corresponding frequency cell(s) for cell (re-)selection were last performed:  - the UE may choose not to perform measurement for measurements on this frequency cell(s);  - else:  - if the UE has performed normal intra-frequency, NR inter-frequency, or inter-RAT frequency measurements for at least TSearchDeltaP after (re-)selecting a new cell, and the relaxed measurement criterion in clause 5.2.4.9.1 is fulfilled for a period of TSearchDeltaP; or,  - if the relaxed measurement criterion in clause 5.2.4.9.2 is fulfilled:  - if combineRelaxedMeasCondition is not configured:  - the UE may choose to perform relaxed measurements for intra-frequency, NR inter-frequency cells of equal or lower priority, or inter-RAT frequency cells of equal or lower priority according to relaxation methods in clauses 4.2.2.9, 4.2.2.10, and 4.2.2.11 in TS 38.133 [8];  - if the serving cell fulfils Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ:  - the UE may choose to perform relaxed measurement for NR inter-frequency cells of higher priority, or inter-RAT frequency cells of higher priority according to relaxation methods in clauses 4.2.2.10, and 4.2.2.11 in TS 38.133 [8]; |
| Xiaomi | Issue 1-1: We are fine with the two options.  Issue 1-2: Support Option 2. Subclause 4.2.2.9.4 and 4.2.2.10.4 in TS38.133 define the requirements for UE fulfill both low mobility and not-at-cell-edge criteria while TS38.304 does not give such requirements.  Issue 1-3: Support Option 2. The “1 hour” requirement is based on long and deep discussion in RAN4, and we don’t think it is reasonable to remove the related descriptions just because it is time-consuming to test. |
| OPPO | Issue 1-1 & 1-2:  As option 1 and option 2 are applicable, we also have no strong view. But slightly prefer option 1, which can avoid confusion due to possible misalignments between 38133 and 38304.  Issue 1-3:  Prefer option 2. Otherwise it causes some confusion. |
| MTK | Issue 1-1: Support option 2.  Issue 1-2: Support option 2.  Issue 1-3: Support option 2. Similar problem happens in cell re-selection. Spec TS38.133 also needs to capture agreements made in RAN4. Furthermore, we do not think RAN2 spec refer to the correct requirement specified in RAN4 |
| Qualcomm | Issue 1-1-1 and 1-1-2: Provided no change to the current agreements is done, an approach which reduces duplication and makes maintenance is to be preferred;  Issue 1-1-3: Option 2, there's little to gain in clarity by removing only half of the requirement; |
| LG | Issue 1-1: If there are no misunderstanding between RAN4 and RAN2, we prefer to keep current statements in 38.133 as option 2. These are conditions of measurement relaxation requirements, and readers can more easily acquire the conditions for measurement relaxation than 38.304.  Issue 1-2: support option 2.  Issue 1-3: support option 2. |
| ZTE | Issue 1-1: Support option 2,  Issue 1-2: Support option 2.  Issue 1-3: support option 2.  For issue 1-1 and 1-2, though there is a little bit redundant in the related clauses, we do not prefer to make any change. The current edition is good for readers to read and understand. In addition, there is no conflict between the content in TS38304 and TS38133.  For issue 1-3, we share the same view as Ericsson. |
| Apple | Issue 1-1: Support option 2,  Issue 1-2: Support option 2.  Issue 1-3: support option 2. |
| vivo | For the option 3, one example is that the inter-frequency NB-IOT measurement requirements in normal coverage in TS36.133 is specified as below where 1 hour requirement is not included in.  *If all the relaxed monitoring criteria defined in clause 5.2.4.12 [1] are fulfilled then the UE’s inter-frequency measurement is not required to meet Tdetect,NB\_Intra\_EC, Tmeasure,NB\_Intra\_EC and Tevaluate,NB\_intra\_EC as defined in Table 4.6.2.5-1 and Table 4.6.2.5-2.* |

### 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** |
| [**R4-2014408**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014408.zip)  CATT | Ericsson: We cannot agree with the CR. See our comments on issues 1-1, 1-2 and 1-3. We cannot agree to remove any existing requirements/functionality. If necessary some clean up can be done to avoid duplication between 38.304 and 38.133. |
| vivo   1. In cover page, test specification should be 38.533 2. In 4.2.2.10.1 and 4.2.2.11.1, maybe “and meets the EMR requirements as defined in [1]” is not necessary.   3. For higher priority search, slightly prefer the version in vivo’s CR 2014528, since the requirement for higher priority is defined in 4.2.2.7 but not 4.2.2.3. Anyway this version is also fine for us. |
| Huawei: depends on the outcome of open issues |
| [**R4-2014528**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014528.zip)  Vivo | Ericsson: We cannot agree with the CR. See our comments on issues 1-1, 1-2 and 1-3. We cannot agree to remove any existing requirements. If necessary some clean up can be done to avoid duplication between 38.304 and 38.133. |
| vivo:  As indicated at 1.3.1, the intention of this CR is to align TS38.133 and TS38.304 and remove duplicated parts, if necessary.  For issues indicated in R4-2015482, R4-2015574 and R4-2016066, our preference is to capture them in TS 38.304 as discussion in our proposal 2 and 3 in 2014527, since 304 can refer to the correct clause in 38.133. Not sure whether these should also be discussed as open issues or just discussed in these CRs.  All other changes are discussed in open issues. |
| Huawei: depends on the outcome of open issues |
| CATT: In the summary of change:  Ok for bullet 1.  For bullet 2, consider how to integration with bullet 2 of R4-2015482 (Huawei).  Ok for bullet 3.  For bullet 4, we think it is incorrect. Please refer to the reason in the comments for Issue 1-3. |
| [**R4-2015482**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015482.zip)  Huawei, HiSilicon | Ericsson: Looks fine. |
| vivo:   1. For clause 4.2.2.9.2, 4.2.2.9.3, 4.2.2.10.2, 4.2.2.10.3, 4.2.2.11.2, 4.2.2.11.3, only adding “and UE has fulfilled” might not be enough. It would still be ambiguous on whether UE has just fulfilled the cellEdgeEvaluation configured by RRC, or also the related configurations such as “TdeltasearchP” are also considered. Additionally it would be ambiguous if some conditions with and/or parallel.   2. The correction to lowMobilityEvaluation is fine for us, however in our understanding the conditions would better be described in TS 38.304, as indicated in vivo’s CR 2014528. |
| CATT: In the summary of change:  For bullet 1, Fine for us. Need discussion how to be resolved with bullet 2 of R4-2014528 (vivo) for same part.  For bullet 2, ok. But for 4.2.10.4, replacing "intra" with "inter" for first sentence is also required. |
| [**R4-2015574**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015574.zip)  ZTE | Ericsson: Looks fine. |
| vivo:  The correction is fine for us, however our understanding is the conditions would better be described in TS 38.304, as indicated in vivo’s CR 2014528. |
| Huawei: depends on the outcome of open issues |
| CATT: The change is correct. Need discussion how to be resolved with R4-2014528 (vivo) for same part. |
| [**R4-2016066**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016066.zip)  Qualcomm Incorporated | Ericsson: Looks fine. |
| vivo: The correction is fine for us, however in our understanding the conditions would better be described in TS 38.304, as indicated in vivo’s CR 2014528. |
| Huawei: the change is also cover in R4-2015482 |
| CATT: The change is correct. Need discussion how to be resolved with R4-2014528 (vivo) for same part. |
| [**R4-2016146**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016146.zip)  Ericsson | vivo:   1. In cover page, test specification should be 38.533 2. Decision related to EMR carrier is in issue 1-1. |
| Huawei: depends on the outcome of open issues |
| CATT: Fine with change 1.  For change 2, our understanding is that the change is related to the decision of Issue 1-1. It remains EMR related description in 38.133 with adding the description to refer to chapters in 38.133 and 36.133 of Idle Mode CA/DC measurements. If the understanding is not the same as your thought, please correct. |

## 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:* |
| **Issue 1-1: How to avoid duplications between 38.304 and 38.133 about EMR measurement?** | The following options were discussed.   * Option 1: Yes: Remove EMR related description in 38.133, refer to 38.304 * Option 2: No   11 companies showed their views on the issue:   * 2 companies support option 1. 1 additional company supports option 1 slightly. * 5 companies support option 2. * 3 companies with no strong view.   Both options don’t plan to modify the RAN4’s agreement before.  *Tentative agreements:*   * Option 2. Whether to need wording modification such as CR [R4-2016146](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016146.zip) can be discuss in second round.   *Candidate options:*  *Recommendations for 2nd round:*  Reflect the above agreement in the CR |
| **Issue 1-2: Do you think subclause 4.2.2.9.4 and 4.2.2.10.4 should be removed from 38.133 given the measurement relaxation requrements when both low mobility and not-at-cell-edge criteria are fulfilled has been defined in 38.304?** | The following options were discussed.   * Option 1: Yes, remove * Option 2: No   11 companies showed their views on the issue:   * 2 companies support option 1. * 6 companies support option 2. * 3 companies with no strong view.   *Tentative agreements:*   * Option 2   *Candidate options:*  *Recommendations for 2nd round:*  Reflect the above agreement in the CR |
| **Issue 1-3: If HighpriorityRelax is configured and UE fulfils low mobility criterion, whether to remove the descriptions on requirements on UE behaviours when Srxlev > SnonIntraSearchP, Squal > SnonIntraSearchQ in subclause 4.2.2.10.2 and 4.2.2.11.2 of 38.133?** | The following options were discussed.   * Option 1: Yes, remove * Option 2: No   11 companies showed their views on the issue:   * 1 company supports option 1. * 10 companies support option 2.   *Tentative agreements:*   * Option 2   *Candidate options:*  *Recommendations for 2nd round:*  Reflect the above agreement in the CR |

*Recommendations on WF/LS assignment*

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| --- | --- | --- |
|  | **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”* |
| [**R4-2014408**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014408.zip) | To be noted. |
| [**R4-2014528**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014528.zip) | To be noted. |
| [**R4-2015482**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015482.zip) | To be revised. |
| [**R4-2015574**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015574.zip) | Agreeable. |
| [**R4-2016066**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016066.zip) | To be noted. Changes are covered by R4-2015482. |
| [**R4-2016146**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016146.zip) | To be revised. Only cover the agreeable changes not covered by R4-2015482. |

## Discussion on 2nd round (if applicable)

**Issue 1-1: How to avoid duplications between 38.304 and 38.133 about EMR measurement?**

* Do not remove EMR related description in 38.133. Whether to need wording modification such as CR [R4-2016146](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016146.zip) can be discuss in second round.

### CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2017131  Huawei, HiSilicon  (Revised from R4-2015482) |  |
| R4-2017132  Ericsson  (Revised from R4-2016146) |  |

## 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”* |
| R4-2017131 | *Agreeable* |
| R4-2017132 | *Agreeable* |

# Topic #2: RRM measurement relaxation-Perf. part

*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** |
| [**R4-2014370**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014370.zip) | MediaTek inc. | **Observation 1: For FR2 inter-frequency cell reselection, the accuracy margins for estimated RSRP shall be +27.5 dB and -17.5 dB.**  **Observation 2: For FR2 intra-frequency cell reselection, the accuracy margins for estimated RSRP shall be +7.5 dB and -7.5 dB.**  **Observation 3: For FR2 inter-frequency, the relative minimum signal power transmitted from TE is 34 dB, i.e., -106+140 (**Qrxlevmin**) =34, if we take the -106 dBm/SCS as minimum SSB reference power.**  **Observation 4: For FR2 inter-frequency, the relative maximum signal power transmitted from TE is 48.5 dB depending on Noc=-102 dBm.**  **Proposal 1: RAN4 needs to further study on the feasibility of testing two criteria, low mobility and not-at-cell edge, in one test case for cell reselection to FR2 inter-frequency.** |
| [**R4-2014371**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014371.zip) | MediaTek inc. | CR on TS38.133 for cell reselection to FR1 inter-RAT E-UTRA test case with low mobility criterion |
| [**R4-2014409**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014409.zip) | CATT | **Proposal #1:** for intra-frequency/inter-frequency NR cell re-selection test cases for UE configured with relaxed measurement criterion, include both criteria (low mobility/not-at-cell-edge) in the same test in different T periods.  **Proposal #2:** The two cells are set to higher and lower priority frequency layer respectively for inter-frequency/inter-RAT cell re-selection test case.  **Proposal #3:** No test defined for the case of 60s search time for higher frequency layer.  **Proposal #4:** In Scenario 1 (low mobility), it is configured by SSearchDeltaP > X1 dB. X1 is the relative accuracy. Such as: SSearchDeltaP = 2dB for FR1 and SSearchDeltaP = 6dB for FR2. In Scenario 2 (not-at-cell-edge), it is configured by SSearchThresholdP < signal level of cell – X2 dB. X2 is absolute accuracy. Such as SSearchThresholdP < signal level of cell – 4.5dB for FR1 and SSearchThresholdP < signal level of cell – 6dB for FR2.  **Proposal #5:** exclude test of cell search process for relaxation in the RRM test cases for power saving. |
| [**R4-2014410**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014410.zip) | CATT | CR for TS38.133, test case for cell reselection to FR1 intra-frequency NR case for power saving |
| [**R4-2014455**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014455.zip) | CATT | Work plan for power saving RRM test cases |
| [**R4-2014656**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014656.zip) | Xiaomi | Draft CR for RRM test cases for NR UE power saving  Introduce 5 test cases:   1. Cell re-selection to FR1 intra-frequency NR for UE configured with relaxed measurement criterion 2. Cell re-selection to FR1 inter-frequency NR case for UE configured with relaxed measurement criterion 3. Cell re-selection to E-UTRAN for UE configured with relaxed measurement criterion 4. Cell re-selection to FR2 intra-frequency NR case for UE configured with relaxed measurement criterion 5. Cell re-selection to FR2 inter-frequency NR case for UE configured with relaxed measurement criterion |
| [**R4-2014657**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014657.zip) | Xiaomi | **Proposal 1: Combine the criteria of low mobility and not-at-cell-edge in one test case through different T period, T1 and T2, respectively.**  **Proposal 2: For inter-frequency/inter-RAT, test cases for high priority and low priority could also be merged into one test case.**  **Proposal 3: The value of parameter SSearchDeltaP can be configured as 3dB or 6dB to ensure “low mobility” criterion is always met and the value of parameter SSearchThresholdP can be configured to less than signal level of cell to ensure “no-at-cell-edge” criterion is always met.**  **Proposal 4: The cell search process should be excluded from test repetition.**  **Proposal 5: It is proposed to define the following test cases to verify the corresponding relaxed cell reselection requirements:** |
| [**R4-2014835**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014835.zip) | vivo | **Proposal 1: use option 1 for test 1/2/5/6**  **Proposal 2: no new test case is introduced for higher priority frequency layer search requirement**  **Proposal 3: It is not necessary to include cell search process in the test case.**  **Proposal 4: Using intra-frequency cell reselection test case as an example, test cases could be designed as a process consists of 3 timing periods. Except for initial period one of the low mobility or not at the cell edge criteria is verified within one of the rest periods.**  **Proposal 5: To achieve the condition when low mobility criterion is always satisfied, suggest to configure SSearchDeltaP = 3dB. To achieve the condition when not at the cell edge criterion is always satisfied, suggest to configure SSearchThresholdP 10 dB higher than Qrxlevmin.** |
| [**R4-2014836**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014836.zip) | vivo | CR for test case for cell reselection to FR1 inter-RAT E-UTRA for not at cell edge criterion |
| [**R4-2015483**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015483.zip) | Huawei, HiSilicon | **Proposal 1: The corresponding test cases are not required to be satisfied for the UE who declares that it doesn’t support the relaxed measurement.**  **Proposal 2: specify separate tests for *lowMobilityEvalutation* and *cellEdgeEvaluation* in intra-frequency relaxation measurement test case.**   1. **Two cells: serving cell and neighbour cell with different tracking area;** 2. **Two time durations:**   **During T1, *cell2 is unknown (power OFF). lowMobilityEvalutation* or *cellEdgeEvaluation criteria is satisfied.***  **- For low mobility criteria, received signal level of serving cell remain unchanged andSSearchDeltaP can be set as 3dB. Low mobility criteria is fulfilled.**  **- For cell edge criteria, SSearchThresholdP can be set as lower than (Srxlev- 4.5)dB. SSearchThresholdQ is not configured. Cell edge criteria is fulfilled.**  **At the beginning of T2, cell2 arises. UE detects cell2 with relaxed requirement (including cell detection, measurement and R criteria evaluation) and starts to send preambles on the PRACH for sending the RRC CONNECTION REQUEST message to perform a Tracking Area Update procedure on Cell 2.**  **Proposal 3: In the condition Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ, no need to consider high/low priority frequency layers for inter-frequency/inter-RAT in power saving test cases.**  **Proposal 4: It is no need to design two round (to and back) cell reselection process for inter-frequency/inter-RAT in power saving test cases.**  **Proposal 5: Specify separate test cases for *lowMobilityEvalutation* and *cellEdgeEvaluation* in inter-frequency and inter-RAT relaxation measurement. The test case setup can refer to intra-frequency cases.** |
| [**R4-2015484**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015484.zip) | Huawei, HiSilicon | Test case for cell reselection to FR2 intra-frequency NR case for UE configured with relaxed measurement |
| [**R4-2016065**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016065.zip) | Qualcomm Incorporated | Draft CR on Cell reselection Tests for UE configured with relaxed measurement criterion  Introduce 2 test cases:   1. Cell reselection to FR1 inter-frequency NR case for UE fulfilling low mobility relaxed measurement criterion 2. Cell reselection to FR1 inter-frequency NR case for UE fulfilling not-at-cell edge relaxed measurement criterion |
| [**R4-2016147**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016147.zip) | Ericsson | * **Proposal #1:** RAN4 defines separate tests for low mobility criterion and not-at-cell-edge criterion. * **Proposal #2:** Do not define separate test to verify the higher priority carrier relaxation requirements. * **Proposal #3:** The UE compares the measured SS-RSRP and SS-RSRQ values to their thresholdsSSearchThresholdP, and SSearchThresholdQ that are all included in the list of test parameters. * **Proposal #4:** Cell search process in the total cell reselection delay test depending on whether or not the test is known or unknown. |
| **[R4-2016148](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016148.zip)** | Ericsson | Cell reselection to FR2 inter-frequency NR case under power saving |
| [**R4-2016149**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016149.zip) | Ericsson | Discussions on cell reselection to FR2 inter-freq. case under power saving |

## 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: How to design test case

*Sub-topic description:*

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

**Issue 2-1-1: How to combine the criteria (low mobility/not-at-cell-edge) with each test.**

* Proposals
  + Option 1: Include both criteria in the same test for Intra/inter-frequency for FR1 and intra-frequency for FR2, but for inter-frequency for FR2, need further study (MediaTek)
  + Option 2: Include both criteria in the same test for Intra/inter-frequency for FR1 and intra/inter-frequency for FR2 (CATT, vivo)
  + Option 3: Include both criteria in the same test for Intra/inter-frequency for FR1 and intra/inter-frequency for FR2 and inter-RAT (Xiaomi)
  + Option 4: Have separate test for each criterion (Huawei, Qualcomm(from draftCR), Ericsson)
* Recommended WF
  + TBA

**Issue 2-1-2: Whether to have different priority frequency layers for inter-frequency/inter-RAT in the same test?**

* Proposals
  + Option 1: Yes. (CATT, Xiaomi, Qualcomm(from draftCR), MediaTek(no comments in discussion document, from inter-RAT draftCR), vivo (from inter-RAT draftCR))

Include both higher priority and lower priority in the same test, configured in different duration. The test coverage can be improved. Otherwise, only test equal priority.

* + Option 2: No
* Recommended WF
  + TBA

**Issue 2-1-3: Whether to include high priority layer cell search for inter-frequency/inter-RAT?**

* Proposals
  + Option 1: Exclude (CATT, Xiaomi, vivo, Huawei, Ericsson)
  + Option 2: Include. (Qualcomm(from draftCR))
* Recommended WF
  + TBA

**Issue 2-1-4: If option 4 of issue 2-1-1 is agreeable, whether to design two round (to and back) cell reselection process for inter-frequency/inter-RAT in power saving test cases?**

* Proposals
  + Option 1: No
  + Option 2: Yes
* Recommended WF
  + TBA

**Issue 2-1-5: whether to consider UE gain G in FR2?**

* Proposals
  + Option 1: Yes (MediaTek)

For FR2, the accuracy margins for estimated RSRP shall be affected by UE gain G for inter-frequency, it will affect the thresholds.

* + Option 2: No.
* Recommended WF
  + TBA

**Issue 2-1-6: How to reflect the low mobility criterion by threshold setting?**

* Proposals
  + Option 1: It is configured by SSearchDeltaP > X1 dB. X1 is the relative accuracy. Such as: SSearchDeltaP = 2dB for FR1 and SSearchDeltaP = 6dB for FR2 (CATT)
  + Option 2: SSearchDeltaP is 3dB (vivo, Huawei, Qualcomm(from draftCR, only inter-f for FR1), Ericsson)
  + Option 3: SSearchDeltaP can be configured as 3dB or 6dB (Xiaomi)
* Recommended WF
  + The idea is similar, to decide the value

**Issue 2-1-7: How to reflect the not-at-cell-edge criterion by threshold setting?**

* Proposals:
  + Option 1: SSearchThresholdP is configured to the signal level of cell – margin (CATT, Xiaomi, Huawei)
    - 1a: margin is absolute accuracy such as: -4.5dB for FR1 and -6dB for FR2 (CATT)
    - 1b: SSearchThresholdP can be configured to less than signal level of cell. (Xiaomi) No exact value description, but from draft CR, there is margin.
    - 1c: SSearchThresholdP can be set as lower than (Srxlev- 4.5)dB (Huawei)
  + Option 2: SSearchThresholdP is 10dB higher than Qrxlevmin (vivo).
  + Option 3: SSearchThresholdP is 0 dB (Qualcomm(from draftCR, only inter-f for FR1)), maybe Qualcomm can add more details in the discussion.
  + Option 4: SSearchThresholdP, is set to be less than or equal to *s-IntraSearchP* and *s-NonIntraSearchP* (Ericsson)
* Recommended WF
  + TBA

**Issue 2-1-8: Whether to exclude the cell search process from test repetition or not**

* Proposals
  + Option 1: Exclude (CATT, Xiaomi, vivo)

To improve the test efficiency, both cells are assumed to be already identified by the UE prior to the start of the test (e.g. before T1). The test repetition is only done for T1/T2 (e.g. 2-round repetition is assumed).

* + Option 2: Include (Huawei, Qualcomm(from draftCR), Ericsson)
* Recommended WF
  + Option 1 to improve the test efficiency

**Issue 2-1-9: Whether to use shorter DRX cycle and shorter TSI-NR to improve test efficiency or not?**

* Proposals
  + Option 1: use shorter ones (CATT)
  + Option 2: use legacy ones
* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Ericsson | Issue 2-1-1: In our view having separate test to verify low mobility or not-at-cell-edge criteria will be easier and cleaner approach.  Issue 2-1-2: Support option 1.  Issue 2-1-3: Support option 1.  Issue 2-1-4: Support option 1.  Issue 2-1-5: Support option 1. UE gain G in FR2 is unavoidable so thresholds will be affected.  Issue 2-1-8: Support option 2 except for higher priority layer the cell should be known/identified. The reason is that UE searches higher priority layer once every T\_higher\_priority\_search (not-at-cell edge) or T2\*T\_higher\_priority\_search (low mobility); but this is not cell detection time.  Issue 2-1-9: Support option 1. But Tsi-nr will be the same as in legacy tests.  ….  Others: |
| vivo | Issue 2-1-1  Prefer option 2. We are open for study on this issue for FR2.  Issue 2-1-2  Prefer option 1  Issue 2-1-3  Option 1. We think the cell search has already been verified by the normal cell reselection test cases. The necessity to re-verify the cell search process in the UE power saving test cases are low.  Issue 2-1-4  We think if option 2 (option 1)is agreeable, we still have this question for inter-RAT test cases. For the inter-RAT test cases, we do not have strong view on it.  Issue 2-1-5  We are ok to further study whether to have two criteria combined in one test case or not.  Issue 2-1-6  Proposals are quite close. Suggest SSearchDeltaP = 3dB for FR1 and SSearchDeltaP = 6dB for FR1  Issue 2-1-7  Option 2. The intention of option 2 is to set the threshould much lower than the serving cell level to ensure “not at the cell edge criteria” to be easily satisfied during test.  Issue 2-1-8  OK with the recommended WF.  Issue 2-1-9  Shorter DRX is ok for us. |
| Huawei | Issue 2-1-1: support option 4. It is more clear and straight forward to have separate test for low mobility and not at cell edge criteria.  Issue 2-1-2: we have no strong view. If we agree to have different priority layers, then we shall decide reselect to high priority cell or low priority cell. To be simple, maybe the equal priority can be considered.  Issue 2-1-3: support option 1. To reduce the testing time, Cell 1 and Cell2 are already identified by the UE prior to the start of the test.  Issue 2-1-4: Support option 2. After checking, we think UE reselect back to cell1 is for iteration of the tests.  Issue 2-1-5: The issue proposed by option 1 can refer the method for FR2 RACH test which we discussed in last meeting. Anritsu provided a paper ([R4-2009554], and corresponding CR is [R4-2009558]) and pointed out a similar issue. So we think the method of calibration can address this issue as well.  Issue 2-1-6: Option 2 considering the accuracy into account.  Issue 2-1-7: support option 1C. In order to satisfy the criteria Srxlev > SSearchThresholdP, the Srxlev shall be first calculated according to the configured parameters in the test, then SearchThresholdP is set lower than (Srxlev-RSRP accuracy).  Issue 2-1-8: option 1 is also agreeable to us.  Issue 2-1-9: Support using shorter DRX for measurement. We had one question on the issue, for Tsi-nr, how to reduce it? What’s the exact value? |
| CATT | **Issue 2-1-1: How to combine the criteria (low mobility/not-at-cell-edge) with each test.**  Prefer to combine two criteria in the same test for Intra/inter-frequency for FR1 and intra-frequency for FR2. For inter-frequency for FR2, it is related to Issue 2-1-5. For inter-RAT, we prefer to use separate test cases to test two criteria.  **Issue 2-1-2: Whether to have different priority frequency layers for inter-frequency/inter-RAT in the same test?**  Prefer Option 1 which both higher priority and lower priority in the same test.  **Issue 2-1-3: Whether to include high priority layer cell search for inter-frequency/inter-RAT?**  Prefer Option 1.  **Issue 2-1-4: If option 4 of issue 2-1-1 is agreeable, whether to design two round (to and back) cell reselection process for inter-frequency/inter-RAT in power saving test cases?**  Prefer two round cell reselection process.  **Issue 2-1-5: whether to consider UE gain G in FR2?**  Agree to need further study for FR2.  **Issue 2-1-6: How to reflect the low mobility criterion by threshold setting?**  We think the SSearchDeltaP should cover the relative accuracy.  **Issue 2-1-7: How to reflect the not-at-cell-edge criterion by threshold setting?**  We think the SSearchThresholdP should be the signal level of cell - absolute accuracy.  **Issue 2-1-8: Whether to exclude the cell search process from test repetition or not**  We prefer option 1 to improve the test efficiency. Because the regular cell search process has already been tested by normal tests. We can just focus on the relaxation process. If the cell search is included, the time is too long. Such as more than 380ms for inter-frequency test case (R4-2016148). If the test repeats more than 1000 times, the time consumption will be more than 105 hours for one case.  **Issue 2-1-9: Whether to use shorter DRX cycle and shorter TSI-NR to improve test efficiency or not?**  We think that it will reduce test time by using shorter DRX cycle. |
| Xiaomi | Issue 2-1-1  We support Option 3. As the requirements for the inter/intra frequency and inter-RAT cell reselection have been verified through the normal test cases. For timesaving, we think it is fine to include both criteria in the same test for intra/inter-frequency for FR1 and intra/inter-frequency for FR2 and inter-RAT. We are open to discuss.  Issue 2-1-2  Support Option 1.  Issue 2-1-3  Support Option 1.  Issue 2-1-4  Support Option 1.  Issue 2-1-5  Support Option 1. This issue does exist in FR2 and we can further discuss.  Issue 2-1-6  SSearchDeltaP = 3dB for FR1 and SSearchDeltaP = 6dB for FR2 is OK for us.  Issue 2-1-7  Support Option 1. We think the margin used here can refer to the margin to the R value range specified in normal cell reselection.  Issue 2-1-8  Support Option 1.  Issue 2-1-9  We are fine with short DRX cycle. |
| OPPO | Issue 2-1-1: Option 2 is fine.  Issue 2-1-2: Option 1  Issue 2-1-3: Option 1.  Issue 2-1-6: Option 2. And also fine with SSearchDeltaP = 3dB for FR1 and SSearchDeltaP = 6dB for FR2  Issue 2-1-7: Option 1. The margin can be discussed based on 1a.  Issue 2-1-8: Option 1. Share the similar view as CATT’s.  Issue 2-1-9: Shorter DRX is ok for us. |
| MTK | Sub topic 2-1:  Issue 2-1-1:  We support option 1 and option 4. In our understanding, the beamforming gain, i.e., UE gain G defined in Table B.2.1.5.1-1 TS 38.133, shall be considered in FR2. The margin for power class 3 is provided as follows.  Table B.2.1.5.1-1: UE gain G, Rx beam peak direction   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | UE Power class | | | | |  | 1 | 2 | 3 | 4 | | Minimum, dBi | FFS | FFS | -10 | FFS | | Maximum, dBi | FFS | FFS | +20 | FFS |   To avoid over estimation or under estimation problem, large margin should be provided (+20 ~ -10). As we mentioned in our discussion paper (R4-2015169), if we combine the testing of 2 criteria in 1 test, the total accuracy margins for inter-freq. measurement in FR2 may exceed the difference between relative maximum (48.5 dB) and relative minimum ((34 dB)) signal power i.e., 45 > 14.5 (48.5-34).  Issue 2-1-2:  Support option 1. Similar concern with Issue 2-1-1.  If we test 2 equal priority carrier for cell reselection, the cell reselection will depend on which cell has better quality. Larger margin is needed for inter-freq. measurement in FR2.  Issue 2-1-3:  Support option 2. Depending on the conclusion in Issue 2-1-2.  Issue 2-1-4:  We suggest option 1. For option 2, As we mentioned in our discussion paper (R4-2015169), the margin considering UE gain G and measurement accuracy shall be provided. It is possible that the signal quality of cell 1 needs to higher than threshold A for 17.5dB during T1, while lower than threshold A for 27.5dB during T2. The total accuracy margins for inter-freq. measurement in FR2 may exceed the difference between relative maximum (48.5 dB) and relative minimum ((34 dB)) signal power.  Issue 2-1-5:  We suggest option 1. As we mentioned in Issue 2-1-1  Issue 2-1-6:  We suggest option 3. The value of TSearchDeltaP should also be discussed.  Issue 2-1-7:  Depending on the conclusion in Issue 2-1-5. Whether the UE gain G should be considered will impact the setting of SSearchThresholdP.  Issue 2-1-8:  We support option 1 to improve the test efficiency.  Issue 2-1-9:  We support option 1 to reduce the testing time. |
| Qualcomm | Issue 2-1-1: Option 4. While separate tests might increase the overall number of test, keeping the relax conditions separated leads to independent and more streamlined tests that do not involve transitions. However different typologies of tests can be mixed for different scenario to reach agreement;  Issue 2-1-2: Option 1;  Issue 2-1-3: For the purpose of reducing the test duration high priority layer cell search can be covered with the existing tests. Option 2 is agreeable, we can skip the cell search and remove the related test requirement proposed in our draft CR;  Issue 2-1-4: Two round process with no reselection time requirement on the second round, can be designed if it speeds up iterative testing;  Issue 2-1-5: Agree to investigate further FR2  Issue 2-1-6: Option 2, keep threshold to minimum value to ensure relaxation criteria is met;  Issue 2-1-7: Option 3, Threshold is set to minimum value to ensure relaxation criteria is met;  Issue 2-1-8: Cell search can be excluded from test repetition to save time;  Issue 2-1-9: To reduce testing duration, shorter DRX can be used. Tsi-nr can be kept as in legacy tests; |

### 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.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2014455**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014455.zip) | This is the work plan for power saving test case discussion. |
| [**R4-2014371**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014371.zip)  MediaTek inc. | Ericsson: On cover sheet it states tests for both low mobility and not-at-cell edge relaxed measurements. But actual test verifies only former. Why do we need 3 test times? Test is done in T2. |
| Vivo: suggest to discuss this CR after solving open issues |
| CATT: need the decision of open issues. |
| [**R4-2014410**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014410.zip)  CATT | Ericsson: The same tests is used for both low mobility and not-at-cell edge relaxed measurements in different test times. Then it is better to have 3 test times. UE should do cell reselection in T2 not in T1. It is not clear which test requirement map to which core requirement. Higher priority cell reselection cannot be 16 s (min = 60 s or K\*60 s). |
| Vivo: suggest to discuss this CR after solving open issues |
|  |
| [**R4-2014656**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014656.zip)  Xiaomi | Ericsson: In this methodology (testing both criteria) we prefer 3 test times. Signal levels should be changed in T2 forcing the UE to reselect cell2 which was detected in T1. |
| Vivo: suggest to discuss this CR after solving open issues |
| CATT: need the decision of open issues. |
| [**R4-2014836**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014836.zip)  vivo | Ericsson: Looks fine to us. |
|  |
| CATT: need the decision of open issues. |
| [**R4-2015484**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015484.zip)  Huawei, HiSilicon | Ericsson: Looks fine to us except that the test should give reference to core requirements (section 4.2.2.9.2) not to high level 4.2.2.9. |
| Vivo: suggest to discuss this CR after solving open issues |
| CATT: need the decision of open issues. |
| [**R4-2016065**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016065.zip)  Qualcomm Incorporated | Ericsson: UE is forced to search higher priority cell (cell2) during T3 since in T1 cell2 does not exists. But in low mobility test case the higher priority cannot be 81 seconds (UE searches once every K2\*Tsearch). In not at cell edge cell also it cannot search in 81 s. I think one option is to skip higher priority search for low mobility. In not at cell edge cell case, do not cell2 to -infinity in T2. Then UE can cell reselect to cell2 in T2. |
| Vivo: suggest to discuss this CR after solving open issues |
| CATT: need the decision of open issues. |
| [**R4-2016148**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016148.zip)  Ericsson | Vivo: suggest to discuss this CR after solving open issues |
| CATT: need the decision of open issues. |
|  |

## 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:* |

**Issue 2-1-1: How to combine the criteria (low mobility/not-at-cell-edge) with each test.**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * Option 1: Include both criteria in the same test for Intra/inter-frequency for FR1 and intra-frequency for FR2, but for inter-frequency for FR2, need further study * Option 2: Include both criteria in the same test for Intra/inter-frequency for FR1 and intra/inter-frequency for FR2 * Option 3: Include both criteria in the same test for Intra/inter-frequency for FR1 and intra/inter-frequency for FR2 and inter-RAT * Option 4: Have separate test for each criterion   8 companies showed their views on the issue:   * 3 companies support option 2. Open for discussion of FR2 issue. * 3 companies support option 4. * 1 company supports option 3. Open for discussion of FR2 issue. * 1 company supports option 1 and 4.   From the current situation, 4 companies support including both criteria in the same test (option 1-3) and 4 companies support to have separate test for each criterion. It is understood that the original intention of including both criteria in the same test is to reduce the UE test efforts. However it is noted that the company views on Issue 2-1-5 are quite aligned; FR2 test cases will be separated anyway to address the UE gain G. It is suggested to keep consistent between FR1 and FR2. So, we propose to have separate test for each criterion if there is no concern in terms of test effort.  *Tentative agreements:*  To have separate test for each criterion  *Candidate options:*  *Recommendations for 2nd round:*  Confirm whether the proposed tentative agreement is agreeable. |

**Issue 2-1-2: Whether to have different priority frequency layers for inter-frequency/inter-RAT in the same test?**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * Option 1: Yes * Option 2: No   8 companies showed their views on the issue:   * 7 companies support option 1. * 0 company supports option 2. * 1 company with no strong view   *Tentative agreements:*  Option 1  *Candidate options:*  *Recommendations for 2nd round:* |

**Issue 2-1-3: Whether to include high priority layer cell search for inter-frequency/inter-RAT?**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * Option 1: Exclude * Option 2: Include   8 companies showed their views on the issue:   * 6 companies support option 1. * 2 company support option 2.   *Tentative agreements:*  Option 1  *Candidate options:*  *Recommendations for 2nd round:* |

**Issue 2-1-4: If option 4 of issue 2-1-1 is agreeable, whether to design two round (to and back) cell reselection process for inter-frequency/inter-RAT in power saving test cases?**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * Option 1: No * Option 2: Yes   7 companies showed their views on the issue:   * 3 companies support option 1. * 3 companies support option 2. * 1 company with no strong view   *Tentative agreements:*  No. Provide more details in second round.  *Candidate options:*  *Recommendations for 2nd round:*  Companies are encourage to check whether two round (to and back) mechanism is acceptable since test repetition will be done between cell 1 and cell 2 during the test. |

**Issue 2-1-5: whether to consider UE gain G in FR2?**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * Option 1: Yes * Option 2: No   7 companies showed their views on the issue:   * 7 companies agree to do further study for FR2   *Tentative agreements:*  Option 1. Further study on how to address this issue.  *Candidate options:*  *Recommendations for 2nd round:* |

**Issue 2-1-6: How to reflect the low mobility criterion by threshold setting?**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * Option 1: It is configured by SSearchDeltaP > X1 dB. X1 is the relative accuracy. Such as: SSearchDeltaP = 2dB for FR1 and SSearchDeltaP = 6dB for FR2 (CATT) * Option 2: SSearchDeltaP is 3dB (vivo, Huawei, Qualcomm(from draftCR, only inter-f for FR1), Ericsson) * Option 3: SSearchDeltaP can be configured as 3dB or 6dB (Xiaomi)   7 companies showed their views on the issue:   * 2 companies support option 2. * 2 companies support: 3dB for FR1 and 6dB for FR2. * 1 company supports option 3. * 1 company support option 2 also fine with “3dB for FR1 and 6dB for FR2”   *Tentative agreements:*  *Candidate options:*  The options are quite similar. Just decide the value of SSearchDeltaP.  *Recommendations for 2nd round:*  The following options are proposed for the 2nd round discussion based on the 1st round discussion:  Option 1: 3dB for FR1 and 6dB for FR2  Option 2: 3dB |

**Issue 2-1-7: How to reflect the not-at-cell-edge criterion by threshold setting?**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * + Option 1: SSearchThresholdP is configured to the signal level of cell – margin (CATT, Xiaomi, Huawei)     - 1a: margin is absolute accuracy such as: -4.5dB for FR1 and -6dB for FR2 (CATT)     - 1b: SSearchThresholdP can be configured to less than signal level of cell. (Xiaomi) No exact value description, but from draft CR, there is margin.     - 1c: SSearchThresholdP can be set as lower than (Srxlev- 4.5)dB (Huawei)   + Option 2: SSearchThresholdP is 10dB higher than Qrxlevmin (vivo).   + Option 3: SSearchThresholdP is 0 dB (Qualcomm(from draftCR, only inter-f for FR1)), maybe Qualcomm can add more details in the discussion.   + Option 4: SSearchThresholdP, is set to be less than or equal to *s-IntraSearchP* and *s-NonIntraSearchP* (Ericsson)   7 companies showed their views on the issue:   * 4 companies support option 1. (1 company support 1a, 1 company support 1c, 2 companies support to decide the margin based option 1) * 1 company supports option 2 * 1 company supports option 3 * 1 company support to consider UE gain   *Tentative agreements:*  As most companies support option 1, SSearchThresholdP is configured to Srxlev – X (dB)   * For FR1: X > 4.5 * For FR2: X > 6   *Candidate options:*  *Recommendations for 2nd round:* |

**Issue 2-1-8: Whether to exclude the cell search process from test repetition or not**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * Option 1: Exclude * Option 2: Include   8 companies showed their views on the issue:   * 7 companies support option 1. * 1 company supports option 2.   *Tentative agreements:*  Option 1  *Candidate options:*  *Recommendations for 2nd round:* |

**Issue 2-1-9: Whether to use shorter DRX cycle and shorter TSI-NR to improve test efficiency or not?**

|  |  |
| --- | --- |
|  | **Status summary** |
|  | The following options were discussed.   * Option 1: use shorter ones * Option 2: use legacy ones   8 companies showed their views on the issue:   * 8 companies support option 1. But 3 companies don’t want to modify TSI-NR * 0 company supports option 2.   *Tentative agreements:*  Option 1  *Candidate options:*  Use shorter DRX cycle. Is 0.64 okay for everyone?  *Recommendations for 2nd round:*  Further discussion on DRX cycle value  Further discussion on TSI-NR |

*Suggestion on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on RRM test cases for power saving | CATT |

### 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”* |
| [**R4-2014455**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014455.zip) | *To be revised.* |
| [**R4-2014371**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014371.zip)  MediaTek inc. | *To be revised* |
| [**R4-2014410**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014410.zip)  CATT | *To be revised.* |
| [**R4-2014656**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014656.zip)  Xiaomi | *To be revised* |
| [**R4-2014836**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014836.zip)  vivo | *To be revised.* |
| [**R4-2015484**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015484.zip)  Huawei, HiSilicon | *To be revised.* |
| [**R4-2016065**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016065.zip)  Qualcomm Incorporated | *To be revised.* |
| [**R4-2016148**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016148.zip)  Ericsson | *To be revised.* |
|  |  |

## Discussion on 2nd round (if applicable)

Since no comment was received after 1st round summary, it is supposed the tentative agreements of Issue 2-1-1 / 2-1-2 / 2-1-3 / 2-1-5 / 2-1-8 / 2-1-9 are agreed,

* Have separate test for each criterion
* Have different priority frequency layers for inter-frequency/inter-RAT in the same test
* Exclude high priority layer cell search for inter-frequency/inter-RAT
* UE gain G in FR2 should be considered
* Exclude the cell search process from test repetition
* Use shorter DRX cycle

The 2nd round discussion will focus on the following open issues:

**Issue 2-1-4: If option 4 of issue 2-1-1 is agreeable, whether to design two round (to and back) cell reselection process for inter-frequency/inter-RAT in power saving test cases?**

* Option 1: No
* Option 2: Yes. Two round (to and back) cell reselection process is considered for inter-frequency/ inter-RAT in power saving test cases.

*Note: Test repetition will be done between cell 1 and cell 2 during the test.*

**Issue 2-1-6: How to reflect the low mobility criterion by threshold setting?**

* Option 1: 3dB for FR1 and 6dB for FR2 because 3dB is not enough for FR2
* Option 2: 3dB

**Issue 2-1-7: How to reflect the not-at-cell-edge criterion by threshold setting?**

**SSearchThresholdP is configured to Srxlev – X (dB), where X>=4.5dB for FR1 and X>=6dB for FR2.**

* Option 1: X=4.5dB for FR1 and X=6dB for FR2.
* Option 2: If Option1 is not agreeable, please give your recommendation on X for FR1 and FR2.

**Issue 2-1-9: Whether to use shorter DRX cycle and shorter TSI-NR to improve test efficiency or not?**

* Option 1: DRX cycle length = 0.64s TSI-NR = 0.64s
* Option 2: DRX cycle length = 0.64s TSI-NR = 1280ms

**Issue 2-1-10: How to reflect UE gain G in FR2?**

* Option 1: leave the threshold impacted by G as [TBD] and discuss it in the next meeting.
* Option 2: Please recommend, if any.

### Companies views’ collection for 2nd round

|  |  |
| --- | --- |
| **Company** | **Comments** |
| CATT | Issue 2-1-4: Support option 2 because it is applicable to do the iteration of test. Test repetition will be done between cell 1 and cell 2 during the test. Otherwise, the test repetition will be done from the beginning.  Issue 2-1-6: Support option 1 because FR2 requires more than FR1, Otherwise inFR2, cannot meet the condition  Issue 2-1-7: Support option 1 because FR2 requires more than FR1. Otherwise inFR2, cannot meet the condition  Issue 2-1-9: Support option1. TSI-NR is the time to receive the system information such as (MIB, SIB1, and other relevant SIB), The period of MIB/SIB1… is much shorter than 640ms,  Issue 2-1-10: Support option 1. |
| vivo | **Issue 2-1-4 Either are ok slightly prefer option 1.**  **Issue 2-1-6 option 1**  **Issue 2-1-7 we are ok to compromise to option 1**  **Issue 2-1-9 option 2.**  **Issue 2-1-10 option 1** |

These issues were further discussed 10th Nov GTW session and agreements have been reached for all the issues except for 2-1-10.

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2017135  CATT |  |
| R4-2017136  MediaTek |  |
| R4-2017137  CATT |  |
| R4-2017138  Xiaomi |  |
| R4-2017139  vivo |  |
| R4-2017140  Huawei, HiSilicon |  |
| R4-2017141  Qualcomm |  |
| R4-2017142  Ericsson |  |
| R4-2017133  CATT |  |
| R4-2017134  Big CR | *Moderator’s Note:*  *Depending on the progress on individual draft CR, consider whether to merge into single big CR in this meeting or defer it to the next meeting.* |

## 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*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Issue 2-1-4: If option 4 of issue 2-1-1 is agreeable, whether to design two round (to and back) cell reselection process for inter-frequency/inter-RAT in power saving test cases?** | * Option 1: No * Option 2: Yes. Two round (to and back) cell reselection process is considered for inter-frequency/ inter-RAT in power saving test cases.   *Note: Test repetition will be done between cell 1 and cell 2 during the test.*  *Agreement:*  FR1: Use two round (to and back) cell reselection process for inter-frequency/ inter-RAT in power saving test cases  FR2: Use two round (to and back) cell reselection process for inter-frequency in power saving test cases. Further check on TE feasibility for FR2.  Use two round (to and back) cell reselection process for intra-frequency power saving test cases. |
| **Issue 2-1-6: How to reflect the low mobility criterion by threshold setting?** | * Option 1: 3dB for FR1 and 6dB for FR2 because 3dB is not enough for FR2 * Option 2: 3dB   Agreement: 3dB for FR1 and 6dB for FR2 |
| **Issue 2-1-7: How to reflect the not-at-cell-edge criterion by threshold setting?** | **SSearchThresholdP is configured to Srxlev – X (dB), where X>=4.5dB for FR1 and X>=6dB for FR2.**   * Option 1: X=4.5dB for FR1 and X=6dB for FR2. * Option 2: If Option1 is not agreeable, please give your recommendation on X for FR1 and FR2.   Agreement: X = 6dB for FR1, X = 7.5dB for FR2 |
| **Issue 2-1-9: Whether to use shorter DRX cycle and shorter TSI-NR to improve test efficiency or not?** | * Option 1: DRX cycle length = 0.64s TSI-NR = 0.64s * Option 2: DRX cycle length = 0.64s TSI-NR = 1280ms   Agreement: DRX cycle length = 0.64s TSI-NR = 1280ms |
| **Issue 2-1-10: How to reflect UE gain G in FR2?** | * Option 1: leave the threshold impacted by G as [TBD] and discuss it in the next meeting.   Option 2: Please recommend, if any.Agreement: Option 1 |

|  |  |
| --- | --- |
| **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”* |
| R4-2017135  CATT | *Agreeable* |
| R4-2017136  MediaTek | *Agreeable* |
| R4-2017137  CATT | *Agreeable* |
| R4-2017138  Xiaomi | *Agreeable* |
| R4-2017139  vivo | *Agreeable* |
| R4-2017140  Huawei, HiSilicon | *Agreeable* |
| R4-2017141  Qualcomm | *Agreeable* |
| R4-2017142  Ericsson | *Agreeable* |
| R4-2017133  CATT | *Agreeable* |
| R4-2017134  Big CR | *For E-mail approval.* |