**3GPP TSG-RAN WG4 Meeting #94-e R4-20xxxxx**

**Electronic Meeting, Feb.24th – Mar.6th 2020**

**Agenda item:** 6.10 (except 6.10.8)

**Source:** Huawei, HiSilicon

**Title:** Email discussion summary for RAN4#94e\_#41\_NR\_NewRAT\_RRM\_Core\_Part\_1

**Document for:** Information

# Introduction

According to RAN4 Chairmen arrangement, this contribution provides the summary of topics of Rel-15 NR RRM Core maintenance general (except signalling) under agenda 6.10 (except agenda 6.10.8).

List of candidate target of email discussion for 1st round and 2nd round.

* 1st round: Invite companies to provide the comments for the discussion paper and CRs. According to comments, the possible way forward will be suggested. Based on the possible way forward, the Chair can allocate the Tdoc numbers for way forward or CRs to the responsible companies by the deadline of the first round.
* 2nd round: The responsible companies are expected to provide the way forward or revised/new CRs as soon as possible by capturing the comments in the first round, and companies are encouraged to review them again. The comments in the 2nd round will be captured in this summary. If no further comment for the way forward or CRs, the moderator will report that those documents are agreeable to the Chair. If there is still controversial issues, the moderator will capture the issues and opinions from the companies for the further discussion in the next meetings.

# Topic #1: General

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2001329 | Nokia, Nokia Shanghai Bell | **Proposal 1**: QCL chain depth restriction is for the certain QCL type.  **Proposal 2**: Agree to following text proposal to 38.133, section 3.6.7. |
| R4-2001335 | Nokia, Nokia Shanghai Bell | Based on above analysis and the answer 1 from RAN1:  [Answer 1] According to RAN1 understanding, it is up to the UE implementation which configured CSI-RS resources it monitors for RLM, BFD, candidate beam detection or L1-RSRP, outside of active time, as long as it can meet the performance requirements set by RAN4 in 38.133 for RLM, BFD, CBD and L1-RSRP.  This is already aligned with principles of the RAN4 specification and the current RAN4 UE requirements. Hence, we see no need for any RAN4 actions related to answer 1.  [Answer 2]  The UE may assume that CSI-RS resources are available outside DRX active time, if configured  This enables good UE implementations to take advantage of the additional availability of the CSI-RS resources to perform better than minimum requirements. No actions are needed concerning the RAN4 requirements.  Based on this we conclude that the replies from RAN1 related to the LS from RAN4, do not lead to any actions in RAN4.  **Observation:** No actions needed in RAN4 related to the reply LS [2]. |

## Open issues summary

### Sub-topic 1-1

**Issue 1-1: Clarification of QCL chain depth restriction is for a certain QCL type**

* Proposals
  + Proposal 1: QCL chain depth restriction is for the certain QCL type
  + Proposal 2: Agree to follow text proposal to 38.133, section 3.6.7
* Recommended WF
  + Invite companies to check if Proposal 1 is agreeable.

### Sub-topic 1-2

**Issue 1-2: Actions to RAN1 reply LS on CSI-RS measurement outside DRX active time**

* Proposals
  + No action is needed
* Recommended WF
  + Invite companies’ comments.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MTK | **Issue 1-1: Clarification of QCL chain depth restriction is for a certain QCL type**  OK to the change  **Issue 1-2: Actions to RAN1 reply LS on CSI-RS measurement outside DRX active time**  Ok to the proposal |
| Intel | Issue 1-1: support proposals from Nokia  Issue 1-2: agree that no action is needed. |

## 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: |

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
|  |  |

## 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** |
|  |  |

# Topic #2: Editorial CRs

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2000580](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000580.zip) | CATT | The value of *timeDurationForQCL* is defined in TS38.331 other than in TS38.306, thus, the reference spec should be revisited in 38.133.  Change TS38.306 to TS38.331; |
| R4-2000581 | CATT | Cat A CR corresponding to [R4-2000580](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000580.zip) |
| [R4-2000914](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000914.zip) | MediaTek inc. | Referenced to incorrect specifications and sections |
| R4-2000915 | MediaTek inc. | Cat A CR corresponding to [R4-2000914](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000914.zip) |
| [R4-2000522](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000522.zip) | ZTE Corporation | 1. In 9.1.1, the reference to the control of reporting is 36.331, should be 38.331. 2. The values in the two tables in 9.4.4.2.2.2 are the minimum numbers of ACK/NACK transmissions. The header of the two tables are wrong currently. Number of transmissions and minimum number of transmissions are two totally different concepts. 3. In 8.10.3, the reference to where THARQ is specified is wrong, it’s specified in clause 9.2.3 in 38.213. |
| [R4-2000510](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000510.zip) | ZTE Corporation | Cat A CR corresponding to [R4-2000522](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000522.zip) |

## Open issues summary

### CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| [R4-2000580](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000580.zip) | Company A |
| Company B |
|  |
| [R4-2000914](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000914.zip) | Company A |
| Company B |
|  |
| [R4-2000522](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000522.zip) | Company A |
| Company B |
|  |

## Summary for 1st round

### 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** |
|  |  |

## 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** |
|  |  |

# Topic #3: UE measurement capability (38.133/36.133)

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2001923](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001923.zip) | Ericsson | Observation 1: From the latest TS 38.133, it follows that is the total number of NR reporting criteria configured by PSCell and E-UTRA PCell, which means that if PCell and PSCell are configuring on the same serving NR carrier frequency, the PCell and PSCell may need to be aware of the still available number of reporting criteria to not exceed the limit specified in TS 38.133.  Observation 2: The above observation does not come from the clarifying CR in R4-1907862, rather this approach had been already in both TS 38.133 and TS 36.133.  Based on the above observations, a draft response LS is provided in [3]. |
| [R4-2001924](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001924.zip) | Ericsson | LS corresponding to [R4-2001923](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001923.zip) |
| [R4-2001331](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001331.zip) | Nokia, Nokia Shanghai Bell | Observation 1: There is a need to exchange information impacting the reporting criteria configuration, between MN and SN. |
| [R4-2001332](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001332.zip) | Nokia, Nokia Shanghai Bell | LS corresponding to [R4-2001331](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001331.zip) |
| R4-2001278 | ZTE | Proposal 1. Reporting criteria for NR serving cell frequencies, i.e. component in , needs to be coordinated between the MN and the SN in EN-DC operation. |
| R4-2001270 | ZTE | LS corresponding to R4-2001278 |
| [R4-2001333](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001333.zip) | Nokia, Nokia Shanghai Bell | Observation 1: it needs to be clarified what the reporting criteria is for an EN-DC capable UE configured with additional SCells.  Proposal 1: For each configured SCell the UE shall support additionally 9 reporting criteria.  Proposal 2: UE requirement for reporting criteria when UE is configured with SCells and NR SCells need to be clarified.  Proposal 3: RAN4 to select one of the text proposals for clarifying the UE reporting criteria requirement when configured with SCells and NR SCells. |
| [R4-2001259](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001259.zip) | ZTE | Proposal 1. The reporting criteria for EN-DC when E-UTRA SCell(s) are configured is to be specified.  Proposal 2. The reporting criteria for NE-DC when E-UTRA SCell(s) are configured is to be specified.  Proposal 3. The requirements structure for reporting criteria in TS36.133 is not changed by introducing requirements for CA at E-UTRA side.  Proposal 4. Reporting criteria for EN-DC is 36+9\*n when the UE is configured with E-UTRA SCell(s), and n is the number of E-UTRA SCell carrier frequencies.  Proposal 5. For NE-DC, the total number of E-UTRA reporting criteria is E\_(cat,NE-DC,E-UTRA)=10+9×n, and is the number of configured E-UTRA serving frequencies, including PSCell and SCells carrier frequencies. |
| [R4-2001261](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001261.zip) | ZTE | CR:  For EN-DC, reporting criteria has not been specified when E-UTRA SCell carrier frequencies are configured.  For NE-DC, reporting criteria has not been finalized and reporting criteria has not been specified when E-UTRA SCell carrier frequencies are configured   * Specified reporting criteria for EN-DC when E-UTRA SCell carrier frequencies are configured. * Specified reporting criteria for NE-DC when E-UTRA SCell carrier frequencies are configured. * Change ‘excluding’ to ‘in addition to’ * Change the property of Table 8.2.2-1 so it can be on the same page with the title. * Editorial changes |
| R4-2001262 | ZTE | Cat A CR to [R4-2001261](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001261.zip) |
| [R4-2001922](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001922.zip) | Ericsson | The total numbers of mandatory reporting criteria for EN-DC in TS 36.133 are then:  **36** reporting criteria if the UE is not configured with any LTE SCell or NR SCell or NR PSCell carrier frequencies,  **36+(10+9\*1)** reporting criteria if the UE is not configured with any LTE SCell or NR SCell but configured with one NR PSCell carrier frequency,  **36+9\*k+(10+9\*n)** reporting criteria if the UE is configured with *k* carrier frequencies with LTE SCells, one NR PSCell carrier frequencies, and (*n*-1) carrier frequencies with NR SCells.  The total numbers of mandatory reporting criteria for NE-DC in TS 36.133 are then:  - **29** reporting criteria if the UE is not configured with any LTE SCell or LTE PSCell or NR SCell, but configured with NR PCell,  - **29+(10+9\*1)** reporting criteria if the UE is not configured with any LTE SCell or NR SCell, but configured with LTE PSCell and NR PCell,  - **29+(10+9\*k)+9\*n** reporting criteria if the UE is configured with (*k*-1) LTE SCells, LTE PSCell, and *n* NR SCells carrier frequencies. |
| [R4-2001920](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001920.zip) | Ericsson | CR  Removed editor’s note and updated the reporting criteria for EN-DC and NE-DC accordingly |
| R4-2001921 | Ericsson | Cat A CR to [R4-2001920](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001920.zip) |
| [R4-2001260](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001260.zip) | ZTE | The CR (R4-1914771) implementation makes a misalignment between specifications and therefore the different versions of TS38.133 (Rel-15 and Rel-16) are inconsistent.  Move the change in R4-1914771 to correct place. |

## Open issues summary

### Sub-topic 3-1

**Issue 3-1: Need of coordination between MN and SN for 9×n in reporting criteria**

RAN2 in-coming LS on whether there is implication that component 9 in needs to be coordinated between the MN and the SN. Related contributions are [R4-2001923](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001923.zip), [R4-2001924](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001924.zip) (LS), [R4-2001331](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001331.zip), [R4-2001332](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001332.zip) (LS)

* Proposals
  + Option 1 (Nokia [R4-2001923](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001923.zip), [R4-200192](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001923.zip)4, ZTE R4-2001278, R4-2001270 ): RAN4 has been discussing the question raised in the LS and has concluded that regarding question 1, there is a need to exchange information between MN and SN related to configurations impacting the component in .
  + Option 1a (Ericsson [R4-2001331](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001331.zip), [R4-2001332](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001332.zip)): From the latest TS 38.133, it follows that is the total number of NR reporting criteria configured by PSCell and E-UTRA PCell, which means that if PCell and PSCell are configuring on the same serving NR carrier frequency, the PCell and PSCell may need to be aware of the still available number of reporting criteria to not exceed the limit specified in TS 38.133.
* Recommended WF
  + To answer RAN2 LS
    - There is a need to exchange information between MN and SN related to configurations impacting the component in
  + Further discussion on the content of draft LS based in [R4-2001924](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001924.zip) (LS), [R4-2001332](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001332.zip) (LS)

### Sub-topic 3-2

**Issue 3-2: Reporting criteria for EN-DC with more than one LTE and/or NR SCells configured**

The current requirements do not cover the cases when a UE configured with EN-DC is configured with more LTE and/or NR SCells. The related contributions are [R4-2001333](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001333.zip), [R4-2001259](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001259.zip), [R4-2001261](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001261.zip)/2 (CR), [R4-2001922](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001922.zip), [R4-2001920](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001920.zip)/1 (CR)

* Proposals for reporting criteria for EN-DC
  + Option 1 (Nokia R4-2001333) :

…the UE need not support more than the number of reporting criteria, excluding reporting criteria specified in TS 38.133 [50] that are applicable for the UE configured with EN-DC operation, as follows

* [36] reporting criteria if the UE is not configured with any SCell or PSCell carrier frequency or NR SCell or NR PSCell,
* [36] reporting criteria if the UE is not configured with any SCell or NR SCell but configured with one NR PSCell carrier frequency.
* [36+9xn] reporting criteria if the UE is configured with one or more SCells and with one NR PSCell carrier frequency and not configured with any NR SCell, where n is the number of configured SCells.
* [36+9xn] reporting criteria if the UE is configured with one or more SCells and with one NR PSCell carrier frequency and one or more NR SCells, where n is the number of configured SCells.
  + Option 1a (Nokia R4-2001333):

…the UE need not support more than the number of reporting criteria, excluding reporting criteria specified in TS 38.133 [50] that are applicable for the UE configured with EN-DC operation, as follows

* [36] reporting criteria if the UE is not configured with any SCell or PSCell carrier frequency or NR SCell or NR PSCell,
* [36] reporting criteria if the UE is not configured with any SCell or NR SCell but configured with one NR PSCell carrier frequency.
* [36+9xn] reporting criteria if the UE is configured with n SCells and with one NR PSCell carrier frequency and not configured with any NR SCell.
* [36+9xn] reporting criteria if the UE is configured with n SCells and with one NR PSCell carrier frequency and one or more NR SCells.
  + Option 1b (Nokia R4-2001333):

… the UE need not support more than the number of reporting criteria, excluding reporting criteria specified in TS 38.133 [50] that are applicable for the UE configured with EN-DC operation, as follows

* [36] reporting criteria if the UE is not configured with any SCell or PSCell carrier frequency or NR SCell or NR PSCell,
* [36] reporting criteria if the UE is not configured with any SCell but configured with one NR PSCell carrier frequency with or without NR SCells configured.
* [36+9xn] reporting criteria if the UE is configured with n SCells and with one NR PSCell carrier frequency with or without NR SCells configured.
  + Option 2 (ZTE [R4-2001259](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001259.zip), [R4-2001261](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001261.zip)):

… the UE need not support more than the number of reporting criteria, in addition to reporting criteria specified in TS 38.133 [50] that are applicable for the UE configured with EN-DC operation, as follows:

* [36] reporting criteria if the UE is not configured with any SCell or PSCell or NR SCell or NR PSCell carrier frequency,
* [36] reporting criteria if the UE is not configured with any SCell or NR SCell but configured with one NR PSCell carrier frequency.
* [] reporting criteria if the UE is configured with SCells and one NR PSCell carrier frequencies, and *n* is the number of configured SCells carrier frequencies.
  + Option 3 (Ericsson [R4-2001922](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001922.zip), [R4-2001920](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001920.zip)):

…the UE need not support more than the number of reporting criteria in total, as specified in TS 38.133 [50]:

* [36] reporting criteria if the UE is not configured with any SCell or NR SCell or NR PSCell carrier frequencies,
* ] reporting criteria if the UE is not configured with any SCell or NR SCell, but configured with one NR PSCell carrier frequency,
* [)] reporting criteria if the UE is configured with *k* carrier frequencies with SCells, one NR PSCell carrier frequencies, and (*n*-1) carrier frequencies with NR SCells.
* Recommended WF
  + Agreement: UE requirement for reporting criteria for EN-DC when UE is configured with SCells and NR SCells need to be clarified. (Nokia)
  + Further discussion on how to modify the criteria based on Option 1~Option 3 above.
  + Decide which CR can be used as baseline.

### Sub-topic 3-3

**Issue 3-3: Reporting criteria for NE-DC with more than one LTE and/or NR SCells configured**

The agreement will be aligned with that for sub-topic 3-2

* Proposals for reporting criteria for NE-DC
  + Option 2 (ZTE [R4-2001259](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001259.zip), [R4-2001261](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001261.zip)):

…the UE need not support more than the number of reporting criteria, in addition to reporting criteria specified in TS 38.133 [50] that are applicable for the UE configured with NE-DC operation, as follows:

* [19] reporting criteria if the UE is not configured with any SCell or NR SCell.
* [] reporting criteria if the UE is configured with SCells, and *n* is the number of configured SCells carrier frequencies.
  + Option 3 (Ericsson [R4-2001922](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001922.zip), [R4-2001920](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001920.zip)):

…the UE need not support more than the number of reporting criteria in total, as specified in TS 38.133 [50]:

* [29] reporting criteria if the UE is not configured with any SCell or PSCell or NR SCell, but configured with NR PCell,
* [29+(10+9)] reporting criteria if the UE is not configured with any SCell or NR SCell, but configured with PSCell and NR PCell,
* [ reporting criteria if the UE is not configured with (*k*-1) SCells, PSCell, *n* NR SCell carrier frequencies, and NR PCell.
* Recommended WF
  + Agreement should be aligned with that for EN-DC case.
  + Further discussion on number for the reporting criteria based on Option 2 and Option 3.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Sub topic 3-1: RAN2 asked if coordination on component in between MN and SN is needed. ZTE and Nokia both think coordination is needed. It’s just how to coordinate is up to RAN2. Exchange information between MN and SN is one of approach. There could be other approaches, e.g. hard split. The point is the discussion should happen in RAN2. It is RAN4’s responsibility to confirm whether coordination is needed. So we still prefer the wording in our LS R4-2001270.  Sub topic 3-2:  The issue has been discussed for three meeting cycles based on ZTE’s discussion papers and CRs only. In the last meeting the decision was further postponed to this meeting.  **R4-1915786 CR to 36.133 on NR reporting criteria**  36.133 CR-6727 rev 1 Cat: F (Rel-15) v15.8.0  *Source: ZTE*  **Abstract:**  **Discussion:**  E///: object the CR  Chair: Postpone the decision to Feb. E/// is recommended to also bring detailed analysis / CRs to clarify their proposals.  **Decision: Postponed**  There is no point to further select the baseline CR.  Technically, Nokia’s proposal 1b is aligned with ZTE’s proposal option 2. It can be merged to option 2. Option 1a is slightly different from option 2 from wording, but we think option 2 covers all of cases in option 1a and both options would be the same requirements. Since there is no impact on E-UTRA carrier reporting criteria whether NR SCells has been configured or not, we prefer option 2/1b.  Comments to option 3  1. The total number of reporting criteria for EN-DC is as equation below.    2. The reporting criteria for measurements on NR carrier is specified in 38.133 as  3. The reporting criteria for measurements on E-UTRA carrier is specified in 36.133 as  If follows option 3, then will be  **36+(10+9\*1)** reporting criteria if the UE is not configured with any LTE SCell or NR SCell but configured with one NR PSCell carrier frequency  4. The total number of reporting criteria for EN-DC then will be  [36+ (10+9\*1)] () + (10+9\*1) ().  So with option 3 the **(10+9\*1)** will be calculated twice, which is not the correct approach.  Sub topic 3-3:  In our contribution R4-2001259 we provided how the reporting criteria for NE-DC is calculated.  *For single carrier case, the number of reporting criteria should be 19 by taking inter frequency and intra frequency E-UTRA measurements into consideration. When CA is configured the number of reporting criteria is scaled by number of serving frequencies, similar to EN-DC case.*  However we don’t see any analysis how the number 29 in option 3 is derived.  Again similar comments (same logic) on option 3 in topic 3-2 can be applied to option 3 here.  ….  Others: |
| XX |  |

### CRs/TPs comments collection

CRs R4-2001920/1 and R4-2001261/2 which are included in the above sub-topis are not listed here. Please provide the comment whether CR R4-2001260 is agreeable or not.

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| **CR/TP number** | **Comments collection** |
| [R4-200126](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001261.zip)0 | Company A |
| Company B |
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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: |

Suggestion 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 provided recommendation on CRs/TPs Status update suggestion

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
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## 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** |
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# Topic #4: RRM measurement and measurement gap

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2001406](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001406.zip) | Ericsson | Observation 1 : With Scell only on FR2, the UE is not required to measure more than one SCC concurrently.  Observation 2: Regardless if the same or different SMTC configuration is used on all FR2 CC, the BM requirements need to be updated to capture the impact of measurement operations on a different FR2 CC.  Proposal 1 : There are no restrictions on SMTC configuration when SCC only are configured on FR2  Proposal 2 : BM requirements are updated to account for measurement operations on any FR2 CC  Proposal 3 : Klayer1\_measurement definition is updated to account for BM operations on any FR2 CC  Proposal 4: If an SpCell is configured on FR2  - The same SMTC offset is used for different CC on FR2  - If smtc2 is configured on any FR2 CC,   * All CCs have the same periodicity for smtc1, and * All CCs configured with smtc2 have the same periodicity for smtc2   - If smtc2 is not configured on any FR2 CC,   * The total number of different SMTC periodicities on all CCs does not exceed 2 |
| [R4-2001407](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001407.zip) | Ericsson | CR:  Update BM requirements (RLM, BFD, CBD and L1-RSRP) to consider measurement configuration on all FR2 carriers.  Update measurement requirement to consider BM configuration on all FR2 carriers.  Capture the restriction that non gap based measurementy requirements apply, provided that the following conditions are met:  Either:  There are only SCells configured for FR2  Or:  - The same SMTC offset is used for different CC on FR2 and:  -If smtc2 is configured on any FR2 CC, all CCs have the same periodicity for smtc1, and all CCs configured with smtc2 have the same periodicity for smtc2  -If smtc2 is not configured on any FR2 CC, the total number of different SMTC periodicities on all CCs does not exceed 2 |
| R4-2001408 | Ericsson | Cat A CR to [R4-2001407](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001407.zip) |
| [R4-2001330](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001330.zip) | Nokia, Nokia Shanghai Bell | **Proposal 1:** No limitations are introduced on the use of SMTC periodicities for intra-frequency carriers.  **Proposal 2:** No limitations are introduced on the use of Offset.  **Proposal 3:** Limit the use of SMTC2 for intra-frequency measurements in Rel-15. |
| [R4-2001606](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001606.zip) | Huawei, HiSilicon, MediaTek | Proposal: Agree on the compromise proposal from RAN4#93 with 4 different SMTC periodicities for single SMTC case, and add the following condition for FR2 intra-frequency requirements.   |  | | --- | | The requirements in this clause for FR2 measurement objects apply provided that the SMTC on all CCs in FR2 have the same offset, and one of following conditions is met   * If *smtc2* is configured on any FR2 CC,   + All CCs have the same configuration for *smtc1*, and   + All CCs configured with *smtc2* have the same configuration for *smtc2* * If *smtc2* is not configured on any FR2 CC,   + The total number of different SMTC periodicities on all CCs does not exceed 4   *Editor’s Note: The impact of different SMTC offset for different CC on FR2 has not been considered in requirements in this version of the specification.* | |
| [R4-2001607](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001607.zip) | Huawei, HiSilicon, MediaTek | CR:  Define applicability for FR2 intra-frequency measurement requirements. |
| R4-2001608 | Huawei, HiSilicon, MediaTek | Cat A CR to [R4-2001607](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001607.zip) |
| [R4-2001789](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001789.zip) | MediaTek inc. | CR:  Revise the conditions for Klayer1\_measurement =1,   * All of the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are not overlapped with the symbols that UE has to conduct the RSRP measurement, when UE is not requested to measure the RSSI. * All of the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are not overlapped with the symbols that UE has to conduct the RSRP and RSSI measurement.   Klayer1\_measurement =1.5 for all the other cases. |
| R4-2001790 | MediaTek inc. | Cat A CR to [R4-2001789](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001789.zip) |
| [R4-2001787](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001787.zip) | MediaTek inc. | CR:  Clarify that a cell can only be called a detectable cell only if the cell was detected by the UE within 5 seconds |
| R4-2001788 | MediaTek inc. | Cat A CR to [R4-2001787](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001787.zip) |
| [R4-2001925](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001925.zip) | Ericsson | 38.133 CR:  “≤5 seconds” (similar to LTE) was added to replace the mistakenly removed TBD |
| R4-2001926 | Ericsson | Cat A CR to [R4-2001925](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001925.zip) |
| [R4-2001588](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001588.zip) | Huawei, HiSilicon | 38.133 CR:  1. Requirements defined in 38.133 clause 9.4.2/9.4.3 and clause 10.2 apply for Inter-RAT LTE measurement configured by NR PCell on serving carrier in NE-DC.  2. Requirements defined in 38.133 clause 10.2 apply for Inter-RAT LTE measurement configured by NR PCell on non-serving carrier in NE-DC. |
| R4-2001589 | Huawei, HiSilicon | Cat A CR to [R4-2001588](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001588.zip) |
| [R4-2001590](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001590.zip) | Huawei, HiSilicon | 36.133 CR:  The context “When the E-UTRAN FDD-NR measurement object configured by E-UTRA PCell is on an NR serving frequency carrier, then the NR intra-frequency measurements requirements defined in clause 9.2 of TS 38.133 [50] shall apply” is removed. |
| R4-2001591 | Huawei, HiSilicon | Cat A CR to [R4-2001590](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001590.zip) |
| [R4-2001791](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001791.zip) | MediaTek inc. | Clarify that UE is only required to conduct the neigboring cell measurement on 1 serving carrier in a FR2 band. |
| R4-2001792 | MediaTek inc. | Cat A CR to [R4-2001791](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001791.zip) |

## Open issues summary

### Sub-topic 4-1

**Issue 4-1: SMTC alignment for FR2 intra-frequency measurement**

The conditions when RF2 intra-frequency measurement apply are discussed. The related contributions include [R4-2001406](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001406.zip), [R4-2001407](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001407.zip)/8 (CR), [R4-2001330](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001330.zip), [R4-2001606](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001606.zip), [R4-2001607](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001607.zip)/8 (CR)

* Proposals for conditions under which FR2 intra-frequency measurement requirements (Clause 9.1.5) apply
  + Option 1 (Ericsson [R4-2001406](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001406.zip), [R4-200140](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001406.zip)7):

The requirements in this clause for FR2 measurement objects apply provided that the following conditions are met

Either:

* There are only SCells configured for FR2

Or:

* The same SMTC offset is used for different CC on FR2 and:
  + If smtc2 is configured on any FR2 CC, all CCs have the same periodicity for smtc1, and all CCs configured with smtc2 have the same periodicity for smtc2
  + If smtc2 is not configured on any FR2 CC, the total number of different SMTC periodicities on all CCs does not exceed 2
  + Option 2 (Nokia [R4-2001330](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001330.zip)):
    - No limitations are introduced on the use of SMTC periodicities for intra-frequency carriers.
    - No limitations are introduced on the use of Offset.
    - Limit the use of SMTC2 for intra-frequency measurements in Rel-15. (proposed text as follows)

For a Rel-15 UE, the requirements in this clause apply provided following related to use of *smtc2*:

* If *smtc2* is configured on any FR2 CC,
  + All CCs configured with *smtc2* have the same configuration for *smtc2*
  + Option 3 (Huawei, Mediatek, [R4-2001606](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001606.zip), [R4-2001607](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001607.zip))
    - Agree on the compromise proposal from RAN4#93 with 4 different SMTC periodicities for single SMTC case, and add the following condition for FR2 intra-frequency requirements.

The requirements in this clause for FR2 measurement objects apply provided that the SMTC on all CCs in FR2 have the same offset, and one of following conditions is met

* If *smtc2* is configured on any FR2 CC,
  + All CCs have the same configuration for *smtc1*, and
  + All CCs configured with *smtc2* have the same configuration for *smtc2*
* If *smtc2* is not configured on any FR2 CC,
  + The total number of different SMTC periodicities on all CCs does not exceed 4

*Editor’s Note: The impact of different SMTC offset for different CC on FR2 has not been considered in requirements in this version of the specification.*

* Recommended WF
  + TBA

### Sub-topic 4-2

**Issue 4-2: Time sharing between RRM and BM measurement (P factor)**

Issue description is as follows. The related contributions are [R4-2001406](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001406.zip), [R4-2001407](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001407.zip)/8 (CR)

*When defining the time sharing between RRM and BM measurement (P factor), RAN4 has only considered single carrier case, but since UE only has one Rx beam at a time across all CCs, RRM measurement on SCell1 and BM measurement on SCell2 also need to be TDMed.*

Although it is argued in [1] that it is not necessary or beneficial to solve this issue in specifications, we would like to emphasize that even if the L3 measurement SMTCs on CC1 and CC2 are identical, it could happen that there is a 3rd CC, CC3 which does not have L3 measurements configured, but still has BM. In this case, the problem would also occur in that the BM requirements on CC3 do not L3 consider measurement operations on CC1 and CC2.

* Proposals (Ericsson)
  + Proposal 1: BM requirements are updated to account for measurement operations on any FR2 CC
  + Proposal 2: Klayer1\_measurement definition is updated to account for BM operations on any FR2 CC
  + Proposal 3: the text changes are as follows ([R4-2001407](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001407.zip))

For FR2,

Klayer1\_measurement=1,

* if all of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency outside measurement gap are not fully overlapped by intra-frequency SMTC occasions, or
* if all of the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting on any FR2 serving frequency outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are not overlapped by with the SSB symbols indicated by *SSB-ToMeasure* and 1 symbol before each consecutive SSB symbols indicated by *SSB-ToMeasure* and 1 symbol after each consecutive SSB symbols indicated by *SSB-ToMeasure*, given that *SSB-ToMeasure* is configured;
* Recommended WF
  + TBA

### Sub-topic 4-3

**Issue 4-3: modification of the layer 3 and layer 1 measurement sharing factor**

Ran4 does extend the measurement requirement when the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are overlapped with the symbols that UE has to conduct the RSSI measurement.

The related contributions are R4-2001789.

* Proposals (Mediatek) in CR

For FR2,

Klayer1\_measurement=1,

- if all of the reference signals configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap are not fully overlapped by intra-frequency SMTC occasions, or

- if all of the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are not overlapped with the SSB symbols and 1 symbol before each consecutive SSB symbols and 1 symbol after each consecutive SSB symbols, given that *SSB-ToMeasure* is configured and UE is not requested to measure the RSSI, where SSB symbols are indicated by *SSB-ToMeasure*, or- if all of the reference signal configured for RLM, BFD, CBD or L1-RSRP for beam reporting outside measurement gap and fully-overlapped by intra-frequency SMTC occasions are not overlapped with any of the SSB symbols and the RSSI symbols, and 1 symbol before each consecutive SSB symbols and RSSI symbols and 1 symbol after each consecutive SSB symbols and RSSI symbols , given that *SSB-ToMeasure* and *SS-RSSI-Measurement* are configured and UE is requested to measure the RSSI, where SSB symbols are indicated by *SSB-ToMeasure* and RSSI symbols are indicated by *SS-RSSI-Measurement*;

Klayer1\_measurement=1.5, otherwise.

### Sub-topic 4-4

**Issue 4-4: definition of detectable cell**

* Proposals for conditions under which FR2 intra-frequency measurement requirements (Clause 9.1.5) apply
  + Mediatek (R4-2001787): Clarify that a cell can only be called a detectable cell only if the cell was detected by the UE within 5 seconds
  + Ericsson (R4-2001925) : “≤5 seconds”
* Recommended WF
  + A cell can only be called a detectable cell only if the cell was detected by the UE within 5 seconds
  + Both CRs are agreeable.

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| MTK | **Issue 4-1: SMTC alignment for FR2 intra-frequency measurement**  Support Option 3.  Option 1 is also fine to us. If the FR2 band has no SpCell, the UE’s scheduling complexity can be largely reduced. Both Option 1 and Option 3 suggest to have same SMTC offset of all CCs in the same band. This assumption has already been used in Rel-15 in certain requirements like SCell activation. We should at least keep this assumption here also.  Regarding Option 2, the analysis in [R4-2001330](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001330.zip) does not consider other factors that UE has to deal with. For example, SMTC puncturing by measurement gap and the sharing factor when both L1 and L3 measurements are conducted on the same OFDM symbol from the same CC or from different multiple CCs. The real situation that UE has to consider is far more complicated.  **Issue 4-2: Time sharing between RRM and BM measurement (P factor)**  We slightly prefer the solution in [R4-2001407](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001407.zip). CR [R4-2001407](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001407.zip) is addressing the same issue as R4-2000922, but with different approaches. If we go with [R4-2001407](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001407.zip), we still need a note saying that the SMTC offsets of CCs in the same FR2 band are the same, which is the basic assumption we used also in SCell activation.  Another issue is that this proposal covers the case when SSB occasions are fully overlapped by measurement gap. But actually this particular case should be left as no requirement.  **Issue 4-3: modification of the layer 3 and layer 1 measurement sharing factor**  This CR R4-2001789 is focusing on L3 measurement, while another CR R4-2001584 from Huawei in RLM session is addressing similar issue.  **Issue 4-4: definition of detectable cell**  Agree with the WF. Both CR are addressing the same issue. |
| Intel | Issue 4-1: we support option 1  Issue 4-2: we are fine with proposals from Ericsson |

### CRs/TPs comments collection

The CRs included in the above sub-topics are not listed here.

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| **CR/TP number** | **Comments collection** |
| [R4-2001588](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001588.zip)  R4-2001589 | MTK: No. In our understanding CSSFoutside\_gap,i does not consider any EUTRA intra-frequency, because the searchers between EUTRA and NR are not shared. In that case, the sentence should not be deleted, because this inter-RAT carrier somehow becomes a EUTRA intra-frequency layer. Not sure if there is any technical reason we missed here? |
| Company B |
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| [R4-2001590](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001590.zip)  R4-2001591 | MTK: No. Similar view as the comment for 1588. The sentence should not be deleted, because this inter-RAT carrier somehow becomes a EUTRA intra-frequency layer. |
| Company B |
|  |
| [R4-2001791](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001791.zip)  R4-2001792 | 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.

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

Suggestion on WF/LS assignment

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

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
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## 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** |
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# Topic #5: Connected state mobility

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2000030](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000030.zip) | ZTE Corporation | **Observation 1:** For NR to NR handover, Dhandover is defined as the maximum RRC procedure delay to be defined in clause 12 in TS 38.331 [2] plus the interruption time.  **Proposal 1**: In TS 38.133, change the requirement for NR to NR handover to:  “When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within Dhandover from the end of the last TTI containing the RRC command.  Where:  Dhandover equals the RRC procedure delay of RRC reconfiguration defined in clause 12 in TS 38.331 [2] plus the interruption time stated in clause 6.1.1.X.2.”  **Proposal 2**: Agree on CR [] which captures the above proposals. |
| [R4-2000031](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000031.zip) | ZTE Corporation | 38.133 CR:  There are several details need to be corrected:   1. Dhandover is not in the units of seconds 2. The RRC procedure delay is not described in a correct way 3. The only RRC command which can trigger an NR to NR handover is RRC reconfiguration.   Clarify on the above issues. |
| [R4-2000032](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000032.zip) | ZTE Corporation | Cat A CR to [R4-2000031](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000031.zip) |
| [R4-2000033](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000033.zip) | ZTE Corporation | **Observation 1**: According to TS 38.133 [1], TRRC\_procedure\_delay is specified in TS 38.331.  **Observation 2**: TRRC\_procedure\_delay is not specified in TS 38.331.  **Proposal 1:** For TS 38.133 R15, remove the wrong reference and keep the value of TRRC\_procedure\_delay unchanged.  **Proposal 2**: Open the discussion in RAN4 regarding the value of TRRC\_procedure\_delay for R16 and/or later releases and further study at least the following options:  Option 1: Send LS to RAN2 for a suggested value of TRRC\_procedure\_delay for RRC release.  Option 2: Modify the overall delay requirement so that TRRC\_procedure\_delay is not needed.  Option 3: Specify TRRC\_procedure\_delay = X ms based on internal RAN4 discussion.  **Proposal 3:** Open the discussion in RAN4 regarding where to specify TRRC\_procedure\_delay for R16 and/or later releases and further study at least the following options:  Option 1. TRRC\_procedure\_delay = X ms specified in test cases  Option 2. TRRC\_procedure\_delay = X ms specified in core requirements and test cases  Option 3. TRRC\_procedure\_delay = X ms specified in TS 38.331 by RAN2 |
| [R4-2000034](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000034.zip) | ZTE Corporation | LS:  RAN4 thinks RAN2 is at a better position determining the RRC procedure delay for RRC Release message.  **Question:** Can RAN2 suggest a proper value of the RRC procedure delay for RRC Release message? |
| [R4-2000511](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000511.zip) | ZTE Corporation | **Observation 1**: The UE is not aware of whether the network contains UE context before sending RRCReestablishmentRequest. Thus, the UE has to fulfill the delay requirement defined in clause 6.2.1.2.1 in TS 38.133 always.  **Observation 2:** Having a line saying “There is no requirement if the target cell does not contain the UE context” in the specification gives impression to readers that under some cases, the UE is certain that the network doesn’t have UE context, which can be misleading.  **Proposal 1:** The UE shall meet the delay requirement always since it can’t be sure whether the network has UE context or not.  **Proposal 2:** Agree on the CRs to remove the statement “There is no requirement if the target cell does not contain the UE context” in the specification. |
| [R4-2000512](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000512.zip) | ZTE Corporation | 38.133 CR:  Remove the statement “There is no requirement if the target cell does not contain the UE context”. |
| [R4-2000513](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000513.zip) | ZTE Corporation | Cat A CR to [R4-2000512](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000512.zip) |
| [R4-2002075](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2002075.zip) | Ericsson | CR:  Introducing the following corrections:   * Modifying the wording to “Dhandover equals the applicable RRC procedure delay defined in clause 12 in TS 38.331 [2]” * Removing self-references to “TS 38.133 [50]”   Removing “NOTE 1:The actual value of TIU shall depend upon the PRACH configuration used in the target cell” |
| R4-2002076 | Ericsson | Cat A CR to [R4-2002075](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2002075.zip) |

## Open issues summary

### Sub-topic 5-1

**Issue 5-1: Dhandover definition update**

* Proposals (ZTE [R4-2000030](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000030.zip), [R4-200003](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000030.zip)1/2 CR)

**6.1.1.2.1 Handover delay**

When the UE receives a RRC message implying handover the UE shall be ready to start the transmission of the new uplink PRACH channel within Dhandover msec from the end of the last TTI containing the RRC command.

Where:

Dhandover equals the RRC procedure delay of RRC reconfiguration defined in clause 12 in TS 38.331 [2] plus the interruption time stated in clause 6.1.1.2.2.

* Recommended WF
  + TBA

### Sub-topic 5-2

**Issue 5-2: Re-open discussion on TRRC\_procedure\_delay for requirements of RRC release with redirection**

* Proposals (ZTE, R4-2000033/4)
  + Proposal 1: For TS 38.133 R15, remove the wrong reference and keep the value of TRRC\_procedure\_delay unchanged.
  + Proposal 2: Open the discussion in RAN4 regarding the value of TRRC\_procedure\_delay for R16 and/or later releases and further study at least the following options:
    - Option 1: Send LS to RAN2 for a suggested value of TRRC\_procedure\_delay for RRC release.
    - Option 2: Modify the overall delay requirement so that TRRC\_procedure\_delay is not needed.
    - Option 3: Specify TRRC\_procedure\_delay = X ms based on internal RAN4 discussion.
  + Proposal 3: Open the discussion in RAN4 regarding where to specify TRRC\_procedure\_delay for R16 and/or later releases and further study at least the following options:
    - Option 1. TRRC\_procedure\_delay = X ms specified in test cases
    - Option 2. TRRC\_procedure\_delay = X ms specified in core requirements and test cases
    - Option 3. TRRC\_procedure\_delay = X ms specified in TS 38.331 by RAN2
* Recommended WF
  + TBA

### Sub-topic 5-3

**Issue 5-3: removal of the statement about no requirement if UE context not contained for RRC re-establishment requirement**

* Proposals (ZTE, R4-2000511, [R4-2000512](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000512.zip)/3 CR)
  + Proposal 1: The UE shall meet the delay requirement always since it can’t be sure whether the network has UE context or not.
  + Proposal 2: Agree on the CRs to remove the statement “There is no requirement if the target cell does not contain the UE context” in the specification.

------------- CR Text ------------------

Nfreq: It is the total number of NR frequencies to be monitored for RRC re-establishment; Nfreq = 1 if the target intra-frequency NR cell is known, else Nfreq = 2 and Tidentify\_intra\_NR = 0 if the target inter-frequency NR cell is known.

In the requirement defined in the below tables, the target FR1 cell is known if it has been meeting the relevant cell identification requirement during the last 5 seconds otherwise it is unknown.

* Recommended WF
  + TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| MTK | **Issue 5-1: Dhandover definition update**  Agree with ZTE. The reason behind is that we just copied the wording from LTE. In LTE, the longest RRC procedure delay is just 20ms, but in NR, RAN2 introduced the ‘UE capability transfer’ which delay is 80ms. It’s better to have a CR to update the wording. This proposal is addressing the same issue as CR [R4-2002075](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2002075.zip). We slightly prefer the wording in [R4-2002075](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2002075.zip).  **Issue 5-2: Re-open discussion on TRRC\_procedure\_delay for requirements of RRC release with redirection**  We don’t agree to remove the reference. It’s not a wrong reference in RAN2 by the value of NA. The reason is that there is no response message to network and actually the network don’t know the end point of RRC Release. It’s not necessary to define this time in RAN2.  For current value 110ms in test case is just copied from legacy LTE. If some companies think it's too long, it’s fine for discussing this value internally in RAN4 test case, but we don’t think we need to update the Core requirement or send LS to RAN2.  **Issue 5-3: removal of the statement about no requirement if UE context not contained for RRC re-establishment requirement**  This requirement is for RRC re-establishment. If the network doesn’t send the *RRCreestablishment* message to UE, it means the overall procedure is not a RRC re-establishment, but a RRC setup.  ‘There is no requirement if the target cell does not contain the UE context.’ It also implies that the network should guarantee the UE context is not released before the time UE sending the RACH.  So we don’t think it’s necessary to remove this wording. |
| ZTE | Issue 5-1: Suggest to merge CRs from ZTE and Ericsson. Please also see our comments for the CRs below.  Issue 5-2: We think that the problem is pretty clear as described and analyzed in our paper. We’re a bit confused by MediaTek’s comment because now in 38.133, it says “TRRC\_procedure\_delay: It is the RRC procedure delay for processing the received message “*RRCRelease*” as defined in clause 6.2.2 of TS 38.331 [2]” while in 38.331 it’s not defined. “NA” is not a value to be used when calculating the overall delay. We think that it’s clear that a hole exists in the current spec and it needs fixing.  As to whether to send a LS or not, we don’t have strong opinions to send the LS (or not to send), we’re just listing all possible options which would be of help to resolve this problem.  Also to MTK’s comment “It’s not necessary to define this time in RAN2”, we’re not suggesting to define it in RAN2. We just said it’s one possible solution to this problem. Then I guess MTK favors Option 1 or 2 over Option 3 for the question raised in proposal 3 in our paper.  Also to MTK’s comment “For current value 110ms in test case is just copied from legacy LTE. If some companies think it's too long, it’s fine for discussing this value internally in RAN4 test case, but we don’t think we need to update the Core requirement or send LS to RAN2.”: this is one of the possible ways to solve this problem, which means MTK favors Option 1 for the question raised in proposal 3 in our paper. Somehow other companies might have different views on this.  Again, the intention of this paper is to trigger discussions on this problem by listing all possible solutions without suggesting preference of ZTE. We volunteer to lead an offline discussion to collect views from companies and prepare a draft WF. This could be done using email reflector RAN4\_Drafts (like during a face-to-face meeting). Need instructions from the chair / moderator on how to move on.  Issue 5-3: Thank MediaTek for the comments. We don’t agree on the following part in your comment:  *‘There is no requirement if the target cell does not contain the UE context.’ It also implies that the network should guarantee the UE context is not released before the time UE sending the RACH.*  We can’t see a relationship between that statement, which focuses on requirements for the UE, and requirement for the network.  We agree with your comment that “If the network doesn’t send the *RRCreestablishment* message to UE, it means the overall procedure is not a RRC re-establishment, but a RRC setup”, this is also pointed out and illustrated with figures in our paper R4-2000511. The point is , the UE would not know if network contains the UE context before it goes through the whole process.  We’re not trying to relax or tighten any requirements, but just to remove a statement that’s useless. The UE will have to meet the requirements anyway since the UE doesn’t know if network has UE context. |

### CRs/TPs comments collection

CRs included in the above sub-topics are not listed here.

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [R4-200003](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000030.zip)1 |  |
| [R4-2000512](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000030.zip) |  |
| [R4-2002075](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2002075.zip)  R4-2002076 | ZTE: This CR intends to resolve the same problems as R4-2000031, while missing some corrections for example “within Dhandover seconds” should be changed to “within Dhandover milliseconds”. But basically these two CRs are very similar. Suggest to merge these two CRs. We volunteer to take care of it. |
| 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** |
|  |  |

## 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** |
|  |  |

# Topic #6: Timing

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2001567](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001567.zip) | Huawei, HiSilicon | Observation 1: When the timing difference between before and after beam transition is smaller than 2Te, UE may not observe the timing change due to timing error.  Proposal 1: The timing threshold H used for one-shot adjustment should be larger than 2Te.  Observation 2: when the magnitude of the T is within (H-2Te, H+2Te], it is difficult for the UE to correctly determine when to perform a one-shot timing adjustment.  Proposal 2: It is suggested to remove the one-shot timing adjustment requirements due to implementation difficulties. |
| [R4-2001568](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001568.zip) | Huawei, HiSilicon | CR:  1. To remove one-shot timing adjustment requirements. |
| R4-2001569 | Huawei, HiSilicon | Cat A CR to [R4-2001568](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001568.zip) |
| [R4-2001843](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001843.zip) | Ericsson | Observation # 1: The threshold, H, beyond which the UE applies one shot adjustment should be small fraction of UL CP length (e.g. not more than 10%) to prevent BS reception problem.  Proposal # 1: The threshold, H, beyond which the UE applies single shot adjustment shall be small fraction of UL CP length as shown in table below:   |  |  |  |  | | --- | --- | --- | --- | | Frequency Range | SCS of SSB signals (KHz) | SCS of uplink signals s(KHz) | H [Tc] | | 1 | 15 | 15 | 768 | | 30 | 320 | | 60 | 160 | | 30 | 15 | 512 | | 30 | 512 | | 60 | 224 | | 2 | 120 | 60 | 224 | | 120 | 112 | | 240 | 60 | 192 | | 120 | 96 |   Observation # 2: Relaxation of Te after the one-shot adjustment will increase the BS reception error resulting in BS reception problem.  Proposal # 2: The transmission after the one-shot adjustment shall meet the existing timing error, Te, defined in Table 7.1.2-1  Observation # 3: Upon applying one-shot timing adjustment the UE may rarely cause interruption.  Proposal # 4: No interruption requirement due to one-shot timing adjustment is specified. |
| [R4-2001844](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001844.zip) | Ericsson | CR:  The value of threshold (H) above which the UE adjusts its transmission timing in one adjustment are missing. The value of H are specified. |
| R4-2001845 | Ericsson | Cat A CR to [R4-2001844](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001844.zip) |
| [R4-2000458](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000458.zip) | MediaTek inc. | Observation 1: As long as Te1 is smaller than TΔ, BS will always benefit from UE’s one-shot adjustment  Observation 2: When H is somehow within the range of 25~30% of the UL CP, then the overall BS error could be roughly controlled around half of CP.  Observation 3: From UE’s perspective, reasonable H is within the range of 40~56%.  Proposal 1: The threshold H is 33% of the CP for all SCSs.  Proposal 2: No explicit accuracy requirement is specified for UL Tx transmit timing on non-serving beam, because it is already implicitly considered in the threshold H.  Proposal 3: No requirements are specified for one-shot UL timing adjustment due to UE’s autonomous Rx beam change.  Proposal 4: If requirements (H, Te1 and interruption) are not finalized in RAN4 #94-e then remove one shot timing adjustment requirements from Rel-15. |
| [R4-2001009](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001009.zip) | NEC | Proposal 1: UE transmit timing error after one shot timing adjustment shall be within ±Te.  Proposal 2: Threshold for one shot timing adjustment is CP/3  Proposal 3: If proposal 1 and 2 are not agreeable, then RAN4 should remove one shot timing adjustment requirements from Rel-15. |
| [R4-2001328](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001328.zip) | Nokia, Nokia Shanghai Bell | Observation 1: Rel-15 gNB’s are already available in the field.  Observation 2: Existing Rel-15 gNB’s assume that UEs follow the existing specified time adjustment requirements.  Observation 3: A one-shot adjustment is agnostic to gNB when the timing error, Te, after one-shot adjustment is within the ±Te of the reference timing used before the one-shot adjustment.  Observation 4: UE autonomous UL transmit timing can only be applied assuming UL/DL reciprocity.  And we propose following:  Proposal 1: One-shot timing adjustment is only allowed when gradual timing adjustment cannot be applied.  Proposal 2: H = Te+Tq.  Proposal 3: Any one-shot UL transmit timing adjustment due to UE autonomous beam change shall be agnostic to the gNB.  Proposal 4: No additional relaxation in UL transmit error relaxation is introduced when applying one-shot adjustment.  Proposal 5: When applying one-shot timing adjustment, the transmission timing error shall stay within ±Te of the reference timing after the adjustment  Proposal 6: No interruptions are allowed for UE autonomous Rx beam Change. |
| [R4-2002062](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2002062.zip) | Qualcomm Incorporated | Observation 1: UE behavior on how it corrects for timing change is different above and below the threshold H.  Observation 2: In scenario where DL timing jumps by a larger amount, even with a relaxed Te after one-shot adjustment, the system performance is better in case one-shot timing adjustment than where UE slews its timing adjustment.  Observation 3: The relaxed Te applies only from the time when the UE sees the large timing change till the next SSB is received.  Observation 4: At large timing jump, the UE applies one-shot timing adjustment. At the reception of new SSB, it reverts to gradual adjustment to bring error within Te.  Proposal 1: The threshold H should be 0.5\*CP  Proposal 2: UE shall adjust its UL timing in one-shot if the value of the correction is less than the maximum value of TA command for that SCS.  Proposal 3: The value of Te1 should be Te+5Ts in FR1 and Te+4Ts in FR2 |
| [R4-2001258](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001258.zip) | ZTE | Proposal 1. The threshold H to trigger one shot timing adjustment is 15% UL CP.  Proposal 2. The threshold H is calculated as in Table below.   |  |  |  | | --- | --- | --- | | **Frequency Range** | **SCS of uplink signals (kHz)** | **H [Tc]** | | 1 | 15 | 20\*64\*Tc | | 30 | 10\*64\*Tc | | 60 | 5.5\*64\*Tc | | 2 | 60 | 5.5\*64\*Tc | | 120 | 2.5\*64\*Tc |   Proposal 3. The accuracy of one-shot timing adjustment (Te1) is the same as initial uplink transmission accuracy Te.  Proposal 4. No interruption is allowed during one shot timing adjustment. |
| [R4-2001265](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001265.zip) | ZTE | CR:  • The threshold value of H is proposed  • The definition of T1 and T2 are corrected  • “x Tc” is added in the formula. |
| R4-2001266 | ZTE | Cat A CR to [R4-2001265](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001265.zip) |
| [R4-2001570](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001570.zip) | Huawei, HiSilicon | CR:   1. To add the MRTD/MTTD requirements for inter-band synchronous EN-DC and NE-DC to new sub-sections.   The Rel-16 version of MRTD and MTTD requirements for inter-band EN-DC and NE-DC are inconsistent with the Rel-15 version. |

## Open issues summary

### Sub-topic 6-1

**Issue 6-1: Threshold for one shot timing adjustment requirements for FR2**

The threshold (H) values above which the UE adjusts its transmission timing in on adjustment is discussed. The BS performance loss, UE implementation, DL timing estimation errors and etc are taken into consideration in the companies’ contributions. The related contributions are [R4-2001567](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001567.zip), [R4-2001568](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001568.zip)/9 (CR), [R4-2001843](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001843.zip), [R4-200184](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001843.zip)4/5 (CR), [R4-2000458](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000458.zip), [R4-200](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000458.zip)1009, [R4-2001328](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001328.zip), [R4-200](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001328.zip)2062, [R4-2001258](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001258.zip), [R4-2001265](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001265.zip)/6 (CR)

* Proposals
  + Option 1 (Huawei [R4-2001567](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001567.zip), [R4-2001568](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001568.zip)/9):
    - The timing threshold H used for one-shot adjustment should be larger than 2Te.
    - It is suggested to remove the one-shot timing adjustment requirements due to implementation difficulties.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Frequency Range** | **SCS of SSB signals ( kHz)** | **SCS of uplink signals ( kHz)** | **Te** | **H > Te (Tc)** |
| 1 | 15 | 15 | 12\*64\*Tc | 1536 |
| 30 | 10\*64\*Tc | 1280 |
| 60 | 10\*64\*Tc | 1280 |
| 30 | 15 | 8\*64\*Tc | 1024 |
| 30 | 8\*64\*Tc | 1024 |
| 60 | 7\*64\*Tc | 896 |
| 2 | 120 | 60 | 3.5\*64\*Tc | 448 |
| 120 | 3.5\*64\*Tc | 448 |
| 240 | 60 | 3\*64\*Tc | 384 |
| 120 | 3\*64\*Tc | 384 |
| Note 1: Tc is the basic timing unit defined in TS 38.211 [6] | | | | |

* + Option 2 (Ericsson R4-2001843, R4-2001844/5):
    - The threshold, H, beyond which the UE applies single shot adjustment shall be small fraction of UL CP length as shown in table below:

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency Range | SCS of SSB signals (KHz) | SCS of uplink signals s(KHz) | H [Tc] |
| 1 | 15 | 15 | 768 |
| 30 | 320 |
| 60 | 160 |
| 30 | 15 | 512 |
| 30 | 512 |
| 60 | 224 |
| 2 | 120 | 60 | 224 |
| 120 | 112 |
| 240 | 60 | 192 |
| 120 | 96 |

* + Option 3 (Mediatek R4-2000458)
    - The threshold H is 33% of the CP for all SCSs.
    - If requirements (H, Te1 and interruption) are not finalized in RAN4 #94-e then remove one shot timing adjustment requirements from Rel-15.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Frequency Range** | **SCS of SSB signals ( kHz)** | **SCS of uplink signals ( kHz)** | **Te** | **H = 33%\*CP (Tc)** |
| 1 | 15 | 15 | 12\*64\*Tc | 3041.28 |
| 30 | 10\*64\*Tc | 1520.64 |
| 60 | 10\*64\*Tc | 760.32 |
| 30 | 15 | 8\*64\*Tc | 3041.28 |
| 30 | 8\*64\*Tc | 1520.64 |
| 60 | 7\*64\*Tc | 760.32 |
| 2 | 120 | 60 | 3.5\*64\*Tc | 760.32 |
| 120 | 3.5\*64\*Tc | 380.16 |
| 240 | 60 | 3\*64\*Tc | 760.32 |
| 120 | 3\*64\*Tc | 380.16 |
| Note 1: Tc is the basic timing unit defined in TS 38.211 [6] | | | | |

* + Option 3a (NEC [R4-200](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000458.zip)1009)
    - Threshold for one shot timing adjustment is CP/3
  + Option 4 (Nokia [R4-2001328](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001328.zip))
    - One-shot timing adjustment is only allowed when gradual timing adjustment cannot be applied.
    - H = Te+Tq.
    - Any one-shot UL transmit timing adjustment due to UE autonomous beam change shall be agnostic to the gNB.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Frequency Range** | **SCS of SSB signals ( kHz)** | **SCS of uplink signals ( kHz)** | **Te** | **Tq (Tc)** | **H = Te+Tq (Tc)** |
| 1 | 15 | 15 | 12\*64\*Tc | 5.5\*64 | 1120 |
| 30 | 10\*64\*Tc | 5.5\*64 | 992 |
| 60 | 10\*64\*Tc | 2.5\*64 | 800 |
| 30 | 15 | 8\*64\*Tc | 5.5\*64 | 864 |
| 30 | 8\*64\*Tc | 5.5\*64 | 864 |
| 60 | 7\*64\*Tc | 2.5\*64 | 608 |
| 2 | 120 | 60 | 3.5\*64\*Tc | 2.5\*64 | 384 |
| 120 | 3.5\*64\*Tc | 2.5\*64 | 384 |
| 240 | 60 | 3\*64\*Tc | 2.5\*64 | 352 |
| 120 | 3\*64\*Tc | 2.5\*64 | 352 |

* + Option 5 (Qualcomm [R4-2002062](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2002062.zip))
    - The threshold H should be 0.5\*CP
    - UE shall adjust its UL timing in one-shot if the value of the correction is less than the maximum value of TA command for that SCS.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Frequency Range** | **SCS of SSB signals ( kHz)** | **SCS of uplink signals ( kHz)** | **Te** | **H = 50%\*CP (Tc)** |
| 1 | 15 | 15 | 12\*64\*Tc | 4608 |
| 30 | 10\*64\*Tc | 2304 |
| 60 | 10\*64\*Tc | 1152 |
| 30 | 15 | 8\*64\*Tc | 4608 |
| 30 | 8\*64\*Tc | 2304 |
| 60 | 7\*64\*Tc | 1152 |
| 2 | 120 | 60 | 3.5\*64\*Tc | 1152 |
| 120 | 3.5\*64\*Tc | 576 |
| 240 | 60 | 3\*64\*Tc | 1152 |
| 120 | 3\*64\*Tc | 576 |

* + Option 6 (ZTE [R4-2001258](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001258.zip), [R4-2001265](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001265.zip)/6)
    - The threshold H to trigger one shot timing adjustment is 15% UL CP.
    - The threshold H is calculated as in Table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency Range** | **SCS of uplink signals (kHz)** | **H [Tc]** | **H (Tc)** |
| 1 | 15 | 20\*64\*Tc | 1280 |
| 30 | 10\*64\*Tc | 640 |
| 60 | 5.5\*64\*Tc | 352 |
| 2 | 60 | 5.5\*64\*Tc | 352 |
| 120 | 2.5\*64\*Tc | 160 |

* Recommended WF
  + Summary: Should we agree that H should be larger than 2\*Te considering the UE DL timing estimation error?
    - ≥ 2\*Te: Option 1, 3, 3a, 5
    - < 2\*Te: Option 2, 4, 6
  + If no agreement in this meeting, remove the single shot requirement

**Issue 6-2: Accuracy of timing after one shot timing adjustment**

* Proposals
  + Option 1 (Ericsson R4-2001843, R4-2001844/5, NEC [R4-2001](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001328.zip)009, Nokia [R4-2001328](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001328.zip), ZTE [R4-2001258](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001258.zip), [R4-2001265](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001265.zip)/6) : The transmission after the one-shot adjustment shall meet the existing timing error, Te, defined in Table 7.1.2-1
  + Option 2 (Mediatek [R4-2000458](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000458.zip)): No explicit accuracy requirement is specified for UL Tx transmit timing on non-serving beam, because it is already implicitly considered in the threshold H.
  + Option 3 (Qualcomm [R4-2002062](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2002062.zip)): The value of Te1 should be Te+5Ts in FR1 and Te+4Ts in FR2
* Recommended WF
  + Tentative agreement: The transmission after the one-shot adjustment shall meet the existing timing error, Te, defined in Table 7.1.2-1.

**Issue 6-3: Interruption requirements**

* Proposals
  + Option 1 (Ericsson R4-2001843, R4-2001844/5, Mediatek [R4-2000458](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000458.zip), Nokia [R4-2001328](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001328.zip), ZTE [R4-2001258](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001258.zip), [R4-2001265](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001265.zip)/6): No interruption requirement due to one-shot timing adjustment is specified.
* Recommended WF
  + Tentative agreement: No interruption requirement due to one-shot timing adjustment is specified.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE | Sub topic 6-1: We observed the same situation as in the last meeting. It was agreed in R4-1915947,   * Further discuss one shot timing adjustment in RAN4 #94. If requirements are not finalized in RAN4 #94 then remove one shot timing adjustment requirements from Rel-15.   To move forward we can compromise to   * H < 20% CP * No explicit uplink transmission accuracy requirements for one shot timing adjustment is specified.     In addition we are also fine to remove one shot timing adjustment requirements from Rel-15 if no consensus can be reached.  Sub topic 6-2:  Sub topic 6-3:  ….  Others: |
| MTK | First of all, we should follow the principle agreed in last meeting: if this feature cannot be finalized in RAN4#94-e meeting, then this feature should be removed from Rel-15  **Issue 6-1: Threshold for one shot timing adjustment requirements for FR2**  H < 2\*Te means that the sum of UL timing error from both beam pairs is larger than H. If this H value is agreed, this feature will not work at all, because UE behaviour becomes unstable and dominated by timing error.  **Issue 6-2: Accuracy of timing after one shot timing adjustment**  Both Option 2 and 3 are OK to us  **Issue 6-3: Interruption requirements**  One thing to clarify here. No requirements could still allow interruption. It is only the interruption duration and the staring time of the interruption is not defined. For this case, interruption is definitely needed if one-shot timing advance is larger than CP. We suggest to have no requirement because this interruption timing is never to be known by network. Therefore, network has no way to leverage this requirement to optimize OLLA or some others. |
|  |  |

### CRs/TPs comments collection

CRs included in the above sub topics are not listed here.

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [R4-2001570](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001570.zip) | MTK: OK |
| 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** |
|  |  |

## 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** |
|  |  |

# Topic #7: Beam management based on SSB and/or CSI-RS

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2000916](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000916.zip) | MediaTek inc. | 38.133 CR:  Add measurement restriction across CCs |
| R4-2000917 | MediaTek inc. | Cat A CR to [R4-2000916](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000916.zip) |
| [R4-2000918](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000918.zip) | MediaTek inc. | 38.133 CR  Add Lower bound for evaluation period of SSB based CBD. |
| R4-2000919 | MediaTek inc. | Cat A CR to [R4-2000918](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000918.zip) |
| [R4-2000920](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000920.zip) | MediaTek inc. | 38.133 CR  Add side condition that *QCL-Type D* should be provided in FR2 for CSI-RS resources in a resource set configured with higher layer parameter *repetition* set to ON. |
| R4-2000921 | MediaTek inc. | Cat A CR to [R4-2000920](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000920.zip) |
| [R4-2000922](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000922.zip) | MediaTek inc., Huawei, HiSilicon | 38.133 CR  Add clarification on TSMTCperiod for multiple FR2 CCs.  Add clarification on smtc1 and smtc2 for TSMTCperiod in candidate beam detection. |
| R4-2000923 | MediaTek inc., Huawei, HiSilicon | Cat A CR to [R4-2000922](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000922.zip) |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [R4-2000916](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000916.zip)  R4-2000917 | Company A |
| Company B |
|  |
| [R4-2000918](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000918.zip)  R4-2000919 | Company A |
| Company B |
|  |
| [R4-2000920](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000920.zip)  R4-2000921 | Company A |
| Company B |
|  |
| [R4-2000922](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000922.zip)  R4-2000923 | Company A |
| Company B |
|  |

## Summary for 1st round

### 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** |
|  |  |

## 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** |
|  |  |

# Topic #8: Requirements for NE-DC (Option 4) and NGEN-DC

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2001609](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001609.zip) | Huawei, HiSilicon | 36.133 CR  In section 8.19.4 of 36.133, intra-frequency RSTD measurement requirements are specified for NE-DC.  However, in NE-DC LPP message can only be transmitted from NR PCell, so LTE PSCell cannot configure RSTD measurement. Therefore, the corresponding requirements should be removed from 36.133.  Remove intra-frequency RSTD measurement requirements for NE-DC from 36.133. |
| R4-2001610 | Huawei, HiSilicon | Cat A CR to [R4-2001609](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001609.zip) |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [R4-2001609](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2001609.zip)  R4-2001610 | Company A |
| Company B |
|  |

## Summary for 1st round

### 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** |
|  |  |

## 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** |
|  |  |