**3GPP TSG-RAN WG4 Meeting # 97-e R4-2017271**

**Electronic Meeting, Nov. 2-13, 2020**

**Agenda item:** 4.7

**Source:** Moderator (Huawei, HiSilicon)

**Title:** Email discussion summary for [97e][201] NR\_NewRAT\_RRM\_Core

**Document for:** Information

# Introduction

This contribution provides the summary of Rel-15 NR RRM core maintenance in Agenda 4.7. It will be used to capture the comments in the 1st round and 2nd round. The tentative agreements will be provided based on the proposals and comments.

The topics include the maintenance for the following topics:

* RRM measurements: CSSFoutside\_gap, MO merging
* SCell activation: update the condition for TCI and multiple SSB configurations, SSB-less activation
* Beam management: CSI-RS bandwidth condition for BFD/CBD, sharing factor P for L1-RSRP measurement
* BWP switching: clarification of applicability of requirement related to PCell or SCell, or cross-carrier scheduling
* TCI switching: clarification of condition for case where NW configures both SSB and CSI-RS, TOk
* Others: frequency range for 8SSB configuration, E-CID, FSTD

# Topic #1: RRM measurement

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2014273](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014273.zip) | Apple | **On CSSF for R15 EN-DC**  Proposal 1: the NR inter-RAT MO on NR serving CC configured by LTE MN shall be captured into CSSF outside MG:   * NR Inter-RAT measurement object configured by the E-UTRAN PCell   + NR inter-RAT MO configured by LTE MN is on the NR serving CC with no measurement gap, when none of the SMTC occasions of this NR inter-RAT measurement object are overlapped by the measurement gap   + NR inter-RAT MO configured by LTE MN is on the NR serving CC with no measurement gap, when part of the SMTC occasions of this NR inter-RAT measurement object are overlapped by the measurement gap   Proposal 2: RAN4 CSSF outside MG design uses option 3, i.e., in EN-DC the CSSF without MG is determined by the number of MOs without MG configured from both LTE MN and NR SN, and if any two MOs from LTE MN and NR SN meet MO merging rule, they shall be counted as one single MO in MO number counting.  Proposal 3: the CSSF outside MG shall be updated as in this contribution.  Proposal 4: the NR inter-RAT MO configured by LTE MN shall be further divided into following types for CSSF inside MG,   * NR inter-RAT MO configured by LTE MN is on the NR serving CC with no measurement gap, when all of the SMTC occasions of this inter-RAT MO are overlapped by the MG * NR inter-RAT MO configured by LTE MN is on the NR serving CC with measurement gap * NR inter-RAT MO configured by LTE MN is on the NR non-serving CC   Proposal 5: RAN4 CSSF inside MG design uses option 3, i.e., Mtot,i,j = Mintra,i,j + Minter,i,j : Total number of intra-frequency, inter-frequency and inter-RAT measurement objects which are candidates to be measured in gap j where the measurement object i is also a candidate. If any two MOs from LTE MN and NR SN meet MO merging rule, they shall be counted as one single MO in MO number counting. Otherwise Mtot,i,j equals 0. |
| [R4-2015445](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015445.zip) | Huawei, HiSilicon | **Correction to CSSF calculation R15**   1. Take inter-RAT measurement on serving carrier into account in the calculation of CSSFoutside\_gap. 2. Clarify that in EN-DC inter-frequency measurement and inter-RAT measurement on the same frequencies are only count as one in CSSF\_within\_gap calculation if MO merging conditions are satisfied, as well as inter-frequency measurements configured by PCell and PSCell on the same frequency in NR-DC. |
| [R4-2015446](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015446.zip) | Huawei, HiSilicon | **Correction to CSSF calculation R16**  Cat A CR for R4-2015445 |
| [R4-2014274](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014274.zip) | Apple | **CR on CSSF for R15 EN-DC**  The CSSF requirement has been updated for EN-DC to consider the MOs configured from both LTE MN and NR SN in EN-DC. |
| [R4-2014765](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014765.zip) | MediaTek inc. | **CR on MO merge**  Clarify the layer shall be counted only once unless the configured NR frequency layers have different *SSB-ToMeasure* indications. |
| R4-2014766 | MediaTek inc. | **CR on MO merge**  Cat A CR for [R4-2014765](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014765.zip) |
| R4-2015210 | MediaTek inc. | CR on MO merge |

## Open issues summary

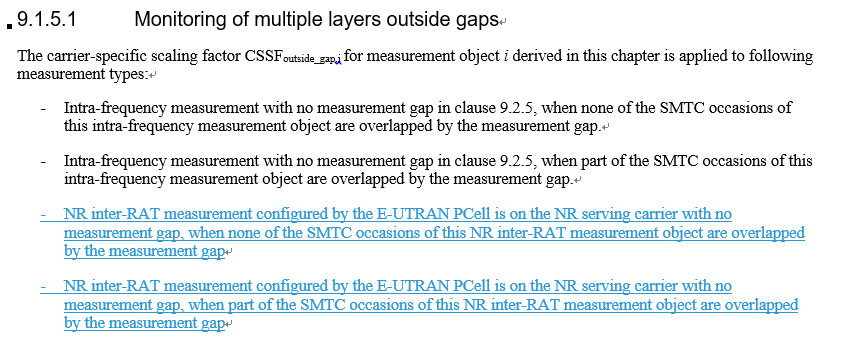
### Sub-topic 1-1 CSSF calcualtion for Inter-RAT measurement objective

In last RAN4 meeting, there was discussions on CSSF for EN-DC when the intra-frequency and inter-RAT measurements are configured on the same serving CC from both LTE MN and NR SN. Companies discussed this issue.

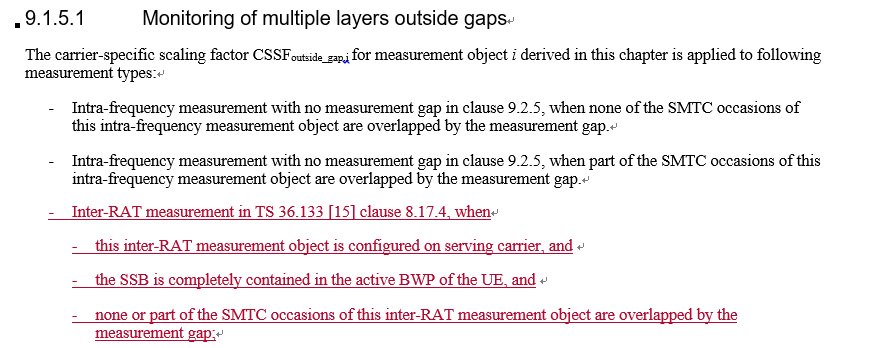
The related contributions include R4-2014273, R4-2014274, R4-2015445 and R4-2015446.

**Issue 1-1-1: How to capture inter-RAT MO on NR serving CC configured by LTE MN**

* Proposal: (Apple R4-2014273/R4-2014274, Huawei, HiSilicon R4-2015445/R4-2015446)
  + The NR inter-RAT MO on NR serving CC configured by LTE MN shall be calculated in CSSF outside MG
* Proposed changes:
  + Option 1 (Apple, R4-2014274)



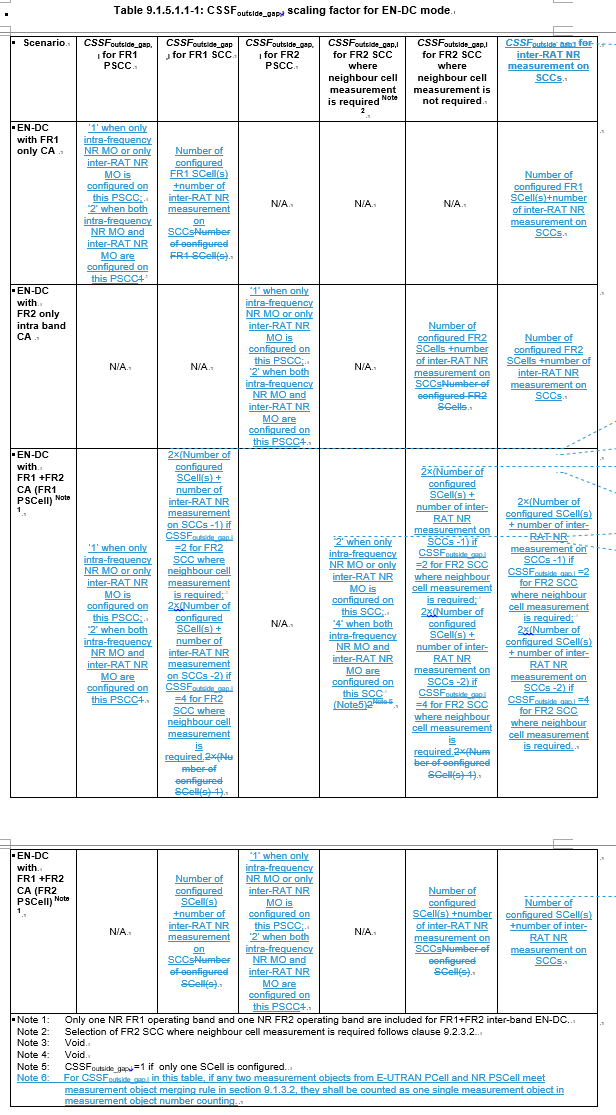
* + Option 2 (Huawei, HiSilicon, R4-2015446)



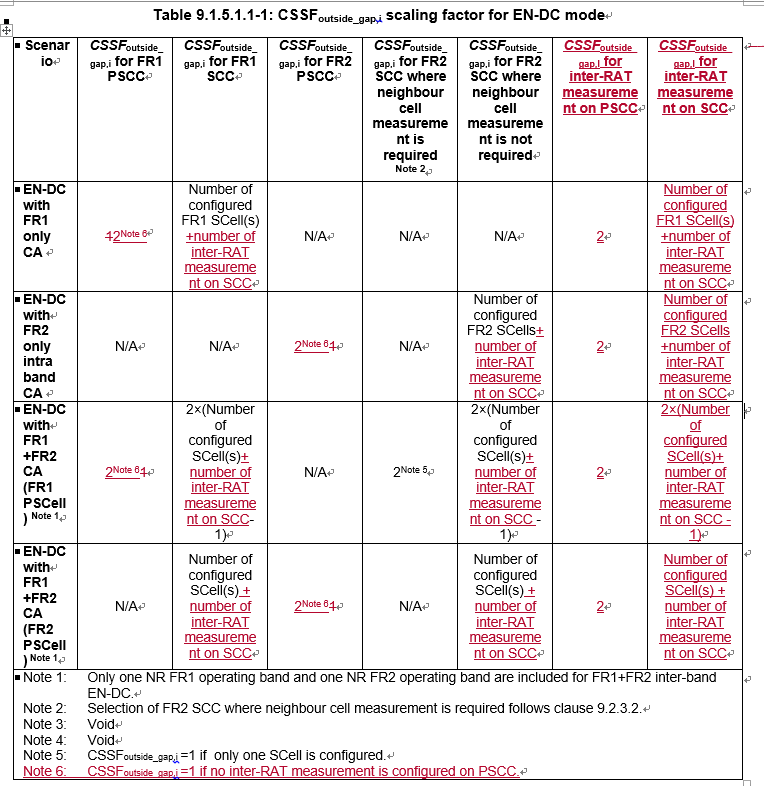
* Recommended WF
  + Can we agree that
    - The NR inter-RAT MO on NR serving CC configured by LTE MN shall be calculated in CSSF outside MG
  + Further discussion on how to capture the above tentative agreement in specification.

**Issue 1-1-2: How to count MO number configured from both LTE MN and NR SN**

* Proposal:
  + Option 1(Apple R4-2014273): RAN4 CSSF outside MG design uses option 3, i.e., in EN-DC the CSSF without MG is determined by the number of MOs without MG configured from both LTE MN and NR SN, and if any two MOs from LTE MN and NR SN meet MO merging rule, they shall be counted as one single MO in MO number counting.
  + Option 2(Mediatek R4-2014760): To simplify the CSSF definition, it shall always treat Inter-RAT measurement as SCC measurement in EN-DC.
* Proposed changes:
  + Option 1 (Apple, R4-2014274)



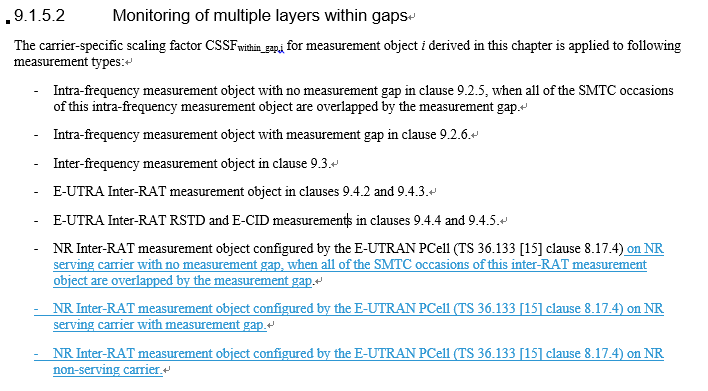
* + Option 2 (Huawei, HiSilicon, R4-2015446, Mediatek R4-2014760)

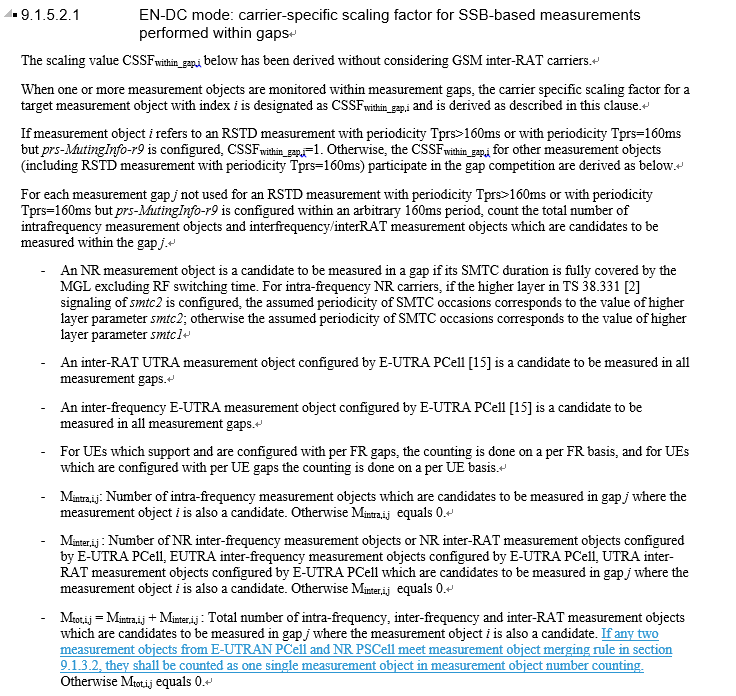


* Recommended WF
  + More discussion is needed

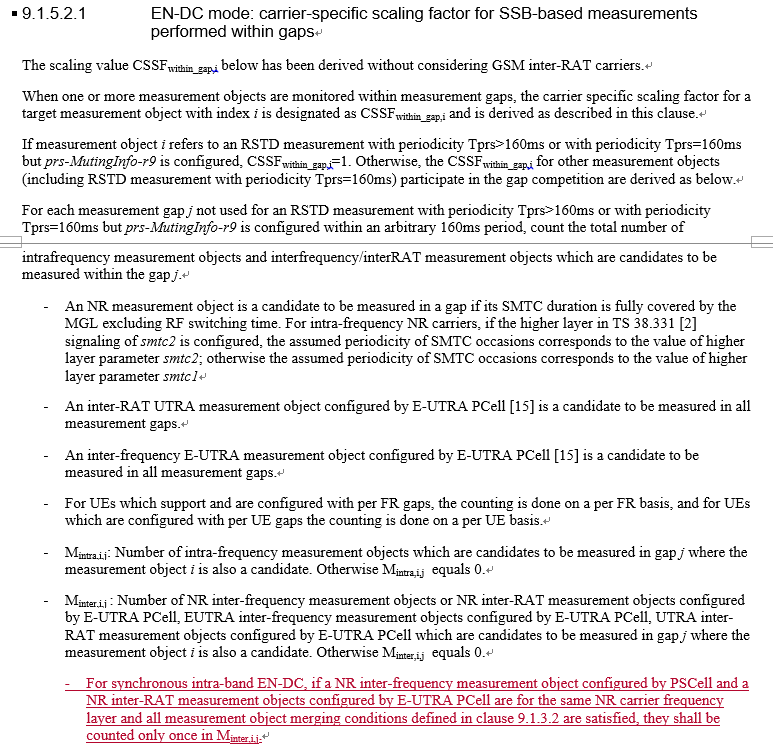
**Issue 1-1-3: Update requirement of monitoring of multiple layers within gaps**

* Proposal:
  + Option 1 (Huawei R4-2015445): Clarify that in EN-DC inter-frequency measurement and inter-RAT measurement on the same frequencies are only count as one in CSSF\_within\_gap calculation if MO merging conditions are satisfied, as well as inter-frequency measurements configured by PCell and PSCell on the same frequency in NR-DC.
  + Option 2 (Apple R4-2014274):
    - The NR inter-RAT MO configured by LTE MN shall be further divided into following types for CSSF inside MG,
      * NR inter-RAT MO configured by LTE MN is on the NR serving CC with no measurement gap, when all of the SMTC occasions of this inter-RAT MO are overlapped by the MG
      * NR inter-RAT MO configured by LTE MN is on the NR serving CC with measurement gap
      * NR inter-RAT MO configured by LTE MN is on the NR non-serving CC
    - RAN4 CSSF inside MG design uses option 3, i.e., Mtot,i,j = Mintra,i,j + Minter,i,j : Total number of intra-frequency, inter-frequency and inter-RAT measurement objects which are candidates to be measured in gap j where the measurement object i is also a candidate. If any two MOs from LTE MN and NR SN meet MO merging rule, they shall be counted as one single MO in MO number counting. Otherwise Mtot,i,j equals 0.
  + Option 3 (Mediatek R4-2014760): To simplify the CSSF definition, it shall always treat Inter-RAT measurement as SCC measurement in EN-DC.
* Proposed changes:
  + Option 1 (Apple, R4-2014274)





* + Option 2 (Huawei, HiSilicon, R4-2015446)

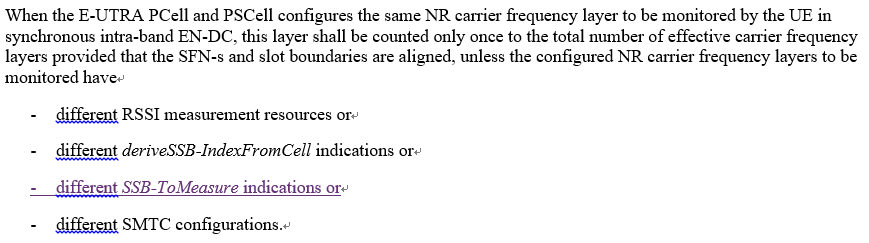


* Recommended WF
  + More discussion is needed

### Sub-topic 1-2 MO merging related to SSB-ToMeasure indications

**Issue 1-2: MO merging related to SSB-ToMeasure indications**

* Proposal: (Mediatek R4-2014765)
  + Clarify the layer shall be counted only once unless the configured NR frequency layers have different *SSB-ToMeasure* indications.



* Recommended WF
  + More discussion is needed

## Companies views’ collection for 1st round

### Comments for open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | **Issue 1-1-1: How to capture inter-RAT MO on NR serving CC configured by LTE MN**  Agree with that “The NR inter-RAT MO on NR serving CC configured by LTE MN shall be calculated in CSSF outside MG” .  Regarding the proposed change, both option 1 and 2 is fine to us since they have the same physical meaning. We used option 1 because it’s in the same format as the context.  **Issue 1-1-2: How to capture inter-RAT MO on NR serving CC configured by LTE MN**  We propose to consider MO merging rule when counting the number of MOs in CSSF. Agree with Option 1.  Comment to option 2: (1) we prefer to consider MO merging rule, (2) the inter-RAT MO on FR2 SCCs that has neighbor cell measurement shall be counted as 4 if both LTE and NR configured MOs on this SCC; and then other CSSF in the other columns shall be revised accordingly  **Issue 1-1-3: Update requirement of monitoring of multiple layers within gaps**  We prefer option 1 since it clarifies the inter-RAT measurement types. Regarding the MO counting, option 1 and option 2 are same since both of they propose to use MO merging rule to decide the number of CSSF.  **Issue 1-2: MO merging related to SSB-ToMeasure indications**  Agree with MTK proposal |
| MTK | Issue 1-1-1:  We agree that the NR inter-RAT MO on NR serving CC configured by LTE MN shall be calculated in CSSF outside MG.  Issue 1-1-2:  As discussed in our tdoc, RAN2 had already agreed that if MCG MO has the same *ssbFrequency* with SCG MO, NW shall ensure that these two MOs have   * the same *ssbSubcarrierSpacing* * the same *SS-RSSI-Measurement* * the measurement window according to the *smtc* configured in TS 36.331 [10] includes the measurement window according to the *smtc1* configured in TS 38.331   It implies NW can have good coordination between MN and SN. In other words, if NW configures inter-RAT measurement from MCG in EN-DC, NW may want to measure the NR frequency layer from MN for different purposes with the MO in SN.  To simplify the CSSF definition, it shall always treat Inter-RAT measurement as SCC measurement in EN-DC.  Issue 1-1-3:  The same as issue 1-1-2. We prefer option 3: Don’t change current spec.  Issue 1-2:  As discussed in our tdoc, when SSB-ToMeasure is different in two CGs, Klayer1\_measurement will be different due to collision with RLM-RS. Thus, two MOs can’t be merged together even other factors are the same.  At the same time, the P factor in RLM meas. shall be the largest P value deduced by two MOs. |
| Ericsson | **Issue 1-1-1: How to capture inter-RAT MO on NR serving CC configured by LTE MN**  Yes, we agree with the proposal; interRAT MO configured by LTE MN on NR serving frequencies and measured outside gap should be included in CSSF outside MG, this seems to be a bug in the current specification. However, we think they have not been excluded from CSSFwithin gap, and if this CR was agreed by itself they would be assumed to be measured both in gaps and outside gaps which is not correct.  **Issue 1-1-2: How to count MO number configured from both LTE MN and NR SN**  Our view is that the MO counting for CSSF purposes should be done consistently with the counting that is already agreed for measurement capabilities purposes. Which we understand to be option 1.  **Issue 1-1-3: Update requirement of monitoring of multiple layers within gaps**  Again we think the basic principle should be that if MO are merged as far as capabilities are concerned, they should be counted as 1 measurement for CSSF purposes as well (option 1 or option 2). So far we have not seen a big difference between option 1 or option 2, but as commented in issue 1-1-1 we have a concern that some MO might end up being double counted in both CSSFoutside\_gap and CSSFwithin\_gap, so CRs for issue 1-1-1 and 1-1-3 really need to be considered jointly.  **Issue 1-2: MO merging related to SSB-ToMeasure indications**  We do not see any reason that MO merging can’t be done even if SSB-toMeasure is different. From a physical layer point of view we know the UE can cope even if SSB-toMeasure isn’t signalled and the UE has to be willing to measure at possible single time index, so in case different SSB to measure are indicated, it should just be a case of a logical OR on the bitmasks to get the SSB that the physical layer needs to measure, then providing the results to the appropriate UE RRC entity for event evaluation. |
| Nokia | Sub-topic 1-1 CSSF calcualtion for Inter-RAT measurement objective  **Issue 1-1-1: How to capture inter-RAT MO on NR serving CC configured by LTE MN**  This needs further discussion. As discussed in last meeting and based on the detailed description in R4-2014273 it is our understanding is that the inter-RAT MO is already captured as the inter-RAT MO is ‘a serving cell’. It is therefore measured accordingly, and no additional measurements would be needed.  **Issue 1-1-2: How to count MO number configured from both LTE MN and NR SN**  This would need further discussion. Based on the description in R4-2014273 our understanding is that this may not be needed or at least not always. The copied text box relates to counting of carriers concerning the UE capability related to the number of carriers the UE at least shall be able to measure/monitor. CSSF is about how to share the measurement resources among configured carriers. Maybe this needs a bit more clarification.  For example, If the UE can measure the configured measurement resources within same SMTC why additional scaling is needed?  As for SMTC: This is good question but if e.g. the UE has already measured NR serving cell/carrier (which has SMTC = 20ms) why would the UE need additional measurement effort to measure same cell/carrier with e.g. SMTC = 80ms? This would just mean that the LTE requirements are relaxed compared to the NR requirements, but measurements performed once and would be the same – and UE can always perform better.  **Issue 1-1-3: Update requirement of monitoring of multiple layers within gaps**  It is needs to be clear which problem is addressed. Based on the listed cases in R4-2014273 it is not clear to us which scenarios they address and hence it is difficult to evaluate whether any clarifications are needed or not.  Based on above this would need more discussion to understand what problem actually needs to be addressed. |
| Huawei | **Issue 1-1-1: How to capture inter-RAT MO on NR serving CC configured by LTE MN**  Agree that “The NR inter-RAT MO on NR serving CC configured by LTE MN shall be calculated in CSSF outside MG”.  To Ericsson: for CSSF within gap, there seem to be different understandings of the current spec regarding whether MO merging is considered or not, so some clarification is needed.  To Nokia: At least for the case when MO configured by MN cannot be merged with MO configured by SN, UE needs to take separate measurement even they are for the same SSB frequency.  **Issue 1-1-2: How to capture inter-RAT MO on NR serving CC configured by LTE MN**  We are ok with either option but slightly prefer option 2 since it is a quite late change. Also MO merging referred by option 1 is designed for non-serving carrier, while here the discussion is about serving carrier.  **Issue 1-1-3: Update requirement of monitoring of multiple layers within gaps**  We are ok with option 1, which is technically same as option 2 but with more clarifications.  **Issue 1-2: MO merging related to SSB-ToMeasure indications**  No strong view on MO merging condition, but agree with MTK observation that there is ambiguity on Klayer1. |
| ZTE | **Issue 1-1-1: How to capture inter-RAT MO on NR serving CC configured by LTE MN**  Even for the intra-frequency measurement configured by NR PSCell, it may be conducted inside MG depending on the relationship of SSB and active BWP. It is not clear to us if it is feasible that the measurement can always be conducted outside MG.  **Issue 1-1-2: How to count MO number configured from both LTE MN and NR SN**  Option 1 seems straightforward. However the Note 6 should be clearer. In addition Note 6 should also consider the case that NR inter-RAT measurement on NR serving CC may be conducted inside MG.  **Issue 1-1-3: Update requirement of monitoring of multiple layers within gaps**  Option 1 is straightforward.  **Issue 1-2: MO merging related to SSB-ToMeasure indications**  We share similar view as Ericsson. It would be easy for UE to merge the MOs with different SSB-ToMeasure indication. |

## Summary for 1st round

### Summary of open issues

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| --- | --- |
|  | **Status summary** |
| **Sub-topic #1-1-1** | **Issue 1-1-1: How to capture inter-RAT MO on NR serving CC configured by LTE MN**  6 companies made comments. 4 company supported the proposal. 2 companies had concerns. Besides, Ericsson thought inter-RAT MO is not excluded from CSSFwithin\_gap. So more clarification and the revision are needed for CR.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Can we agree on the proposal that the NR inter-RAT MO on NR serving CC configured by LTE MN shall be calculated in CSSF outside MG?   + Yes (Apple, MTK, Ericsson, Huawei)   + No (Nokia, ZTE) * If the above can be agreed, then more discussion is needed to address Ericsson’s comment and CR needs be revised.   ***Recommendations for 2nd round:***  Suggest to have more discussion on the above two issues. |
| **Sub-topic #1-1-2** | **Issue 1-1-2: How to count MO number configured from both LTE MN and NR SN**  6 companies made comments. 3 supported Option 1. 2 supported Option 2 (1 company is also OK with Option 2). 1 company questioned whether to need address the issue.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Option 1: RAN4 CSSF outside MG design uses option 3, i.e., in EN-DC the CSSF without MG is determined by the number of MOs without MG configured from both LTE MN and NR SN, and if any two MOs from LTE MN and NR SN meet MO merging rule, they shall be counted as one single MO in MO number counting. (Apple, Ericsson, Huawei, ZTE) * Option 2: To simplify the CSSF definition, it shall always treat Inter-RAT measurement as SCC measurement in EN-DC. (MTK, Huawei) * Option 3: The issue needs not be addressed. (Nokia)   ***Recommendations for 2nd round:***  Firstly the issue needs be clarified. Secondly, it is suggest to have more discussion on the above options. If the solution was agreeable, the CR needs be revised. |
| **Sub-topic #1-1-3** | **Issue 1-1-3: Update requirement of monitoring of multiple layers within gaps**  6 companies made comments. Most companies are OK with both Option 1 and Option 2. More companies prefer Option 1. 1 company proposed Option 3. 1 company expressed that the problem itself is unclear.  Besides, like Issue 1-1-1 Ericsson commented that the potential issue to double counting the same MO in CSSFoutside\_gap and CSSFwithin\_gap needs be addressed when CR is revised.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Option 1: (Apple, Ericsson, Huawei, ZTE)   Clarify that in EN-DC inter-frequency measurement and inter-RAT measurement on the same frequencies are only count as one in CSSF\_within\_gap calculation if MO merging conditions are satisfied, as well as inter-frequency measurements configured by PCell and PSCell on the same frequency in NR-DC.   * Option 2: (Apple, Ericsson)   + The NR inter-RAT MO configured by LTE MN shall be further divided into following types for CSSF inside MG,     - * NR inter-RAT MO configured by LTE MN is on the NR serving CC with no measurement gap, when all of the SMTC occasions of this inter-RAT MO are overlapped by the MG       * NR inter-RAT MO configured by LTE MN is on the NR serving CC with measurement gap       * NR inter-RAT MO configured by LTE MN is on the NR non-serving CC   + RAN4 CSSF inside MG design uses option 3, i.e., Mtot,i,j = Mintra,i,j + Minter,i,j : Total number of intra-frequency, inter-frequency and inter-RAT measurement objects which are candidates to be measured in gap j where the measurement object i is also a candidate. If any two MOs from LTE MN and NR SN meet MO merging rule, they shall be counted as one single MO in MO number counting. Otherwise Mtot,i,j equals 0. * Option 3: (MTK)   To simplify the CSSF definition, it shall always treat Inter-RAT measurement as SCC measurement in EN-DC.   * Option 4: (Nokia)   The problem needs be clear before being addressed.  ***Recommendations for 2nd round:***  Firstly the issue needs be clarified. Secondly, it is suggested to have more discussion on the above options. If the solution was agreeable, the CR needs be revised. |
| **Sub-topic #1-2** | **Issue 1-2: MO merging related to SSB-ToMeasure indications**  5 companies made comments. 3 companies supported the proposal. 2 companies opposed it.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Can we clarify that the layer shall be counted only once unless the configured NR frequency layers have different *SSB-ToMeasure* indications?   + Yes (MTK, Apple, Huawei)   + No (Ericsson, ZTE)   ***Recommendations for 2nd round:***  Firstly the group need reach a consensus whether the MO merging can be done if *SSB-ToMeasure* indications are different, and then decide if the CR is agreeable. |

*Recommendations on WF/LS assignment*

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

### CRs/TPs Status

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| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2015445 | Revised (need revision number). |
| R4-2015446 | Return to. |
| R4-2014274 | Merged (into revised R4-2015445) |
| R4-2014765 | Return to |
| R4-2015210 | Return to. |

## Discussion on 2nd round (if applicable)

In the second round the CRs R4-2015445/R4-2015446, and CRs R4-2014765/ R4-2015210 need further discussion.

* Please Huawei trigger the email discussion for sub-topic #1-1, and if the agreements were reached, to revise R4-2015445/R4-2015446.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-CSSF calculation
* Please Mediatek trigger the email discussion for R4-2014765/ R4-2015210.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-MO merging

[Comments and responses will be captured by moderator here]

|  |  |
| --- | --- |
| **Sub-topic** | **Comments and responses** |
| Sub-topic #1-1-1  [97e][201] NR\_NewRAT\_RRM\_Core-CSSF calculation | Tdoc: R4-2015445, R4-2015446  **Huawei:**  To Nokia:  We agree that in some cases UE does not need to take additional measurement for the inter-RAT MO, but this is not always the case. E.g. in case of async EN-DC, or the case where the intra-f MO and inter-RAT MO have different configuration (the details can be further discuss under issue 1-1-2), UE needs to take additional measurement which should be accounted in CSSF.  To ZTE  We agree that inter-RAT MO configured by PSCell may be measured without MG or within MG, depending on the relationship of SSB and active BWP, and also overlapping between SMTC and MG. This should be same as intra-f MO configured by NR PSCell. Therefore, for this issue 1-1-1 we are only considering the inter-RAT MO that can be measured outside MG, while inter-RAT MO to be measured within MG will be discussed in issue 1-1-3. Hope this clarified a bit.  To Ericsson  We agree this needs to be addressed. In option 2 of issue 1-1-3 there is a clarification to clause 9.1.5.2 (CSSF within MG) such that only inter-RAT MOs that are to be measured with MG are counted in CSSF within MG. Does this clarification solve your concern?  **Ericsson:**  To Huawei: Yes that was exactly my concern. Whatever we do, we need to ensure that outside\_gap and within\_gap counting are consistent and that no MO falls within both definitions. So then we need to address these options as a package.  **Mediatek:**  If we consider both counting NR inter-RAT MO on NR serving CC configured by LTE MN in CSSF outside MG and removed from CSSF within MG, our proposal is to keep current spec. unchanged. We have concerns on the optimization about the current meas. requirement if we remove the inter-RAT MOs which had been captured in within gap.  **Nokia:**  As mentioned during the GTW we can agree to ‘that the NR inter-RAT MO on NR serving CC configured by LTE MN shall be calculated in CSSF outside MG’. To us this wold address the issue that RAN4 missed considering NR inter-RAT measurements on a serving NR carrier.  How to address the CSSF and scaling then need to be discussed separately. Our general view here is that when UE is performing measurements on UE side on the same carrier, this carrier is only counted once. This principle has been applied so far.  **Huawei:**  Thanks for all the discussions.  Based on the GTW discussion, please find the draft WF which captures the open issues and possible options discussed during this meeting. The CRs should be postponed since there was no conclusion, and we can further discuss based on the WF next meeting.  [R4-2017331 WF on CSSF calculation for Inter-RAT MO.pptx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/R4-2017331%20WF%20on%20CSSF%20calculation%20for%20Inter-RAT%20MO.pptx)  Your comments on the WF are welcomed. |
| Sub-topic #1-1-2  [97e][201] NR\_NewRAT\_RRM\_Core-CSSF calculation | Tdoc: R4-2015445, R4-2015446  **Huawei:**  The issue is for calculation of CSSF outside MG, whether to consider merging of intra-f MO configured by NR PSCell and inter-RAT MO configured under certain conditions (e.g. MO merging conditions in section 9.1.3.2) or not.  We are fine with either of option 1 or option 2. In case of option 1, we are also fine to use the MO merging conditions in section 9.1.3.2  To Apple,  Regarding your 2nd comments in the 1st round, we can discuss the detailed design of the CSSF table later when working on the CR.  **Ericsson:**  Prefer option 1. Deciding on MO merging was a long and complicated discussion for UE measurement capabilities. Having concluded that discussion for capabilities purposes it would be very strange to say that something counts as 1 MO as far as whether the UE is capable to measure it, but then it counts as 2 separate measurements as far as delay.  **Apple:**  We prefer option 1 here, since we already had MO merging rule defined in capability requirement, we think it’s better to keep the CSSF design consistent with capability requirement, i.e., following the MO merging rule to count the MO number for CSSF scaling factor design. Since in R15 UE already supported doing such merging and comparison between configured Mos on the same frequency layer, we don’t think there is any additional complexity to the UE implementation.  **Nokia:**  As far as I can read from the options our position is the same as option 1. Hence, if the carrier measured is one and same physical carrier, it should only count once. |
| Sub-topic #1-1-3  [97e][201] NR\_NewRAT\_RRM\_Core-CSSF calculation | Tdoc: R4-2015445, R4-2015446  **Huawei:**  The issue is for calculation of CSSF within MG, whether to consider merging of two MOs from MN and SN configured on the same frequency under certain conditions (e.g. MO merging conditions in section 9.1.3.2) or not.  We can support option 2, which is more complete and accurate than option 1 with the clarification on the types of inter-RAT MOs to be measured within gap. It is noted that option 1 and option 2 are same on whether MO merging is considered or not.  **Ericsson:**  We agree with Huawei that option 2 is the more complete solution, and is our preference too. In the first bullet it might be a useful clarification to say something like  For UE which support the capability of interRAT measurements of NR without gaps, NR inter-RAT MO configured by LTE MN is on the NR serving CC with no measurement gap, when all of the SMTC occasions of this inter-RAT MO are overlapped by the MG  This isn't strictly necessary but it took me some time to figure out how the option really works and mentioning UE capabilities in the first bullet might help give the hint this line is only for specially capable UEs (as mentioned at the start of 36.133 section 8.17.4A.1).  One other comment, if I remember correctly, this capability is a TEI16 enhancement from RAN2 so we anyway don't capture the first bullet  from option 2 case in an R15 CR (but I agree we will need to cover it when it comes to the R16 CSSFinsideMG).  **Apple:**  We support option 2. We agree with Ericsson’s observation, and we are wondering if LTE MN can assume an inter-RAT MO without MG since MN knows that MO is exactly on a NR serving CC without any explicit capability indication. If the inter-RAT measurement on serving CC could be a MO without MG regardless of UE capability, then we don’t need this clarification; otherwise like Ericsson said we need to include such clarification and consider which release to include the first bullet.  **Huawei:**  We do not think the highlighted sentence is needed. As Ericsson also commented, in Rel-15 there is no signalling to indicate UE capability to perform inter-RAT measurement without gap. If we add this sentence, then by default all inter-RAT measurement should be gap based, which is unnecessary. In our view, whether the inter-RAT MO on a serving cell carrier is measured with or without gap should be determined in the same way as intra-frequency MO configured by NR PSCell, which is reflected by the 3 sub-bullets under option 2. It is also noted that in 36.133, the following is specified, and it is not dependent on UE capability to perform inter-RAT measurement without gap.  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.  To Ericsson:  Please find a further comment from Huawei2 below in the table on Issue 1-1-3 regarding the suggested addition (as marked in yellow) from Ericsson.  For UE which support the capability of interRAT measurements of NR without gaps, NR inter-RAT MO configured by LTE MN is on the NR serving CC with no measurement gap, when all of the SMTC occasions of this inter-RAT MO are overlapped by the MG  **Ericsson:**  Thanks for your further comment; OK then I am fine not to add the highlighted clarification that I proposed, and I agree that the first case can happen even in R15 i.e. "·   NR inter-RAT MO configured by LTE MN is on the NR serving CC with no measurement gap, when all of the SMTC occasions of this inter-RAT MO are overlapped by the MG"  **Mediatek:**  If we remove the inter-RAT MO configured by LTE MN on the NR serving CC non-ovelapping/partially overlapping with MG from within gap to outside gap, it will tight the requirement for within gap. R15 UE had already implemented by current spec. design. We have concerns on this optimization in R15.  Our proposal is to either keep current spec. unchanged or only extend the requirement for outside MG.  **Nokia:**  Reading the options our impression is that option 2 is our preference. Meaning we can work using option 2 as baseline. Our baseline understanding is that for the inter-RAT NR MO on a serving carrier would be counted as current NR carriers are counted accounting the allocation of the SMTC and whether they are overlapping or not with gaps. For inter-RAT NR MO on non-serving carrier would be accounted as NE inter-frequency and with same rules. |
| Sub-topic #1-2  [97e][201] NR\_NewRAT\_RRM\_Core-MO merging | Tdoc: R4-2014765, R4-2015210  **Mediatek:**  Thank you for Ericsson and ZTE’s comments.  If we believe UE will always merge the SSB to measure once these MOs can be merged.  An alternative proposal is to clarify the Klayer1\_measurement shall consider the SSB indices indicated by the union of SSB-ToMeasure from all MOs which can be merged.  **Ericsson:**  Thanks for the further comment. Yes, since the UE should measure the union of both sets, it seems reasonable that Klayer1\_measurement also considers this (better technical solution than assuming they are measured in different SMTCs).  **Apple:**  We can also compromise to this approach of union of two SS-to-measure set, and it’s not necessary to differentiate two MOs with only different SSB-to-measure on a synchronized frequency layer.  **Mediatek:**  Since there is no further comments, can we just to agree the proposal:  The Klayer1\_measurement shall be deduced by the SSB indices indicated by the union of *SSB-ToMeasure* from all MOs which can be merged.  I uploaded the CR to update the wording for measurement part only. I think we may still need to update other related parts, such as RLM, L1-RSRP to align the definition together.  <https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/%5BDraft%5D%20R4-2014765%20CR%20on%20MO%20merge%20-R15.docx>  **Nokia：**  Just for my clarification:  The union of SSBs below refer to the combined set of indicated SSB’s from the configured MO’s merged?  If this is the case we’re fine with the proposal.  **Mediatek:**  Thank you for supporting this alternative proposal.  You’re right. The union of SSBs refer to the combined set from merged MOs.  If possible, you can also check the wording in our CR. J  **Mediatek:**  The formal version R4-2017336 has been uploaded to the inbox:  <https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/R4-2017336.zip> |

## Summary on 2nd round (if applicable)

*GTW session (November 11, 2020)*

**Issue 1-1-1: How to capture inter-RAT MO on NR serving CC configured by LTE MN**

* Can we agree on the proposal that the NR inter-RAT MO on NR serving CC configured by LTE MN shall be calculated in CSSF outside MG?
  + Yes (Apple, MTK, Ericsson, Huawei)
  + No (Nokia, ZTE)
  + Chair: continue discussion

An additional way forward was allocated in 2nd after GTW session.

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| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| R4-2017331 | WF on CSSF calculation for Inter-RAT MO | Huawei, HiSilicon |

*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** |
| R4-2017331 | Agreed (WF) |
| R4-2015445 | Noted |
| R4-2017034 | Withdrawn (Revised Tdoc number for R4-2015445) |
| R4-2015446 | Withdrawn (Cat A CR for R4-2015445) |
| R4-2017336 | Agreed (Revised from R4-2014765) |
| R4-2014766 | Agreed (Cat A CR for R4-2017366) |
| R4-2015210 | Withdrawn |

# Topic #2: Scell activation

## Companies’ contributions summary

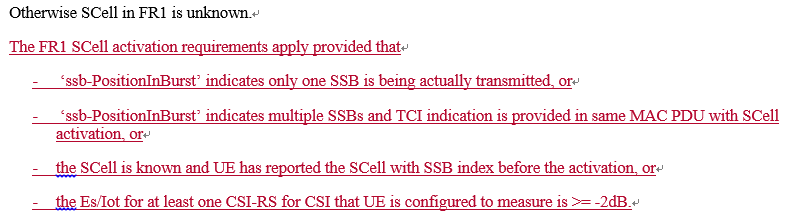
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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015735 | Huawei, HiSilicon | **Discussion on remaining issues in Rel-15 SCell activation requirements**  Proposal 1: The current FR1 SCell activation requirements apply provided that   * ‘*ssb-PositionInBurst*’ indicates only one SSB is being actually transmitted, or * ‘*ssb-PositionInBurst*’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation, or * the SCell is known and UE has reported the SCell with SSB index before the activation, or * the Es/Iot for at least one CSI-RS for CSI that UE is configured to measure is >= -2dB.   Proposal 2: The current SCell activation requirements apply provided that the SSB of the to-be-activated SCell is within the first active DL BWP of the SCell. |
| R4-2014760 | MediaTek inc. | **Remaining issues on RRM in R15**  Observation 1: For Scell, the only use case for RRC signalling *firstActiveDownlinkBWP-Id* is SCell addition.  Proposal 1: When ‘*ssb-PositionInBurst*’ indicates multiple SSBs but no TCI indication is provided in the same MAC PDU, there are two options:   * Option 1: Introducing in FR1 unknown SCell activation; * Option 2: RAN4 clarifies there is no requirement for this scenario.   Proposal 2: There is no such a procedure of RRC-based BWP switch for SCell. RAN4 to clarify that RRC-based BWP switch requirement is only applied to PCell/PSCell.  Proposal 3: Define L1-RSRP delay requirement as max(TL1-RSPR\_Measurement\_Period\_SSB, TL1-RSRP\_Measurement\_Period\_CSI-RS) when both SSB and CSI-RS are configured for L1-RSRP measurement.  Proposal 4: Delete TOk in active TCI list update requirement.  Proposal 5: Two MOs with different SSB-ToMeasure configuration shall be counted as two layers.  Proposal 6: To simplify the CSSF definition, it shall always treat Inter-RAT measurement as SCC measurement in EN-DC. |
| R4-2015736 | Huawei, HiSilicon | **CR on SCell activation requirements R15**  Clarify the applicability of the current SCell activation requirements. |
| R4-2015737 | Huawei, HiSilicon | **CR on SCell activation requirements R16**  Cat A CR for R4-2015736. |
| R4-2016580 | Qualcomm Incorporated | **CR to TCI activation in FR1**  Clarified the unknown FR1 SCell activation requirement is not applied when *ssb-PositionInBurst* indicates multiple SSBs but no TCI indication is provided in the same MAC PDU with SCell activation for the unknown cell. |
| R4-2015306 | NEC | **CR to TS 38.133 on clarification of applicability of SCell activation requirements for  unknown FR1 cell**  Since this is maintenance part, modifying requirements should be avoided. Hence added clarification for applicability of existing SCell activation requirements for FR1 unknown cell |
| [R4-2016581](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016581.zip) | Qualcomm Incorporated | **CR to SSB-less SCell activation delay requirement for deactivated FR1 SCell**  Added an SSB-less SCell activation delay requirement for deactivated FR1 SCell and included QCL relations between refernce signals across cells in the same FR1 band in accordance with allowed QCL relations specified by the current spec. |
| [R4-2015570](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip) | ZTE | **CR to 38.133 correction to SCell activation delay requirements**  Added requirements for SCell activation without SSB in FR1 intra-band CA . |
| R4-2015571 | ZTE | CR to 38.133 correction to SCell activation delay requirements  Cat A CR for [R4-2015570](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip) |

## Open issues summary

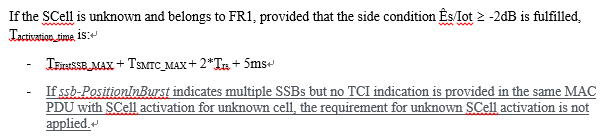
### Sub-topic 2-1 Requirement applicability for Scell activation

**Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**

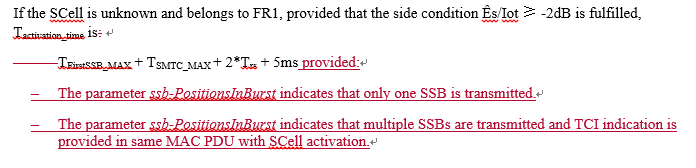
* Proposals:
  + Option 1 (Huawei R4-2015735): The current FR1 SCell activation requirements apply provided that
    - ‘*ssb-PositionInBurst*’ indicates only one SSB is being actually transmitted, or
    - ‘*ssb-PositionInBurst*’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation, or
    - the SCell is known and UE has reported the SCell with SSB index before the activation, or
    - the Es/Iot for at least one CSI-RS for CSI that UE is configured to measure is >= -2dB.
  + Option 2 (Mediatek R4-2014760): When ‘ssb-PositionInBurst’ indicates multiple SSBs but no TCI indication is provided in the same MAC PDU, Introducing T\_(uncertainty,MAC,FR1) in FR1 unknown SCell activation;
  + Option 3 (Qualcomm R4-2016580, Mediatek R4-2014760, NEC R4-2015306):
    - Clarified the unknown FR1 SCell activation requirement is not applied when ssb-PositionInBurst indicates multiple SSBs but no TCI indication is provided in the same MAC PDU with SCell activation for the unknown cell.
* Proposed changes
  + Option 1 (Huawei R4-2015736/R4-2015737):



* + Option 2 (Mediatek R4-2014760): N/A
  + Option 3 (Qualcomm R4-2016580):



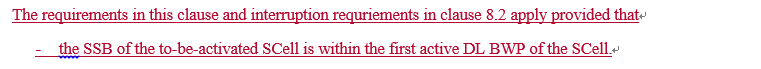
* + Option 4 (NEC R4-2015306)



* Recommended WF
  + In principle, it seems that companies are OK to clarify that the requirement is applied on the condition that ‘*ssb-PositionInBurst*’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation, or to clarify that if *ssb-PositionInBurst* indicates multiple SSBs but no TCI indication is provided in the same MAC PDU with SCell activation for unknown cell, the requirement for unknown SCell activation is not applied.
  + More discussion on how to make changes

**Issue 2-1-2: Applicability related to first active BWP**

* Proposals (Huawei R4-2015735/R4-2015736):
  + The current SCell activation requirements apply provided that the SSB of the to-be-activated SCell is within the first active DL BWP of the SCell.
* Proposed changes (Huawei R4-2015736):



* Recommended WF
  + More discussion is needed.

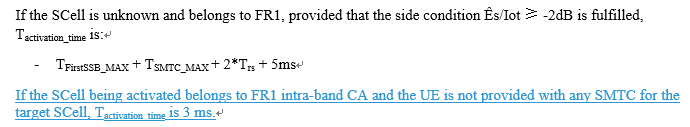
### Sub-topic 2-2 SSB-less SCell activation delay requirement

**Issue 2-2: SSB-less SCell activation delay requirement**

* Proposal (Qualcomm R4-2016581, ZTE [R4-2015570](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip)/[R4-201557](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip)1)
  + Add an SSB-less SCell activation delay requirement for deactivated FR1 SCell and included QCL relations between refernce signals across cells in the same FR1 band in accordance with allowed QCL relations specified by the current spec.
* Proposed changes:
  + Option 1 (Qualcomm R4-2016581)



* + Option 2 (ZTE [R4-2015570](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip)/[R4-201557](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip)1)



* Recommended WF
  + More discussion is needed

## Companies views’ collection for 1st round

### Comments for open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | **Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**  We agree with option 1 if companies would like to define requirement for all the possible scenarios, otherwise we are also fine with option 3 or 4 which mean we preclude those scenarios from requirement.  **Issue 2-1-2: Applicability related to first active BWP**  We support Huawei’s proposal.  **Issue 2-2: SSB-less SCell activation delay requirement**  We have concerns from both feature timeline perspective and technical perspective. Regarding the R15 timeline, we think it’s too late to introduce a new individual kind of requirement for Scell activation; the similar example is PUCCH SCell activation requirement is about to discussed in R17; so we think this SSB less SCell activation could be discussed from at least R16. Regarding the technical part, we have concern for intra-band non-contiguous case with 3us MRTD and the SCS of PCC/SCC is 30kHz, and after adding this SCell without SSB, UE may need to perform CSI-RS based SCell measurement up to its capability but the CSI-RS L3 RSRP/RSRQ measurement is introduced in R16 for RAN4, so we think it’s better to define this requirement after we have requirement for SCell CSI-RS L3 measurement. |
| MTK | 2-1-1:  We support Option 3 in R15. And Option 2 in R16.  When ‘ssb-PositionInBurst’ indicates multiple SSBs but no TCI indication is provided in the same MAC PDU, UE doesn’t know how to deduce timing information for this SCell.  An optional solution is to introduce the to wait the TCI info. as FR2 SCell, but considering it’s hard to update the spec. in current stage. We can claim no requirement for this scenario in R15.  At the same time, since this unknown FR1 Scell activation is a rarely case in current real field, we suggest that RAN4 doesn’t need to spend too much time on this paper issue.  2-1-2:  We support HW’s proposal.  In current stage, it’s too late for RAN4 to spend time to discuss this new scenario in R15. We can discuss this scenario in later release.  2-2:  We don’t support to introduce new scenario in R15.  In current stage, it’s too late for RAN4 to spend time to discuss this new scenario in R15. We can discuss this scenario in later release. |
| Ericsson | **Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**  Given that this is FR1 where omni-directional antennas are assumed, we think it might be a bit too strict to assume that TCI state indication has to come with the same MAC PDU as the SCell activation command. In FR2 it is different, since UE has to know which spatial transmission filter to use already at the early stages of the activation procedure. For FR1, it should be enough to receive the TCI state indication before CSI-RS or PUCCH (depending on scenario).  **Issue 2-1-2: Applicability related to first active BWP**  The need for this is a little unclear. Why would UE receive over other subband than where the SSBs and/or CSI-RS are before it is ready to receive on PDCCH?  **Issue 2-2: SSB-less SCell activation delay requirement**  Our preference is Option 1 as it is consistent with how the same condition is described for SCell in FR2. |
| NEC | Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI  We are fine with Ericsson suggestion also. Which is option 5.  Option 5: If the SCell is unknown and belongs to FR1, Tactivation\_time is TFirstSSB\_MAX + TSMTC\_MAX + 2\*Trs + 5ms provided the TCI indication is received at UE before CSI-RS reception and the side condition Ês/Iot ≥ -2dB is fulfilled.  Issue 2-1-2: Applicability related to first active BWP  We are ok with proposal  Issue 2-2: SSB-less SCell activation delay requirement  We are prefer option 1 |
| Nokia | **Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**  Recommended WF is acceptable but it need to clarified, which of the two options. We prefer to define when they requirements apply.  **Issue 2-2: SSB-less SCell activation delay requirement**  Need more discussion. Baseline proposals looks acceptable; however we would prefer clear definition. |
| CMCC | **Issue 2-2: SSB-less SCell activation delay requirement** |
|  | We support to specify the SSB-less SCell activation delay requirement for FR1. Currently, the requirements for SCell activation without SSB are only specified for FR2, we do not see the reason not to specify the corresponding requirements for FR1. |
| Huawei | **Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**  Fine with the recommended WF. In addition, we think at least the last scenario in option 1 should be considered the scenario where the current requirements apply. There seems to be no technical issue raised by companies.  Regarding the new option suggested by Ericsson and NEC, is it correct understanding that UE is assumed to receive TCI within Tactivation\_time?  **Issue 2-1-2: Applicability related to first active BWP**  We support the proposal.  To Ericsson, CSI-RS and SSB may not be transmitted on the same BWP, and in particular CSI-RS measurement is on per BWP basis. UE may try to receive CSI-RS on the first active BWP, and thus needs RF retuning to receive SSB if SSB is not contained the first active BWP. Similarly, if UE stays on the BWP with SSB, it will need to re-tune to the first active BWP to receive CSI-RS.  **Issue 2-2: SSB-less SCell activation delay requirement**  This may need to be further discussed. In our understanding, UE is assumed to use the timing of the active cell in the same band for receiving PDSCH or CSI-RS on the SCell. In this sense, the 3us MRTD for intra-band non-contiguous CA could be too large. |
| Qualcomm | **Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**  We share the same view as MTK. For argument about “Omni beam for FR1”, it is not spec compliant and can potentially create more forward compatibility issues when beamforming becomes more prevalent than now. For an idea behind option 1 that network can configure UE with multiple CSI-RS resources and/or CSI-RS resource sets for CSI measurement/report, it is undesirable and also up to UE capability.  We believe Option 3 minimizes spec effort and properly addresses concerns about TCI activation missing in FR1 unknown SCell activation requirement. For Rel-16, we can further discuss Option 2 and Option 3.  **Issue 2-2: SSB-less SCell activation delay requirement**  We don’t believe this cause any significant spec effort. When cells are collocated and network is sure that actual reception time different between cells from UE perspective won’t be larger than CP, e.g. small cell deployments, network can activate SCell with very low latency by, e.g. not configuring SSB for the to-be-activated SCell. Note than this will also reduce possible interruption time window and thereby minimize Tput loss. Spec already supports everything for this such as feature list, QCL mapping, configuration, etc other than a simple RAN4 CORE requirement (Option 1). |
| ZTE | **Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**  It is fine without requirements when TCI indication is not provided. Kind of agree with E/// that TCI indication isn’t necessary to be in the same MAC CE from specification perspective, though it may be the typical case.  **Issue 2-1-2: Applicability related to first active BWP**  We think this would be a very strong restriction to NW configuration. Instead we think requirements when SSB is outside of first active BWP could be specified if necessary.  **Issue 2-2: SSB-less SCell activation delay requirement**  Requirements for SCell without SSB are specified in Rel-15 for FR2, so there is no reason not to specify requirements for FR1. It cannot be assumed as a new feature or requirement.  Technically, after SCell activation, it is not necessary to perform CSI-RS based L3 measurement for the UE. Measurement can still be based on SSB on the target frequency. UE just needs to follow intra-band PCell/PSCell timing for the SCell without SSB.  For the CR, we have concern on 6581:  the RS (s) of SCell being activated is (are) QCL-TypeA with TRS (s) of the SCell being activated and the TRS (s) is (are) QCL-TypeC with SSB (s) of one active serving cell on that FR1 band.  The above restriction is not necessary for FR1. UE will follow PCell/PSCell timing for the SCell without SSB in FR1 and UE is doing Omni-directional receiving. |

## Summary for 1st round

### Summary of 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 #2-1-1** | **Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**  8 companies made comments. It seems that the recommended WF is acceptable but needs update.  Companies’ views seem diverse. More discussions are needed, including whether all the conditions should be considered, if considered in which release and whether the change is needed for requirement, and whether TCI indication should be provided in the same MAC PDU or before CSI-RS reception and the side condition is fulfilled.  ***Tentative agreements:***   * In Rel-15, clarify that if *ssb-PositionInBurst* indicates multiple SSBs but no TCI indication is provided, the requirement for unknown SCell activation is not applied.   + FFS whether TCI indication is provided in the same MAC PDU with SCell activation for unknown or before CSI-RS reception   ***Candidate options:***  Except Option 1~4, further discussion is needed for the newly added options. All the options on table after 1st round are listed below   * Option 1 (Huawei, Apple):   The current FR1 SCell activation requirements apply provided that   * + ‘*ssb-PositionInBurst*’ indicates only one SSB is being actually transmitted, or   + ‘*ssb-PositionInBurst*’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation, or   + The SCell is known and UE has reported the SCell with SSB index before the activation, or   + The Es/Iot for at least one CSI-RS for CSI that UE is configured to measure is >= -2dB. * Option 2 (Mediatek):   When ‘ssb-PositionInBurst’ indicates multiple SSBs but no TCI indication is provided in the same MAC PDU, Introducing T\_(uncertainty,MAC,FR1) in FR1 unknown SCell activation;   * Option 3 (Qualcomm, Apple):      * Option 5 (NEC, Ericsson, ZTE):   If the SCell is unknown and belongs to FR1, Tactivation\_time is TFirstSSB\_MAX + TSMTC\_MAX + 2\*Trs + 5ms provided the TCI indication is received at UE before CSI-RS reception and the side condition Ês/Iot ≥ -2dB is fulfilled.   * Option 6 (Mediatek, Qualcomm):   Option 3 for Rel-15 and FFS for Rel-16 whether Option 2 or Option 3 will be adopted.  ***Recommendations for 2nd round:***  In Rel-15, should we focus on clarify under which condition the existing unknown cell requirements are not applied?  Can we further discuss more scenarios targeting at defining or updating the requirements in Rel-16?  Further discussion is needed. |
| **Sub-topic #2-1-2** | **Issue 2-1-2: Applicability related to first active BWP**  6 companies made comments. 4 companies supported the proposal. 2 companies questioned the need of change and among them 1 company provide the alternative approach.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Can we agree the current SCell activation requirements apply provided that the SSB of the to-be-activated SCell is within the first active DL BWP of the SCell?   + Yes (Huawei, Apple, NEC)   + Yes, but discuss the scenario in later release (Mediatek)   + Clarify the need of the correction (Ericsson)   + Consider the alternative approach, i.e., defining requirements when SSB is outside of first active BWP could be specified if necessary (ZTE)   ***Recommendations for 2nd round:***  Further discussion is needed. |
| **Sub-topic #2-2** | **Issue 2-2: SSB-less SCell activation delay requirement**  9 companies made comments. 5 companies proposed to define the new requirements. Among them, 3 companies preferred Option 1. 2 companies thought it is too late to define the new requirements in Rel-15. 2 companies expressed more discussion is needed.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Can we introduce the new requirements for SSB-less in Rel-15?   + Yes (Qualcomm, ZTE, Ericsson, NEC, CMCC)   + No, too late to define the requirement in Rel-15 (Apple, Mediatek)   + Need more discussion (Nokia, Huawei) * How can we specify the requirements?   + Option 1 (Qualcomm, Ericsson, NEC)      * + Option 2 (ZTE)     ***Recommendations for 2nd round:***  Firstly, it is encouraged that companies try to reach an agreement on whether SSB-less requirements need be specified. Maybe companies can consider whether RAN4 can discuss it in Rel-16.  Secondly, if companies agreed to introduce the requirements, further discussions on which options among Option 1 and Option 2 are needed. |

*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on SSB-less SCell activation delay requirement | Qualcomm |

### CRs/TPs Status

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| R4-2015736 | Revised (need revision Tdoc number) |
| R4-2015737 | Return to |
| R4-2016580 | Merged (into revised R4-2015736) |
| R4-2015306 | Merged (into revised R4-2015736) |
| [R4-2016581](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016581.zip) | Return to |
| [R4-2015570](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip) | Return to |
| R4-2015571 | Return to |

## Discussion on 2nd round (if applicable)

In the second round the CRs R4-2015736/R4-2015737, and way forward for SSB-less SCell activation delay requirements together with CRs R4-2016581/R4-2015570/R4-2015571 need further discussion.

* Please Huawei trigger the email discussion for sub-topic #2-1, and and revise R4-2015736/R4-2015737 to capture the agreements if any.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-Applicability for SCell activation
* Please Qualcomm trigger the email discussion for R4-2016581/R4-2015570/R4-2015571 together with the way forward.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-SSB-less SCell activation

[Comments and responses will be collected by moderator here]

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| **Sub-topic** | **Comments and responses** |
| Sub-topic #2-1-1  [97e][201] NR\_NewRAT\_RRM\_Core-Applicability for SCell activation | R4-2015736 and R4-2015737.  **Huawei:**  The issues are updated as below by Huawei:  **Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**  For Rel-15, define applicability conditions for FR1 unknown SCell activation   * Option 1 (NEC, Ericsson, ZTE, Huawei, Apple, Nokia, MTK, QC): The current requirement for unknown SCell activation is applied of one of the following conditions is met:   + Condition 1:     - ‘*ssb-PositionInBurst*’ indicates only one SSB is being actually transmitted   + Condition 2:     - ‘*ssb-PositionInBurst*’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation   + Condition 3 (NEC, Ericsson, ZTE):     - ‘*ssb-PositionInBurst*’ indicates multiple SSBs, and TCI indication is received at UE before CSI-RS reception, and the side condition Ês/Iot ≥ -2dB is fulfilled.   + Condition 4 (Huawei, Apple):     - ‘*ssb-PositionInBurst*’ indicates multiple SSBs, and the Es/Iot for at least one CSI-RS for CSI that UE is configured to measure is >= -2dB. * Option 2: when ‘ssb-PositionInBurst’ indicates multiple SSBs but no TCI indication is provided in the same MAC PDU, Introducing T\_(uncertainty,MAC,FR1) in FR1 unknown SCell activation   For Rel-16, how to handle the requirement for unknown SCell activation   * Option 1 (default, MTK, QC):   Keep the same requirement and applicability conditions as in Rel-15   * Option 2 (MTK, QC):   When ‘ssb-PositionInBurst’ indicates multiple SSBs but no TCI indication is provided in the same MAC PDU, Introducing T\_(uncertainty,MAC,FR1) in FR1 unknown SCell activation.  **Huawei:**  For Rel-15,  - We support C4. Even today NW can already configure UE to measure multiple CSI-RS for CSI (of course up to UE capability), so we do not see any technical issue of C4. From UE side, it can also accelerate the activation process without the need to wait for TCI indication, and as a result, it can more quickly enjoy the higher throughput enabled by SCell scheduling.  - For C3, we have one question. Does it mean that UE is assumed to receive TCI indication within the current Tactivation\_time? We ask because in current requirements, UE is assumed to take CSI-RS measurement for CSI after Tactivation\_time.  For Rel-16, we are open to both options, and prefer to discuss it next meeting.  **Apple:**  In R15, we prefer option 1, and we are fine with C1+C2+C4 or C1+C2+ “no requirement if multiple SSBs in 'usb-PositionInBurst' but no TCI indication”. To C3, a bit different from Huawei’s comment, we think the CSI-RS measurement could starts during the Tactivation\_time, which can trigger earlier valid CSI report to network for a fast activation; so we have concern that the timing point of “ before CSI-RS reception” is not very clear in the requirement.  In R16, we slightly prefer the same solution as R15, but open to discuss.  **Qualcomm:**  For Rel-15,   * On the premise that C1 and C2 are agreed/agreeable, we support adding C3 to the set of applicability conditions. For the detailed latest timeline for TCI indication, we can provide further input soon, e.g. including an option “in the same MAC PDU with SCell activation for unknown cell”. * For C4, if UE capability allows and/or if network uses an omni-beam, C4 would probably work. However, if network uses an omni-beam, the network can provide TCI indication as C3 rather than configuring multiple CSI-RS resources. Technically, it’s a bit hard for us to understand a motivation of C4. If the motivation is a blind configuration of multiple CSI-RS resources, such an approach should be avoided because it is harmful for both network and UE in terms of resource utilization and power consumption.   For Rel-16   * We can discuss it further separately once this issue is gotten straightened out. In principle, we prefer to consider Option 2 to begin with because it is technically more correct.   **Mediatek:**  We have concerns on both C3 and C4.  For C3, we have some concern on the processing time for this TCI indication. If this TCI comes from a different MAC CE, UE needs additional parsing time. Another issue is UE shall wait the fine timing tracking until UE receiving the TCI indication. Thus, we think it still needs further clarifications on this option.  For C4, if no TCI indication will be configured by NW. A possible solution is UE may use the best SSB to track the timing, but this is not captured in current spec. For R15 UE, we think it’s too late to optimize UE’s behaviour.  We supports to say no requirement for other scenarios except C1 and C4. The most important thing is this scenario doesn’t exist in real field. We don’t think RAN4 shall spend too much time to discuss this issue to assume some optimizations for UE behaviour.  **Ericsson:**  We support adding C3 to C1 and C2. For C4, we do not see an immediate need to specify it as a UE that has this capability would not be stopped from faster activation in case network provides CSI-RS before the TCI state has been indicated.  For Rel-16 we can further discuss. We agree with Qualcomm on that Option 2 may be the technically more correct approach.  **Huawei:**  Based on the received comments, for Rel-15, we can accept C1+C2. For C3, we are open but we still want to clarify with the proponents – which time period is considered as valid for the TCI indication (such that the requirements will apply)?  **Mediatek:**  We have concerns on both C3 and C4.  For C3, we have some concern on the processing time for this TCI indication. If this TCI comes from a different MAC CE, UE needs additional parsing time. Another issue is UE shall wait the fine timing tracking until UE receiving the TCI indication. Thus, we think it still needs further clarifications on this option.  For C4, if no TCI indication will be configured by NW. A possible solution is UE may use the best SSB to track the timing, but this is not captured in current spec. For R15 UE, we think it’s too late to optimize UE’s behaviour.  We supports to say no requirement for other scenarios except C1 and C4. The most important thing is this scenario doesn’t exist in real field. We don’t think RAN4 shall spend too much time to discuss this issue to assume some optimizations for UE behaviour. |
| Sub-topic #2-1-2  [97e][201] NR\_NewRAT\_RRM\_Core-Applicability for SCell activation | R4-2015736 and R4-2015737.  **Issue 2-1-2: Applicability related to first active BWP**   * Can we agree the current SCell activation requirements apply provided that the SSB of the to-be-activated SCell is within the first active DL BWP of the SCell?   + Yes (Huawei, Apple, NEC)   + Yes, but discuss the scenario in later release (Mediatek)   + Clarify the need of the correction (Ericsson)   + Consider the alternative approach, i.e., defining requirements when SSB is outside of first active BWP could be specified if necessary (ZTE)   **Huawei:**  We support the proposal.  To Ericsson,  We have provided some feedback on the need for the change in the 1st round. It is copied below for convenience. Could you please confirm if you are fine with the proposal with the clarifications?  CSI-RS and SSB may not be transmitted on the same BWP, and in particular CSI-RS measurement is on per BWP basis. UE may try to receive CSI-RS on the first active BWP, and thus needs RF retuning to receive SSB if SSB is not contained the first active BWP. Similarly, if UE stays on the BWP with SSB, it will need to re-tune to the first active BWP to receive CSI-RS.  To ZTE,  We are open to define the requirements for the case when SSB is outside of first active BWP, but we tend to agree with MTK that it is too late for Rel-15. Is it ok that in Rel-15 we have no requirements, and we can further discuss this case in Rel-16?  **Qualcomm:**  We don’t support the proposal.   * What happens to the scenario of SSB-less SCell activation? * For the background/observation that “UE needs to switch the RF between “the first active BWP” and “the SSB”, and as a result, there could be much more interruptions than allowed by current requirement” in R4-2015735, we don’t think UE should retune BW and/or switch frequency back-and-forth between active BWP and SSB BW in general because it will cause interruptions even after activation procedure and require scheduling restriction around SMT which, in turn, may decrease UE throughput.   **Huawei:**  Some response to QC,   * In case of SSB-less activation, it’s true that UE is not supposed to use SSB during activation, so the activation requirement should apply regardless of whether SSB is contained in first active BWP or not. We agree this should be clarified if the Proposal is to be agreed. * We agree that re-tuning between active BWP and SSB BW is undesirable, but we understand this may be unavoidable if the SSB is not contained in the first active BWP. It is also noted that after activation (when the SCell is active), UE would need measurement gap to measure the SSB if it is not contained in the active BWP, which means there will be interruptions due to the measurement. Similarly, interruptions may be needed for the activation process because UE may need to receive both SSB and CSI-RS in the first active BWP for activation. Given that those interruptions has not been considered in Rel-15 requirements, we propose that current SCell activation requirements apply only when the SSB of the to-be-activated SCell is within the first active DL BWP of the SCell.   **Mediatek:**  Firstly, we need to clarify our position is Option 1.  Secondly, we have concerns on QC’s proposal to introduce SSB-less SCell activation behaviour in R15.  UE may need additional efforts to update the design to follow intra-band contiguous SCell’s timing. In current stage, it’s too late for R15 UE.  We can consider this in R16.  **Huawei:**  Thanks for the discussions. Please find the revised CR on SCell activation at [R4-2017036 revised CR on SCell activation.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/R4-2017036%20revised%20CR%20on%20SCell%20activation.docx).  The CR captures the following agreement from GTW session:   * Agreement   + For Rel-15, define applicability conditions for FR1 unknown SCell activation     - The current requirement for unknown SCell activation is applied of one of the following conditions is met:       * Condition 1:         + ‘*ssb-PositionInBurst*’ indicates only one SSB is being actually transmitted       * Condition 2:         + ‘*ssb-PositionInBurst*’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation     - No requirements will be defined for other cases   Your further comments are welcomed. |
| Sub-topic #2-2  [97e][201] NR\_NewRAT\_RRM\_Core-SSB-less SCell activation | New way forward and CRs R4-2016581/R4-2015570/R4-2015571  **Qualcomm:**  **Plan for the discussion**  I’m planning to receive some initial technical comments over this email thread for one day (**by 6am Tue in UTC, 10pm Mon in PST**) and draft a WF for further discussion on detailed wording, etc.  **Technical discussion and Concerns from companies’ on/offline comments**  *Please feel free to add more bullets if needed and provide your feedback*   * **Spec effort for Rel-15 at this stage:** even without defining test cases, any further spec effort?   + [QC] We do not see any further spec effort to addition of Core requirement.   + [ZTE] We do not see any further spec effort for introducing core requirements for R15/R16. Test cases can be further discussed in the next meeting.   + [Apple]: If majority companies are fine to introduce it in R15, we can compromise to have it from R15, like FR2 without SMTC configuration case. * **Intra-band contiguous vs. non-contiguous**: for intra-band non-contiguous CA, MRTD 3us is larger than CP of 30kHz based OFDM symbol   + [QC] At least, for intra-band contiguous CA, we do not seen an issue. Note that in 38.104, BS TAE requirement for intra-band contiguous CA is up to 130 or 260ns depending on BS type. For intra-band contiguous CA, we believe this won’t cause an issue even for SCS 30kHz because when network can’t be sure about (M)RTD being shorter than CP, e.g. larger cell deployment, it can configure UEs with SMTC for the to-be-activated SCell. And we’re also open to other options if companies are concerned about MRTD for UEs with 30kHz SCS in non-contiguous CA.   + [ZTE] The feature is based on UE capability **scellWithoutSSB** . For UE supporting this capability, the UE should be able to handling MRTD at least defined in the spec for corresponding deployment scenarios.   + [Apple]: we have different view about intra-band contiguous CA case. We think 3us MRTD (due to TAE) is out of control of the network, and with such high time difference UE cannot reliably leverage the PCell/PSCell timing for a to-be-activated SCell. Our first preference is to preclude this intra-band FR1 NC CA case from the requirement, but if majority companies would like to specify for that case, we propose to add RTD conditions for the requirement, i.e., the 3ms activation delay requirement only applies for intra-band FR1 CA when RTD is <= [CP] if the SMTC is not configured,  and we think this condition is not conflicted with the network behavior. * **Detailed QCL relation information**: whether it is necessary or not   + [QC] For UE channel estimation and time/freq tracking, UE needs QCL information. And the QCL information provided in R4-2016581 is based on “QCL-Info field descriptions” under Table of “TCI-State”.   + [ZTE] UE will use PCell/PSCell timing for the to-be-activated SCell. No time/freq tracking is needed. Moreover the proposed activation dealy for SCell without SSB is 3ms from both QC and ZTE CRs, which is only for MAC CE decoding and processing. Furthermore omni-directional reception is assumed in FR1 and UE can still do time/freq tracking without TCI information if UE deems it is necessary.   + [Apple]: we have no strong view to have such QCL config, if we assume UE can directly use the timing from PCell/PSCell, the QCL info would not help anything for activating the target cell (like FR2 CA case without SMTC config). Furthermore, real RTD cannot be completely reflected by QCL info (TAE is not in the scope of QCL), and as long as we can make sure RTD can be within certain range, the QCL condition does not matter much in this requirement. More discussion might be needed.   [ZTE] For SCell without SSB, the requirements should apply only for UE supporting scellWithoutSSB and when there is PCell/PSCell. So we would like to propose the revision as follows.  "If the SCell being activated belongs to FR1 and if there is PCell or PSCell on that FR1 band, and if the UE supporting *scellWithoutSSB* is not provided with any SMTC for the target SCell, Tactivation\_time is 3 ms."  [Apple]: we agree to add UE capability indication here as a condition, but as we commented above, the FR1 intra-band NC CA case needs more discussion.  **Proposed CRs**   * **R4-2016581 (QC)**   If the SCell being activated belongs to FR1 and if there is at least one active serving cell on that FR1 band, if the UE is not provided with any SMTC for the target SCell, Tactivation\_time is 3 ms, provided  -     the RS (s) of SCell being activated is (are) QCL-TypeA with TRS (s) of the SCell being activated and the TRS (s) is (are) QCL-TypeC with SSB (s) of one active serving cell on that FR1 band.   * **R4-2015570 (ZTE)**   If the SCell being activated belongs to FR1 intra-band CA and the UE is not provided with any SMTC for the target SCell, Tactivation\_time is 3 ms.   * **Reference (SSB-less for FR2 in Rel-15 spec)**   If the SCell being activated belongs to FR2 and if there is at least one active serving cell on that FR2 band, if the UE is not provided with any SMTC for the target SCell, Tactivation\_time is 3 ms, provided  -     the RS (s) of SCell being activated is (are) QCL-TypeD with RS (s) of one active serving cell on that FR2 band.  **Qualcomm:**  Thanks Qian and Jerry for the detailed feedback and good suggestions.  I have incorporated technical comments from both companies and came up with the following **proposal**:   |  | | --- | | * RAN4 to define SSB-less FR1 SCell activation delay requirement as follows:   + If the SCell being activated belongs to FR1 and if there is at least one active serving cell contiguous to the Scell on that FR1 band, if the UE [supporting *scellWithoutSSB*] is not provided with any SMTC for the target SCell, Tactivation\_time is 3 ms[, provided     - the RS (s) of SCell being activated is (are) QCL-TypeA with TRS (s) of the SCell being activated and the TRS (s) is (are) QCL-TypeC with SSB (s) of one active serving cell on that FR1 band.]   + FFS on non-contiguous intra-band CA |   **Background of updates**   * NC CA can be further discussed in future meetings, if necessary. * UE feature ‘scellWithoutSSB’ is in [] just because it is not explicated stated for FR2 SSB-less requirement. We don’t have a strong view on this, but if I do not hear otherwise, ‘[]’ will be taken out in the final version. * For PDCCH/PDSCH channel estimation and time/freq tracking for the to-be-activated SCell, UE needs QCL-TypeA and TypeC. According to TS38.331 TCI-State information, QCL-association across CCs is only allowed for typeC and typed. Therefore, the QCL information in ‘[]’ is necessary and in accordance with spec. Hope this can clarify the QCL information on the third bullet. If we do not hear otherwise, ‘[]’ will be taken out in the final version. If companies want to further check this, we are open to leaving ‘[]’.   **Draft version can be found here:**  <https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/(draft)%20R4-2017035%20WF%20on%20SSB-less%20SCell%20activation%20delay%20requirement%20v1.pptx>  **Mediatek:**  Thanks for QC to prepare the WF.  In our opinion, it’s too late to introduce this requirement in R15. We have concern on the wording ‘RAN4 to define SSB-less FR1 SCell activation delay requirement’.  In current stage, some UEs had already finished their design to support this feature but may not meet the delay requirement what we discussed here.  Our suggestion is to discuss this requirement in R16 other than R15.  At the same time, we support Apple’s proposal to restrict the RTD less than some values, but we’re not sure whether CP is too large or not. So we suggest to add a bracket on this value and discuss it together with multiple SCell activation in next meeting.  **ZTE:**  Thanks for working out the WF. We have some follow up comments.  For PDCCH/PDSCH channel estimation and time/freq tracking for the to-be-activated SCell, UE needs QCL-TypeA and TypeC. According to TS38.331 TCI-State information, QCL-association across CCs is only allowed for typeC and typed. Therefore, the QCL information in ‘[]’ is necessary and in accordance with spec. Hope this can clarify the QCL information on the third bullet. If we do not hear otherwise, ‘[]’ will be taken out in the final version. If companies want to further check this, we are open to leaving ‘[]’.  Firstly when should UE conduct time/freq tracking for the to-be activated SCell during 3ms activation time? The UE should use PCell/PSCell timing for the SCell in our view.  If the SCell being activated belongs to FR1 and if there is PCell or PSCell on that FR1 band,  This comment is not reflected in the WF.  For the PDCCH/PDSCH channel estimation we think it is not part of SCell activation. Furthermore does this imply for intra band CA in FR1 same TCI state should be used? If so why?  To Zhixun: Is it okay for you that requirements are specifed by taking all esiting implementation into consideration? |

## Summary on 2nd round (if applicable)

*GTW session (November 11, 2020)*

**Issue 2-1-1: Applicability related to ssb-PositionInBurst and TCI**

* Agreement
  + For Rel-15, define applicability conditions for FR1 unknown SCell activation
    - The current requirement for unknown SCell activation is applied of one of the following conditions is met:
      * Condition 1:
        + ‘*ssb-PositionInBurst*’ indicates only one SSB is being actually transmitted
      * Condition 2:
        + ‘*ssb-PositionInBurst*’ indicates multiple SSBs and TCI indication is provided in same MAC PDU with SCell activation
    - No requirements will be defined for other cases

**Issue 2-2: SSB-less SCell activation delay requirement**

* Proposal:
* RAN4 to define SSB-less FR1 SCell activation delay requirement as follows:
  + If the SCell being activated belongs to FR1 and if there is at least one active serving cell contiguous to the Scell on that FR1 band, if the UE [supporting *scellWithoutSSB*] is not provided with any SMTC for the target SCell, Tactivation\_time is 3 ms [, provided
    - the RS (s) of SCell being activated is (are) QCL-TypeA with TRS (s) of the SCell being activated and the TRS (s) is (are) QCL-TypeC with SSB (s) of one active serving cell on that FR1 band.]
  + FFS on non-contiguous intra-band CA
  + Chair: continue discussion whether R15 and/or R16 requirements shall be defined. Aim to conclude in RAN4 98e.

*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** |
| R4-2017036 | Agreed (Revised from R4-2015736) |
| R4-2015737 | Agreed |
| R4-2017035 | Noted (WF) |
| [R4-2016581](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016581.zip) | Postponed |
| [R4-2015570](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip) | Postponed |
| R4-2015571 | Withdrawn (Cat A CR for [R4-2015570](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015570.zip)) |

# Topic #3: Beam management

## Companies’ contributions summary

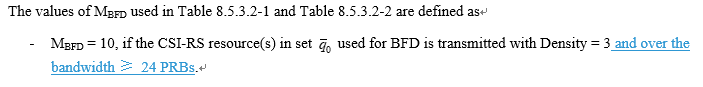
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| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2014268](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014268.zip) | Apple | **CR on CSI-RS BW condition for BFD/CBD R15**  Add the side condition of CSI-RS BW for CBD/BFD, i.e., 24PRB. |
| R4-2014269 | Apple | **CR on CSI-RS BW condition for BFD/CBD R16**  Cat A CR for [R4-2014268](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014268.zip) |
| [R4-2015527](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015527.zip) | Huawei, HiSilicon | **CR on BFD and CBD requirements\_R15**  Add the condition that the CSI-RS resource is over the bandwidth ≥ 24 PRBs within the active BWP. |
| R4-2015528 | Huawei, HiSilicon | **CR on BFD and CBD requirements\_R16**  Cat A CR for [R4-2015527](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015527.zip) |
| [R4-2014270](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014270.zip) | Apple, Huawei, HiSilicon | **On AP-CSI-RS based L1-RSRP measurement**  Proposal 1:  AP CSI-RS based L1-RSRP measurement shall not be performed within MG duration. But outside MG, if this AP CSI-RS for L1-RSRP measurement is overlapped with L3 RRM measurement RS, the AP CSI-RS based L1-RSRP measurement shall be prioritized.  Proposal 2:   * in TS38.133, RAN4 clarifies that scaling factor P=1 for AP CSI-RS based L1-RSRP measurement outside MG regardless of whether this AP CSI-RS is overlapped with L3 measurement RS or not. * in TS38.133, RAN4 clarifies that longer SSB based L3 measurement period would be expected if SSB symbols for L3 measurement are colliding with AP CSI-RS for L1-RSRP. * in TS38.133, RAN4 clarifies that AP CSI-RS based L1-RSRP measurement requirement is not applied for the case that AP CSI-RS is overlapped with MG. |
| [R4-2014271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014271.zip) | Apple, Huawei, HiSilicon | **CR on AP-CSI-RS based L1-RSRP measurement R15**  Revise the AP CSI-RS based L1-RSRP measurement requirement and add some clarification to L3 SSB based measurement. |
| R4-2014272 | Apple, Huawei, HiSilicon | **CR on AP-CSI-RS based L1-RSRP measurement R16**  Cat A CR for [R4-2014271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014271.zip) |

## Open issues summary

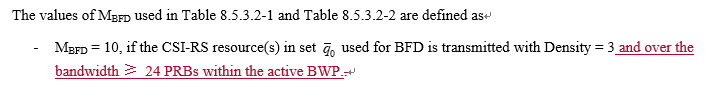
### Sub-topic 3-1 CSI-RS bandwidth condition for beam management

**Issue 3-1: CSI-RS bandwidth condition for beam management**

* Proposed change:
  + Option 1 (Apple [R4-2014268](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014268.zip)/R4-2014269):



* + Option 2 (Huawei, HiSilicon [R4-2015527](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015527.zip)/R4-2015528)

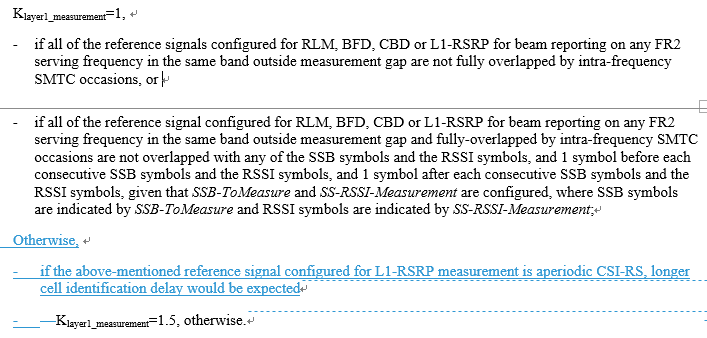


* Recommended WF
  + Which option is agreeable needs more discussion.

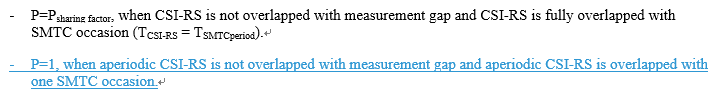
### Sub-topic 3-2 Aperiodic CSI-RS based L1-RSPR measurement

**Issue 3-2: Aperiodic CSI-RS based L1-RSRP measurement**

* Proposals (Apple, Huawei, HiSilicon [R4-2014270](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014270.zip)/[R4-2014271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014271.zip)/R4-2014272)
  + Proposal 1: AP CSI-RS based L1-RSRP measurement shall not be performed within MG duration. But outside MG, if this AP CSI-RS for L1-RSRP measurement is overlapped with L3 RRM measurement RS, the AP CSI-RS based L1-RSRP measurement shall be prioritized.
  + Proposal 2:
    - In TS38.133, RAN4 clarifies that scaling factor P=1 for AP CSI-RS based L1-RSRP measurement outside MG regardless of whether this AP CSI-RS is overlapped with L3 measurement RS or not.
    - In TS38.133, RAN4 clarifies that longer SSB based L3 measurement period would be expected if SSB symbols for L3 measurement are colliding with AP CSI-RS for L1-RSRP.
    - In TS38.133, RAN4 clarifies that AP CSI-RS based L1-RSRP measurement requirement is not applied for the case that AP CSI-RS is overlapped with MG.
* Proposed changes (Apple, Huawei, HiSilicon [R4-2014270](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014270.zip)/[R4-2014271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014271.zip)/R4-2014272)



…



* Recommended WF
  + More discussion is needed

## Companies views’ collection for 1st round

### Comments for open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | **Issue 3-1:**  Either option 1 or option 2 is fine to us.  **Issue 3-2:**  Support both proposal and changes. |
| MTK | Issue 3-1: Both option is fine.  Issue 3-2: Agree. |
| Intel | Issue 3-1:  Both option 1 and option 2 are fine.  Issue 3-2:  Agree about the proposed changes. |
| Ericsson | Issue 3-1 : Either clarification CR looks OK as a starting point. Since the introductory text in the section 8.5.3.1 already says “The requirements in this clause apply for each CSI-RS resource in the set  of resource configurations for a serving cell, provided that the CSI-RS resource(s) in set for beam failure detection are actually transmitted within the UE active DL BWP during the entire evaluation period specified in clause 8.5.3.2.” we don’t see it critical to make a special clarification for active BWP in this particular sub-bullet of 8.3.5.2. since it is generally true anyway.  Issue 3-2: Regarding the first part of the proposed changes, it starts with ‘Otherwise’, and ends with ‘Klayer1\_measurement=1.5, otherwise’. We are fine with the intention of the changes, but it is good to improve the sentence.  We think it is better to say ‘aperiodic CSI-RS resources’ rather than ‘aperiodic CSI-RS’. |
| NEC | Issue 3-1: Both options are fine.  Issue 3-2: Support both the proposals in principle. Similar comment as Ericsson regarding the CR text. |
| Nokia | Issue 3-1: CSI-RS bandwidth condition for beam management  Both proposals are fine. UE is anyway only required to measure within the active BWP. However, we would prefer to capture this in the transmission parameter table as this is minimum requirement and have the assumption in the table:   |  |  | | --- | --- | | **Attribute** | **Value for BLER** | | DCI format | 1-0 | | Number of control OFDM symbols | 2 | | Aggregation level (CCE) | 8 | | Ratio of hypothetical PDCCH RE energy to average CSI-RS RE energy | 0dB | | Ratio of hypothetical PDCCH DMRS energy to average CSI-RS RE energy | 0dB | | Bandwidth (PRBs) | 48 | | Sub-carrier spacing (kHz) | SCS of the active DL BWP | | DMRS precoder granularity | REG bundle size | | REG bundle size | 6 | | CP length | Normal | | Mapping from REG to CCE | Distributed | | Bandwidth (CSI-RS) | 24 |   Issue 3-2: Aperiodic CSI-RS based L1-RSRP measurement  Network is aware of when measurement gaps are configured and hence in a good network configuration this should not happen. It is known that UE is not required to measure other than RRM measurements. E.g. ‘is not required to conduct reception/transmission from/to the corresponding NR serving cells for SA (with single carrier or CA configured) except the reception of signals used for RRM measurement(s) and the signals used for random access procedure according to TS38.321 [7].’ |
| Huawei | **Issue 3-1:**  Either option 1 or option 2 is fine to us.  **Issue 3-2:**  Support both proposal and changes.  To Nokia, we agree that UE behavior related to MG is clear, but here the scenario is collision between AP CSI-RS and SMTC outside MG. The current requirement is that P>1 which means AP CSI-RS is not always prioritized/measured. |

## Summary for 1st round

### Summary of open issues

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic #3-1** | **Issue 3-1: CSI-RS bandwidth condition for beam management**  7 companies made comments. All of them are fine with proposals. Either option 1 or option 2 are OK. Besides, Ericsson had comments that we don’t see it critical to make a special clarification for active BWP in this particular sub-bullet of 8.3.5.2, and Nokia had suggestion to capture the CRS-RS bandwidth in transmission parameter table. Those comments may need be captured in the revised CR.  ***Tentative agreements:***   * Add the condition that CSI-RS bandwidth ≥24 PRBs for BFD and CBD requirements.   ***Candidate options:***  ***Recommendations for 2nd round:***  Revised CR should capture comments from companies. |
| **Sub-topic #3-2** | **Issue 3-2: Aperiodic CSI-RS based L1-RSRP measurement**  7 companies made comments. Among them, 6 companies supported the proposals and 2 companies had comments to improve the wording, i.e., 1) Regarding the first part of the proposed changes, it starts with ‘Otherwise’, and ends with ‘Klayer1\_measurement=1.5, otherwise’. We are fine with the intention of the changes, but it is good to improve the sentence. 2) We think it is better to say ‘aperiodic CSI-RS resources’ rather than ‘aperiodic CSI-RS’. 1 company questioned whether the scenario exists.  ***Tentative agreements:***  N/A  ***Candidate options:***  ***Recommendations for 2nd round:***  Firstly we would like to check with Nokia if the response from Huawei can address your concern. If OK, we can have further discussion on the revision of CR. |

*Recommendations on WF/LS assignment*

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

### CRs/TPs Status

*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** |
| [R4-2014268](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014268.zip) | Revised (need revision Tdoc number). |
| R4-2014269 | Return to. |
| [R4-2015527](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015527.zip) | Merged (into revised [R4-2014268](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014268.zip)). |
| R4-2015528 | Withdrawn. |
| [R4-2014271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014271.zip) | Revised (need revision Tdoc number). |
| R4-2014272 | Return to. |

## Discussion on 2nd round (if applicable)

In the second round the CRs [R4-2014268](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014268.zip)/R4-2014269, and CRs [R4-2014271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014271.zip)/R4-2014272 need further discussion.

* Please Apple trigger the email discussion for sub-topic #3-1, and revise [R4-2014268](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014268.zip)/R4-2014269 to capture the comments.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-CSI-RS bandwidth for beam management
* Please Apple trigger the email discussion for sub-topic #3-2, and revise [R4-2014271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014271.zip)/R4-2014272 to capture the comments.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-Aperiodic CSI-RS based L1-RSRP

In the second round the following email threads are needed:

|  |  |
| --- | --- |
| **Sub-topic** | **Comments and responses** |
| Sub-topic #3-1  [97e][201] NR\_NewRAT\_RRM\_Core-CSI-RS bandwidth for beam management | [R4-2014268](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014268.zip)/R4-2014269  **Apple:**  To Ericsson,  Agree, and we only use the CSI-RS BW >= 24PRBs in the revised sentence without any extra clarification on active BWP in that sentence.  To Nokia,  [Apple]: We think the above table is for hypothetical PDCCH parameter configuration rather than RS configuration. And in CSI-RS based RLM requirement, we already had a sentence there to clarify that CSI-RS BW >=24PRBs, and therefore we think same sentence could be copy/paste to BFD/CBD requirement directly. Hope this clarification could address Nokia’s concern. Thanks!  No comment was received in the 2nd round.  The formal version of this CR has been uploaded to the inbox:  [R4-2017037.zip](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/R4-2017037.zip) |
| Sub-topic #3-2  [97e][201] NR\_NewRAT\_RRM\_Core-Aperiodic CSI-RS based L1-RSRP | R4-2017038/R4-2014272  **Apple**  To reply companies’s comment in the first round:   |  |  | | --- | --- | | Ericsson/NEC | Issue 3-2: Regarding the first part of the proposed changes, it starts with ‘Otherwise’, and ends with ‘Klayer1\_measurement=1.5, otherwise’. We are fine with the intention of the changes, but it is good to improve the sentence.  We think it is better to say ‘aperiodic CSI-RS resources’ rather than ‘aperiodic CSI-RS’.  [Apple]: we revised the CR to capture these two comments from Ericsson/NEC. Please Ericsson/NEC double check if the revised wording is fine or not. |  |  |  | | --- | --- | | Nokia | Issue 3-2: Aperiodic CSI-RS based L1-RSRP measurement: Network is aware of when measurement gaps are configured and hence in a good network configuration this should not happen. It is known that UE is not required to measure other than RRM measurements. E.g. ‘is not required to conduct reception/transmission from/to the corresponding NR serving cells for SA (with single carrier or CA configured) except the reception of signals used for RRM measurement(s) and the signals used for random access procedure according to TS38.321 [7].’  [Apple]: we agree with Nokia comment and removed the applicability of AP-CSI-RS colliding with MG. Please Nokia double check if the revised version is fine or not. |   Your further comments are welcome! Thanks!  **Nokia:**  Thank you for the revised CR.  One question to the CR:  ‘P=1, when aperiodic CSI-RS resource is not overlapped with measurement gap and aperiodic CSI-RS resource is overlapped with one SMTC occasion.’ First part of the condition is fine but can Apple clarify the reasoning for ‘and aperiodic CSI-RS resource is overlapped with one SMTC occasion’  Can you elaborate a bit on the latter condition – why is it needed?  Our reading now is that the CSI-RS for L1-RSRP now need to be within the SMTC in order for P=1 – otherwise it will be P=3. This condition is not clear to us.  **Apple:**  That’s a good question. In fact our original intention is to say that: in case AP CSI-RS is colliding with SMTC, it shall be prioritized over L3 measurement and P=1. But you are right, if the AP CSI-RS is not overlapped with SMTC, the P is still 1.  So with that, I think we can remove the second half sentences, and it will be ”P=1, when aperiodic CSI-RS resource is not overlapped with measurement gap”; because no matter AP CSI-RS is overlapped or not overlapped with SMTC occasion, the P for AP CSI-RS is always =1. Does that make sense to you?  The updated version is uploaded to : [R4-2017038 CR on AP-CSI-RS based L1-RSRP measurement R15-revised2.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/R4-2017038%20CR%20on%20AP-CSI-RS%20based%20L1-RSRP%20measurement%20R15-revised2.docx)  The formal version has been uploaded to the inbox: [R4-2017038.zip](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/R4-2017038.zip) |

## 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** |
| R4-2017037 | Agreed (Revised from R4-2014268) |
| R4-2014269 | Agreed |
| R4-2017038 | Agreed (Revised from [R4-2014271](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014271.zip)) |
| R4-2014272 | Agreed (Cat A CR to R4-2017038) |

# Topic #4: BWP switching

## Companies’ contributions summary

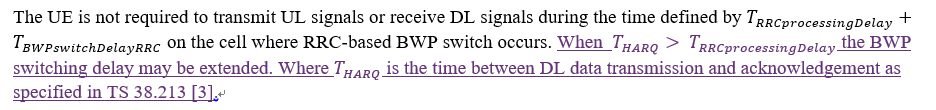
|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2016162](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016162.zip) | Ericsson | **HARQ delay during RRC based BWP, CBW and TCI switching procedures**   * Observation 1: RRC based BWP switching and UE specific CBW are serving cell procedure performed typically under higher SNR. Therefore, HARQ ACK may be delayed in rare circumstances. * Proposal 1: Clarify in the core requirement that if the ACK transmission for the received RRC takes longer than the RRC procedure delay for a procedure then the overall switching delay for that procedure may be extended. * Proposal 2: Proposal 1 is applicable for the following requirements:   + RRC based BWP switching delay   + UE specific CBW change delay and   + RRC based active TCI state switching delay. |
| [R4-2016373](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016373.zip) | Apple | **CR to 38.133 on Active BWP switch and Active TCI State Switching requirements - Rel15**  Add note that longer switching delay may be expected if THARQ > TRRCProcessing |
| R4-2016374 | Apple | **CR to 38.133 on Active BWP switch and Active TCI State Switching requirements - Rel16**  Cat A CR for [R4-2016373](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016373.zip) |
| [R4-2014237](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014237.zip) | Apple | **Discussion on RRC based BWP switch for Scell**  Observation #1: RRC based BWP switch by RRC re-configuration of firstActiveUplinkBWP-Id is not allowed for Scell.  Proposal #1: Update applicability of current RRC based BWP switch to only PCell or PScell.  Proposal #2: Discuss further on how to extend RRC based switching delay requirement to be applicable to SCell  Proposal#3: Send LS to RAN2 to clarify how RRC based BWP switch can be applicable to SCell. |
| [R4-2014565](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014565.zip) | Intel Corporation | **Discussion of RRC based BWP switching on single CC**  Proposal 1: Current single RRC based BWP switch delay requirement in Rel-15 is only applied for PCell or PScell.  Proposal 2: RRC based single BWP switch delay for SCell needs more discussion. |
| [R4-2014238](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014238.zip) | Apple | **CR on Applicability of RRC based BWP switch requirements - Rel15**   1. Delete Editor’s Note 2. Capture that RRC based BWP switch requirements for single CC are only applicable to PCell and PScell. |
| R4-2014239 | Apple | CR on Applicability of RRC based BWP switch requirements - Rel16  Cat A CR for [R4-2014238](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014238.zip). |
| [R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip) | Huawei, HiSilicon | **CR on RRC-based BWP switch requirements\_R15**  Remove the notes: More than one BWP configurations for RRC-based BWP switch on SCell is FFS. |
| R4-2015530 | Huawei, HiSilicon | CR on RRC-based BWP switch requirements\_R16  Cat A CR for [R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip). |
| [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip) | MediaTek inc. | **CR on BWP switch**  Clarify RRC-based BWP switch only applies for PCell and PSCell. |
| [R4-201476](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip)2 | MediaTek inc. | **CR on BWP switch**  Cat A CR for [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip). |
| R4-2015208 | MediaTek inc. | CR on BWP switch  Cat A CR for [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip). |
| [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip) | ZTE | **CR to 38.133 correction to RRC based BWP switch requirements**  RRC based BWP switch requirements is applicable for RRC configuration (including RRCsetup message and RRCresume message). |
| R4-2015573 | ZTE | CR to 38.133 correction to RRC based BWP switch requirements  Cat A CR for [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip) |
| [R4-2015300](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015300.zip) | NEC | CR to TS 38.133 on DCI based BWP switch requirements applicability |

## Open issues summary

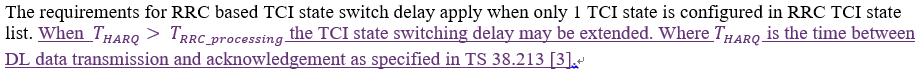
### Sub-topic 4-1 HARQ delay

**Issue 4-1: Clarification of requirement applicability when THARQ > TRRCprocessingDelay**

* Proposal (Ericsson [R4-2016162](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016162.zip), Apple [R4-2016373](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016373.zip)/R4-2016374)
  + Proposal 1: Clarify in the core requirement that if the ACK transmission for the received RRC takes longer than the RRC procedure delay for a procedure then the overall switching delay for that procedure may be extended.
  + Proposal 2: Proposal 1 is applicable for the following requirements:
    - RRC based BWP switching delay
    - UE specific CBW change delay and
    - RRC based active TCI state switching delay.
* Proposed change (Apple [R4-2016373](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016373.zip)/R4-2016374)



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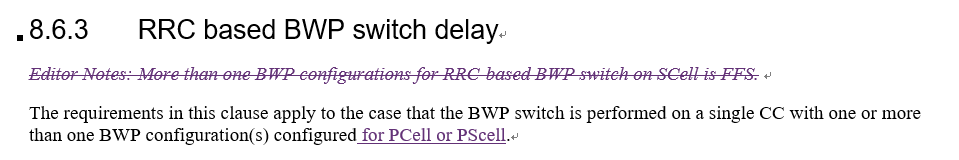


* Recommended WF
  + More discussion is needed.

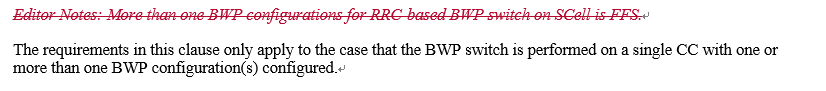
### Sub-topic 4-2 Applicability condition for RRC based BWP switching

**Issue 4-2: Clarification on BWP configuration(s) for active BWP switch**

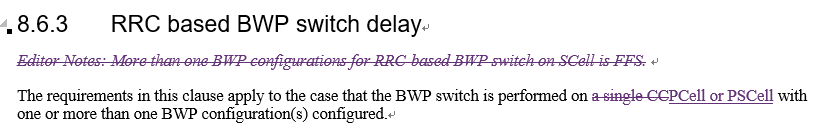
* Proposals:
  + Proposal 1 (Apple [R4-2014237](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014237.zip), Intel R4-2010032, Mediatek R4-2014760): Update applicability of current RRC based BWP switch to only PCell or PScell.
  + Proposal 2 (Apple [R4-2014237](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014237.zip), Intel R4-2010032): RRC based single BWP switch delay for SCell needs more discussion. Discuss further on how to extend RRC based switching delay requirement to be applicable to SCell.
  + Proposal 3 (Apple [R4-2014237](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014237.zip)): Send LS to RAN2 to clarify how RRC based BWP switch can be applicable to SCell.
  + Proposal 4 (ZTE [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip)/[R4-201557](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip)3): RRC based BWP switch requirements is applicable for RRC configuration (including RRCsetup message and RRCresume message).
* Proposed changes:
  + Option 1 (Apple [R4-201423](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014237.zip)8):



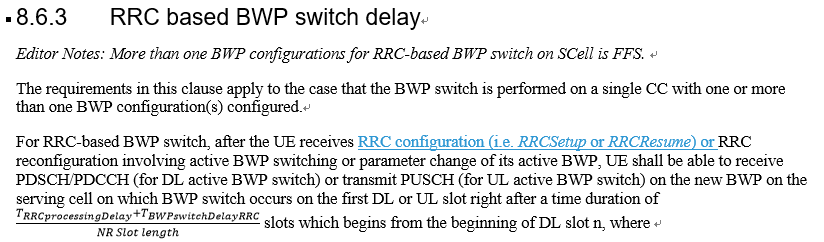
* + Option 2 (Huawei, HiSilicon [R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip))



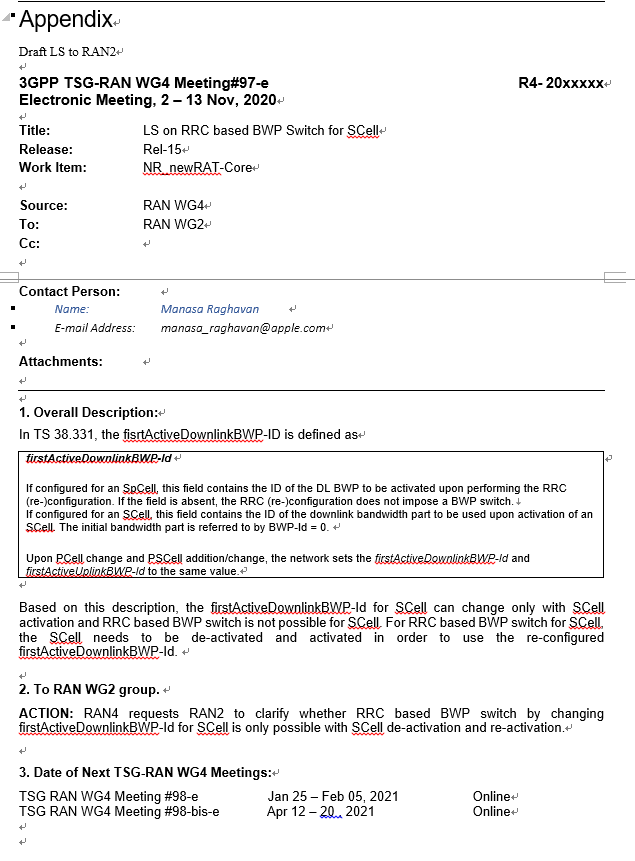
* + Option 3 (Mediatek [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip)):



* + Option 4 (ZTE [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip))



* Draft LS (Apple [R4-2014237](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014237.zip))

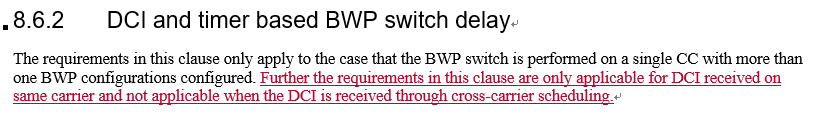


* Recommended WF
  + More discussion is needed.
  + Collect comments for Apple draft LS in [R4-2014237](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014237.zip)

### Sub-topic 4-3 Cross carrier scheduling

**Issue 4-3: Clarification on cross-carrier scheduling**

* Proposed change (NEC [R4-2015300](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015300.zip))



* Recommended WF
  + More discussion is needed

## Companies views’ collection for 1st round

### Comments for open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | Sub-topic 4-1 HARQ delay  When THARQ > TRRCProcessingDelay the HARQ feedback from the UE might take longer due to BWP switch delay, hence the total BWP switching delay could also be longer as the UE is not required to transmit or received during the entire BWP switch delay period.  Sub-topic 4-2 Applicability condition for RRC based BWP switching  Option 1.  Also, we propose to send LS to RAN2 for clarification in case we need further clarification on applicability of existing RRC based BWP switch to SCell  Sub-topic 4-3 Cross carrier scheduling  We agree that requirements defined don’t apply to cross-carrier scheduling. However, we propose the following wording:  The requirements are only applicable to DCI based BWP switch on the same carrier. |
| MTK | Issue 4-1:  As we discussed in several meetings, this is a seldom scenario and only happens in SCS=15KHz.  We don’t agree to introduce this requirement in current stage for R15.  Issue 4-2:  Support proposal 1.  If no consensus in RAN4, we can support on proposal 3.  Issue 4-3:  Agree. |
| Intel | Issue 4-1:  Agree with proposal changes.  Issue 4-2:  Support option 1, option 2 and option 3.  From our understanding, RRC based BWP switch signalling for SCell is more like a configuration command rather than a switching command. LS can help to clarify whether and in what condition RRC based BWP switch can be applicable to SCell.  Issue 4-3:  Agree with proposed changes. |
| Ericsson | **Issue 4-1: Clarification of requirement applicability when THARQ > TRRCprocessingDelay**  Apple and Ericsson share the same proposals, and we are OK with the wording in the CRs (R4-2016373/R4-202016374)  **Issue 4-2 : Clarification on BWP configuration(s) for active BWP switch**  Our understanding is that RRC based BWP switch is possible on an Scell at activation. So RAN4 requirements should include RRC based Scell BWP switch even if might include activation delay. We support Apple proposals 2 and 3 and getting further clarification from RAN2 so that we can define the requirements.  **Issue 4-3: Clarification on cross-carrier scheduling**  Although DCI based BWP using cross carrier scheduling is functionally supported by RAN1 in R15 our understanding is that RAN4 has not defined the requirements because of ambiguities in cases where different SCS is used on the scheduling carrier and the BWP switch carrier which makes it ambiguous where the BWP switch would start from. So then we think that such clarification is OK. |
| NEC | **Issue 4-1: Clarification of requirement applicability when THARQ > TRRCprocessingDelay**  We still think this scenario may not occur. However the clarification may not have much impact on implementation. Hence, we are OK with the change.  **Issue 4-2 : Clarification on BWP configuration(s) for active BWP switch**  BWP change using RRC reconfiguration can happen for following scenarios  a) SCell addition  b) SCell modification  c) ReconfigurationWithSync.  Since the SCell is in deactivated state upon addition, the gNB configures the first activate BWP, to serve as active BWP upon SCell activation by MAC CE. This is applicable for scenario a) and c).  According to our understanding for case b) gNB can still modify BWP parameters through RRC reconfiguration. However changing number of BWP (if more than one BWP is configured) and BWP location/BW is not supported by RAN2 for the reason specified by MTK.  For scenario b) gNB may change BWP (when more than one BWP is configured) of SCell using SCell release and addition (in same RRC message). This actually takes one additional step of SCell activation.  Issue 4-3: Clarification on cross-carrier scheduling  If the changes are agreeable to all companies, we can revise wording if it is required. |
| Nokia | Issue 4-1: Clarification of requirement applicability when THARQ > TRRCprocessingDelay  If it is handling errors, then we don't think that is needed in RAN4 (we do not handle other ack/nack error cases). We had similar discussion in LTE when DRX configuration changed and at that time we left it for network implementation to handle. It would need to clear when conditions leading to the additional delay may happen as otherwise it seems to allow relaxation on UE side for any condition. Our understanding is that network is configuring the HARQ delay by ‘dl-DataToUL-ACK delay’ and this should be clarified. Hence, we can agree on clarifying, but wording would need some discussion.  Issue 4-2: Clarification on BWP configuration(s) for active BWP switch  For R15, according to RAN2 specification, RRC based BWP switch should be performed only for SpCell, proposal 1 is fine in R15. However, in R16 we have direct Scell activation by RRC in which case this parameter is valid, with this feature, RRC-based BWP switch should be performed for any cell.  Since the RAN2 specification is very clear on this, RAN4 does not need to send LS to RAN2 to clarify how RRC based BWP switch can be applicable to SCell.  Proposal 4 is fine.  Issue 4-3: Clarification on cross-carrier scheduling  We don’t think we should limit the DCI-based BWP switching on same carrier, we have cross-carrier scheduling with same SCS requirements in R15. |
| Huawei | Issue 4-2:  We agree that the BWP switch by changing the firstactivebwp-ID via RRC is only applicable for sPCell. But for a SCell, it is feasible to change the parameters of the active BWP ID without changing the active BWP ID via RRC. It is also a typical case considered in Rel-15 as it is stated in in 8.6.3 that “RRC reconfiguration involving active BWP switching or parameter change of its active BWP”. So we support the changes in option 2 that only remove the editor note without any other changes.  Issue 4-3:  The applicability clarification has already been added in the spec (R4-2012242 agreed in the last meeting), so the CR is no needed. |
| ZTE | Issue 4-1:  It seems a corner case. We don’t need to specify requirements for this.  Issue 4-2:  If we look at the current status, proposal 1 should be fine.  We also think it is worthy of further discussion if RAN4 can agree there is benefit if SCell BWP switch can be triggered by RRC directly, rather than via SCell activation. If agreements can be achieved then we can send an LS to RAN2.  ZTE’s CR [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip)/[R4-201557](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip)3 address different issue. It only involves BWP switch on PCell rather than SCell. The main intention is adding the applicable scenario and we see the urgency to do this.  Issue 4-3:  We can further work on the wording. There is common understanding of this issue. |

## Summary for 1st round

### Summary of 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 #4-1** | **Issue 4-1: Clarification of requirement applicability when THARQ > TRRCprocessingDelay**  7 companies made comments. 4 companies supported the proposed changes. 3 companies had concern and thought it would be a corner case.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Can we consider the scenario when THARQ > TRRCprocessingDelay?   + Yes (Apple, Intel, Ericsson, NEC)   + No (Mediatek, Nokia, ZTE)   ***Recommendations for 2nd round:***  Encourage companies to make the agreements on whether the changes are needed. Since this topic have been discussed for several meetings, it is better to make decision on whether the change is needed. |
| **Sub-topic #4-2** | **Issue 4-2: Clarification on BWP configuration(s) for active BWP switch**  8 companies made comments. 6 companies supported proposal 1. Among them 1 company thought the proposal 1 is valid for Rel-15 and not for Rel-16. 3 companies supported proposal 2 and 3.  Regarding the changes, most companies supported Option 1, 2 companies accepted Option 2, and 2 companies can accepted Option 3 under some condition.  We do not see the clear objection to proposal 2. So it could be agreeable.  ***Tentative agreements:***   * Update applicability of current RRC based BWP switch to only PCell or PScell in Rel-15.   ***Candidate options:***   * Should RAN4 send LS to RAN2 to clarify how RRC based BWP switch can be applicable to SCell?   + Yes (Apple, Ericsson, Mediatek [if no consensus reached], ZTE)   + No (Nokia) * How to extend RRC based switching delay requirement to be applicable to SCell?   + Scenario 1: In R16 we have direct Scell activation by RRC in which case this parameter is valid, with this feature, RRC-based BWP switch should be performed for any cell. (Nokia)   + Scenario 2: for a SCell, it is feasible to change the parameters of the active BWP ID without changing the active BWP ID via RRC.   + Other scenario is not precluded * How to make changes to reflect the tentative agreement of proposal 1?   + Option 1 (Apple, Intel)      * + Option 2 (Intel, Huawei)      * + Option 3 (Mediatek, Intel)      * Can we agree on ZTE CR [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip) for a separate topic?     ***Recommendations for 2nd round:***  More discussions are needed. Regarding how to make change, can we agree on removing the note in this meeting?  More comments on ZTE CR [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip) are encouraged.  For the CR, it is suggested to keep [R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip) (removing editorial note only) and [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip) (with additional clarification for applicability) as return to. Which one will be approved depends on the agreement. |
| **Sub-topic #4-3** | **Issue 4-3: Clarification on cross-carrier scheduling**  8 companies made comments. 6 companies supported the change and the wording change is suggested. 2 companies opposed it.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Can we clarify that DCI and timer based BWP switch delay requirement are only applicable for DCI received on same carrier and not applicable when the DCI is received through cross-carrier scheduling.   + Yes (NEC, Apple, Mediatek, Intel, Ericsson, ZTE).   + No, we don’t think we should limit the DCI-based BWP switching on same carrier, we have cross-carrier scheduling with same SCS requirements in R15. (Nokia)   + No, the applicability clarification has already been added in the spec (R4-2012242 agreed in the last meeting), so the CR is no needed. (Huawei)   ***Recommendations for 2nd round:***  Need check with Huawei and more discussion with Nokia. |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 | WF on RRC based BWP switching for SCell | Apple |
| #2 | LS on RRC based BWP switching for SCell | Apple |

### CRs/TPs Status

*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** |
| [R4-2016373](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016373.zip) | Return to. |
| R4-2016374 | Return to. |
| [R4-2014238](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014238.zip) | Merged (into [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip)). |
| R4-2014239 | Withdrawn. |
| [R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip) | Return to. |
| R4-2015530 | Return to. |
| [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip) | Return to. |
| R4-2015208 | Return to. |
| [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip) | Return to. |
| R4-2015573 | Return to. |
| [R4-2015300](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015300.zip) | Return to. |
| New Tdoc | Return to. (New Tdoc number is needed for Cat A CR for [R4-2015300](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015300.zip)) |

## Discussion on 2nd round (if applicable)

In the second round the CRs R4-2016373/R4-2016374, CRs R4-2014761/R4-2015208/[R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip)/R4-2015530, CRs R4-2015572/R4-2015573, and CR R4-2015300 need further discussion.

* Please Apple trigger the email discussion for sub-topic #4-1 together with sub-topic #5-3, and further discuss R4-2016373/R4-2016374 and revise them if needed.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-HARQ delay and HARQ timing
* Please Apple trigger the email discussion for sub-topic #4-2, and further discuss the new way forward and draft LS together with CRs R4-2014761/R4-2015208/[R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip)/R4-2015530.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-RRC based BWP switching for SCell
* Please NEC trigger the email discussion for sub-topic #4-3, and revise R4-2015300 if needed. (Cat A CR is also needed if Cat F CR is agreeable)
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-Cross carrier scheduling
* Please ZTE trigger the email discussion for [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip)/[R4-201557](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip)3
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-RRC configuration

[Comments and responses will be collected by moderator here]

|  |  |
| --- | --- |
| **Sub-topic** | **Comments and responses** |
| Sub-topic #4-1  [97e][201] NR\_NewRAT\_RRM\_Core-HARQ delay and HARQ timing | R4-2016373/R4-2016374  **Apple:**  Based on the moderator’s recommendation, we would like to trigger the email discussion for CR R4-2016373 for Sub topics 4-1 and 5-3.  To MTK, ZTE, to address your concern that it is corner case and no requirements need to be specified. For the case when THARQ > TRRCProcessing , UE might need additional time to send ACK/NACK due to ongoing switching procedure and the network might wait to switch BWP or TCI state after ACK is received. A longer switching delay is expected in this case. It might be a corner case, but since it's not precluded, we propose to capture behavior so that there is no ambiguity.  To Nokia, thanks for your comments, please suggest revised wording to capture the behavior.  The CR is uploaded at:  [Update R4-2016373 CR RRC Based BWP TCI Switch R15.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Update%20R4-2016373%20CR%20RRC%20Based%20BWP%20TCI%20Switch%20R15.docx) Please provide your comments directly in the CR. Thanks!  **Qualcomm:**  Thanks Manasa for triggering the discussion and responses to companies’ comments.  We understand the concern/motivation of the CR. However, we do prefer to \***NOT**\* define a requirement for cases which we believe should be avoided as much as possible given that RRC processing delay >= 10ms. In order to address your concern, we’re open to addition of this if this can be restated as e.g. “the requirement is not applicable” because we do want to give an impression that “this is not excluded but should preferably be avoided”. I hope this can be seen as an effort to find the middle ground between two parties.   |  | | --- | | The UE is not required to transmit UL signals or receive DL signals during the time defined by on the cell where RRC-based BWP switch occurs. When   the BWP switching delay may be extended. Where is the time between DL data transmission and acknowledgement as specified in TS 38.213 [3]. |   **Apple:**  Thanks for your response. It was our original proposal in the last meeting to add that no requirements apply when THARQ > TRRCProcessingDelay. We are fine with it if it's acceptable to other companies. This proposal is a compromise as it was difficult to get agreement from companies for that in the last meeting.  All, Please provide feedback if the change to state that requirements are not applicable when THARQ > TRRCProcessingDelay would it be acceptable to you.  Option 1:  When  THARQ > TRRCProcesingDelay the BWP switching delay may be extended.  Option 2: The requirements for RRC based BWP switch delay are applicable when THARQ ≤ TRRCProcessingDelay.  **Nokia:**  We are fine to use the proposal by CH as baseline. We share the same view as Qualcomm here that this should not be common case, but may happen. Hence, we are fine to say that in such situations the delay may be extended.  We also suggest to use the correct parameter name to make readability more clear. Our understanding is that the THARQ (I.e. the HARQ timer) is configured using ‘dl-DataToUL-ACK delay’ and hence the line could be:  When   a longer BWP switching delay is allowed. Where (dl-DataToUL-ACK delay) is the time between DL data transmission and acknowledgement as specified in TS 38.213 [3].  I wonder if this would be agreeable. We’re fine to discuss the wording further.  **Apple:**  Thanks for your comments. The proposal below is the same as what we had in our CR. Regarding THARQ - we have mentioned THARQ  in other requirements. We wonder if it would be necessary to include THARQ (dl-DataToUL-ACK delay) here and if that means we have to change it in other sections as well.  Could you please confirm if this is acceptable:  For BWP switch:  When THARQ > TRRC\_processing  the BWP switching delay may be extended. Where THARQ is the time between DL data transmission and acknowledgement as specified in TS 38.213 [3].  For TCI State switch:  When THARQ > TRRC\_processing  the TCI state switching delay may be extended. Where THARQ is the time between DL data transmission and acknowledgement as specified in TS 38.213 [3].  **Qualcomm:**  Thanks for considering QC’s very late suggestion. If I’m not wrong, based on what Lars said in the email, Nokia might be okay with either way, i.e. “delay may be extended” or “requirement is not applicable” when T\_HARQ is greater than T\_RRC\_processing.  From latency requirement perspective, there are only subtle differences between “delay may be extended” and “requirement is not applicable” unless we specify up to how much it can get extended. However, the latter gives an impression that “this is not excluded but should preferably be avoided” given that min T\_RRC\_processing is greater than 10msec. Along the lines of this, we can also apply the same to BWP switch and TCI State switch, i.e. “the requirement is not applicable”.  [@Manasa Raghavan](mailto:manasa_raghavan@APPLE.COM), [@Dalsgaard, Lars (Nokia - FI/Oulu)](mailto:lars.dalsgaard@NOKIA.COM) and [@Muhammad Kazmi](mailto:muhammad.kazmi@ERICSSON.COM), would this change be acceptable to Apple, Nokia, and Ericsson? Any concerns from other companies?  **Apple:**  Thanks for the update. To be consistent with other parts of the spec, we used similar wording as other requirements. Please find the updated spec at: [R4-2017041 CR RRC Based BWP TCI Switch R15.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/R4-2017041%20CR%20RRC%20Based%20BWP%20TCI%20Switch%20R15.docx)  When  THARQ > TRRCPreocessingDelay a longer switching delay is expected. Where THARQ is the time between DL data transmission and acknowledgement as specified in TS 38.213 [3].  We hope that this is agreeable to all. |
| Sub-topic #4-2  [97e][201] NR\_NewRAT\_RRM\_Core-RRC based BWP switching for SCell | New way forward, draft LS, CRs R4-2014761/R4-2015208/[R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip)/R4-2015530  **Apple:**  Based on the moderator’s recommendation, we would like to trigger the email discussion for Sub topic 4-2 on RRC based BWP switch for SCell.  The draft LS and WF are uploaded at: [Draft LS on RRC BWP Switch for SCell.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell.docx) and [Draft R4-2017039 WF on RRC based BWP switch for SCell.pptx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20R4-2017039%20WF%20on%20RRC%20based%20BWP%20switch%20for%20SCell.pptx)  respectively. Please provide your comments and revisions to the drafts directly and comments to the CRs inline below.  **CRs R4-2014761/R4-2015208**  cid:image003.png@01D6B6A6.82ED3B60  **CRs**[**R4-2015529**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip)**/R4-2015530.**  cid:image005.png@01D6B6A6.82ED3B60  **Huawei:**  For the LS:  From our understanding, it is clear that the BWP switch via firstactiveBWPID is only feasible to sPCell from 38.331. But we are also fine to send an LS for confirmation.  For the WF:  As commented in our paper and 1st round. The current requirements for RRC based BWP switch include not only the BWP change but also changing the parameters of the active BWP. We paste the spec below. So for an activated SCell, it is feasible to change the parameters of the active BWP instead of using the firstactiveBWPID. So we think there is no need to limit the scenarios only to sPCell in R15 or R16.  This related to the WF on slides 2 and 3   |  | | --- | | 8.6.3       RRC based BWP switch delay *Editor Notes: More than one BWP configurations for RRC-based BWP switch on SCell is FFS.*  The requirements in this clause apply to the case that the BWP switch is performed on a single CC with one or more than one BWP configuration(s) configured.  For RRC-based BWP switch, after the UE receives RRC reconfiguration involving active BWP switching or parameter change of its active BWP, UE shall be able to receive PDSCH/PDCCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWP on the serving cell on which BWP switch occurs on the first DL or UL slot right after a time duration of slots which begins from the beginning of DL slot n, where |   For the CRs:  Based on the analysis above, we prefer to only remove the editor notes without any other changes.  **Apple:**  Our comments below for the CRs:  CRs R4-2014761/R4-2015208  cid:image003.png@01D6B6A6.82ED3B60  [Apple] We prefer removing the editor’s note and updating the text as below. Since the title of the section doesn’t include single CC, we prefer to include it in the text.  8.6.3       RRC based BWP switch delay  *~~Editor Notes: More than one BWP configurations for RRC-based BWP switch on SCell is FFS.~~*  The requirements in this clause apply to the case that the BWP switch is performed on a single CC with one or more than one BWP configuration(s) configured *for PCell or PScell*.  CRs [R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip)/R4-2015530.  cid:image005.png@01D6B6A6.82ED3B60  [Apple] We don’t agree with this change. We don’t think RRC based BWP switch with the current requirements is possible by changing BWP core parameters. We propose to capture the correct meaning of RRC based BWP switch as RRC re-configuration to change firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id. We propose the following to be included in the CR for RRC based BWP switch as well:  For RRC-based BWP switch, after the UE receives RRC reconfiguration involving *~~active BWP switching or parameter change of its active BWP~~ change to its firstActiveDownlinkBWP-Id or firstActiveUplinkBWP-Id*, UE shall be able to...  **Intel:**  For the LS:  We are fine with sending it for further clarification.  For the CR:  CRs [R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip)/R4-2015530.  cid:image002.png@01D6B74D.F713C0C0  [Intel]: If we only get rid of the editor notes, it will cause some confusion by the following words in the specification.   |  | | --- | | For RRC-based BWP switch, after the UE receives RRC reconfiguration involving active BWP switching or parameter change of its active BWP, |   The wording “or ” implies that when BWP switching applies to SCell, RRC reconfiguration involving active BWP switching  may still be applied. Therefore, we prefer to clearly specify the applicability for PCell and PScell.  For the WF:  On slide 3, there only list two options.   * Requirements for RRC based BWP switch for SCell (Rel-16 onwards)   + Option 1: No requirements   + Option 2: Extend delay requirements to include SCell de-activation and activation   We’re not sure if some other scenarios existed for the extended delay requirements. For example, only SCell activation delay. It’s more clear if we get the response from RAN2. It’s better that “Other scenario is not precluded” at this stage.  **Huawei:**  Thanks for the discussion. For the RRC switching by changing the parameters, we can’t agree with the proposed changes in Apple’s comments.  It could be observed from the agreed CR R4-1910564 that the case was added on purpose, but why it becomes unfeasible now? The pending issue is about changing the active BWP by firstactiveBWP-ID, which has different descriptions for sPCell and SCell in Ran2’s spec. But we cannot see the different between sPCell and SCell when NW is changing the parameters of the active BWP.  **Ericsson:**  Thanks for the discussion.  RRC based BWP switching requirements in section 8.6.3 are clearly applicable by changing any parameter w/o changing the active BWP ID. In our view this is possible also on active BWP of an activated SCell. However, we are fine to check this from RAN2.  Unfortunately the LS text looks more like drawing conclusion rather than providing all facts and asking question. The current LS and WF are not acceptable to us.  Therefore, we have updated both drafts for clarity. Please see our suggested updates uploaded in the folder:  [Draft LS on RRC BWP Switch for SCell\_Ericsson](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_Ericsson.docx)  [Draft R4-2017039 WF on RRC based BWP switch for SCell Ericsson](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20R4-2017039%20WF%20on%20RRC%20based%20BWP%20switch%20for%20SCell%20Ericsson.pptx)  Secondly we agree with Huawei to only remove the editor notes without any technical change at this stage. We should wait for RAN2 response.  **Qualcomm:**  Thank you for discussion. We share similar view as Ericsson and Huawei. However we have slightly different view on the LS text for RAN2. Please find the modified LS uploaded [here](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_Ericsson_NEC.docx) from NEC point of view/understanding.  **Apple:**  Thanks for the comments and discussion. Is it understanding the BWP parameters can be changed by RRC-reconfiguration message for PCell and PScell? Our understanding is that this is not possible.  For the CR, we propose to modify Editor’s note until we have further clarification from RAN2 as:  Editor's note: RRC based BWP switch for SCell is FFS.  Muhammad, Thanks for the updated WF and LS. We are fine with the updates. We added one additional point in the WF in green.  Venkat, Your update to the LS is not acceptable to us. We prefer to keep it concise as proposed by Ericsson and get clarification on the issue.  The updated WF and LS are uploaded at:  [Draft R4-2017039 WF on RRC based BWP switch for SCell Ericsson Apple.pptx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20R4-2017039%20WF%20on%20RRC%20based%20BWP%20switch%20for%20SCell%20Ericsson%20Apple.pptx)  [Draft LS on RRC BWP Switch for SCell\_Ericsson\_NEC\_Apple.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_Ericsson_NEC_Apple.docx)  **Mediatek:**  Please check Mediatek’s update on the draft LS on the top of Apple’s version as follow. I also update the file’s naming based on chair’s latest suggestion.  <https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_v2_Apple_MTK.docx>  **Intel:**  Please check Intel’s update on the draft LS on top of MTK’s.  <https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_v2_Apple_MTK_Intel2.docx>  in order to make it more clear, the main modification is by the yellow words below:  2. Whether this RRC reconfiguration without modification of BWP-Id for an activated SCell can be believed as a SCell BWP switch.  **NEC:**  Thank you for comments.  Our understanding is it has two scenarios.  1. When the RRC reconfiguration contains single BWP for SCell, RRC based BWP switch is possible without firstActiveBWP id indication. Is it correct understanding? If not we should ask RAN2 about this scenario also.  2. When there are more than one BWP configured in RRC reconfiguration for a SCell, whether change of BWP parameters considered as BWP switch is the point of discussion from our understanding. In our understanding, we should ask RAN2 about this with details about number of BWP configured.  In our view, we think at least above information has to be clearly conveyed/asked to RAN2.  **Apple:**  In our understanding RRC re-configuration of active BWP parameters is not possible for SpCell or activated SCell. Hence, we prefer to clarify this as well with RAN2 and include this in the updated draft: [Draft LS on RRC BWP Switch for SCell\_v2\_Apple2\_MTK\_Intel.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_v2_Apple2_MTK_Intel.docx). Your comments are welcome.  Hua, your addition was missing in the uploaded version and I added it back.  **NEC:**  Could you please clarify your understanding of what is changed by RRC re-configuration when only one BWP is configured for SCell to trigger a BWP switch?  We are asking RAN2 to clarify if RRC based switch is possible with change of BWP parameters, this should be for cases where one or more than one BWP is configured in our understanding.  **Huawei:**  We are generally fine with the current version. We made changes on the wordings as follows in: [Draft LS on RRC BWP Switch for SCell\_v2\_Apple2\_MTK\_Intel\_HW.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_v2_Apple2_MTK_Intel_HW.docx)  “…whether this parameter change triggers a BWP switch or changing. ”  If the intention is to check whether UE will implement the updated BWP parameters upon receiving the RRC command provided that changing the parameter is confirmed feasible, the current wording is a little bit confusing. It seems that we are asking whether it could trigger the switching among configured BWPs by changing the ID.  **Huawei:**  Please check Huawei’s updated on the draft WF on slide 2 in :  [Draft R4-2017039 WF on RRC based BWP switch for SCell Ericsson Apple\_HW.pptx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20R4-2017039%20WF%20on%20RRC%20based%20BWP%20switch%20for%20SCell%20Ericsson%20Apple_HW.pptx)  The changes are shown here as the applicability issue is still pending.   * “Requirements for RRC based BWP switch do not capture applicability of requirements to Pcell and PSCell only”   **Intel:**  From our understanding, firstActiveDownlinkBWP-Id is the only parameter which can’t be modified for an active SCell by RRC signaling. While other parameter can be changed for an active SCell. However, we are not sure whether it can be called ”BWP switch” if we only modify other active BWP parameters. We think BWP-Id is the most important change in BWP switch. RAN2 will clarify this.  By the way, thanks for adding my comments back. I found this issue and upload the file again by changing name with Draft LS on RRC BWP Switch for SCell\_v2\_Apple\_MTK\_Intel2. it’s OK to using your version.  **Nokia:**  We are fine with the latest version of LS.  Please check Nokia’s update on the WF on slide 4.  <https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20R4-2017039%20WF%20on%20RRC%20based%20BWP%20switch%20for%20SCell%20Ericsson%20Apple_HW_Nokia.pptx>  The change is:   * + ~~Can be updated based on outcome in Rel-15, if needed~~   + Can be updated to follow RAN2’s requirements in Rel-16, if needed   **Huawei:**  Thanks for organizing the discussion. As per the moderator’s guidance, the related CRs (R4-2015529 / R4-2014761) are returned to for further check in the 2nd round. But we think new TDoc number maybe needed to update the Editor notes, and the corresponding CR shall be uploaded before DDL.  **ZTE:**  For the WF, we made some update in purple. <https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20R4-2017039%20WF%20on%20RRC%20based%20BWP%20switch%20for%20SCell%20Ericsson%20Apple_HW_Nokia_ZTE.pptx>  For the LS, we are a little bit confusing.  The RRC-based BWP switch delay requirements in clause 8.6.3, TS 38.133, Rel-15, are applicable when the RRC reconfiguration involves active BWP switching or involves any parameter change of the active BWP.  According to RAN4 understanding the *firstActiveDownlinkBWP-Id* or *firstActiveUplinkBWP-Id* defined in TS 38.331 can be changed only for SpCell and for SCell upon activation.  Furthermore, RAN4 would like to ask if the RRC reconfiguration can change any parameter of the already active BWP of an activated SCell or SpCell i.e. without changing the *firstActiveDownlinkBWP-Id* or *firstActiveUplinkBWP-Id* and whether this parameter change triggers a BWP switch or changing.  It seems like RAN4 specified requirements that RAN4 is not sure if it should be specfied and asks RAN2 for confirmation. We don't think this should be the purpose of this LS. The purpose should be whether RRC based BWP switch, by changing firstActiveBWPID or changing active BWP parameters, can trigger a BWP switch for SCell.  **Apple:**  Thanks for the comments.  @Zhongyi, We are fine with WF update. Not sure why “and changing” is needed in LS. What is the “changing” applicable to? I suggest removing it.  @Qian, All companies agree that RRC based switch for SCell with RRC re-config of *firstActiveDownlinkBWP-Id* or *firstActiveUplinkBWP-Id* is not allowed. We are confirming if change of BWP parameter on active BWP is allowed for SCell and SpCell. As BWP parameter change for active BWP for SpCell is also not clear.  @Delia, We are fine with the update to WF.  **Huawei:**  Thanks for the reply. Regarding the “changing”, we understand that companies may have different understanding about BWP switch that some companies hold that only changing the BWPID could be considered as the BWP switch. As we are not sure that if companies are aligned here, so I think “changing” is needed. And also, if we go through RAN1 and RAN2 spec, the BWP changing is a more general definition.  **Apple:**  Is the "changing" referring to *firstActiveDownlinkBWP-Id* or *firstActiveUplinkBWP-Id*change? We have mentioned without change of these in the text already. In RAN4 we use BWP switch, hence we can stick to our terminology.  Thanks All for converging on the WF. The updated version including all companies comments and revisions and agreement in GTW is uploaded: [Draft R4-2017039 WF on RRC based BWP switch for SCell Ericsson Apple2\_HW\_Nokia\_ZTE.pptx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20R4-2017039%20WF%20on%20RRC%20based%20BWP%20switch%20for%20SCell%20Ericsson%20Apple2_HW_Nokia_ZTE.pptx). Your comments are welcome.  **Huawei:**  “Changing” is to cove the case that  changing the parameters without changing the ID if companies have different understanding here. We are fine to keep the original wording if we have the same understanding hereJ.  **Apple:**  We think the original wording is clear and conveys what we want to clarify.  The updated version is uploaded at: [Draft LS on RRC BWP Switch for SCell\_v2\_Apple3\_MTK\_Intel\_HW.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_v2_Apple3_MTK_Intel_HW.docx)  **Apple:**  Thanks for the good discussion and efforts to draft LS and WF. Please find the clean versions uploaded:  [Draft R4-2017039 WF on RRC based BWP switch for SCell v2.pptx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20R4-2017039%20WF%20on%20RRC%20based%20BWP%20switch%20for%20SCell%20v2.pptx)  [Draft LS on RRC BWP Switch for SCell\_v3.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/Draft%20LS%20on%20RRC%20BWP%20Switch%20for%20SCell_v3.docx)  We also need a CR to capture the agreement. Moderator recommended our CR to be merged with MTK. HW also had a CR. It is not clear who should draft the CR with the latest agreement. We are fine to draft the CR as well. Please confirm.  **Huawei:**  Thanks for organizing the discussion. We are fine to capture the new agreement in our CR R4-2015529. Maybe a revision number is needed?  **Apple:**  The formal TDocs for WF and LS for RRC based switch for SCell have been uploaded to the Inbox: [R4-2017039.zip](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/R4-2017039.zip) [R4-2017040.zip](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/R4-2017040.zip) |
| Sub-topic #4-3  [97e][201] NR\_NewRAT\_RRM\_Core-Cross carrier scheduling | R4-2015300  **NEC:**  As per the guidance from moderator and chairman, we would like to trigger the discussion for CR R4-2015300.  From the first round discussion, Huawei comment that clarification or applicability rule specified in this CR is already agreed in last meeting. I am sorry about not noticing (may be missed as it is not at start of the clause) this change is already implemented in the spec. However considering we are specifying applicability of requirements specified in a particular clause at the beginning of the clause, may I propose following change to the CR.  The requirements in this clause only apply to the case that the BWP switch is performed on a single CC with more than one BWP configurations configured~~. Further the requirements in this clause are only applicable for DCI received on same carrier~~ and not applicable when the DCI is received through cross-carrier scheduling.  For DCI-based BWP switch, after the UE receives BWP switching request at DL slot n on a serving cell, UE shall be able to receive PDSCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWP on the serving cell on which BWP switch on the first DL or UL slot occurs right after a time duration of TBWPswitchDelay which starts from the beginning of DL slot n.  The UE is not required to transmit UL signals or receive DL signals until the first DL or UL slot occurs right after a time duration of TBWPswitchDelay which starts from the beginning of DL slot n except DCI triggering BWP switch on the cell where DCI-based BWP switch occurs. The UE is not required to follow the requirements defined in this clause when performing a DCI-based BWP switch between the BWPs in disjoint channel bandwidths or in partially overlapping channel bandwidths. ~~The UE is not required to follow the requirements defined in this clause when performing a DCI-based BWP switch if the serving cell where UE receives DCI for BWP switching request is different from the serving cell on which BWP switch occurs.~~  Please note that text highlighted in yellow is change proposed in 15300.  If the change is agreeable, our understanding is cat A CR is not required for this CR as cross-carrier scheduling requirements are going to be specified in Rel-16.  **Huawei**  Thanks for drafting the CR. It seems you missed an “if” in the change, could you please double check?  For DCI based BWP switch, if the serving cell where UE receives DCI for BWP switch request is different from the serving cell on which BWP switch occurs, the UE is not required to follow the requirements specified in this clause.  **Apple**  Thanks for triggering the discussion. Our understanding is that the spec already captures that requirements only apply for self-scheduling DCI. No strong view on the update. |
| [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip)/[R4-201557](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip)3  [97e][201] NR\_NewRAT\_RRM\_Core-RRC configuration | **ZTE**  Due to it was categorized to BWP switching on SCell, which is not the case, this was not fully discussed in the 1st round.  When UE moves from RRC IDLE/INACTIVE state to RRC CONNECTED state, NW will most likely configure different BWP than initial BWP. UE also needs time for BWP switching for such case. The current BWP switch delay requirements should apply.  For RRC-based BWP switch, after the UE receives RRC configuration (i.e. *RRCSetup* or *RRCResume*) or RRC reconfiguration involving active BWP switching or parameter change of its active BWP, UE shall be able to receive PDSCH/PDCCH (for DL active BWP switch) or transmit PUSCH (for UL active BWP switch) on the new BWP on the serving cell on which BWP switch occurs on the first DL or UL slot right after a time duration of  cid:00100001322d53b10ee738c600001  slots which begins from the beginning of DL slot n, where  Any comments are welcome for the very first version of the CR R4-2015572/73.  **Apple:**  [Apple] In our understanding a RRC configuration provides the initial configuration and doesn’t initiate a BWP switch but , hence we don’t agree with this change as it doesn’t apply to BWP switch requirements.  **ZTE:**  UE is working initial BWP under IDLE/INACTIVE model. After RRC setup/RRC resume UE may be configured with different BWP.  firstActiveDownlinkBWP-Id  If configured for an SpCell, this field contains the ID of the DL BWP to be activated upon performing the RRC (re-)configuration. If the field is absent, the RRC (re-)configuration does not impose a BWP switch.  If configured for an SCell, this field contains the ID of the downlink bandwidth part to be used upon activation of an SCell. The initial bandwidth part is referred to by BWP-Id = 0.  Upon PCell change and PSCell addition/change, the network sets the firstActiveDownlinkBWP-Id and firstActiveUplinkBWP-Id to the same value.  If firstActiveDownlinkBWP-Id is present, UE will be working a new BWP. This fall into BWP switch in our view.  initialDownlinkBWP  The dedicated (UE-specific) configuration for the initial downlink bandwidth-part (i.e. DL BWP#0). If any of the optional IEs are configured within this IE, the UE considers the BWP#0 to be an RRC configured BWP (from UE capability viewpoint). Otherwise, the UE does not consider the BWP#0 as an RRC configured BWP (from UE capability viewpoint). Network always configures the UE with a value for this field if no other BWPs are configured. NOTE1  If no other BWPs are configured, then UE will be working under initialDownlinkBWP. However the parameters compared to Idle mode initial BWP can be different depending on NW configuration. So this also fall into BWP switch.  If you think this is initial configuration of BWP, do you mean that UE can work correctly on the configured BWP by RRCSetup/RRCResume immediately after RRC processing time? In our view RRC processing time doesn't consider UE preparation time for new BWP. However we are also fine if this is common understanding. And we would like to clarify in the spec that for RRCSetup/RRCResume, the BWP switching time is RRC processing time.  **Apple:**  Sorry for the delayed response. I missed the reply from Qian earlier. From the explanation below, we believe that this is considering BWP switch between different states - Idle mode to connected mode. We don’t believe the requirements apply to this case, since we are defining requirements for Active BWP switch. We don’t think the change in the CR is necessary. |

## Summary on 2nd round (if applicable)

*GTW session (November 11, 2020)*

**Issue 4-2: Clarification on BWP configuration(s) for active BWP switch**

* Agreements
  + Send LS to RAN2 clarifying applicability of RRC based switch to SCell
  + Update Editor’s note as:
    - FFS if RRC based BWP switch is applicable to SCell
  + RRC based BWP switch requirements for SCell defined in Rel-15 can be updated based on RAN2 response, if needed
  + Requirements for RRC based BWP switch for SCell (Rel-16 onwards)
    - Can be updated to follow RAN2’s agreements in Rel-16, if needed

*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** |
| R4-2017041 | Agreed (Revised from R4-2016373) |
| R4-2016374 | Agreed (Cat A CR for R4-2017041) |
| R4-2017039 | Approved (WF) |
| R4-2017040 | Approved (LS) |
| R4-2017342 | Agreed (Revised from [R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip)) |
| R4-2015530 | Agreed (Cat A CR for R4-2017342) |
| [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip) | Merged into revised 5529 |
| [R4-201476](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip)2 | Withdrawn (Cat A CR for [R4-2014761](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014761.zip)) |
| R4-2015208 | Withdrawn |
| [R4-2015572](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015572.zip) | Noted |
| R4-2015573 | Withdrawn |
| R4-2017335 | Agreed (Revised from R4-2015300) |

# Topic #5: TCI switching

## Companies’ contributions summary

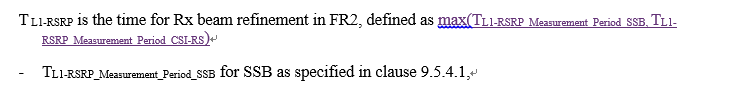
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| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip) | MediaTek inc. | **CR on TCI state**   * On 8.10.3,   Define the minimum requirement when both SSB and CSI-RS for L1-RSRP measurement are configured.   * On 8.10.6,   Replace TOk by 1. |
| R4-2015209 | MediaTek inc. | **CR on TCI state**  Cat A CR for [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip) |
| [R4-2015672](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015672.zip) | ZTE Corporation | **[CR] Specify RRC processing delay in TCI state switching delay**  Specify that the definition of TRRC\_processing is given in Clause 12 in TS 38.331. |
| R4-2015673 | ZTE Corporation | **[CR] Specify RRC processing delay in TCI state switching delay (Cat A)**  Cat A CR for [R4-2015672](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015672.zip) |
| [R4-2016373](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016373.zip) | Apple | **CR to 38.133 on Active BWP switch and Active TCI State Switching requirements - Rel15**  Add note that longer switching delay may be expected if THARQ > TRRCProcessing |
| R4-2016374 | Apple | **CR to 38.133 on Active BWP switch and Active TCI State Switching requirements - Rel16**  Cat A CR for [R4-2016373](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016373.zip) |

## Open issues summary

### Sub-topic 5-1 Condition for TCI switching related to SSB and CSI-RS configuration

**Issue 5-1: Condition for TCI switching related to SSB and CSI-RS configuration**

* Proposal (Mediatek [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip)/R4-2015209)

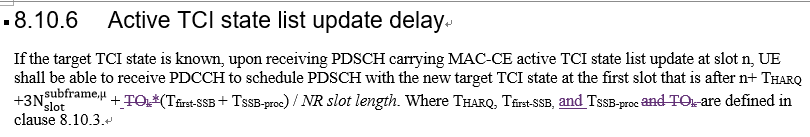


* Recommended WF
  + More discussion is needed.

### Sub-topic 5-2 Active TCI list update

**Issue 5-2: TOk in active TCI list update**

* Proposal (Mediatek [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip)/R4-2015209) Delete TOk in active TCI list update requirement.

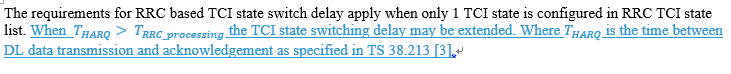


* Recommended WF
  + More discussion is needed.

### Sub-topic 5-3 Condition for TCI switching related to HARQ timing

**Issue 5-3: Condition for TCI switching related to HARQ timing**

* Proposal (Apple R4-2016373/R4-2016374) The other part of CR is discussed in Topic #4



* Recommended WF
  + More discussion is needed.

### Sub-topic 5-4

Please provide the additional comments on the other CRs in Section 5.3.2

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Apple | Sub-topic 5-1 Condition for TCI switching related to SSB and CSI-RS configuration  We agree with the proposal that it’s up to UE implementation on which RS UE chooses to refine RX beam if both SSB and CSI-RS are configured for L1-RSRP measurement.  Sub-topic 5-2 Active TCI list update  We agree with the proposed change.  Sub-topic 5-3 Condition for TCI switching related to HARQ timing  Related to issue 4-1. |
| MTK | Issue 5-1: support the update.  UE doesn’t know follow which RS to execute the L1-RSRP measurement once NW configures both SSB and CSI-RS for measurement. Since RAN4 will only define the minimum requirement, a reasonable solution is the requirement shall follow the longest L1-RSRP delay duration.  Issue 5-2: support the update.  When NW asks UE to update the TCI state list, definitely the new added TCI state wasn’t included in original active TCI list. Otherwise, it’s not expected to update UE’s active TCI list. Thus, UE always needs the timing tracking bullet.  Issue 5-3: The same issue as 4-1. |
| Ericsson | **Issue 5-1: Condition for TCI switching related to SSB and CSI-RS configuration**  We are fine with the proposal.  **Issue 5-2: TOk in active TCI list update**  We are fine with the proposal. It only applies when there is a new TCI state. In case UE receives an identical UE-specific PDSCH TCI state activation bitmap to what it received last time, there is no new active TCI state. So the proposal makes sense.  **Issue 5-3: Condition for TCI switching related to HARQ timing**  We are fine with the proposal. |
| NEC | Issue 5-1:  Ok with the proposal  Issue 5-2:  Ok with the proposal  Issue 5-3:  Similar comments as BWP switching issue. We can agree to proposal as it may not have any implementation impact. |
| Nokia | Issue 5-1: Condition for TCI switching related to SSB and CSI-RS configuration  Is it corner case that network would do this?  This needs more discussion on how to capture this requirement is agreed. Can Mediatek clarify why it would be Max(…) and how the see the UE requirement?  Issue 5-2: TOk in active TCI list update  This needs more discussion. We have different understanding here and this change to us seems contradictive to 8.10.3. The reason for this change: ‘because the new target TCI state should not be in the old active TCI state list. Otherwise, this update is not necessary.’ is not clear to us and would need some clarification.  Issue 5-3: Condition for TCI switching related to HARQ timing  The reason for this change is still unclear. If Apple can clarify the reason for this change. Current change in the CR and reason is unclear. Our understanding is HARQ check and feedback is done on lower layer while the RRC processing higher layer aspect. It is not clear how the condition can be fulfilled. |
| MTK | To Nokia,  Issue 5-1,  From UE’s perspective, NW may configure both L1-RSRP for them. In this situation, UE doesn’t know how to handle it based on current spec.  The reason we using max{} is we suggest to define minimum requirement in RAN4. Otherwise, if we choose any RS as a reference, it will restrict UE’s implementation to follow the spec. But we think in current stage, it’s not a good choice. We can just believe this is a bug fix in R15.  Issue 5-2,  This section title is ‘active TCI state list update delay’. It implies the TCI state will be updated. This equals a new TCI state will be introduced. If no new TCI state will be added, also mentioned in Ericsson’s comments, the TCI list bitmap will be identical with the last one. Thus, no update is needed. |

### CRs/TPs comments collection

Please provide comments in the table below.

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [R4-2015672](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015672.zip)  R4-2015673 | Ericsson : Don’t think the CR is needed even though it is technically correct |
| NEC: We also think CR may not be needed. But no strong view. |
| ZTE: Can Ericsson share with us some thoughts on why this CR seems not needed? In our view it is indeed needed or else the calculation cannot be done and the spec is broken in some sense. |
|  |
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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.*

|  |  |
| --- | --- |
|  | **Status summary** |
| **Sub-topic #5-1** | **Issue 5-1: Condition for TCI switching related to SSB and CSI-RS configuration**  5 companies made comments. 4 companies supported the changes. 1 company questioned it.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Can we agree the CR for TCI switching related to SSB and CSI-RS configuration?   + Yes (Apple, Mediatek, Ericsson, NEC).   + Need more discussion (Nokia).   ***Recommendations for 2nd round:***  More discussion is needed. We wonder if Nokia is OK with the response from Mediatek. |
| **Sub-topic #5-2** | **Issue 5-2: TOk in active TCI list update**  5 companies made the comments. 3 companies supported the changes. 1 company though the update is not needed. 1 company thought more discussion is needed.  ***Tentative agreements:***  N/A  ***Candidate options:***   * Can we agree the CR for TOk in active TCI list update?   + Yes (Apple, Ericsson, NEC).   + No (Mediatek).   + Need more discussion (Nokia).   ***Recommendations for 2nd round:***  More discussion is needed. |
| **Sub-topic #5-3** | **Issue 5-3: Condition for TCI switching related to HARQ timing**  Companies had similar comments as for sub-topic #4-1. So we can merge them.  ***Tentative agreements:***  N/A  ***Candidate options:***  ***Recommendations for 2nd round:***  More discussion is needed. |

*Recommendations on WF/LS assignment*

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

### CRs/TPs Status

*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** |
| [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip) | Return to |
| R4-2015209 | Return to |
| [R4-2015672](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015672.zip) | Return to |
| R4-2015673 | Return to |

## Discussion on 2nd round (if applicable)

In the second round the CRs R4-2016373/R4-2016374, CRs R4-2014761/R4-2015208/[R4-2015529](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015529.zip)/R4-2015530, CRs R4-2015572/R4-2015573, and CR R4-2015300 need further discussion.

* Please Mediatek trigger the email discussion for sub-topic #5-1 and #5-2, and further discuss [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip)/R4-2015209 and revise them if needed.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-SSB&CSI-RS and TOk for TCI switching
* Please ZTE trigger the email discussion for R4-2015672/R4-2015673 to try to convince the other companies.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-RRC processing delay for TCI switching

[Comments and responses will be collected by moderator here]

|  |  |
| --- | --- |
| **Sub-topic** | **Comments and responses** |
| Sub-topic#5-1  [97e][201] NR\_NewRAT\_RRM\_Core-SSB&CSI-RS and TOk for TCI switching | [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip)/R4-2015209  **MTK:**  From UE’s perspective, NW may configure L1-RSRP for both SSB and CSI-RS. In this situation, UE doesn’t know how to handle it based on current spec.  The reason to use max{} in the spec. is we suggest to define minimum requirement in RAN4. Otherwise, if we choose any RS as a reference, it may ask UE to change the implementation to follow the spec. But we think in current stage it’s not a good choice. Some R15 UEs were already in the market. Thus, We suggest to fix this bug in R15 spec.  **MTK:**  It seems no further comments on this CR. I just upload the CR without any change as follow.  <https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/%5BDraft%5D%20R4-2014763%20CR%20on%20TCI%20state%20-R15.docx>  **Nokia:**  We are that RAN4 is defining minimum requirements. However, this does not mean that we do expect that the UE would not be using available RS in an efficient manner when provided by the network. We expect, that is both CSI-RS and SSB RS are available from network the UE would be required to use the RSs. Defining, the requirements with Max() would lead to too relaxed requirements where the network and system gain from making additional RS available for the UE would vanish. We believe this should be Min(). If this is not possible from Rel-15 we believe we can leave the requirements for Rel-15 open (and assume minimum performance – based on Max() assumption) and correct this from Rel-16 directly.  **MTK:**  Since this is the 1st time we raised the issue, we’re fine to continue the discussion.  Processing timing is one side. On the other side, the performance will be better if UE can considered both RSs configured by NW.  Based on current wording, we don’t understand whether UE consider both RSs to guarantee the performance is possible. Current spec. is unclear on how to handle the situation when both RSs are configured.  We’re open on how to clarify the spec. |
| Sub-topic#5-2  [97e][201] NR\_NewRAT\_RRM\_Core-RRC processing delay for TCI switching | [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip)/R4-2015209  **MTK:**  This section title is ‘active TCI state list update delay’. It implies the TCI state will be updated. This equals a new TCI state will be introduced. If no new TCI state will be added, also mentioned in Ericsson’s comments, the TCI list bitmap will be identical with the last one. Thus, no update is needed.  **Nokia:**  We cannot see the why such a limitation and assumption on the network configuration and operation is needed.  **MTK:**  We’re wondering the possibility on this scenario. Could Nokia further explain the reason why NW want to configure the same or less TCI set to UE? |
| Sub-topic#5-4 | R4-2015672/R4-2015673  No comment was received during 2nd round. |

## 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** |
| [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip) | Noted |
| R4-2015209 | Withdrawn (Cat A CR for [R4-2014763](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014763.zip)) |
| [R4-2015672](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015672.zip) | Agreed |
| R4-2015673 | Agreed (Cat A CR for [R4-2015672](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015672.zip)) |

# Topic #6: Others

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2014693](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014693.zip) | CMCC | CR on carrier frequency range of PCell/PSCell for the maximum number of RLM-RS resources |
| R4-2014694 | CMCC | CR on carrier frequency range of PCell/PSCell for the maximum number of RLM-RS resources |
| [R4-2015876](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015876.zip) | Nokia, Nokia Shanghai Bell | Introducing reference to the source of the Lmax and NRLM. |
| R4-2015877 | Nokia, Nokia Shanghai Bell | Introducing reference to the source of the Lmax and NRLM. |
| [R4-2016022](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016022.zip) | Ericsson | CR 36.133 Removal of brackets for SFTD measurements (Rel-15) |
| R4-2016023 | Ericsson | CR 36.133 Removal of brackets for SFTD measurements (Rel-16) |
| [R4-2015731](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015731.zip) | Huawei, HiSilicon | CR to remove intra-frequency ECID requirements for NE-DC 36133 R15 |
| R4-2015732 | Huawei, HiSilicon | CR to remove intra-frequency ECID requirements for NE-DC 36133 R16 |
| [R4-2015733](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015733.zip) | Huawei, HiSilicon | CR to remove inter-RAT ECID requirements for NE-DC 38133 R15 |
| R4-2015734 | Huawei, HiSilicon | CR to remove inter-RAT ECID requirements for NE-DC 38133 R16 |
| [R4-2015159](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015159.zip) | Ericsson | Addition of symbol definitions |
| R4-2015160 | Ericsson | Addition of symbol definitions |

## Open issues summary

### Sub-topic 6-1

Please provide the additional comments on the CRs in Section 6.3.1.

## Companies views’ collection for 1st round

### CRs/TPs comments collection

Please provide the comments in the table below.

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [R4-2014693](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014693.zip)  R4-2014694 | Apple: fine with this CR |
| MTK: Agree. |
| Ericsson: OK |
| NEC: agree |
| Huawei: OK |
| [R4-2015876](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015876.zip)  R4-2015877 | Apple: fine with this CR |
| MTK: Agree. |
| Ericsson: The CR is not needed. The table is not strictly duplicated. There is already the reference in the note of the table in 38.133. |
| NEC: OK |
| Huawei: similar as Ericsson, it seems current spec is correct and complete without the change. |
| [R4-2016022](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016022.zip)  R4-2016023 | Apple: fine with this CR |
| MTK: Agree. |
| Ericsson : OK |
| NEC: OK |
| Huawei: OK |
| [R4-2015731](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015731.zip)  R4-2015732 | Apple: agree with this CR |
| MTK: Agree. |
| Ericsson:  the CR is not needed. According to 38.305, LTE E-CID is supported also in Rel-15 for any serving node. [38.305]4.3.4  Enhanced Cell ID methods In the Cell ID (CID) positioning method, the position of an UE is estimated with the knowledge of its serving ng-eNB, gNB and cell. The information about the serving ng-eNB, gNB and cell may be obtained by paging, registration, or other methods.  Enhanced Cell ID (E‑CID) based on LTE signals positioning refers to techniques which use additional UE measurements and/or NG-RAN radio resource and other measurements to improve the UE location estimate.  Although E-CID based on LTE signals positioning may utilise some of the same measurements as the measurement control system in the RRC protocol, the UE generally is not expected to make additional measurements for the sole purpose of positioning; i.e., the positioning procedures do not supply a measurement configuration or measurement control message, and the UE reports the measurements that it has available rather than being required to take additional measurement actions.  In cases with a requirement for close time coupling between UE and ng-eNB measurements (e.g., TADV type 1 and UE E-UTRA Rx-Tx time difference), the ng-eNB configures the appropriate RRC measurements and is responsible for maintaining the required coupling between the measurements.  In the case of a serving gNB, E‑CID based on LTE signals positioning can be supported using E-UTRA measurements provided by a UE to the serving gNB.  The operation of the Enhanced Cell ID based on LTE signals method is described in clause 8.3. |
| Nokia: Removing the intra-frequency requirement for E-CID PSCC is OK for Rel-15. In NE-DC, SCC E-CID measurements while UE is served by NR PCell are inter-RAT measurements. So, deleting the SCC intra-frequency E-CID measurements is also OK. However, in Rel-16 E-CID measurements based on Rel-16 NR signals is possible. So, intra-frequency measurement requirements should be there for NE-DC case in Rel-16. |
| Huawei:  To Ericsson, we agree that LTE E-CID is supported in Rel-15, but it should be considered as an inter-RAT measurement instead of intra-frequency measurement, since LPP message is transmitted by the NR PCell not LTE PSCell.  To Nokia, we understand this CR is for 36.133 and the E-CID refers to E-CID based on LTE signals. Intra-frequency E-CID measurement based on NR signals are defined in clause 9.9.5 of 38.133, and we agree that it applies also for NE-DC. |
| [R4-2015733](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015733.zip)  R4-2015734 | Apple: agree with this CR |
| MTK: Agree. |
| Ericsson : not needed – see the comment above. intra-frequency LTE E-CID can be configured via Rel-16 LPP via NR PCell if these measurements are on the serving LTE carrier. |
| Nokia: Seems in generally fine. The term E-CID measurements is generic, and it is better to be specific about which measurement we are addressing in general (like it is done in the heading in 9.4.5.1). In 9.4.1, when we say “NR-E-UTRAN FDD or TDD measurement (RSRP, RSRQ, RS-SINR, RSTD, or E-CID)” it is unclear which E-CID measurement is referenced. E-CID in 9.4.1 is deleted but there is one more in the bullet list above the paragraph in which E-CID was deleted. |
| Huawei:  To Ericsson, same as comment above, LTE E-CID can be configured via Rel-16 LPP via NR PCell should be considered as inter-RAT measurement.  To Nokia, we can revise and replace “E-CID” in 9.4.1 to “E-CID RSRP and RSRQ”, if we understand the comments correctly. For the last comment, we understand the bullet is for SA or NR-DC, so the “E-CID” should be kept. |
| [R4-2015159](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015159.zip)  R4-2015160 | Apple: fine with this CR |
| MTK: Agree. |
| NEC: OK |
| Huawei: OK |

## Summary for 1st round

### CRs/TPs Status

*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** |
| [R4-2014693](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014693.zip) | Agreed. |
| R4-2014694 | Agreed. |
| [R4-2015876](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015876.zip) | Return to |
| R4-2015877 | Return to |
| [R4-2016022](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016022.zip) | Agreed |
| R4-2016023 | Agreed |
| [R4-2015731](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015731.zip) | Return to |
| R4-2015732 | Return to |
| [R4-2015733](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015733.zip) | Return to |
| R4-2015734 | Return to |
| [R4-2015159](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015159.zip) | Agreed |
| R4-2015160 | Agreed |

## Discussion on 2nd round (if applicable)

In the second round the CRs R4-2015876/R4-2015877, CRs R4-2015731/R4-2015732, and CRs R4-2015733/R4-2015734 need further discussion.

* Please Nokia trigger the email discussion for R4-2015876/R4-2015877 and revise them if needed.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-5876 Lmax and NRLM
* Please Huawei trigger the email discussion for R4-2015731/R4-2015732 and R4-2015733/R4-2015734, and revise them if needed.
  + With subject of [97e][201] NR\_NewRAT\_RRM\_Core-5731&5733 ECID

[Comments and responses will be collected by moderator here]

|  |  |
| --- | --- |
| **Tdoc** | **Comments and responses** |
| R4-2015876, R4-2015877  [97e][201] NR\_NewRAT\_RRM\_Core-5876 Lmax and NRLM | **Nokia**  Based on the feedback I have updated the CR coversheet and content to clarify that also NRLM in the table 8.1.1-2 is according to 38.213. Hopefully this is agreeable.  Note: this change is not impacting the UE requirements. The change is about ensuring drafting and ensuring that in the future it is clear that both LMAX and NRLM are defined based on 38.213. It is usually not good practise to copy same requirements in different specification (here the LMAX and NRLM requirements) but instead they should refer to origin of the requirement (here 38.213).  **Huawei:**  Thanks for the discussion. Just to confirm – yes, we are fine with the revision.  **Ericsson:**  Thanks, the update is agreeable to Ericsson. |
| R4-2015731, R4-2015732, R4-2015733, R4-2015734  [97e][201] NR\_NewRAT\_RRM\_Core-5731&5733 ECID | **Huawei**  Based on the moderator’s suggestion, this email is to trigger the second round discussion on CRs R4-2015731 (36.133) and R4-2015733 (38.133) on E-CID requirements.  From the first round, the changes in the two CRs are agreeable to Apple, MTK and Nokia (there are some suggestions for further updates from Nokia), while Ericsson had some concerns. The 1st round comments are copied at the end of the email for your convenience.  @Ericsson, we have provided some feedback in the 1st round, could you please let us know if you are fine with the two CRs with the clarifications, or you have some further comments?  @Nokia, we have provided some feedback in the 1st round, could you please let us know if you are fine with the two CRs if, based on your comments, we replace “E-CID” in 9.4.1 to “E-CID RSRP and RSRQ” in R4-2015733 (38.133) , or you have some further suggestions?  Your comments are welcomed. We will share the revised CRs later based on the outcome of the discussion.  **Ericsson**  Thank you for the clarification, but we do not agree:   * Your justification is wrong because if a measurement is on a serving carrier than it is intra-frequency, regardless of which node is configuring.   We have discussed this for a whole year earlier.  So, we do not agree with both CRs.  **Huawei:**  Thanks for the feedback. We have different understanding on the principle you mentioned: if a measurement is on a serving carrier than it is intra-frequency, regardless of which node is configuring  In clause 9.4. of 38.133 (which is for NR-LTE inter-RAT measurement) it is clear from the highlighted sentence that in NE-DC the measurement on the E-UTRA serving carrier configured by NR PCell is an inter-RAT measurement, and the E-UTRA intra-frequency requirements apply.   |  | | --- | | 9.4        Inter-RAT measurements  9.4.1       Introduction  The requirements in this clause are specified for NR−E-UTRAN FDD and NR−E-UTRAN TDD measurements and are applicable without an explicit E-UTRAN neighbour cell list containing physical layer cell identities, for a UE:  -     in RRC\_CONNECTED state, and  -     configured  -     with SA or NR-DC operation mode or configured in NE-DC operation mode by PCell with NRE-UTRAN FDD or TDD measurement (RSRP, RSRQ, RS-SINR, RSTD, or E-CID) on E-UTRA non-serving frequency carrier, or  -     with SA operation mode on NR carrier frequencies with CCA by PCell with NRE-UTRAN FDD or TDD measurement (RSRP, RSRQ, RS-SINR) on E-UTRA non-serving frequency carrier, and  -     configured with an appropriate measurement gap pattern according to Table 9.1.2-3.  When the UE is in NE-DC operation mode and an NRE-UTRAN FDD or TDD measurement (RSRP, RSRQ, RS-SINR, or E-CID) configured by NR PCell is on a E-UTRA serving frequency carrier, then the corresponding E-UTRA intra-frequency measurements requirements specified in clause 8.19 of TS 36.133 [15] shall apply. |   Similarly, in clause 8.17.4 of 36.133, which is for LTE-NR inter-RAT measurement, it is clear from the highlighted sentence that in EN-DC the measurement on the NR serving carrier configured by E-UTRA PCell is an inter-RAT measurement, and the NR intra-frequency requirements apply.   |  | | --- | | 8.17.4    E-UTRA Inter-RAT NR Measurements when Configured with E-UTRA-NR Dual Connectivity Operation  8.17.4.1          E-UTRAN FDD – NR measurements when configured with E-UTRA-NR Dual connectivity  Requirements in this clause apply for the NR capable UE configured with inter-RAT measurement on NR. For UE supporting EN-DC operation, the requirements in this clause shall apply when NR PSCell is configured. When the UE is not configured with E-UTRA-NR dual connectivity mode then the E-UTRAN FDD - NR measurement requirements defined in section 8.1.2.4.21 shall apply. 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. The requirements in this section shall also apply, when the UE is configured to perform NR SRS carrier based switching and using measurement gaps.  The UE shall be able to identify new inter-RAT NR cells and perform SS-RSRP, SS-RSRQ, and SS-SINR measurements of identified inter-RAT NR cells if carrier frequency information is provided by the PCell, even if no explicit neighbour list with physical layer cell identities is provided. |   Based on existing requirements, we understand that whether a measurement on a serving carrier is intra-frequency or inter-RAT depends on the configuring node. For E-CID measurement, it is reasonable to follow the same principle.  Could you please double check and let us know if you can agree to the CRs with above clarifications?  **Nokia:**  As for 5731 I wonder if there is some mix up here. Let me check it again and return. As for the proposed 5733 – it could address our comment – need to get check once a draft is ready.  **Huawei:**  Thanks for the comments. Please find revision for 5733 at [R4-201xxxx revised CR on ECID 38133.docx](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5B97e%5D%5B201%5D%20NR_NewRAT_RRM_Core/Revised%20CR%26WF-LS/R4-201xxxx%20revised%20CR%20on%20ECID%2038133.docx). In the revision, we replaced “E-CID” in 9.4.1 to “E-CID RSRP and RSRQ”.  Your further comments are welcomed. |

## 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** |
| R4-2017338 | Agreed. (revised from R4-2015876) |
| R4-2015877 | Agreed. (Cat A CR to R4-2015876) |
| R4-2017343 | Return to (Revised from [R4-2015731](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015731.zip)) |
| R4-2015732 | Return to (Cat A CR for R4-2017343) |
| R4-2017344 | Return to (Revised from R4-2017344) |
| R4-2015734 | Return to (Cat A CR for R4-2017344) |