Email discussion [R16\_NR\_RRM]

# Topic #1: Rel-16 NR RRM Enhancements WI

## Initial comments

**Topic 1-1: Revised WID (RP-201112)**

* Background: Revised WID RP-201112 proposes to remove “Non-simultaneous UL carrier operation in FR2” objective from WID
* Companies are encouraged to give input on the need for such a modification.

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| **Company Name** | **Comments** |
| Qualcomm | Revised WID is ok. |
| CATT | Ok with the Revised WID. |
| NTT DOCOMO     | The proposed revision looks O.K to us |
| ZTE | WID revision is fine. |
| vivo | Ok with revised WID |
| Intel | We support the revision. |
| Nokia | The revised WID and removal of “Non-simultaneous UL carrier operation in FR2” objective are ok and it is aligned with the corresponding update to the FR2 UE RF WID |

**Topic 1-2: Exception sheet (RP-201113)**

* Background: Exception sheet provides a full list of remaining open issues.
* Companies are encouraged to provide comments whether the exception sheet includes all the remaining open issues, or anything is missing.

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| **Company Name** | **Comments** |
| Qualcomm | Exception sheet is inclusive of all remaining open issues. |
| vivo | Exception sheets provides a full list of remaining open issues. |
| Intel | Exception sheet lists all the remaining open issues. It is OK. |
| Nokia | All the open items should be kept in the exception sheet as proposed |
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**Topic 1-3: Down-scoping and prioritization of the remaining open issues (RP-201099, RP-201114)**

* Background: RP-201099, RP-201114 provide proposals on possible down-scoping of the WI remaining issues.
* Companies are encouraged to provide views on:
* Companies are encouraged to provide views on:
	+ Whether any of the issues below shall be down-scoped in Rel-16 and postponed to Rel-17?
		- Issue 1: UL spatial relation change requirement for BC bit-0 UE
		- Issue 2: SRS carrier switching requirement for inter-band FR2 CA
		- Issue 3: Multiple SCell activation/deactivation requirement in FR2 inter-band CA
		- Issue 4: RRM requirements for CBM in FR2 inter-band CA
		- Other issues to be down-scoped
	+ How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?

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| Company Name | Comments |
| Huawei | For RRM requirements for CBM in FR2 inter-band CA, we hope a conclusion shall be draw in R16.The following items can be put in Rel-17* Requirement for BC bit-0 UE in 2. UL spatial relation change

Multiple SCell activation/deactivation in FR2 inter-band CA |
| Qualcomm | Issue 1: UL spatial relation change* Requirement for BC bit-0: ok to defer to R17
* Whether UE should meet initial Tx timing accuracy requirements after UL spatial relation switch: ok to defer one-shot timing accuracy to R17

Issue 2: SRS carrier switching for inter-band FR2 CA:* Interruption requirements for inter-band and case 1/2/3: ok to defer to R17. Have to wait for RF conclusion anyways.

Issue 3: Multiple SCell activation/deactivation in inter-band FR2 CA* Ok to defer to R17 for CBM UEs  given the current state of MRTD discussion for CBM

Issue 4: RRM requirements for CBM in inter-band FR2 CA:* Ok to defer to R17 for CBM UEs  given the current state of MRTD discussion for CBM

Other issues to defer to R17:* BWP switching on multiple CCs: RRM requirement for partial overlapped timer-based BWP switching on multiple CCs is not essential for R16

How to handle the remaining open issues in case they are not down-scoped: revisit the remaining issues in RAN#89-e and decide. |
| NTT DOCOMO | We're fine to down-scope Issue 2 to 4. On Issue 1, if it is down-scoped, the signalling bit itself should be removed |
| Apple |  Most of remaining open issues have been discussed for many meeting cycles with no compromise from either sides. It would be less likely they can be easily resolved beyond Aug. meeting. It is suggested no further extension in RAN#89e and drop all unsolved issues from the WI scope. Some special cases can be considered in TEI but the bar should be high. To be more focused in RAN4#96e, the follow items are suggested to down scope from WI in RAN#88e.* Requirement for BC bit-0 UE
* Interruptions for inter-band SRS carrier switching in FR2 are waiting for RF room conclusion
* Multiple SCell activation/deactivation in FR2 inter-band CA

 On CBM, we should follow the WF in RAN4#95e.  |
| MTK | Issue 1: UL spatial relation change requirement for BC bit-0 UE* Requirement for BIT-0 UE can be postponed to R17.
* Whether UE should meet initial transmit timing accuracy requirements should be removed from R16, since RAN4 already agreed not to introduce one-shot timing adjustment requirement in R16.

Issue 2: SRS carrier switching requirement for inter-band FR2 CA* Interruptions for inter-band SRS carrier switching in FR2 can be postponed to R17. Since

Issue 3: Multiple SCell activation/deactivation requirement in FR2 inter-band CA* OK to be postponed to R17

Issue 4: RRM requirements for CBM in FR2 inter-band CA* OK to be postponed to R17

One question: does this also include MRTD requirement?  |
| OPPO | Issue 2: SRS carrier switching requirement for inter-band FR2 CAIssue 3: Multiple SCell activation/deactivation requirement in FR2 inter-band CAIssue 4: RRM requirements for CBM in FR2 inter-band CAOk to defer to R17 for issue 2/3/4 considering RF progress on FR2 inter-band CA |
| ZTE | Issue 1: UL spatial relation change* Requirement for BC bit-0: Fine to move to R17
* Whether UE should meet initial Tx timing accuracy requirements after UL spatial relation switch: We think it is important to ensure uplink transmit timing following QCL-ed DL-RS after UL spatial relation switch. The DL receiving timing of QCL-ed DL-RS could be much different than cell timing reference. Without adjusting uplink timing accordingly the gNB demodulation performance could be degraded significantly.

In addition this is different from one shot timing adjustment discussion, which was mainly to handle active TCI state switch and UE autonomous RX beam switch. We don't think UL spatial relation switch was covered by one shot timing adjustment discussion.So our preference is to have some technical discussion on this in the Aug. meeting. If there is no consensus, it should be moved to R17 WIs.Issue 2: SRS carrier switching for inter-band FR2 CA:* It is dependent on RF conclusion. If there is no possbility to have any conclusion in RF room in Aug. meeting then it it fine to move to R17.

Issue 3: Multiple SCell activation/deactivation in inter-band FR2 CA* Ok to move to R17

Issue 4: RRM requirements for CBM in inter-band FR2 CA:* Ok to move to R17

How to handle the remaining open issues in case they are not down-scoped: Move to R17 if no conclusion in Aug. meeting. |
| vivo | Issue 1: UL spatial relation change requirement for BC bit-0 UE* Ok for BIT-0 UE to be postponed to R17.

Issue 2: SRS carrier switching requirement for inter-band FR2 CA* Interruptions for inter-band SRS carrier switching in FR2 : ok to be postponed to R17.

Issue 3: Multiple SCell activation/deactivation requirement in FR2 inter-band CA* OK to be postponed to R17

Issue 4: RRM requirements for CBM in FR2 inter-band CA* OK to be postponed to R17
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| Intel | * Whether any of the issues below shall be down-scoped in Rel-16 and postponed to Rel-17?
	+ Issue 1: UL spatial relation change requirement for BC bit-0 UE
	+ Issue 2: SRS carrier switching requirement for inter-band FR2 CA
	+ Issue 3: Multiple SCell activation/deactivation requirement in FR2 inter-band CA
	+ Issue 4: RRM requirements for CBM in FR2 inter-band CA
	+ Other issues to be down-scoped

Intel: we are fine to the down-scoping of issue 1~4 above. * How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?

Intel: we should try to complete the other remaining open issues as much as possible. The decision can be made in RAN#89e.  |
| Nokia | No down-scope now as many Rel-16 requirements areas have not been progressing sufficiently well and more time for completing Rel-16 is needed for many WID. FR2 UE RF work also need to continue in the August meeting and the discussion of RF and RRM topics should be coordinated in the August meeting. The need for down-scoping should be checked again in the September RAN. |
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# Topic #2: Rel-16 NR L3 CSI-RS measurements WI

## Initial comments

**Topic 2-1: Revised WID (RP-200921)**

* Companies are encouraged to give input whether a revised WID is agreeable.

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| Company Name | Comments |
| Qualcomm | We are fine with the minor changes. |
| ZTE | Fine with the WID revision. |
| Intel | The revision is OK. |
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**Topic 2-2: Exception sheet (RP-200920)**

* Background: Exception sheet provides a full list of remaining open issues.
* Companies are encouraged to provide comments whether the exception sheet includes all remaining open issues or anything is missing.

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| Company Name | Comments |
| Qualcomm | This RP is for RRM enhancement not CSI-RS L3, which should be [RP-200920](http://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_88e/Docs/RP-200920.zip), in which the open issues are completely listed. |
| CATT | Yes, exception is in RP-200920. |
| Intel | RP-200920 is OK. |

**Topic 2-3: Down-scoping and prioritization of the remaining open issues (RP-201230, RP-201099)**

* Background: RP-201230, RP-201099 provide proposals on possible down-scoping and prioritization of the WI remaining issues.
* Companies are encouraged to provide views on:
	+ Whether any of the issues below shall be down-scoped in Rel-16 and postponed to Rel-17?
		- Issue 1: CSI-RS configuration applicability
		- Issue 2: Necessity to define requirements for {D=1 with PRBs ≥ 96}
		- Issue 3: New UE capability on the simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell
		- Issue 4: New UE capability on minimum separation between two slots with CSI-RS resources
		- Issue 5: CMTC for CSI-RS L3 measurement and time-restriction restriction on CSI-RS resources configuration
		- Issue 6: Scheduling restriction and measurement restriction for CSI-RS measurement
		- Other?
	+ How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?

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| Company Name | Comments |
| Huawei | For “CSI-RS configuration applicability: whether to define requirements for {D=1 with PRBs ≥ 96” a conclusion should be drawn in Rel-16 that the configuration is forbidden.For “Whether or not to introduce new UE capability for minimum separation between two slots with CSIRS resource”, the separation is needed in Rel-16 since UE needs the processing time.The following items can be put in Rel-17The collision case between L1 measurement of serving cell and CSI-RS L3 measurement of neighbour cell |
| CMCC | Issue 1 and issue 2 seems to be the same issue.Issue 1-5, we are OK to down scope them in Rel-16 and postpone to Rel-17.For Issue 6 “Scheduling restriction and measurement restriction for CSI-RS measurement”, it is necessaary to specify the related requirements in Rel-16. In detail, issue 6 includes three parts: mixed numerology of serving data and CSI-RS L3 mobility, CSI-RS intra-f measurement in TDD band, RX beam sweeping. All of thses need to be considered and specify UE behaviour in Rel-16 to guarantee the system performance. And the scheduling restriction specified for SSB can be used as baseline to save RAN4 efforts. |
| Qualcomm | Issue 1: CSI-RS configuration applicabilityIssue 2: Necessity to define requirements for {D=1 with PRBs ≥ 96}* {D=3 with PRB>=48} is the majority agreed configuration for Rel-16. The above configuration is not essential for R16 and is ok to defer to R17.

Issue 3: New UE capability on the simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell* we prefer to keep the discussion on this in Rel-16 and hope a conclusion can be reached in RAN4#96-e.

Issue 4: New UE capability on minimum separation between two slots with CSI-RS resources* agree to continue discussing in Rel-16 to address the concern in the UE processing timeline to deal with back to back CSI-RS L3 slots..

Issue 5: CMTC for CSI-RS L3 measurement and time-restriction restriction on CSI-RS resources configuration* CMTC specification depends on other WGs which are officially finished in Rel-16 so we agree to postpone it to Rel-17.

Issue 6: Scheduling restriction and measurement restriction for CSI-RS measurement* Prefer to continue discussing in Rel-16 as it affects the UE implementation.

Other issues to be down-scopedwhether UE is required to perform Rx beam sweeping for CSI-RS based L3  measurement can be down-scoped or postponed to Rel-17 as it requires further discussions/complexity in UE specific to FR2, e.g. the processing delay w.r.t whether to sweep the UE Rx beams. How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?revisit the remaining issues in RAN#89-e and decide. |
| CATT | As the rapporteur company of this WI, we could understand the willing to do more work for this WI in Rel-16. However considering the remaining work and low efficient of E-meeting, the top priority now is to ensure Q3 discussion is focused as much as possible so that we can complete this WI in a timely manner in Rel-16.To this end, I propose to consider a minimum set of exception list and do further enhancement in Rel-17 for others.As shown in our paper RP-201230, we are ok to have further discussion for issue 1-5 in Rel-17. And it seems Issue 3 have already converged to majority views in May meeting. maybe we can have a try for issue 3. |
| Apple | All issues listed can be down scoped from Rel-16 WI as proposed in RP-201099. For issue 5, it is important to introduce this feature. However, due to time limitation, we are OK should be postponed to Rel-17 since time domain restriction has been agreed in the last RAN4 meeting |
| MTK | Issue 1: CSI-RS configuration applicability* This item is not very clear to us. Some clarification is needed

Issue 2: Necessity to define requirements for {D=1 with PRBs ≥ 96}* Remove this from exception sheet. This issue has been discussed several meetings without conclusion, while there is already a majority view on {D=3 with PRBs ≥ 48}

Issue 3: New UE capability on the simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell* This one is not controversial and can be kept.

Issue 4: New UE capability on minimum separation between two slots with CSI-RS resources* Keep in Rel-16 is OK, although we are not 100% confident if conclusion can be reached in Aug.

Issue 5: CMTC for CSI-RS L3 measurement and time-restriction restriction on CSI-RS resources configuration* Time domain restriction is a prerequisite to discuss CSSF within gap requirement. We can agree to have **no new signaling for CMTC**, but a certain time-domain restriction (either re-using SMTC or other signaling) is certainly needed to conclude this WI.

Issue 6: Scheduling restriction and measurement restriction for CSI-RS measurement* This part is important but certainly there is no sufficient time for discussion. As a compromise, we are OK to postpone it to Rel-17.

Other issues to be down-scoped* If it is agreed to have no time domain restriction to be specified in R16, then we should also remove inter-frequency requirements in Rel-16. Because the inter-frequency requirements is deeply coupled with time-domain restriction in both CSSF and delay requirement. For intra-frequency requirement, its corresponding CSSF does not depend on any time-domain restriction.

How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?Handled in a R17 RRM basket WI (to be discussed in Sep RP meeting) |
|  OPPO | Issue 2: Necessity to define requirements for {D=1 with PRBs ≥ 96}* FFS in Rel-17 if possible

Issue 3: New UE capability on the simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell* Agree with CATT that we could have a try in Aug.

Issue 4: New UE capability on minimum separation between two slots with CSI-RS resources* Also not sure we can reach conclusion in Aug. OK to postpone it to Rel-17.

Issue 5: CMTC for CSI-RS L3 measurement and time-restriction restriction on CSI-RS resources configuration* OK with CMTC to be postponed to Rel-17, considering time domain restriction has been agreed in last RAN4 meeting.

Issue 6: Scheduling restriction and measurement restriction for CSI-RS measurement* We could have a try in Aug. If no conclusion then OK to postpone it to Rel-17.

How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?Agree to be handled and decided in Sep RAN meeting |
| ZTE | Issue 1: CSI-RS configuration applicability* The issue is not clear.

Issue 2: Necessity to define requirements for {D=1 with PRBs≥ 96}* It is important to define requirments for  {D=1 with PRBs≥ 96} since the overhead issue is quite significant with D=3 for CSI-RS based mobility and usally lager BW may be configured. In addition the interference due to high density CSI-RS for L3  mobility is also a big issue. If this is delayed to R17 there will be legacy UE issue that NW cannot take advantage of D=1. So RAN4 is to define requirements for {D=1 with PRBs≥ 96} in R16.

Issue 3: New UE capability on the simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell* This can be further discussed in Aug. meeting

Issue 4: New UE capability on minimum separation between two slots with CSI-RS resources* Move to R17 for further discussion.

Issue 5: CMTC for CSI-RS L3 measurement and time-restriction restriction on CSI-RS resources configuration* CMTC may be discussed in R17.
* When defining RRM requirements, time-restriction on CSI-RS resources configuration can be further discussed in Aug. meeting.

Issue 6: Scheduling restriction and measurement restriction for CSI-RS measurement* This absolutely should be further discussed in Aug. meeting. At least it needs to figure out what the impact will be if there is no requirements for scheduling restriction and measurement restriction.

How to handle the remaining open issues in case they are not down-scoped: * Move to R17 if no conclusion in Aug. meeting.
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| vivo |  Issue 1-2 Necessity to define requirements for {D=1 with PRBs ≥ 96}: We prefer down-scoping of this issue to later release. Issue 3: New UE capability on the simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell.We are fine to discuss this in R16.Issue 4: New UE capability on minimum separation between two slots with CSI-RS resourcesWe are fine to discuss this in R16.Issue 5: CMTC for CSI-RS L3 measurement and time-restriction restriction on CSI-RS resources configurationWe think time-restriction for CSI-RS should not be moved to R17 since this is already agreed in R16, based on R4-2009009. The details can be discussed and decided in future RAN4 meetings.On CMTC, it is also agreed in R4-2009009 that is should be discussed in R17.Issue 6: Scheduling restriction and measurement restriction for CSI-RS measurementWe think this should be within R16 scope and is one basic feature.How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?We see quite high possibility that the issues that are not down-scoped can not be finished in RAN4  August. We should discuss them in RAN 89e. Maybe further extension or exception(e.g. square bracket or main-tainence in CR phase) is needed. |
| Intel | * Issue 1: CSI-RS configuration applicability
* Issue 2: Necessity to define requirements for {D=1 with PRBs ≥ 96}

OK to defer to R17.* Issue 3: New UE capability on the simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell

OK to defer to R17. If no UE capability is introduced, is it common understanding that UE is NOT required to handle simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell as baseline?* Issue 4: New UE capability on minimum separation between two slots with CSI-RS resources

OK to defer to R17. But what’s the baseline assumption for R16 UE?* Issue 5: CMTC for CSI-RS L3 measurement and time-restriction restriction on CSI-RS resources configuration

OK to defer the concept to R17. But some time domain restriction is still needed. * Issue 6: Scheduling restriction and measurement restriction for CSI-RS measurement

OK to defer to R17.How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?Revisit in RANP#89e. |
| Xiaomi | Issue 2: Necessity to define requirements for {D=1 with PRBs ≥ 96}* OK to defer to Rel-17

Issue 3: New UE capability on the simultaneous reception of CSI-RS of neighbour cell and SSB of serving cell* This issue is not controversial, it can be further discussed in Aug meeting.

Issue 4: New UE capability on minimum separation between two slots with CSI-RS resources* OK to postpone to Rel-17, this issue has not been converged according to discussion in previous meetings.

Issue 5: CMTC for CSI-RS L3 measurement and time-restriction restriction on CSI-RS resources configuration* Considering time domain restriction has been agreed in last RAN4 meeting, not sure it is necessary to introduced it in Rel-17.

Issue 6: Scheduling restriction and measurement restriction for CSI-RS measurement* Support CMCC’s view, the requirement for scheduling restriction shall be specified in Rel-16. Otherwise, it will impact UE behaviors.

How to handle the remaining open issues in case they are not down-scoped in RAN 88e and not finalized in Aug 2020?* Similar view as other companies, they can be handled and decided in Sep RAN meeting
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# Topic #3: Rel-16 NR Positioning WI

## Initial comments

**Topic 3-1: RP-200899 Status report of WI: NR positioning support; rapporteur: Intel Corporation**

* Background: QC raised a flag for SR – “the list of RAN4 open issues is not completely accurate and needs further discussion. Correspondingly, the exception sheet in RP-200900 will need to be updated”
* Q1: Whether any updates to the SR are needed

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| Company Name | Comments |
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**Topic 3-2: RP-200900 Rel-16 WI Exception for Core part: NR positioning support**

* Background:
	+ E/// raised a flag: “The exception sheet lists, “Report mapping” for RSTD as an open issue. This is related to performance part and should be removed. Core aspects (signaling) are complete and RAN4 already sent LS to RAN2 in RAN4#94-ebis.”
	+ MTK raised a flag: “The exception sheet lists, “Report mapping” for RSTD as an open issue. This is related to performance part and should be removed. Core aspects (signaling) are complete and RAN4 already sent LS to RAN2 in RAN4#94-ebis.”
	+ Intel submitted a discussion paper RP-201117 with the views on the remaining RAN4 open issues handling for Rel-16 NR Positioning WI
* Q1: Whether the exception sheet includes all remaining open issues or any updates needed?

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