3GPP TSG RAN WG2 Meeting #118-e Draft R2-220xxxx

**Electronic meeting, 9- 20 May, 2022**

**Agenda item:** 6.11.1

**Source:** Intel Corporation

**Title:** Report of [AT118-e][622][POS] 38305 positioning CR (Intel)

**Document for:**  Discussion and decision

# Introduction

This is the report of following offline discussion:

* [AT118-e][622][POS] 38305 positioning CR (Intel)

      Scope: Review and update the rapporteur CR (R2-2204931), also taking into account proposals in the stage 2 related tdocs: R2-2205655, R2-2204690, R2-2205017, R2-2205488, R2-2205805, stage 2 proposals from AI 6.11.2.1.  Also check the CR in R2-2204689 to 36.305.  Discussion should coordinate with the handling of agenda item summaries.

      Intended outcome: Agreed CRs to 38.305 and 36.305 (without CBs if possible)

      Deadline:  Tuesday 2022-05-17 1800 UTC

# Annex: companies’ point of contact

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| --- | --- | --- |
| **Company** | **Point of contact** | **Email address** |
| Intel Corporation | Yi Guo | Yi.guo@intel.com |
| Huawei, HiSilicon | Yinghao Guo | yinghaoguo@huawei.com |
| OPPO | Liu Yang | liuyangbj@oppo.com |
| Apple | Sasha Sirotkin | ssirotkin@apple.com |

# Discussion

## Stage 2 CRs not covered by agenda summary and agenda specific offline discussion

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| --- |
| R2-2204930 Open issues on TS38.305 Intel Corporation  R2-2204931 38.305 CR for Positioning WI Intel Corporation  R2-2204995 Corrections on stage 2 for path RSRP Huawei, HiSilicon  R2-2205655 Stage-2 positioning corrections Apple  R2-2204689 Correction on the reference file of BDS Signal B3I CATT, CAICT  R2-2204690 Correction on the reference file of BDS Signal B3I CATT, CAICT |

**Above 6 stage 2 related contributions were not discussed in any offline discussion, agenda summary, and to be discussed in this offline discussion.**

### How to handle PRU

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| R2-2204930 :The situation on PRU issue is   * RAN2 concluded “RAN2 will not discuss PRUs further without further guidance from RAN1 (LS or feature list).”; "correction information" and "PRU antenna orientation information" should be decided by RAN1; * RAN1 concluded that From RAN1 perspective, no change to RAN1 specifications is needed in order to support PRU in Rel-17. (see R2-2203739) * RAN1 has decided no more discussion on “correction information” obtained from PRU measurements for UE-based positioning in Rel-17. In Rel-17, there is no need to support PRU to provide the antenna orientation information to LMF, and thus no need to specify the PRU antenna orientation information. (see R2-2203743 )   **Proposal 1:** In 5.4.5 Positioning Reference Unit (PRU), remove the EN, keep rest part on PRU as it is; No additional work on this;  **R2-2206333**  PRU  Proposal 6a: RAN2 to discuss if there is no further specification enhancement on PRU in RAN2, postpone the PRU to later release, and send a reply LS to RAN1. |

Rapporteur would like to check companies’ view:

**Discussion point 3.1.1-1: Do you agree the handle on PRU, In 5.4.5 Positioning Reference Unit (PRU), remove the EN, keep rest part on PRU as it is; No additional work on this;*?***

|  |  |  |
| --- | --- | --- |
| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSilicon | Yes |  |
| OPPO | Yes |  |
| Apple | Yes |  |
| Qualcomm | Yes |  |

R2-2205655 proposed to add a Note for PRU as:

NOTE: The known location of a PRU may be delivered to the LMF through OAM or other mechanisms external to the NG-RAN.

**Discussion point 3.1.1-2: Do you agree to add a Note for PRU as:**

NOTE: The known location of a PRU may be delivered to the LMF through OAM or other mechanisms external to the NG-RAN.

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| --- | --- | --- |
| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSilicon | No | The location can also be provided to the LMF by provideLocationInformation, but there is no stage3 imapcts to this. For OAM, it should also be possible but the wording “delivered to” is problematic |
| OPPO | Yes |  |
| Apple | Yes | Considering OAM is the only option it should be reflected in the spec. |
| Qualcomm | No | PRUs are up to implementation in this Release. See also Discussion point 3.1.1-1: "No additional work on this"; so also no new NOTE. |

### Other

Besides PRU, R2-2204930 also proposed editorial changes.

R2-2204930 Open issues on TS38.305 Intel Corporation

R2-2204931 38.305 CR for Positioning WI Intel Corporation

**Discussion point 3.1.2-1: Do you agree the changes (except PRU, discussed separately) in R2-2204931*?***

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| --- | --- | --- |
| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSilicon | Yes | fine with all the changes from Intel |
| OPPO | Yes |  |
| Apple | Yes |  |
| Qualcomm | Yes, except for the change in 8.13.3.4 | A UE can provide the TEG association only after it has transmitted SRS, which may not happen before Step 5. Prefer to remove Step 3b and corresponding description, since this is too much detail for these high-level procedures (e.g., we also do not show measurement gap request, additional assistance data request, etc. in these procedures). |

R2-2204995 Corrections on stage 2 for path RSRP Huawei, HiSilicon provided Path RSRP related changes.

**Discussion point 3.1.3-1: Do you agree the changes in R2-2204995*?***

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| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HISIlicon (proponent) | Yes |  |
| Apple | Yes |  |
| Qualcomm | Yes |  |

R2-2205655 Stage-2 positioning corrections Apple

**Discussion point 3.1.4-1: Do you agree the changes (except PRU, discussed separately) in R2-2205655*?***

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| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSIlicon | Yes, but | The serving gNB determines the resources available for UL-SRS and configures the target device with the UL-SRS resource sets at step 3a. The gNB may request the UE TxTEG association information in step 3b, the target device reports it; the target device also reports the UE TxTEG association information upon the change in the association.  we don’t think this change is correct. for periodic TEG reporting, the UE does not report the TEG association immediately when the change in association happens, but batch-reports it periodically |
| Apple (proponent) | Yes | I guess this depends on the outcome of the [AT118-e][638][POS] discussion |
| Qualcomm | Yes, except for changes in 5.4.5 and 8.13.3.4 | See previous comments. |

R2-2204689 Correction on the reference file of BDS Signal B3I CATT, CAICT

**Discussion point 3.1.5-1: Do you agree the changes in R2-2204689*?***

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| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSIlicon | Yes |  |
| Apple | Yes |  |
| Qualcomm | Yes |  |

R2-2204690 Correction on the reference file of BDS Signal B3I CATT, CAICT

**Discussion point 3.1.6-1: Do you agree the changes in R2-2204690*?***

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| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSIlicon | Yes |  |
| Apple | Yes |  |
| Qualcomm | Yes |  |

## Stage 2 changes for GNSS-Integrity

GNSS integrity related stage 2 CRs have been discussed in Pre-606 R2-2206092 Summary of GNSS Positioning Integrity, and to be discussed in [AT118-e][639][POS] Collection of views on integrity proposals (Ericsson). To avoid duplicated discussion, Rapporteur will not discuss following GNSS integrity related stage 2 CRs in this offline discussion. But We will merge the outcome from [AT118-e][639][POS] in final stage 2 CR.

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| R2-2205017 Correction to stage2 on service level support for GNSS integrity Huawei, HiSilicon  P2 Proposal 2 Agree to the addition of service level integrity aspects in the description  R2-2205488 Corrections on Positioning Integrity parameter table Samsung R&D Institute UK  P3 Proposal 3 Agree to the changes in R2-2205488 to TS 38.305, Table 8.1.2.1b-1. |

## Stage 2 changes for latency reduction

Latency reduction related stage 2 CRs have been discussed in Pre-603 R2-2206340 Summary of AI 6.11.2.1 on latency.

### 3.3.1 PPW and MG related issues

Cross group issue on PPW will be discussed in [AT118-e][635][POS] Cross-group alignment for PPW (Qualcomm). Therefore following PPW related stage 2 will be not discussed in this offline discussion, but the potential outcome (if any) will be merged in final stage 2 CR.

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| R2-2205764 Issues with PRS Processing Window Procedures Qualcomm Incorporated discussion  R2-2205808 Correction to activate pre-configured PPW Signaling Ericsson  R2-2205814 On PPW Configuration Release assistance info Ericsson  R2-2206330 On Resolving PPW Capability discrepancy Ericsson  ***Proposal 11: Support to adopt the same procedure for pre-configured PPW and pre-configured MG. The RAN2 changes including:***   * ***Introduce a new UL MAC CE for PPW activation/deactivation request;*** * ***Add UE capabilities for UL/DL MAC-CE based PPW activation.***   ***The RAN3 changes including:***   * ***Include the UE DL-PRS processing capability outside measurement gaps in the NRPPa MEASUREMENT PRECONFIGURATION REQUIRED message.*** * ***Include information on what has been preconfigured in the target device (MGs and/or PPW) in the NRPPa MEASUREMENT PRECONFIGURATION CONFIRM message.*** * ***Enable the NRPPa MEASUREMENT ACTIVATION message to activate/deactivate preconfigured PRS processing windows.***   ***If agreed, adopt TPs of 38.305, 38.321, 38.331, 37.355 in R2-2205764 as baseline. Send LS to RAN1 and RAN3 for confirmation.***  ***Proposal 12: Regarding UE capability of PPW, UE only needs to report whether PPW is supported or not to LMF.***  ***Proposal 13: Support UE to deactivate PPW via UL RRC message, i.e., in UEPositioningAssistanceInfo.*** |

For correction on PPW, MG, following CR was discussed in Pre-603 R2-2206340 Summary of AI 6.11.2.1 on latency. But it has not been treated.

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| R2-2205810 Clarification on PPW and MG configuration to the same UE and miscellaneous corrections Ericsson  ***Proposal 9: RAN2 to agree the changes in 38.305 draft CR R2-2205810 on pre-configured PPW and MG.*** |

Rapporteur would like to check companies’ view:

**Discussion point 3.3.1-1: Do you agree the changes in 38.305 draft CR R2-2205810 on pre-configured PPW and MG.*?***

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| --- | --- | --- |
| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSlicon | No | For the change below, we wonder whether concrete agreement in R1 has been made on this. If not, at least need to confirm with R1  NOTE: Network does not provide configuration for pre-configured measurement gap and pre-configured PRS processing window for the same UE.  For the change below,  The UE may also request to activate pre-configured measurement gaps as described in clause 7.7.2.  Clause 6.2.4 has already captured it 6.2.4 Medium Access Control (MAC) for NR The MAC protocol for NR supports activation and deactivation of configured semi-persistent SRS resource sets as specified in TS 38.321 [39] to support NG-RAN measurements for NR positioning.  The MAC protocol for NR also supports request of positioning measurement gap activation and deactivation from a UE, and activation and deactivation of pre-configured measurement gap from the NG-RAN as specified in TS 38.321 [39].  The MAC protocol for NR can also be used to activate and deactivate of PRS Processing Window as specified in TS 38.321 [39]. |
| Apple | Yes |  |
| Qualcomm | No | PPW and MG can both be pre-configured (and anyhow up to the NW). |

### 3.3.2 Preconfigured AD

RAN2 discussed preconfigured assistance data based on following documents.

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| R2-2205766 Assistance Data Request for Multiple Area IDs Qualcomm Incorporated discussion  R2-2205804 Text Proposal to address UE request of Area Info and Broadcast of Area Ericsson, Fraunhofer IIS, Fraunhofer HHI, Lenovo, Motorola Mobility  ***Proposal 15: Support UE to request pre-configured assistance data associated with area validity in each positioning method AD request.***  ***Proposal 16: Support to introduce a new posSIB to include the area validity of pre-configured AD.*** |

RAN2 agreed:

Agreements:

Proposal 14 (modified): Deletion of the area-id-r17 in current LPP spec to be checked in LPP CR discussion (not related to broadcast).

Proposal 15 (modified): Support UE to request pre-configured assistance data associated with area validity in each positioning method AD request. The indicator is a boolean flag but not an explicit area ID.

The potential stage 2 impact could be:

8.10.3.1.2.1.2 UE initiated Assistance Data Transfer

Figure 8.10.3.1.2.1.2-1 shows the Assistance Data Transfer operations for the Multi-RTT positioning method when the procedure is initiated by the UE.



Figure 8.10.3.1.2.1.2-1: UE-initiated Assistance Data Transfer Procedure

(1) The UE determines that certain Multi-RTT positioning assistance data are desired (e.g., as part of a positioning procedure when the LMF provided assistance data are not sufficient for the UE to fulfil the request) and sends an LPP Request Assistance Data message to the LMF. This request includes an indication of which specific Multi-RTT assistance data are requested. Additional information concerning the UE's approximate location and serving and neighbour cells may also be provided in the Request Assistance Data message and/or in an accompanying Provide Location Information message to help the LMF provide appropriate assistance data. This additional data may include the UE's last known location if available, the cell IDs of the UE serving NG-RAN node and possibly neighbour NG-RAN nodes, as well as NR E-CID measurements. The UE may also request pre-configured assistance data associated with area validity in the Request Assistance Data message.

(2) The LMF provides the requested assistance in an LPP Provide Assistance Data message, if available at the LMF. If any of the UE requested assistance data in step (1) are not provided in step 2, the UE shall assume that the requested assistance data are not supported, or currently not available at the LMF. If none of the UE requested assistance data in step (1) can be provided by the LMF, return any information that can be provided in an LPP message of type Provide Assistance Data which includes a cause indication for the not provided assistance data.

Same change should be applied for DL-AoD and DL-TDOA.

**Discussion point 3.3.2-1: Do you agree the changes shown above on the UE requested preconfigured assistance information (for Multi-RTT, DL-AoD and DL-TDOA)*?***

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| --- | --- | --- |
| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSilicon | Yes for DL-TDOA and DL-AoD  No for multi-RTT | is pre-configured assistance data by area validity also applicable for multi-RTT? |
| OPPO |  | Area validity might be difficult to understanding the meaning. We prefer using ‘validity condition in terms of areas’ or simply ‘validity condition’. |
| Apple | No | This “associated with area validity” was not agreed |
| Qualcomm | No | I don't think there are any additional Stage 2 impacts from these agreements (otherwise we would need to list all such request/provide elements). |

## Stage 2 changes for On-Demand PRS

On-Demand PRS related stage 2 CRs have been discussed in Pre-605 R2-2206058 [Pre118-e][605][POS] Summary of AI 6.11.2.3 on on-demand PRS (Huawei).

Mismatch between RAN2 and RAN3 will be discussed in  [AT118-e][637][POS] Proposals for discussion on on-demand PRS (Huawei).

Therefore following documents will be not discussed in this offline discussion, but the potential outcome (if any) will be merged in final stage 2 CR.

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| **R2-2205581 Discussion on the mismatch between the on-demand PRS procedure of RAN2 and RAN3 vivo**  ***Proposal3:* RAN2 to discuss and fix the mismatch issue of on-demand PRS between RAN2 and RAN3, the following alternatives can be considered:**   * **Alt 1: The pre-defined PRS configuration from LMF to UE includes a list of complete PRS configurations (maintaining the status quo), then the following changes are essential:** * **In step 0, the possible On-Demand PRS configuration from gNB to LMF shall include a list of complete PRS configurations, each associated with a PRS configuration ID;** * **In step 3, the PRS CONFIGURATION REQUEST from LMF to gNB shall include PRS configuration ID;** * **In step 6, the on-demand PRS response from LMF to UE shall include the PRS configuration ID that is successfully activated.** * **Alt 2: The pre-defined PRS configuration from LMF to UE only includes a list of allowed values for the parameters that can be requested by the UE** |

For correction on On-Demand PRS (to add a Note ) was discussed in Pre-605 R2-2206058 [Pre118-e][605][POS] Summary of AI 6.11.2.3 on on-demand PRS (Huawei).. But it has not been treated.

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| R2-2205805 On UE measurements to allow On-Demand PRS Ericsson, Nokia, Fraunhofer IIS, Fraunhofer HHI, Lenovo, Motorola Mobility  ***Proposal4*: Add a note for explaining measurements that is needed for the assistance of LMF/UE-initiated on-demand PRS request.**   * **NOTE 3: In case of LMF-initiated On-Demand PRS or UE-initiated On-Demand PRS, the LMF may obtain measurements from the UE using some existing positioning methods to assist step 3 e.g., the LMF may obtain SSB/CSI-RS RSRP measurements (NR-ECID) or DL-PRS RSRP measurements (DL-AoD).** |

Rapporteur would like to check companies’ view:

**Discussion point 3.4-1: Do you agree the changes in R2-2205805 on On-Demand PRS (add Note 3)*?***

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| --- | --- | --- |
| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSIlicon | Yes,but | Why the other measurements, like RSRPP, RSTD measurements cannot be applicable? we dont need to be exhaustive on the measurements that can be helpful |
| OPPO | Yes | A further explanation of the purpose of using such UE measurement maybe needed in the Note. For example, as indicated in the ***reason of change*** in the CR, to identify which TRPs to send a request for DL-PRS transmission |
| Apple | Yes, but | With the following changes the note may be agreeable:   1. Remove “some” 2. Remove everything after “e.g.” (this is stage-3 level of detail that does not belong here) |
| Qualcomm | No | This is not specific to on-demand PRS. A LMF may for any assistance data request obtain location measurements from the target device (if not provided unsolicited). This is up to implementation. The Step 2b description is sufficient:  2b. In case of LMF-initiated On-Demand PRS, the LMF and the UE may exchange LPP messages e.g., to obtain UE measurements or the DL-PRS positioning capabilities of the UE, etc.  No need to repeat this in another NOTE.  If a change is needed, the first part of the sentence can be deleted:  2b. ~~In case of LMF-initiated On-Demand PRS,~~ the LMF and the UE may exchange LPP messages e.g., to obtain UE measurements or the DL-PRS positioning capabilities of the UE, etc. |

## Stage 2 changes for accuracy

Accuracy related stage 2 CRs have been discussed in Pre-607 R2-2206333 [Pre118-e][607][POS] Summary of AI 6.11.2.6 on accuracy (CATT).

Align the stage 2 specification to introduce the NRPPa enhancement

Proposal 5a: RAN2 to further discuss on how to capture the R17 NRPPa related positioning enhancement via offline, based on the CR in R2-2204697 and R2-2205807.

Proposal 5b: RAN2 to further discuss whether to send LS on the stage-2 update to RAN3 for confirmation, and the LS in R2-2204698 can be taken as baseline if needed.

* Postponed (stage 2)

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| **R2-2204696 Discussion on R17 positioning enhancement impacts on stage-2 specification CATT**  **R2-2204697 Introduction of R17 NRPPa related positioning enhancement to TS38.305 CATT**  **R2-2204698 [Draft] LS to RAN3 on introduction of R17 NRPPa related positioning enhancement to TS38.305 CATT**  **R2-2205807 Update of signalling in stage 2 to align with NRPPa Ericsson**  **Proposal 5a: RAN2 to further discuss on how to capture the** **R17 NRPPa related positioning enhancement via offline, based on the CR in R2-2204697 and R2-2205807.**  **Proposal 5b: RAN2 to further discuss whether** **to send LS on the stage-2 update to RAN3 for confirmation, and the LS in R2-2204698 can be taken as baseline if needed.** |

R2-2205807 also discussed in [AT118-e][630][POS] LS on DL-AoD signalling load (Ericsson)

Considering all of changes are related to RAN3, and moderator of pre-607 also proposed to send LS to RAN3 for confirmation, seems the easy way is to let RAN3 to discuss stage 2 related changes. Therefore Rapporteur would like to check:

**Discussion point 3.5-1: Do you agree to leave NRPPa related stage 2 changes to RAN3, i.e. RAN2 will not discuss them*?***

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| --- | --- | --- |
| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSIlicon | Yes |  |
| OPPO | Yes |  |
| Apple | Yes |  |
| Qualcomm | Yes |  |

**Discussion point 3.5-2: If answer of 3.5-1 is not, do you agree the CR in R2-2204697 and R2-2205807*?***

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| **Company’s name** | **Yes or No?** | **Comments, if any** |
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**Discussion point 3.5-3: If answer of 3.5-1 is not, do you agree to send LS on the stage-2 NRPPa related update to RAN3 for confirmation*?***

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| **Company’s name** | **Yes or No?** | **Comments, if any** |
| Huawei, HiSIlicon | No |  |
| Apple | No |  |
|  |  |  |

# Summary report and proposals

**For agreement:**

**Online discussion:**

# Reference

1. R2-2204930 Open issues on TS38.305 Intel Corporation
2. R2-2204931 38.305 CR for Positioning WI Intel Corporation
3. R2-2204995 Corrections on stage 2 for path RSRP Huawei, HiSilicon
4. R2-2205655 Stage-2 positioning corrections Apple
5. R2-2204689 Correction on the reference file of BDS Signal B3I CATT, CAICT
6. R2-2204690 Correction on the reference file of BDS Signal B3I CATT, CAICT
7. R2-2206092 Summary of GNSS Positioning Integrity AI 6.11.2.4 Ericsson
8. R2-2205017 Correction to stage2 on service level support for GNSS integrity Huawei, HiSilicon
9. R2-2205488 Corrections on Positioning Integrity parameter table Samsung R&D Institute UK
10. R2-2206340 Summary of AI 6.11.2.1 on latency ZTE, Sanechips
11. R2-2205764 Issues with PRS Processing Window Procedures Qualcomm Incorporated discussion
12. R2-2205808 Correction to activate pre-configured PPW Signaling Ericsson
13. R2-2205814 On PPW Configuration Release assistance info Ericsson
14. R2-2206330 On Resolving PPW Capability discrepancy Ericsson
15. R2-2205766 Assistance Data Request for Multiple Area IDs Qualcomm Incorporated discussion
16. R2-2205804 Text Proposal to address UE request of Area Info and Broadcast of Area Ericsson, Fraunhofer IIS, Fraunhofer HHI, Lenovo, Motorola Mobility
17. R2-2205810 Clarification on PPW and MG configuration to the same UE and miscellaneous corrections Ericsson
18. R2-2206058 [Pre118-e][605][POS] Summary of AI 6.11.2.3 on on-demand PRS (Huawei) Huawei, HiSilicon
19. R2-2205805 On UE measurements to allow On-Demand PRS Ericsson, Nokia, Fraunhofer IIS, Fraunhofer HHI, Lenovo, Motorola Mobility
20. R2-2206333 [Pre118-e][607][POS] Summary of AI 6.11.2.6 on accuracy (CATT) CATT
21. R2-2204696 Discussion on R17 positioning enhancement impacts on stage-2 specification CATT
22. R2-2204697 Introduction of R17 NRPPa related positioning enhancement to TS38.305 CATT
23. R2-2204698 [Draft] LS to RAN3 on introduction of R17 NRPPa related positioning enhancement to TS38.305 CATT
24. R2-2205807 Update of signalling in stage 2 to align with NRPPa Ericsson