**3GPP TSG-RAN WG4 Meeting # 97-e R4-201xxxx**

**Electronic Meeting, 2 – 13 November, 2020**

**Agenda item:** 7.7.1, 7.7.2

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

**Title:** Email discussion summary for [97e][213] NR\_pos\_RRM\_1

**Document for:** Information

# Introduction

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

7.7.1: General

7.7.2: RRM core requirements maintenance (38.133)

7.7.2.1: PRS-RSTD measurement requirements

7.7.2.2 : PRS-RSRP measurement requirements

7.7.2.3: UE Rx-Tx time difference measurement requirements

7.7.2.4: Other requirements

In providing comments, companies are encouraged to:

* Ensure that the comments are inserted in the latest version of the document by checking the folder before uploading
* Use “Track changes” to help identify added comments/changes
* Append the company name and round number before uploading

# Topic #1: RSTD measurement

## Companies’ contributions summary

*Note: Proposal 1 of R4-2016390 is to be treated in email 214. Proposal 4 of R4-2015750 is to be treated under Topic 4.*

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014004 | ZTE Corporation | N.A. |
| [**R4-2014445**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014445.zip) | CATT | **Proposal 1: The calculation of PRS sample duration should be based on the type (type 1 or type 2) as UE used to report {N,T}.**  **Proposal 2: When multiple PRS periodicities are configured, use the maximum PRS resource periodicity among all PRS resource in a same positioning frequency layer.**  **Proposal 3: RSTD measurement period to be defined for cases when PRS occasions are not dropped.**  **Proposal 4: RSTD measurement period is not impacted by PRS-RSRP measurement.** |
| [**R4-2014573**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014573.zip) | Intel Corporation | ***Proposal 1: For RSTD measurement delay, the PRS sample duration shall be based on the same type (either type 1 or type 2) as UE used to report {N,T}****.*  ***Proposal 2: Use the maximum PRS resource periodicity among all PRS resource in a same positioning frequency layer.***  ***Proposal 3: The requirement for RSTD measurement reporting in Rel16 need not account the PRS occasion dropping due to PRS and RRM measurement happened simultaneously*.**  ***Proposal 4: RSTD measurement period shall not be impacted by PRS-RSRP measurement.*** |
| [**R4-2014799**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014799.zip) | OPPO | **Proposal 1: The total measurement period for RSTD when MGs and processing time T do not have overlap between different positioning frequency layers:**   * **If such scenario is considered as a rare case, then adopt option 1 *TRSTD, total* = Σ*TRSTD, i* + *X*** * **If such scenario is considered as a typical case, then adopt option 2 *TRSTD, total* = *max*(*TRSTD, i*) + *max*(*Teffect,i*)**  **to reduce the measurement delay**   **Proposal 2: When more than one PRS resource sets with different periodicities are configured in the same positioning frequency layer, the least common multiple of PRS periodicities in that frequency layer, i.e. *LCM*(TPRS1, TPRS2, …), should be used to derive the measurement period.**  **Proposal 3: For the PRS dropping due to SSB collision, we can support either option 1 or option 3:**   * **Option 1: RSTD measurement period to be defined for case when PRS are not dropped** * **Option 3: The same measurement period requirement shall be met, regardless of whether some the PRS symbols are dropped or not during this measurement period** |
| [**R4-2015750**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015750.zip) | Huawei, HiSilicon | **Proposal 1: RAN4 not to define separate requirements for the case when measurement gaps and processing time T do not have overlap between different positioning frequency layers in Rel-16.**  **Proposal 2: Calculation of PRS sample duration L is based the type (type 1 or type 2) UE reported.**  **Proposal 3: SSB collision is not accounted in PRS measurement period. The PRS measurement requirements apply PRS occasions are not dropped due to collision with SSB.**  **Proposal 4: RSTD measurement period is not impacted by PRS-RSRP measurement.** |
| [**R4-2015751**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015751.zip) | Huawei, HiSilicon | CR based on [R4-2015750](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015750.zip) |
| [**R4-2016390**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016390.zip) | Ericsson | * **Observation 1**: The measurement period requirement in TS 38.133 is not correct (as seen from Figure 1b).   Figure 1a: CSSF=1 for a single frequency layer (L=1),  Figure 1b: CSSF=2 for two frequency layers (L=2) which are sharing the same gap.    **Figure 1a: CSSF=1, L=1 (** PRS on f1**).**    **Figure 1b: L=2 with gap sharing, CSSF=2 ( PRS on f1,  PRS on f2).**   * ***Proposal 2***: *CSSF is the NR concept which is used for all types of measurements including RRM, scaling based on the number of frequency layers is the LTE concept. Hence, for the gap sharing case, CSSF shall be used in the requirements, but Σ over frequency layers shall be replaced with the max operator*:   TRSTD, Total = maxi (TRSTD,i).   * ***Observation 2****: The measurement period requirement in TS 38.133 for the sharing case is not relevant (unnecessarily too long) for the non-sharing case.*     **Figure 2: L=2 without gap sharing, CSSF=1 ( PRS on f1,  PRS on f2).**   * ***Proposal 3****: Measurement period for the non-sharing case shall be:* * TRSTD, Total = maxi (TRSTD,i). * ***Proposal 4****: When RSTD is configured together with PRS-RSRP and the required PRS-RSRP measurement period is longer than that for RSTD (configured without RSTD), then the RSTD measurement continues over the entire PRS-RSRP measurement period.* * ***Proposal 5****: RAN4 decides among the following options for the dropped PRS (which are allowed according to RAN1):*   + - *Option 1: UE extends the RSTD measurement period in a specified way, based on the number of dropped PRS.*     - *Option 2: UE is allowed to extend the RSTD measurement period (clarified in the requirements) if more than N PRS are dropped, but the exact value is not specified.*     - *Option 3: The RSTD requirements apply, regardless of how many PRS are dropped.* |
| [**R4-2016391**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016391.zip) | Ericsson | CR based on [R4-2016390](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015750.zip) |
| [**R4-2016507**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016507.zip) | Qualcomm Incorporated | **Proposal 1: For the purpose of PRS sample duration, calculate based on the type (type 1 or type 2) used by the UE to report {N,T}.**  **Proposal 2: Use the maximum PRS resource periodicity among all PRS resources within a given positioning frequency layer.**  **Proposal 3: RSTD measurement period to be defined for cases when PRS occasions are not dropped.**  **Proposal 4: PRS-RSTD measurement period is not impacted by PRS-RSRP measurement.** |
| [**R4-2016558**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016558.zip) | Qualcomm Incorporated | CR based on [R4-2016507](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015750.zip) |
| R4-2016999 | OPPO | CR to TS 38.133 on measurement period requirements for PRS RSTD, PRS-RSRP and UE Rx-Tx(section 9.9) |

## Open issues summary

### Sub-topic 1-1 Calculation of PRS sample duration Lprs

* Option 1 (CATT, Intel, HW, QC): The calculation of PRS sample duration should be based on the type (type 1 or type 2) as UE used to report {N,T}

Recommended WF: Agree on option 1.

### Sub-topic 1-2 Multiple PRS periodicities

* Option 1 (CATT, Intel, QC): Use the maximum PRS resource periodicity among all PRS resources in a single positioning frequency layer
* Option 2 (OPPO): Use the least common multiple of PRS periodicities among all PRS resources in a single positioning frequency layer

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 1-3 Measurement period extension due to SSB collision

* Option 1 (CATT, Intel, HW, QC, OPPO): RSTD measurement period to be defined for cases when PRS samples are not dropped.
* Option 2 (OPPO): The same measurement period requirement shall be met, regardless of whether some the PRS symbols are dropped or not during this measurement period
* Option 3 (Ericsson): RAN4 decides among the following options for the dropped PRS (which are allowed according to RAN1):
  + - Option a: UE extends the RSTD measurement period in a specified way, based on the number of dropped PRS.
    - Option b: UE is allowed to extend the RSTD measurement period (clarified in the requirements) if more than N PRS are dropped, but the exact value is not specified.
    - Option c: The RSTD requirements apply, regardless of how many PRS are dropped.

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 1-4 Measurement period when configured with PRS-RSRP

* Option 1 (CATT, Intel, HW, QC): RSTD measurement period shall not be impacted by PRS-RSRP measurement.
* Option 2 (Ericsson): When RSTD is configured together with PRS-RSRP and the required PRS-RSRP measurement period is longer than that for RSTD (configured without RSTD), then the RSTD measurement continues over the entire PRS-RSRP measurement period

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 1-5 Measurement period of multiple PRS layers – overlapping case

*Based on existing requirements in 38.133, overlapping case is the case when measurement gaps and processing time T have overlap between different positioning frequency layers.*

* Option 1 (existing requirement): Measurement period of multiple PRS layers is defined as summation of the measurement period in each frequency layer
* Option 2 (Ericsson): CSSF is the NR concept which is used for all types of measurements including RRM, scaling based on the number of frequency layers is the LTE concept. Hence, for the gap sharing case, CSSF shall be used in the requirements, but Σ over frequency layers shall be replaced with the max operator:

TRSTD, Total = maxi (TRSTD,i).

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 1-6 Measurement period of multiple PRS layers – non-overlapping case

*Based on existing requirements in 38.133, non-overlapping case is the case when measurement gaps and processing time T do not have overlap between different positioning frequency layers.*

* Option 1 (OPPO): If such scenario is considered as a rare case, then adopt the sum approach; If such scenario is considered as a typical case, then adopt the max approach to reduce the measurement delay
* Option 2 (HW): Same requirements as for overlapping case (sum approach)
* Option 3 (Ericsson): Measurement period for the *non-sharing case* shall be:
* TRSTD, Total = maxi (TRSTD,i).

Recommended WF: Further discussion needed. Collect companies’ views.

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
|  | **Sub-topic 1-1 Calculation of PRS sample duration Lprs**  **Sub-topic 1-2 Multiple PRS periodicities**  **Sub-topic 1-3 Measurement period extension due to SSB collision**  **Sub-topic 1-4 Measurement period when configured with PRS-RSRP**  **Sub-topic 1-5 Measurement period of multiple PRS layers – overlapping case**  **Sub-topic 1-6 Measurement period of multiple PRS layers – non-overlapping case** |
| Huawei | **Sub-topic 1-1 Calculation of PRS sample duration Lprs**  Support the Recommended WF  **Sub-topic 1-2 Multiple PRS periodicities**  We support option 2, which is more accurate.  There is a difference when PRS1 is period is 8ms and PRS2 is 10ms, and MGRP is 20ms. The Tavailalbe should be 40ms but with current spec it is 20ms.  **Sub-topic 1-3 Measurement period extension due to SSB collision**  Support option 1.  We cannot agree to option 3a as it is for corner cases (SSB and PRS collision). We can also not agree to option 2 or option 3c as it means current requirements defined assuming no PRS dropping will apply even there is PRS dropping. For option 3b, we do not see the technical benefit compared to option 1, but RAN4 needs to spend additional efforts to further discuss the value of N.  **Sub-topic 1-4 Measurement period when configured with PRS-RSRP**  Support option 1. We do not see clear benefit to delay RSTD reporting just for PRS-RSRP which is more like a quality indicator.  **Sub-topic 1-5 Measurement period of multiple PRS layers – overlapping case**  Support option 1.  The current CSSF does not work for PRS measurement because processing time is not considered. For example, for the PRS configuration shown in the Figure, following the current CSSF, CSSF for both PRS layers will be 1. However, if the processing time T is >40ms, then UE cannot measure every instance of the two PRS layers, so CSSF=1 does not work. Therefore, the MG sharing between PRS layers is accounted by defining the total measurement period for multiple PRS layers as the sum of the measurement periods of individual PRS layers.    **Sub-topic 1-6 Measurement period of multiple PRS layers – non-overlapping case**  Support option 2.  Defining split requirements for overlapping case and non-overlapping case would complicate the requirements. In particular, it is not easy to define the exact condition of non-overlapping when it comes to more than 2 PRS layers. In addition, the necessity to have separate requirements for non-overlapping case is also a bit unclear. For example, the application of the requirements depends on network configuration and UE capability, so it may not be very useful for real deployment. Also, RAN4 requirements are minimum requirements and UE is always allowed to perform better than RAN4 requirements, and as such the requirements should be defined based on worst case. |
| CATT | **Sub-topic 1-1 Calculation of PRS sample duration Lprs**  Support the recommended WF.  **Sub-topic 1-2 Multiple PRS periodicities**  Support option 2. The issue raised in OPPO’s paper is valid. Since there is only one MG pattern can be configured in R16, all the PRS resources in the same layer should be in the same gap pattern. If maximum PRS periodicity is used, the other PRS may be not covered in MG. So the least multiple of PRS periodicities in single layer should be used to define measurement period requirements.  **Sub-topic 1-3 Measurement period extension due to SSB collision**  Support option 1. But we are fine to add a note like option 3b or option 3c in the spec for clarification.  **Sub-topic 1-4 Measurement period when configured with PRS-RSRP**  Support option 1. The PRS-RSRP measurement in this case is configured as assistance data and should not impact the primary measurement requirements.  **Sub-topic 1-5 Measurement period of multiple PRS layers – overlapping case**  Support option 1. CSSF is also scaling factor based on the number of frequency layers in our understanding. There is no assumption that UE can process multiple layers simultaneously when the gaps and processing time do not have overlap between layers. And we don’t think this is typical case. So the measurement period of multiple PRS layers should be defined as summation of the measurement period in each frequency layer no matter overlapping case and non-overlapping case.  **Sub-topic 1-6 Measurement period of multiple PRS layers – non-overlapping case**  Support option 2. See the comment in sub-topic 1-5. |
| Ericsson | **Sub-topic 1-1 Calculation of PRS sample duration Lprs**  Do not agree with the recommended WF. The sample parameters (e.g., number of repetitions, number of PRS symbols in slot, etc.) are to be defined in the accuracy requirements, no need to rediscuss the sample definition etc. It’s very clear already from how the requirements are defined that it is associated with a PRS period.  **Sub-topic 1-2 Multiple PRS periodicities**  More discussion is needed. What if e.g. not all PRS resources or resource sets are in gaps.  **Sub-topic 1-3 Measurement period extension due to SSB collision**  Option 3b or option 3c  **Sub-topic 1-4 Measurement period when configured with PRS-RSRP**  Option 2. Even if the minimum required measurement period is not extended for RSTD, the UE shall continue the RSTD measurement if PRS-RSRP measurement period is longer than that for RSTD.  **Sub-topic 1-5 Measurement period of multiple PRS layers – overlapping case**  Option 2, since the current requirement is not correct as shown below in figure 1b:  Figure 1a: CSSF=1 for a single frequency layer (L=1),  Figure 1b: CSSF=2 for two frequency layers (L=2) which are sharing the same gap.    **Figure 1a: CSSF=1, L=1 (** PRS on f1**).**    **Figure 1b: L=2 with gap sharing, CSSF=2 ( PRS on f1,  PRS on f2).**  **Sub-topic 1-6 Measurement period of multiple PRS layers – non-overlapping case**  **Option 3, since using the current requirement is not correct:**    **Figure 2: L=2 without gap sharing, CSSF=1 ( PRS on f1,  PRS on f2).** |
| Intel | **Sub-topic 1-1 Calculation of PRS sample duration Lprs**  The recommended WF can be agreed.  **Sub-topic 1-2 Multiple PRS periodicities**  Support Option 1. The argument for Option 2 is misalignment of different periodicity among the same positioning frequency layer. But for the measurement over the different TRPs among the same positioning frequency layer shall be coordinated by LPP server easily. E.g. in most case the different offset for same periodicity can be work properly. The LCM for this will increase the total requirements significantly which can not verify the typical cases exactly.  **Sub-topic 1-3 Measurement period extension due to SSB collision**  Support Option 1. The SSB collision cases was excluded from Rel16 scope already.  **Sub-topic 1-4 Measurement period when configured with PRS-RSRP**  Support Option 1. RSTD shall be reported independent with PRS RSRP.  **Sub-topic 1-5 Measurement period of multiple PRS layers – overlapping case**  Support Option 1. The argument for Option 2 (Ob1 in [R4-2016390](file:///C:\\Users\\rhuang5\\Documents\\my_work\\LTE_A\\RAN4\\97e\\Docs\\R4-2016390.zip) ) is incorrect because in case of gap available, UE may not complete PRS processing of last PRS. UE needs to wait the PRS after that. E.g. in Fig1b, for the second PRS, UE may not handle it because of UE processing time T is larger than MGRP.  **Sub-topic 1-6 Measurement period of multiple PRS layers – non-overlapping case**  Support Option 1. Regarding to RAN4 requirements , the worst cases is based. No need separated requirements for non-overlapping cases |

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2015751 (Huawei) | CATT: for the second change, there is a typo:  ‘ For RSTD, PRS-RSRP and UE Rx-Tx time difference measurements, the requirements in clauses 9.9.2, 9.9.3 and 9.9.4 do not apply for a PRS resource if ‘ |
| Ericsson: overlaps with Ericsson’s CR in R4-2016391 |
| Intel: can merged with other overlapped CRs (e.g. Ericsson’s CR on the overlapping case, Qualcomm’s CR on the introduction part). |
| R4-2016391 (Ericsson) | Huawei: please refer to our comments on sub-topic 1-5 and 1-6.  [Ericsson]: The CR actually is addressing several issues, not just the measurement period. |
| CATT:   * the WI code is incorrect.   [Ericsson]: why not?   * The measurement period should depend on the conclusion of issues in topic 1 above.   [Ericsson]: The CR actually is addressing several issues, not just the measurement period. |
| Intel: for some change to correct the CR implementation issues (e.g. remove the subclause 9.9.2.4.1 9.9.2.4.2 9.9.2.4.3 9.9.2.4.4) are reasonable. But other technical issues can not be agreed. |
| R4-2016558 (Qualcomm) | Huawei: technically OK, but there are some overlapping change with other CRs, and we can discuss how to merge. |
| Ericsson: overlaps with Ericsson’s CR in R4-2016391 |
| Intel: can merged with other overlapped CRs. |
| R4-2016999 (OPPO) | Huawei: technically OK, but there are some overlapping change with other CRs, and we can discuss how to merge. |
| CATT: CR category may be incorrect. |
| Ericsson: overlaps with Ericsson’s CR in R4-2016391 |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| **Sub-topic#1** |  |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: PRS-RSRP measurement

## Companies’ contributions summary

*Note: R4-2014006 is to be treated in email 214. Proposal 1~3 of R4-2016392 is to be treated in email 214. R4-2014575 is to be treated under Topic 3.*

*Note: For some sub-topics, proposals from companies are same as those for RSTD in Topic 1. For these sub-topics, moderator suggests to avoid duplicating the discussions and follow the same conclusions for RSTD.*

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2015369**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015369.zip) | CATT | CR R4-2009129 was agreed in RAN4#95e meeting but not implemented in 38.133. This CR re-introduces PRS-RSRP measurement report mapping in 38.133 |
| [**R4-2015752**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015752.zip) | Huawei, HiSilicon | **Proposal 1: RAN4 not to define separate requirements for the case when measurement gaps and processing time T do not have overlap between different positioning frequency layers in Rel-16.**  **Proposal 2: PRS-RSRP measurement period is defined based on Number of PRS samples = 4.**  **Proposal 3: Same measurement reporting requirements apply for all kinds of positioning measurement reporting.** |
| [**R4-2015753**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015753.zip) | Huawei, HiSilicon | CR based on R4-2015753 |
| [**R4-2016392**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016392.zip) | Ericsson | * ***Observation 2****: The measurement period requirement in TS 38.133 is not correct (as seen from Figure 1b).*   Figure 1a: CSSF=1 for a single frequency layer (L=1),  Figure 1b: CSSF=2 for two frequency layers (L=2) which are sharing the same gap.    **Figure 1a: CSSF=1, L=1 (** PRS on f1**).**    **Figure 1b: L=2 with gap sharing, CSSF=2 ( PRS on f1,  PRS on f2).**   * ***Proposal 4***: *CSSF is the NR concept which is used for all types of measurements including RRM, scaling based on the number of frequency layers is the LTE concept. Hence, for the gap sharing case, CSSF shall be used in the requirements, but Σ over frequency layers shall be replaced with the max operator*:   TPRS-RSRP, Total = maxi (TPRS-RSRP,i).   * **Observation 3**: The measurement period requirement in TS 38.133 for the sharing case is not relevant (unnecessarily too long) for the non-sharing case.     **Figure 2: L=2 without gap sharing, CSSF=1 ( PRS on f1,  PRS on f2).**   * ***Proposal 5****: Measurement period for the non-sharing case shall be:*   TPRS-RSRP, Total = maxi (TPRS-RSRP,i).   * ***Proposal 6****: When PRS-RSRP is configured together with RSTD/UE Rx-Tx and the required PRS-RSRP measurement period is shorter than that for RSTD/UE Rx-Tx (configured without PRS-RSRP), then the PRS-RSRP measurement continues over the entire RSTD/UE Rx-Tx measurement period.* * ***Proposal 7****: RAN4 decides among the following options for the dropped PRS (which are allowed according to RAN1):*   + - *Option 1: UE extends the PRS-RSRP measurement period in a specified way, based on the number of dropped PRS.*     - *Option 2: UE is allowed to extend the PRS-RSRP measurement period (clarified in the requirements) if more than N PRS are dropped, but the exact value is not specified.*     - *Option 3: The PRS-RSRP requirements apply, regardless of how many PRS are dropped.* |
| [**R4-2016393**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016393.zip) | Ericsson | CR based on R4-2016392 |
| [**R4-2016557**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016557.zip) | Qualcomm Incorporated | CR clarifying some aspects of the PRS-RSRP measurement period definition.  1. Clarify that the measurement period calculation should be done according to the type of PRS processing capability reported by the UE.  2. Clarify the the measurement period calculation should be based on the maximum PRS periodicity in each positioning frequency layer.  3. Define the starting point of the PRS-RSRP measurement period. |

## Open issues summary

### Sub-topic 2-1 Measurement period extension due to SSB collision

* Option 1 (Moderator): Follow the same conclusion as RSTD in sub-topic 1-3

Recommended WF: Agree on option 1.

### Sub-topic 2-2 Measurement period of PRS-RSRP

* Option 1 (HW): PRS-RSRP measurement period is defined based on Number of PRS samples Nsample = 4, which is same as RSTD and UE Rx-Tx time difference.
* Option 2 (Ericsson): When PRS-RSRP is configured together with RSTD/UE Rx-Tx and the required PRS-RSRP measurement period is shorter than that for RSTD/UE Rx-Tx (configured without PRS-RSRP), then the PRS-RSRP measurement continues over the entire RSTD/UE Rx-Tx measurement period

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 2-3 Measurement period of multiple PRS layers – overlapping case

* Option 1 (Moderator): Follow the same conclusion as RSTD in sub-topic 1-5

Recommended WF: Agree on option 1.

### Sub-topic 2-4 Measurement period of multiple PRS layers – non-overlapping case

* Option 1 (Moderator): Follow the same conclusion as RSTD in sub-topic 1-6

Recommended WF: Agree on option 1.

### Sub-topic 2-5 Measurement reporting requirements for non-periodic reporting

* Option 1 (HW): Same measurement reporting requirements apply for all kinds of positioning measurement reporting (periodic and non-periodic).

Recommended WF: Further discussion needed. Collect companies’ views.

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  | **Sub-topic 2-1 Measurement period extension due to SSB collision**  **Sub-topic 2-2 Measurement period of PRS-RSRP**  **Sub-topic 2-3 Measurement period of multiple PRS layers – overlapping case**  **Sub-topic 2-4 Measurement period of multiple PRS layers – non-overlapping case**  **Sub-topic 2-5 Measurement reporting requirements for non-periodic reporting** |
| Huawei | **Sub-topic 2-1 Measurement period extension due to SSB collision**  Support the Recommended WF  **Sub-topic 2-2 Measurement period of PRS-RSRP**  Support option 1. When RSTD or UE Rx-Tx is measured together with PRS-RSRP, all the measurements will be reported together with a single message. If we follow option 2, it means reporting of RSTD or UE Rx-Tx will be delayed due to PRS-RSRP measurement. In addition, based on our simulation results, measurement period for PRS-RSRP can be defined same as that for RSTD or UE Rx-Tx.  **Sub-topic 2-3 Measurement period of multiple PRS layers – overlapping case**  Support the Recommended WF  **Sub-topic 2-4 Measurement period of multiple PRS layers – non-overlapping case**  Support the Recommended WF  **Sub-topic 2-5 Measurement reporting requirements for non-periodic reporting**  Support option 1, which is straightforward. |
| CATT | **Sub-topic 2-1 Measurement period extension due to SSB collision**  Support the recommended WF.  **Sub-topic 2-2 Measurement period of PRS-RSRP**  Support option 1. The UE behavior in option 2 should be implementation dependent.  **Sub-topic 2-3 Measurement period of multiple PRS layers – overlapping case**  Support the recommended WF.  **Sub-topic 2-4 Measurement period of multiple PRS layers – non-overlapping case**  Support the recommended WF.  **Sub-topic 2-5 Measurement reporting requirements for non-periodic reporting**  The measurement delay requirements in aperiodic report can be same for all kinds of positioning reporting. The accuracy requirement in one report should refer to each kind of positioning measurement respectively. |
| Ericsson | **Sub-topic 2-1 Measurement period extension due to SSB collision**  Same as for RSTD  **Sub-topic 2-2 Measurement period of PRS-RSRP**  Option 2 is about UE behavior not the number of samples – the UE needs to continue the measurement until the RSTD/UE Rx-Tx is finished, even if it has already met the requirement.  **Sub-topic 2-3 Measurement period of multiple PRS layers – overlapping case**  Same as for RSTD  **Sub-topic 2-4 Measurement period of multiple PRS layers – non-overlapping case**  Same as for RSTD  **Sub-topic 2-5 Measurement reporting requirements for non-periodic reporting** |
| Intel | **Sub-topic 2-1 Measurement period extension due to SSB collision**  The recommended WF can be agreed.  **Sub-topic 2-2 Measurement period of PRS-RSRP**  Support Option 1.  **Sub-topic 2-3 Measurement period of multiple PRS layers – overlapping case**  The recommended WF can be agreed.  **Sub-topic 2-4 Measurement period of multiple PRS layers – non-overlapping case**  The recommended WF can be agreed.  **Sub-topic 2-5 Measurement reporting requirements for non-periodic reporting**  From the reporting delay requirements themselves, support Option 1. For PRS measurement reporting, the non-periodic reporting means the one report requested by LPP. |

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2015753 (Huawei) | Ericsson: overlaps with Ericsson’s CR in R4-2016393 |
| Intel: suggest to merged with other companies CR to avoid overlapping contents |
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| R4-2016393 (Ericsson) | Huawei: Need to wait for conclusion for sub-topic 2-4 and 2-5  [Ericsson]: The CR actually is addressing several issues, not just the measurement period. |
| CATT:   * the WI code is incorrect.   [Ericsson] Why not?   * The measurement period should depend on the conclusion of issues in topic 1 above.   [Ericsson] The CR contains also other proposals, not only for the measurement period |
| Intel: can’t be agree before the technical issues are resolved. (e.g. the last two paragraphs) |
| R4-2016557 (Qualcomm) | Huawei: technically OK, but there are some overlapping change with other CRs, and we can discuss how to merge. |
| CATT: the measurement period for multiple PRS periodicities should follow the conclusion of RSTD measurement discussed in sub-topic 1-2 |
| Ericsson: overlaps with Ericsson’s CR in R4-2016393 |
| R4-2015369 (CATT) | Huawei: OK. |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| **Sub-topic#1** |  |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #3: UE Rx-Tx time difference measurement

## Companies’ contributions summary

*Note: Proposal 2 of R4-2014003 is to be treated in email 214. Proposal 1 of R4-2016394 is to be treated in email 214. Proposal 3 of R4-2015754 is to be treated under Topic 4.*

*Note: For some sub-topics, proposals from companies are same as those for RSTD in Topic 1 or for PRS-RSRP in Topic 2. For these sub-topics, moderator suggests to avoid duplicating the discussions and follow the same conclusions for RSTD or PRS-RSRP.*

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2014003**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014003.zip) | ZTE Corporation | **Proposal 1: The measurement requirements for UE Rx-Tx timing difference is applicable only if the configured parameters SRS-Slot-offset and SRS-Periodicity for SRS resource for positioning are such that any SRS transmission is within [-50, 50] msec of at least one DL PRS resource of each of the TRPs in the assistance data.** |
| [**R4-2014446**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014446.zip) | CATT | **Proposal 1: SRS periodicity should not be accounted in measurement period.**  **Proposal 2: SRS dropping should not be accounted in measurement period** **but to clarify in the requirements that the measurement period can be longer if some (or more than X) SRS are dropped.**  **Proposal 3: The measurement requirements is applicable only if any SRS transmission is within [-160, 160] msec of at least one DL PRS resource of each of the TRPs in the assistance data. Accuracy requirements are independent of PRS and SRS separation.**  **Proposal 4: No need to clarify UE Rx-Tx measurement requirements in case of NTA\_offset change** |
| [**R4-2015754**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015754.zip) | Huawei, HiSilicon | **Proposal 1: RAN4 not to define separate requirements for the case when measurement gaps and processing time T do not have overlap between different positioning frequency layers in Rel-16.**  **Proposal 2: Same measurement reporting requirements apply for all kinds of positioning measurement reporting.**  **Proposal 4: SRS periodicity or SRS dropping is not accounted in UE Rx-Tx time difference measurement period.**  **Proposal 5: The measurement requirements for UE Rx-Tx timing difference is applicable provided that any SRS transmission is within [-160, +160]ms of at least one DL PRS resource of each TRP.**  **Proposal 6: RAN4 to define Rx-Tx time difference requirements only for the case where SRS resource is in the same band as PRS resource.**  **Proposal 7: UE should continue Rx-Tx time difference measurement, even the timing of its UL transmissions changes during the measurement period.**  **Proposal 8: RAN4 not to capture applicability of UE Rx-Tx time difference requirements in case of NTA\_offset change.** |
| [**R4-2015755**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015755.zip) | Huawei, HiSilicon | CR based on R4-2015754 |
| [**R4-2016394**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016394.zip) | Ericsson | * ***Observation 1****: The measurement period requirement in TS 38.133 is not correct (as seen from Figure 1b).*   Figure 1a: CSSF=1 for a single frequency layer (L=1),  Figure 1b: CSSF=2 for two frequency layers (L=2) which are sharing the same gap.    **Figure 1a: CSSF=1, L=1.**    **Figure 1b: L=2 with gap sharing, CSSF=2.**   * ***Proposal 2***: *CSSF is the NR concept which is used for all types of measurements including RRM, scaling based on the number of frequency layers is the LTE concept. Hence, for the gap sharing case, CSSF shall be used in the requirements, but Σ over frequency layers shall be replaced with the max operator*:   .   * ***Observation 2****: The measurement period requirement in TS 38.133 for the sharing case is not relevant (unnecessarily too long) for the non-sharing case.*     **Figure 2: L=2 without gap sharing, CSSF=1.**   * ***Proposal 3****: Measurement period for the non-sharing case shall be:*   .   * ***Proposal 4****: When UE Rx-Tx is configured together with PRS-RSRP and the required PRS-RSRP measurement period is longer than that for UE Rx-Tx (configured without PRS-RSRP), then the UE Rx-Tx measurement continues over the entire PRS-RSRP measurement period.* * ***Proposal 5****: RAN4 decides among the following options for the dropped PRS (which are allowed according to RAN1):*   + - *Option 1: UE extends the UE Rx-Tx measurement period in a specified way, based on the number of dropped PRS.*     - *Option 2: UE is allowed to extend the UE Rx-Tx measurement period (clarified in the requirements) if more than N PRS are dropped, but the exact value is not specified.*     - *Option 3: The UE Rx-Tx requirements apply, regardless of how many PRS are dropped.* * ***Proposal 6****: RAN4 decides among the following options for the dropped SRS:*   + - *Option 1: UE extends the UE Rx-Tx measurement period in a specified way, based on the number of dropped SRS.*     - *Option 2: UE is allowed to extend the UE Rx-Tx measurement period (clarified in the requirements), but the exact value is not specified.*     - *Option 3: The UE Rx-Tx requirements apply, regardless of how many SRS are dropped.* * ***Observation 3****: SRS and PRS are configured by different network nodes (serving cell and LMF/neighbor cells, respectively).* * ***Observation 4****: The SRS is always transmitted to the serving cell while PRS may have to be received from non-collocated neighbor cells.* * ***Observation 5****: The network cannot guarantee that SRS and PRS occur in a certain time relation and/or with the same periodicity. Even the first SRS may be transmitted much later or get never transmitted in the worst case.* * ***Proposal 7****: UE Rx-Tx measurement period also depends SRS periodicity, e.g.:*   + *can be extended if the SRS periodicity is longer than max()* * ***Proposal 8:*** *The requirements for UE Rx-Tx apply regardless of the time separation between SRS and PRS (LTE approach).* * ***Proposal 9****: It is clarified in UE Rx-Tx measurement requirements (section 9.9.4 in TS 38.133) that the UE shall discard the UE Rx-Tx measurement if the NTA\_offset changes during the measurement period.****Observation 6****: Neighbor cells are not aware of network-configured TA. Neither serving cell nor neighbor cell is aware of autonomous timing adjustments.* * ***Observation 7****: For gNB, it has been already agreed that in both serving and neighbor cells of the UE, gNB Rx-Tx accuracy shall not apply if UE transmit timing changes due to gNB sending Timing Advanced (TA) during the measurement period.* * ***Proposal 10****: The UE shall discard the UE Rx-Tx time difference measurement if the uplink transmission timing (autonomous or based on network-configured TA) changes during the UE Rx-Tx measurement period.* * ***Proposal 11****: The UE Rx-Tx time difference measurement is restarted if the serving cell (PCell, PSCell, or SCell) configured with the SRS for positioning changes during the measurement period. In this case, the UE shall restart the UE Rx-Tx time difference measurement after the SRS reconfiguration on the target cell is complete. Otherwise, the UE shall continue the on-going UE Rx-Tx time difference measurement after the serving cell change.* |
| [**R4-2016395**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016395.zip) | Ericsson | CR based on R4-2016394 |
| [**R4-2016508**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016508.zip) | Qualcomm Incorporated | **Proposal 1: Given that proximity between SRS transmission and PRS reception is desirable for measurement accuracy, it should not be necessary to account for SRS periodicity in the UE Rx-Tx measurement period formulation.**  **Proposal 2: The UE Rx-Tx time difference measurement period requirement should not account for SRS dropping.**  **Proposal 3: The measurement requirements are applicable only if any SRS transmission is within [-X, X] msec of at least one DL PRS resource of each of the TRPs in the assistance data. Accuracy requirements is independent of PRS and SRS separation.**  **Proposal 4: In proposal 3, we suggest X = 25.**  **Proposal 5: Basic requirements for UE Rx-Tx time difference measurements shall be based on the assumption that positioning SRS resources are in the same band as PRS frequency layers.**  **Proposal 6: UE Rx-Tx time difference measurement requirements are not applicable if TA change is received during the measurement period.**  **Proposal 7: UE Rx-Tx time difference measurement requirements are applicable for UE autonomous adjustment of UL timing.**  **Proposal 8: No need to clarify UE Rx-Tx measurement requirements in case of NTA\_offset change.** |
| [**R4-2016559**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016559.zip) | Qualcomm Incorporated | CR based on R4-2016508 |
| [**R4-2014575**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014575.zip) | Intel Corporation | ***Proposal 1: UE Rx-Tx measurement delay depends on PRS periodicity, which can be same as that of PRS RSTD [2].***  ***Proposal 2: It needs NOT to take SRS dropping count into UE Rx-Tx measurement delay requirements.***  ***Proposal 3: UE could continue UE/gNB Rx-Tx time difference measurement during which timing adjustment for its UL transmissions. But whether the accuracy requirements shall be applicable to such case can be FFS.***  **Observation 5: NR UE Rx-Tx time difference measurement accuracy requirements can be applicable when the following condition was satisfied:**  **“The measurement requirements for UE Rx-Tx timing difference is applicable only if the configured parameters SRS-Slot-offset and SRS-Periodicity for SRS resource for positioning are such that any SRS transmission is within [-160, 160] ms”**  ***Proposal 4: RAN4 to define Rx-Tx time difference requirements only for the case where SRS resource is in the same band as PRS resource*** |

## Open issues summary

### Sub-topic 3-1 Measurement period extension due to SSB collision

* Option 1 (Moderator): Follow the same conclusion as RSTD in sub-topic 1-1

Recommended WF: Agree on option 1.

### Sub-topic 3-2 Measurement period when configured with PRS-RSRP

* Option 1 (Moderator): Follow the same conclusion as RSTD in sub-topic 1-4

Recommended WF: Agree on option 1.

### Sub-topic 3-3 Measurement period of multiple PRS layers – overlapping case

* Option 1 (Moderator): Follow the same conclusion as RSTD in sub-topic 1-5

Recommended WF: Agree on option 1.

### Sub-topic 3-4 Measurement period of multiple PRS layers – non-overlapping case

* Option 1 (Moderator): Follow the same conclusion as RSTD in sub-topic 1-6

Recommended WF: Agree on option 1.

### Sub-topic 3-5 Measurement reporting requirements for non-periodic reporting

* Option 1 (Moderator): Follow the same conclusion as RSTD in sub-topic 2-5

Recommended WF: Agree on option 1.

### Sub-topic 3-6 SRS/PRS proximity

* Option 1 (ZTE, CATT, HW, QC, Intel): The measurement requirements are applicable only if any SRS transmission is within [-X, X] msec of at least one DL PRS resource of each of the TRPs in the assistance data. Accuracy requirements is independent of PRS and SRS separation.
  + Option 1a (ZTE): X=50ms
  + Option 1b (CATT, HW, Intel): X=160ms
  + Option 1c (QC): X=25ms
* Option 2 (Ericsson): The requirements for UE Rx-Tx apply regardless of the time separation between SRS and PRS (LTE approach)

Option 3 (compromise proposal from Ericsson): The requirements for UE Rx-Tx apply provided MIN(Tsrs, Tprs) ≤ 2\*X; X = FFS (we can accept X = 160 ms).

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 3-7 Whether SRS periodicity should be accounted in measurement period

* Option 1 (CATT, HW, QC, Intel): No
* Option 2 (Ericsson): Yes, can be extended if the SRS periodicity is longer than max()

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 3-8 Whether SRS dropping should be accounted in measurement period

* Option 1 (CATT, HW, QC, Intel): No
* Option 2 (CATT): UE is allowed to extend the UE Rx-Tx measurement period (clarified in the requirements) if some (or more than X) SRS are dropped, but the exact value is not specified
* Option 3 (Ericsson): RAN4 decides among the following options for the dropped SRS:
  + Option a: UE extends the UE Rx-Tx measurement period in a specified way, based on the number of dropped SRS.
  + Option b (same as option 2): UE is allowed to extend the UE Rx-Tx measurement period (clarified in the requirements), but the exact value is not specified.
  + Option c: The UE Rx-Tx requirements apply, regardless of how many SRS are dropped.

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 3-9 SRS/PRS being in same band

* Option 1 (HW, Intel): RAN4 to define Rx-Tx time difference requirements only for the case where SRS resource is in the same band as PRS resource
* Option 2 (QC): Basic requirements for UE Rx-Tx time difference measurements shall be based on the assumption that positioning SRS resources are in the same band as PRS frequency layers

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 3-10 Measurement period in case of UL timing change: TA command

*Note: it is agreed in RAN4#95-e R4-2008664 that UE Rx-Tx time difference accuracy requirements do not apply under TA change during the measurement period.*

* Option 1 (HW, Intel): UE should continue Rx-Tx time difference measurement (existing requirements are applicable)
* Option 2a (Ericsson): UE shall discard the UE Rx-Tx time difference measurement if the uplink transmission timing (autonomous or based on network-configured TA) changes during the UE Rx-Tx measurement period
* Option 2b (QC): UE Rx-Tx time difference measurement requirements are not applicable if TA change is received during the measurement period.

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 3-11 Measurement period in case of UL timing change: UE autonomous adjustment

* Option 1 (HW, Intel, QC): UE should continue Rx-Tx time difference measurement (existing requirements are applicable)
* Option 2 (Ericsson): UE shall discard the UE Rx-Tx time difference measurement if the uplink transmission timing (autonomous or based on network-configured TA) changes during the UE Rx-Tx measurement period

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 3-12 Measurement period in case of UL timing change: *NTA\_offset* change

* Option 1 (CATT, HW, QC): No need to clarify UE Rx-Tx measurement requirements in case of NTA\_offset change
* Option 2 (Ericsson): It is clarified in UE Rx-Tx measurement requirements (section 9.9.4 in TS 38.133) that the UE shall discard the UE Rx-Tx measurement if the NTA\_offset changes during the measurement period.

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 3-13 UE Rx-Tx at cell change

Proposals

* **Option 1** (Ericsson): The UE Rx-Tx time difference measurement is restarted if the serving cell (PCell, PSCell, or SCell) configured with the SRS for positioning changes during the measurement period. In this case, the UE shall restart the UE Rx-Tx time difference measurement after the SRS reconfiguration on the target cell is complete. Otherwise, the UE shall continue the on-going UE Rx-Tx time difference measurement after the serving cell change.

Recommended WF: Agree on option 1

## Companies views’ collection for 1st round

### Open issues

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| --- | --- |
| **Company** | **Comments** |
|  | **Sub-topic 3-1 Measurement period extension due to SSB collision**  **Sub-topic 3-2 Measurement period when configured with PRS-RSRP**  **Sub-topic 3-3 Measurement period of multiple PRS layers – overlapping case**  **Sub-topic 3-4 Measurement period of multiple PRS layers – non-overlapping case**  **Sub-topic 3-5 Measurement reporting requirements for non-periodic reporting**  **Sub-topic 3-6 SRS/PRS proximity**  **Sub-topic 3-7 Whether SRS periodicity should be accounted in measurement period**  **Sub-topic 3-8 Whether SRS dropping should be accounted in measurement period**  **Sub-topic 3-9 SRS/PRS being in same band**  **Sub-topic 3-10 Measurement period in case of UL timing change: TA command**  **Sub-topic 3-11 Measurement period in case of UL timing change: UE autonomous adjustment**  **Sub-topic 3-12 Measurement period in case of UL timing change: *NTA\_offset* change**  **Sub-topic 3-13 UE Rx-Tx at cell change** |
| ZTE | **Sub-topic 3-6 SRS/PRS proximity**  Support Option 1a. A first step would be to try to converge to Option 1 and then to discuss a specific value. We prefer X = 50 ms. |
| Huawei | **Sub-topic 3-1 Measurement period extension due to SSB collision**  Support the Recommended WF  **Sub-topic 3-2 Measurement period when configured with PRS-RSRP**  Support the Recommended WF  **Sub-topic 3-3 Measurement period of multiple PRS layers – overlapping case**  Support the Recommended WF  **Sub-topic 3-4 Measurement period of multiple PRS layers – non-overlapping case**  Support the Recommended WF  **Sub-topic 3-5 Measurement reporting requirements for non-periodic reporting**  Support the Recommended WF  **Sub-topic 3-6 SRS/PRS proximity**  Support option 1b, which represents a reasonable tradeoff between performance of multi-RTT positioning and NW restriction.  **Sub-topic 3-7 Whether SRS periodicity should be accounted in measurement period**  Support option 1. Based on 38.215, the Tx timing in UE Rx-Tx measurement is not based on SRS. The overall performance of multi-RTT positioning can be addressed by SRS/PRS proximity in sub-topic 3-6.  **Sub-topic 3-8 Whether SRS dropping should be accounted in measurement period**  Support option 1. Similar as sub-topic 1-3, we suggest that the UE Rx-Tx measurement requirements apply only for the case when no SRS is dropped.  **Sub-topic 3-9 SRS/PRS being in same band**  Support option 1, which is addressing the typical use case.  **Sub-topic 3-10 Measurement period in case of UL timing change: TA command**  Support option 1.  Technically, as gNB of neighbour cell is not aware of TA change of the UE, there is anyway a possibility that gNB Rx-Tx is based on a different UL timing as UE Rx-Tx, so option 2a or 2b does not provide clear benefit.  On the other hand, UE TA change may happen frequently. If there is no requirement for this case or measurement period restarts, the UE may never complete the measurement.  **Sub-topic 3-11 Measurement period in case of UL timing change: UE autonomous adjustment**  Support option 1, for the same comments as sub-topic as 3-10. It is noted that the amount of autonomous TA adjustment can be up to several Ts, and although it is smaller compared to gNB triggered TA change, it is large enough from positioning perspective, so we prefer to define same requirements for sub-topic 3-10 and 3-11.  **Sub-topic 3-12 Measurement period in case of UL timing change: *NTA\_offset* change**  Support option 1. In our view *NTA\_offset* change is a very corner case, and thus no need to address it in the specification. |
| CATT | **Sub-topic 3-1 Measurement period extension due to SSB collision**  Support the recommended WF.  **Sub-topic 3-2 Measurement period when configured with PRS-RSRP**  Support the recommended WF.  **Sub-topic 3-3 Measurement period of multiple PRS layers – overlapping case**  Support the recommended WF.  **Sub-topic 3-4 Measurement period of multiple PRS layers – non-overlapping case**  Support the recommended WF.  **Sub-topic 3-5 Measurement reporting requirements for non-periodic reporting**  Sub-topic is PRS-RSRP measurement and includes the periodic reporting.  **Sub-topic 3-6 SRS/PRS proximity**  Support option 1b.  **Sub-topic 3-7 Whether SRS periodicity should be accounted in measurement period**  Support option 1. Since we support option 1 in sub-topic 3-6, the SRS periodicity is no need to be accounted in measurement period of UE Rx-Tx.  **Sub-topic 3-8 Whether SRS dropping should be accounted in measurement period**  Support option 1. But we are fine to add a note like option 2 in the spec for clarification.  **Sub-topic 3-9 SRS/PRS being in same band**  We think the two options are quite similar and slightly prefer option 2.  **Sub-topic 3-10 Measurement period in case of UL timing change: TA command**  Based on the previous agreement, we think the option 2b is reasonable. Option 2a is UE behavior in this case which can be implementation dependent and no need to specify.  **Sub-topic 3-11 Measurement period in case of UL timing change: UE autonomous adjustment**  Follow the same conclusion of sub-topic 3-10. **Sub-topic 3-12 Measurement period in case of UL timing change: *NTA\_offset* change**  Support option 1. |
| Ericsson | **Sub-topic 3-1 Measurement period extension due to SSB collision**  Option is Ok  **Sub-topic 3-2 Measurement period when configured with PRS-RSRP**  Option 1 is Ok  **Sub-topic 3-3 Measurement period of multiple PRS layers – overlapping case**  Option 1 is Ok  **Sub-topic 3-4 Measurement period of multiple PRS layers – non-overlapping case**  Option 1 is Ok  **Sub-topic 3-5 Measurement reporting requirements for non-periodic reporting**  Option 1 is Ok  **Sub-topic 3-6 SRS/PRS proximity**  Can accept Option 3.  Compromise proposal (added as Option 3):  The requirements for UE Rx-Tx apply provided MIN(Tsrs, Tprs) ≤ 2\*X; X = FFS (we can accept X = 160 ms).  **Sub-topic 3-7 Whether SRS periodicity should be accounted in measurement period**  Option 2.  **Sub-topic 3-8 Whether SRS dropping should be accounted in measurement period**  Cannot agree on option 1. Prefer Option 3(b) (same as option 2) but option 3(c) is also Ok.  **Sub-topic 3-9 SRS/PRS being in same band**  See no strong reason to limit explicitly.  **Sub-topic 3-10 Measurement period in case of UL timing change: TA command**  Option 2a.  **Sub-topic 3-11 Measurement period in case of UL timing change: UE autonomous adjustment**  Option 2  **Sub-topic 3-12 Measurement period in case of UL timing change: *NTA\_offset* change**  Option 2  **Sub-topic 3-13 UE Rx-Tx at cell change**  Option 1 |
| Intel | **Sub-topic 3-1 Measurement period extension due to SSB collision**  The recommended WF can be agreed.  **Sub-topic 3-2 Measurement period when configured with PRS-RSRP**  The recommended WF can be agreed.  **Sub-topic 3-3 Measurement period of multiple PRS layers – overlapping case**  The recommended WF can be agreed.  **Sub-topic 3-4 Measurement period of multiple PRS layers – non-overlapping case**  The recommended WF can be agreed.  **Sub-topic 3-5 Measurement reporting requirements for non-periodic reporting**  The recommended WF can be agreed.  **Sub-topic 3-6 SRS/PRS proximity**  Option 1a, 1b, 1c are fine for us. But slightly prefer Option 1b because of X=25 is a little bit small which can restrict NW’s configuration on PRS and SRS.  For Option 2, the LTE approach can be same as NR’s if PRS periodicity is up to 320ms only.  **Sub-topic 3-7 Whether SRS periodicity should be accounted in measurement period**  Support Option 1 because of the clear definition in RAN1.  **Sub-topic 3-8 Whether SRS dropping should be accounted in measurement period**  Support Option 1.  **Sub-topic 3-9 SRS/PRS being in same band**  Both Option 1 and 2 are fine. They are quite same from the requirement perspective.  **Sub-topic 3-10 Measurement period in case of UL timing change: TA command**  Support Option 1. But Option 2a with some clarifications on the applicability can be accepted for us.  For Option 2b, the same principle can be used for sub-topic 2-11.  **Sub-topic 3-11 Measurement period in case of UL timing change: UE autonomous adjustment**  Support Option 1.  **Sub-topic 3-12 Measurement period in case of UL timing change: *NTA\_offset* change**  Both options are fine for us. |
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### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2015755 (Huawei) | CATT:   * there is a typo in 9.9.4.5 * pending on the conclusion of measurement period discussed above. |
| Ericsson: overlaps with Ericsson’s CR in R4-2016395 |
| Intel: suggest to merged with other companies CR to avoid overlapping contents |
|  |
| R4-2016395 (Ericsson) | Huawei: Need to wait for conclusion for sub-topic 3-3 and 3-4.  [Ericsson]: The CR actually is addressing several issues, not just the measurement period. |
| Intel: can’t be agree before the technical issues are resolved. |
|  |
| R4-2016559 (Qualcomm) | Huawei: Need to wait for conclusion for sub-topic 3-10. |
| Ericsson: overlaps with Ericsson’s CR in R4-2016395 |
|  |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| **Sub-topic#1** |  |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #4: Other requirements

## Companies’ contributions summary

*Note: Proposal 2 of R4-2014003 is to be treated in email 214. Proposal 1 of R4-2016394 is to be treated in email 214. Proposal 3 of R4-2015754 is to be treated under Topic 4.*

*Note: For some sub-topics, proposals from companies are same as those for RSTD in Topic 1 or for PRS-RSRP in Topic 2. For these sub-topics, moderator suggests to avoid duplicating the discussions and follow the same conclusions for RSTD or PRS-RSRP.*

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2014005**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014005.zip) | ZTE Corporation | **Proposal 1: The measurement gap is split between RRM measurements and PRS measurements by a certain percentage X%.**  **Proposal 2: The measurement gap is split between RRM measurements and PRS measurements by a certain percentage 70%. The value of X can be further discussed.** |
| [**R4-2014282**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014282.zip) | Apple | LS on new per-UE MG for NR positioning  In R4-2012285, RAN4 has informed about the agreement in RAN4 #96e meeting to specify two new measurement gap patterns for NR positioning measurement.  In addition, followings have been concluded in RAN4 as well:  These two new MG patterns are applicable for PRS and NR/LTE RRM measurements, i.e. new gaps are not shared between PRS and 2G/3G RRM measurements.  These two new MG patterns are defined as per-UE capabilities, i.e., new positioning MG is defined for per-UE MG only. |
| [**R4-2015756**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015756.zip) | Huawei, HiSilicon | **Proposal 1: CSSF is only for the MG sharing between PRS and RRM layers.**  **Proposal 2: Define CSSF based on PRS resource periodicity.**  **Proposal 3: A PRS layer is categorized as long periodicity measurement if PRS resource periodicity multiplied by the product of *dl-prs-MutingBitRepetitionFactor* and number of consecutive zeros in *NR-MutingPattern-r16* is >= 160ms.**  **Proposal 4: Count only a single PRS layer for a gap occasion in CSSF calculation for both PRS and RRM layers.** |
| [**R4-2015757**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015757.zip) | Huawei, HiSilicon | CR based on R4-2015757 |
| [**R4-2015758**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015758.zip) | Huawei, HiSilicon | CR to introduce new measurement gap patterns for positioning in 36.133 |
| [**R4-2016156**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016156.zip) | Nokia, Nokia Shanghai Bell | CR on Refinements on CSSF within gap to include NR positioning measurements  In sub-clauses 9.1.5 and 9.1.5.2, the term “NR measurements for positioning” is used to cover both NR PRS measurements and NR E-CID measurements in clause 9.9.  In sub-clauses 9.1.5.2.5 to 9.1.5.2.7, the term “NR PRS measurements for positioning” is used to cover NR PRS measurements.  Applicability of CSSFwithin\_gap,i=1, i.e.long-periodicity NR measurements for positioning, related to PRS periodicities ≤160 ms is fixed taking into account muting patterns, i.e. effective PRS periodicity of 320 ms or larger defines a long-periodicity NR measurement).  Sub-clauses 9.1.5.2.5 to 9.1.5.2.7 for PRS measurements point to sub-clauses 9.1.5.2.2 to 9.1.5.2.4 related to CSSF sharing rules within measurement gaps. |
| [**R4-2016505**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016505.zip) | Qualcomm Incorporated | **Proposal: If the time span of a DL PRS resource instance is greater than UE reported capability N, measurement requirements do not apply for this resource.**  **Proposal: If the time span of a DL PRS resource instance is greater than the configured measurement gap length, measurement requirements do not apply for this resource.**  **Proposal: For position frequency layers, calculate based on the maximum periodicity across all the PRS resources within each layer and taking into account type2 (inter-period) muting.** |
| [**R4-2016556**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016556.zip) | Qualcomm Incorporated | CR based on R4-2016505 |
| [**R4-2016396**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016396.zip) | Ericsson | * ***Proposal 1****: Long-periodicity NR measurements are the measurements with PRS periodicity >160 ms (with or without muting) or equal 160 ms (with muting).* |
| [**R4-2016397**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016397.zip) | Ericsson | CR based on R4-2016396 |
| [**R4-2015750**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015750.zip) | Huawei, HiSilicon | **Proposal 5: The measurement requirements do not apply for a PRS resource if**   * **the time span of the PRS resource instance is greater than UE reported capability N, or** * **the PRS resource is across two sampling duration of N within duration Lprs** |
| [**R4-2015751**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015751.zip) | Huawei, HiSilicon | CR based on [R4-2015750](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015750.zip) |

## Open issues summary

### Sub-topic 4-1 Framework in defining CSSF for RRM/PRS MG sharing

* Option 1 (ZTE): The measurement gap is split between RRM measurements and PRS measurements by a certain percentage X%, X=[70]
* Option 2 (existing requirement): If measurement of a PRS layer is considered as long periodicity measurement, CSSF for this PRS layer is 1, otherwise this PRS layer would compete for MG with other MG-based RRM measurement.

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 4-2 Condition of long periodicity PRS measurement

*Note: the sub-topic is related to the FFS in Table 9.1.5.2.2-1 in 38.133.*

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| Table 9.1.5.2.2-1: PRS configurations for long-periodicity NR measurements for positioning   |  |  | | --- | --- | | [PRS periodicity] (ms) | DL-PRS-MutingPattern configuration | | 320, 640, … ,10240 | [With or without muting] | | Other values (≤ 160) | FFS | |

* Option 1a (HW): Tprs \* X \* *dl-prs-MutingBitRepetitionFactor* >=160ms
  + X is the number of consecutive zeros in *NR-MutingPattern-r16*
* Option 1b (QC): max(Tprs \* X \* *dl-prs-MutingBitRepetitionFactor*) >=320ms
  + X is the length of *NR-MutingPattern-r16*
* Option 1c (Nokia): Tprs \* X >=320ms
  + X is the size of MutingPattern
* Option 1d (Ericsson): Long-periodicity NR measurements are the measurements with PRS periodicity >160 ms (with or without muting) or equal 160 ms (with muting)

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 4-3 Different resource periodicities in a PRS layer

*Note: PRS resources in the same PRS layer can have different periodicities. The sub-topic is about which periodicity is used to represent the PRS layer in CSSF calculation. This is related to not only whether measurement of the PRS layer is a long periodicity measurement, but also the MG competition when the PRS layer is not considered as long periodicity measurement.*

* Option 1 (QC): For position frequency layers, calculate based on the maximum periodicity across all the PRS resources within each layer and taking into account type1 (inter-period) muting

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 4-4 Number of PRS layers to be counted in CSSF calculation

*Note: the sub-topic is related to the TBD in the following texts in 38.133.*

|  |
| --- |
| For each measurement gap *j* not used for a long-periodicity measurement defined above, count the total number of intra-frequency measurement objects and inter-frequency/inter-RAT measurement objects and [TBD for NR positioning measurements] which are candidates to be measured within the gap *j*. |

* Option 1 (HW): CSSF is only for the MG sharing between PRS and RRM layers. Count only a single PRS layer for a gap occasion in CSSF calculation for both PRS and RRM layers.
* Option 2 (Ericsson): frequency layers for PRS-based positioning measurements

Recommended WF: Further discussion needed. Collect companies’ views.

### Sub-topic 4-5 Applicable scenarios for PRS measurement requirements

* Option 1 (HW, QC): The measurement requirements do not apply for a PRS resource, if time span of the PRS resource instance is greater than UE reported capability N.
* Option 2 (QC): The measurement requirements do not apply for a PRS resource, if the time span of a DL PRS resource instance is greater than the configured measurement gap length
* Option 3 (HW): The measurement requirements do not apply for a PRS resource, if the PRS resource is across two sampling duration of N within duration Lprs

Recommended WF: Further discussion needed. Collect companies’ views. Please note that the listed options are not exclusive to each other, and you can indicate support of none, one or more of the options in your comments.

### Sub-topic 4-6 LS on new per-UE MG for NR positioning (R4-2014282)

Recommended WF: Collect companies’ views on the LS.

### Sub-topic 4-7 UE capability for additional measurement gap patterns for PRS measurements

*Based on the GTW discussion in the Main session on the Rel-16 UE feature list on 3rd Nov (summary document can be found* [*here*](https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_97_e/Inbox/Drafts/%5b97e%5d%5b100%5d%20Main_Session/GTW_Nov03/Draft%20email%20discussion%20summary%20for%20%5b97e%5d%5b117%5d%20R16_UE_%20feature%20-%20GTW.docx)*), Issue 8-1 (UE capability for additional measurement gap patterns for PRS measurements) will be discussed further in email 213. This sub-topic is to collect companies’ views on the proposed UE capability*

*Note: there are typos for MGL and MGRP in Component 2, and it is corrected with change marks based on moderator’s understanding.*

Recommended WF: Please provide your comments on UE feature 11-1 in the next page.

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
| 11. NR Positioning | 11-1 | Additional measurement gap patterns for PRS measurements | 1. MG pattern with MGL=10 ms, MGRP=80 ms for PRS measurements 2. MG pattern with MGL=20 ms, MGRP=160 ms for PRS measurements | RAN1 feature list: 13-1 Common DL PRS Processing Capability | Yes | N/A | The network cannot configure additional MG patterns for PRS measurements | Per UE | No | No | N/A | New MG patterns are applicable for PRS and NR/LTE RRM measurements i.e. new gaps are not shared between PRS and 2G/3G RRM measurements.  The new measurement gap patterns can be requested by the UE for FDD and TDD NR positioning measurements.  The new measurement gap patterns can be requested by the UE and configured by the network only when the UE is configured via LPP with NR positioning measurements requiring such gaps and can only be used during the corresponding positioning measurement period. | Optional with capability signalling |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
|  | **Sub-topic 4-1 Framework in defining CSSF for RRM/PRS MG sharing**  **Sub-topic 4-2 Condition of long periodicity PRS measurement**  **Sub-topic 4-3 Different resource periodicities in a PRS layer**  **Sub-topic 4-4 Number of PRS layers to be counted in CSSF calculation**  **Sub-topic 4-5 Applicable scenarios for PRS measurement requirements**  **Sub-topic 4-6 LS on new per-UE MG for NR positioning (R4-2014282)**  **Sub-topic 4-7 UE capability for additional measurement gap patterns for PRS measurements** |
| ZTE | **Sub-topic 4-1 Framework in defining CSSF for RRM/PRS MG sharing**  We can support Option 2.  **Sub-topic 4-3 Different resource periodicities in a PRS layer**  We prefer to further study this problem since it will impact several other issues.  **Sub-topic 4-4 Number of PRS layers to be counted in CSSF calculation**  Slightly prefer Option 2. |
| Huawei | **Sub-topic 4-1 Framework in defining CSSF for RRM/PRS MG sharing**  Support option 2.  **Sub-topic 4-2 Condition of long periodicity PRS measurement**  Support option 1a, which in our view is the most accurate one.  On option 1b, the PRS resource availability should depend on number of consecutive zeros but not the bit-length of the muting pattern. E.g. the muting pattern is configured with 4 bits 1011, and in this case the available periodicity is extended twice but not 4 times.  The same issue applies to option 1c, and in addition the MutingBitRepetitionFactor should be considered.  **Sub-topic 4-3 Different resource periodicities in a PRS layer**  We need more time to check.  If we take an example of PRS layer with 2 resources, Res1 with 80ms period and Res2 with 320ms, option 1 means the CSSF for this PRS layer is defined based on 320ms. One issue with this option is that there would be no opportunity for UE to measure the additional PRS samples for Res1. In worst case, if the time offsets are different for the two resources, UE will have no opportunity at all to measure Res1.  **Sub-topic 4-4 Number of PRS layers to be counted in CSSF calculation**  Support option 1. The issue is related to sub-topic 1-5, and as we commented there, current CSSF cannot work for MG sharing between PRS layers, so we suggest that CSSF is only for the MG sharing between PRS and RRM layers. In this case, it is reasonable to count only a single PRS layer for a gap occasion.  **Sub-topic 4-5 Applicable scenarios for PRS measurement requirements**  We support all 3 options.  **Sub-topic 4-6 LS on new per-UE MG for NR positioning (R4-2014282)**  We are fine to send the LS.  **Sub-topic 4-7 UE capability for additional measurement gap patterns for PRS measurements**  We are fine with the proposed UE capability 11-1, which is aligned with RAN4 agreements in last meeting. |
| CATT | **Sub-topic 4-1 Framework in defining CSSF for RRM/PRS MG sharing**  Support option 2.  **Sub-topic 4-2 Condition of long periodicity PRS measurement**  Long-periodicity PRS means the PRS periodicity in each frequency layer defined in sub-topic 1-2 is larger than or equal to [320]ms.  **Sub-topic 4-3 Different resource periodicities in a PRS layer**  Follow the same conclusion of sub-topic 1-2.  **Sub-topic 4-4 Number of PRS layers to be counted in CSSF calculation**  Support option 1.  **Sub-topic 4-5 Applicable scenarios for PRS measurement requirements**  We are fine with option 1 and option 2. For option 3, how does the UE decide whether the Lprs is across two sampling duration of N? In my understanding, the N defined in RAN1 just a time duration without definition of start and end. Some further clarification may be needed.  **Sub-topic 4-6 LS on new per-UE MG for NR positioning (R4-2014282)**  Fine with the LS.  **Sub-topic 4-7 UE capability for additional measurement gap patterns for PRS measurements**  We are fine with the proposed UE capability. |
| Ericsson | **Sub-topic 4-1 Framework in defining CSSF for RRM/PRS MG sharing**  Option 2  **Sub-topic 4-2 Condition of long periodicity PRS measurement**  Option 1d  **Sub-topic 4-3 Different resource periodicities in a PRS layer**  Not needed. We should take the per-gap approach, as it is in Rel-15.  **Sub-topic 4-4 Number of PRS layers to be counted in CSSF calculation**  Option 2, ie., rel-15 approach and whichever are configured to be counted.  **Sub-topic 4-5 Applicable scenarios for PRS measurement requirements**  These conditions are not needed. We already refer to measurement capabilities in the requirements.  **Sub-topic 4-6 LS on new per-UE MG for NR positioning (R4-2014282)**  For completeness, the following can also be added:  “The new measurement gap patterns can be requested by the UE for FDD and TDD NR positioning measurements.  The new measurement gap patterns can be requested by the UE and configured by the network only when the UE is configured via LPP with NR positioning measurements requiring such gaps and can only be used during the corresponding positioning measurement period.”  **Sub-topic 4-7 UE capability for additional measurement gap patterns for PRS measurements**  Ok |
|  | **Sub-topic 4-1 Framework in defining CSSF for RRM/PRS MG sharing**  Support Option 2.  **In the last meeting, existing CCSF (e.g. =1 for longer PRS periodcity) was agreed for new gap pattern, which can be used to resolve the gap competition between PRS measurement and legacy RRM.[** R4-2012298]  **Sub-topic 4-2 Condition of long periodicity PRS measurement**  Can be FFS.  In our view, the length of “*NR-MutingPattern-r16* “ and *dl-prs-MutingBitRepetitionFactor* effect the periodicity of available PRS ( the distance between two adjacent PRS occasion) similarly.  For an example, in the figure below the total PRS periodicity was extended by 2.    Thus all the option1a and 1b counted the periodicity extension redundantly here.  **Sub-topic 4-3 Different resource periodicities in a PRS layer**  Support Option 1.  **Sub-topic 4-4 Number of PRS layers to be counted in CSSF calculation**  Support Option 1. The gap sharing among the PRS layers may be addressed by LCM(Tprs,i) already.  **Sub-topic 4-5 Applicable scenarios for PRS measurement requirements**  These options can be applicable together? So the option 1 and 3 can be fine for us.  For option 2, UE can handle this PRS twice.  **Sub-topic 4-6 LS on new per-UE MG for NR positioning ([R4-2014282](file:///C:\\Users\\rhuang5\\Documents\\my_work\\LTE_A\\RAN4\\97e\\Docs\\R4-2014282.zip))**  Can be agreed.  **Sub-topic 4-7 UE capability for additional measurement gap patterns for PRS measurements**  We are fine with the proposed UE capability. |
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### CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| R4-2015757 (Huawei) | CATT: pending on the conclusion of sub-topic 4-2 and sub-topic 4-4. |
| Ericsson: we do not agree, we prefer CR in R4-2016397 |
| Intel: can wait the technical discussion then one CR to collect these conclusion is preferred. |
| R4-2015758 (Huawei) | Ericsson: not correct to refer to Table 9.1.2-2 only covering only some deployments. What about the deployments covered in Table 9.1.2-3? |
| Intel: there new gap can’t be used for LTE PCell/SCell in Rel16. Why shall we define them in TS36.133? |
|  |
| R4-2016156 (Nokia) | Huawei: In our view, we should not use two terms “NR measurements for positioning” and “NR PRS measurements for positioning”. The latter term alone is enough. The reason is that E-CID is based on existing RRM measurements and UE is not expected to take additional measurements for E-CID, so the measurement UE takes for E-CID are already accounted in CSSF for RRM.  Some changes depends on the outcome of the sub-topics. |
| CATT:   * pending on the conclusion of sub-topic 4-2 and sub-topic 4-4. * Collide with R4-2015757 |
| Ericsson: we prefer CR in R4-2016397 |
| R4-2016397 (Ericsson) | Huawei: We do not see the point to have clause 9.1.5.2.5 to 9.1.5.2.7 as they are just referring to 9.1.5.2.2 to 9.1.5.2.4.  Some changes depends on the outcome of the sub-topics. |
| CATT:   * pending on the conclusion of sub-topic 4-2 and sub-topic 4-4. * Collide with R4-2015757 * Do not see the need for section 9.1.5.2.5, 9.1.5.2.6 and 9.1.5.2.7. |
| Intel: can wait the technical discussion then one CR to collect these conclusion for CCSF is preferred. |
| R4-2016556 (Qualcomm) | Huawei: technically OK, but there are some overlapping change with other CRs, and we can discuss how to merge. Also, the change depends on the outcome of sub-topic 4-5. |
| Ericsson: do not agree with the changes, the CR is not needed |
| Intel: technically fine. |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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| --- | --- |
| **Sub-topic#1** |  |

*Recommendations on WF/LS assignment*

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

### CRs/TPs

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

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |