**3GPP TSG-RAN WG4 Meeting #100-eR4-21xxxxx**

**Electronic Meeting, 16 – 27 August, 2021**

**Agenda item:** 5.1.7

**Source:** Moderator (Huawei)

**Title:** Email discussion summary for [100-e][201] NR\_RRM\_maintenance\_R15\_Core

**Document for:** Information

# Introduction

The scope of this email discussion includes the following agenda items:

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| --- |
| 5.1.7 RRM core requirements maintenance (38.133/36.133) [NR\_newRAT-Core] |

In providing comments, companies are encouraged to:

* Ensure that the comments are inserted in the latest version of the document by checking the folder before uploading
* Use “Track changes” to help identify added comments/changes
* Pay attention to the rule for shortening file name

# Topic #1: Rel-15 NR RRM core requirements

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc** | **Company** | **Proposals / Observations** |
| [**R4-2111967**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2111967.zip) | CATT | CR  Add Ceil function to resolve the unclear behavior. |
| [**R4-2112084**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112084.zip) | Apple | **Proposal 1: existing RRM requirements for PSCell change can cover the case wherein the target cell is just a neighbour cell before PSCell change.**  **Proposal 2: clarify that interruption on PCell and other serving cells are allowed. Requirements for interruption due to PSCell addition/release defined in TS38.133 clause 8.2 can be reused.** |
| [**R4-2112085**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112085.zip) | Apple | CR for R4-2112084 |
| [**R4-2112111**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112111.zip) | Apple | CR  Add the minimum requirement at transitions for BFD. |
| [**R4-2112953**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2112953.zip) | LG Electronics UK | CR  Remove sentence since the same sentence is repeated. |
| **R4-2112955** | LG Electronics UK | N/A |
| [**R4-2113537**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113537.zip) | vivo | CR  Use NSCC\_SSB for defining CSSF outside gap, NSCC\_SSB is the the number of configured SCell(s) measured outside gaps with only SSB based L3 measurement configured. |
| **R4-2113538** | vivo | N/A |
| **R4-2113539** | vivo | N/A |
| [**R4-2113632**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113632.zip) | Ericsson | CR  Delete the related capability wordings and add the wording for effective MGRP related to inter-frequency measurement without gap. |
| [**R4-2113633**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2113633.zip) | Ericsson | CR  Add the wording for effective MGRP related to inter-frequency measurement without gap. |
| [**R4-2114092**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114092.zip) | Huawei, Hisilicon | CR for 36133  Clarify that If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. |
| [**R4-2114095**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114095.zip) | Huawei, Hisilicon | CR for 38133  Clarify that If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation. |
| [**R4-2114155**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114155.zip) | MediaTek inc. | CR  To clarify in Clauses 9.2.5.1, 9.2.5.2, 9.2.6.2 and 9.2.6.3 the applicable DRX cycle in NR SA, EN-DC, NE-DC, and NR-DC |
| [**R4-2114252**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114252.zip) | Huawei, HiSilicon | CR for 38133  1. Clarify that Kp calculation is based on smtc1 no matter if dual SMTC is configured or not.  2. Add to the FR1 known condition that the report has to be with SSB index.  3. Update the definition of “reference point” in clause 7.1.2 based on arrival time. |
| [**R4-2114255**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114255.zip) | Huawei, HiSilicon | CR for 36133  When UE is configured with inter-RAT NR measurement, the requirements defined for LTE inter-frequency RSTD measurement for EN-DC would apply. |
| [**R4-2114447**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_100-e/Docs/R4-2114447.zip) | Ericsson, Nokia Shanghai Bell, Intel | CR  The definition of the reference point for the UE initial transmit timing control requirement is clarified. |

## Open issues summary

### Sub-topic 1-1: Measurement requirements

#### Issue 1-1-1: CSSF for SCell measurements outside gaps

* Proposals
  + Option 1 (vivo)
    - Reason for change
      * Based on agreements in RAN4 #98e-bis, the interpretation of current R15/R16 spec is that NSCC\_SSB includes the number of configured SCell(s) measured both outside gaps and within gaps. In other word, the SCells measured within gap are counted twice, i.e. counted in CSSFoutside\_gap,i and CSSFwithin\_gap,i
    - Summary of Changes
      * Update the CSSF outside gap, replacing “Number of configured SCell(s)” to NSCC\_SSB, which is the number of configured SCell(s) measured outside gaps with only SSB based L3 measurement configured.
    - Related changes are as shown in R4-2113537 (vivo)
* Recommended WF
  + Further discuss if option 1 agreeable.

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| **Company** | **Comments** |
| Apple | We understood the motivation. However, we prefer not to change R15 spec unless critical issue. This can be considered as some relaxation, as mentioned by some company during previous RAN4 meeting discussion. On the other hand, RAN4 requirements are just minimum requirements, which don’t preclude UE from measuring faster (with shorter measurement period) |
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#### Issue 1-1-2: Calculation of Kp factor in case of dual SMTC

* Proposals
  + Option 1 (HW)
    - Reason for change
      * Current requirements assume smtc2 is used when dual SMTC is configured. This means when smtc1=40ms, smtc2=20ms and MGRP=80ms, Kp=1.33 based on smtc2, but for smtc1 the MG punctures half of the SMTC windows, so Kp should be calculated based on smtc 1 and thus equals to 2
    - Summary of Changes
      * Clarify that Kp calculation is based on smtc1 no matter if dual SMTC is configured or not
    - Related changes are as shown in Change#1 in R4-2114252 (HW)
* Recommended WF
  + Further discuss if option 1 is agreeable.

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| **Company** | **Comments** |
| MTK | Fine with Option 1. |
| Apple | We think the Kp calculation for target cell identification/measurement is based on the smtc which is used by target cell. |

#### Issue 1-1-3: Condition for MG-less inter-frequency measurement

* Proposals
  + Option 1 (Ericsson)
    - Reason for change
      * The spec. specifies the capability for inter-frequency without gaps, but no such capability was introduced in Rel-15 for inter-frequency measurements.
      * The effective MGRP scenario isn’t covered for UE measurement capability:
    - Summary of Changes
      * For Rel-15: delete the capability wordings related to inter-frequency without gaps, and add the wording for effective MGRP scenario.
      * Rel-16: add the wording for effective MGRP scenario
    - Related changes are as shown in R4-2113632 (Rel-15) and R4-2113633 (Rel-16) (Ericsson)
* Recommended WF
  + Further discuss if option 1 is agreeable.

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| **Company** | **Comments** |
| MTK | Fine with Option 1. |
| Apple | We have comment on R15 revision of effective MGRP: in R15 NR-DC, only FR1+FR2 NR-DC is assumed, and therefore the effective MGRP cannot be used in this NR-DC since the serving cells are always in both FR1 and FR2. |

#### Issue 1-1-4: Applicable DRX cycle in EN-DC, NR SA, NE-DC, and NR-DC

* Proposals
  + Option 1 (MTK)
    - Reason for change
      * It was agreed in R4-1816115 that SCG DRX cycle shall apply for the infra-frequency measurement requirement when SCG DRX is in use. In that time only EN-DC mode was considered and NR was always SCG. However, in NR SA, NE-DC, and NR-DC, NR could also be MCG, and thus when MCG DRX is in use, it is unclear which DRX cycle shall apply for infra-frequency measurement requirement.
    - Summary of Changes
      * If MCG DRX is in use, requirements for intra-frequency in MCG shall depend on the MCG DRX cycle.
      * If SCG DRX is in use, requirements for intra-frequency in SCG shall depend on the SCG DRX cycle.
      * Otherwise, the requirements for when DRX is not in use shall apply
    - Related changes are as shown in R4-2114155 (MTK)
* Recommended WF
  + Further discuss if option 1 is agreeable.

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| **Company** | **Comments** |
| MTK | Fine with Option 1. |
| Apple | Fine with option 1. |

#### Issue 1-1-5: Collision between inter-frequency RSTD and inter-RAT NR measurement in LTE SA

* Proposals
  + Option 1 (HW)
    - Reason for change
      * When PRS for LTE RSTD measurement and SMTC window for NR measurement collide, the two measurements compete MG as defined in the CSSF within gap. On the requirement side, when UE is configured with EN-DC, both the LTE-NR inter-RAT measurement (section 8.17.4) and the LTE inter-frequency RSTD measurement (section 8.17.15) are defined based on CSSF, which is correct. However, when UE is in LTE SA, the LTE inter-frequency RSTD measurement (section 8.1.2.6) are not scaled with CSSF, so the time sharing with inter-RAT NR measurement is not accounted.
    - Summary of Changes
      * Clarify in section 8.1.2.6 of 36133 for LTE SA that when UE is configured with inter-RAT NR measurement, the requirements defined for LTE inter-frequency RSTD measurement for EN-DC (section 8.17.15 of 36133, scaled with CSSF) would apply.
    - Related changes are as shown in R4-2114255 (HW)
* Recommended WF
  + Further discuss if option 1 is agreeable.

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| **Company** | **Comments** |
| MTK | Fine with Option 1. |
| Apple | Fine with option 1. |

### Sub-topic 1-2: Signaling characteristic related requirements

#### Issue 1-2-1: Clarification to the PSCell change requirements

* Proposals
  + Option 1 (Apple)
    - Reason for change
      * existing RRM requirements for PSCell change can cover the case wherein the target cell is just a neighbour cell before PSCell change.
      * clarify that interruption on PCell and other serving cells are allowed. Requirements for interruption due to PSCell addition/release defined in TS38.133 clause 8.2 can be reused.
    - Summary of Changes
      * Update the applicability such that existing RRM requirements for PSCell change can cover the case wherein the target cell is just a neighbour cell before PSCell change.
      * Clarify interruption requirements.
    - Related changes is as shown in R4-2112085 (Apple)
* Recommended WF
  + Further discuss if option 1 is agreeable

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| **Company** | **Comments** |
| MTK | Fine with Option 1. |
| Apple | We support these two changes. |

#### Issue 1-2-2: Minimum requirement at transitions for BFD

* Proposals
  + Option 1 (Apple)
    - Reason for change
      * minimum requirement at transitions for BFD is missing
    - Summary of Changes
      * Add the minimum requirement at transitions for BFD, similar as minimum requirement at transitions for RLM
    - Related changes is as shown in R4-2112111 (Apple)
* Recommended WF
  + Further discuss is option 1 is agreeable

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| **Company** | **Comments** |
| MTK | Fine with Option 1. |
| Apple | Support option 1. |

#### Issue 1-2-3: SMTC configuration determination in DC

* Proposals
  + Option 1 (HW)
    - Reason for change
      * Capture the following agreement from RAN4#99-e

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| * When SMTC configuration is not provided within the corresponding command (e.g. Handover, RRC release with redirection, SCell activation and PSCell addition/change), and MN and SN configure measObjectNR having same SSB frequency and subcarrier spacing but with different SMTC configurations,   + It is up to UE implementation which SMTC configuration to use   + UE requirements will be based on the SMTC configuration used by the UE |

* + - Summary of Changes
      * Clarify that If such measObjectNRs configured by MN and SN have different SMTC, Trs is the periodicity of one of the SMTC which is up to UE implementation.
    - Related changes is as shown in R4-2114092 (36133) and R4-2114095 (38188) (HW)
* Recommended WF
  + Further discuss is option 1 is agreeable

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| **Company** | **Comments** |
| MTK | Fine with Option 1. |
| Apple | In general, we support option 1. However, we would like clarify that we don’t have such problem in PSCell addition. |

#### Issue 1-2-4: Known condition for FR1 SCell activation

* Proposals
  + Option 1 (HW)
    - Reason for change
      * FR1 SCell activation, for known case it was considered that NW would know the Tx beam to use because there is L3 report. However, unlike FR2 known condition, in the FR1 known condition, the report of SSB index is not required. In this case, even the FR1 SCell is known, NW may still have no idea which Tx beam to use for scheduling the UE in the SCell.
    - Summary of Changes
      * Add to the FR1 known condition that the report has to be with SSB index
    - Related changes is as shown in Change#2 in R4-2114252 (HW)
* Recommended WF
  + Further discuss is option 1 is agreeable

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| **Company** | **Comments** |
| MTK | Fine with Option 1. |
| Apple | We have some comments:   * For FR1 SCell activation, if network is not using Tx beamforming or single TCI is configurted, the SSB reporting without SSB index can still be used as known condition * When network have multiple TCI configuration to UE, then it could be understood as associated SSB is used to determine the TCI, and therefore SSB reporting with SSB index can be used as known condition. |

### Sub-topic 1-3: Others

#### Issue 1-3-1: Update definition of ’reference point’ in UL timing requirements

* Proposals
  + Option 1 (HW, Ericsson, Nokia, Intel)
    - Update the definition of ’reference point’ as follows
    - Related changes is as shown in R4-2114447 (Ericsson, Nokia, Intel) and Change#3 in R4-2114252 (HW)

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| The UE shall meet the Te requirement for an initial transmission provided that at least one SSB is available at the UE during the last 160 ms. The reference point for the UE initial transmit timing control requirement shall be the downlink timing of the reference cell minus . The downlink timing is defined as the time when the first path (in time) of the corresponding downlink frame from the reference cell arrives at the UE antenna. *N*TA for PRACH is defined as 0. |

* Recommended WF
  + Same as in RAN4#99-e, moderator suggests to treat the issue in Rel-17 URLLC WI, under email #239, so no technical discussion is expected in this email thread.

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| **Company** | **Comments** |
| Moderator | No technical discussion is expected here. |
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## Companies views’ collection for 1st round

### Open issues

### CRs/TPs comments collection

***No need to repeat the comments if you have already provided comments to the related open issue in section 1.2. Comments on the exact wording can be provided here, if any.***

|  |  |
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| **CR/TP number** | **Comments collection** |
| R4-2112953 (LGE) | Moderator: this CR is not for open issues listed in section 1.2, so please provide your comments to the CR directly here, if any. |
| Apple: fine with CR |
|  |
| R4-2111967 (CATT) | Moderator: this CR is not for open issues listed in section 1.2, so please provide your comments to the CR directly here, if any. |
| Apple: fine with CR |
|  |
| R4-2112085 (Apple) | Moderator: Related to 1-2-1 |
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| R4-2112111 (Apple) | Moderator: Related to 1-2-2 |
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| R4-2113537 (vivo) | Moderator: Related to 1-1-1 |
| Apple: depends on outcome of 1-1-1 |
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| R4-2113632 (Ericsson) | Moderator: Related to 1-1-3, Rel-15 |
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| R4-2113633 (Ericsson) | Moderator: Related to 1-1-3, Rel-16 |
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| R4-2114092 (HW, 36) | Moderator: Related to 1-2-3 |
| Apple: in general, we support the CR. One comment regarding change 2: is this clarification needed in PSCell addition? |
|  |
| R4-2114095 (HW, 38) | Moderator: Related to 1-2-3 |
| Apple: in general, we support the CR. One comment regarding change 4: is this clarification needed in PSCell addition? In our view the issue may exist in PSCell change but not PSCell addition. |
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| R4-2114155 (MTK) | Moderator: Related to 1-1-4 |
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| R4-2114255 (HW, 36) | Moderator: Related to 1-1-5 |
| typo on  All inter-frequency RSTD measurement requirements specified in Sections 8.7.15.1-8.7.15.4 shall apply, provided that  - the UE is capable of inter-frequency RSTD measurements for OTDOA [24], and  It should to be 8.17.15.1- 8.17.15.4 |
|  |
| R4-2114252 (HW, 38) | Moderator: Related to 1-1-2, 1-2-4  Moderator: No discussion on change #3 expected, this change is handled in email #239 |
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| R4-2111313 (Ericsson, Nokia, Intel) | Moderator: No discussion expected, this CR is handled in email #239 |
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## 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*

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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*

|  |  |
| --- | --- |
| **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”* |

# 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:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
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. Do not include hyper-links in the documents

Annex

Contact information

|  |  |  |
| --- | --- | --- |
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|  |  |  |

Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)