3GPP TSG RAN WG2 Meeting #117-e Draft R2-2202492

**Electronic meeting,** **21 Feb- 3 March, 2022**

**Agenda item:** 8.11.1

**Source:** Intel Corporation

**Title:** Report of [Pre117-e][614][POS] Issues requiring RAN1 input (Intel)

**Document for:**  Discussion and decision

# Introduction

This is the report of [Pre117-e][614][POS] Issues requiring RAN1 input (Intel).

Feb 9th Start of Pre-discussions that collects structured company Input.

Feb 14th, 2359 UTC. **General Tdoc Submission Deadline**. Tdoc number allocation deadline. Kick off, summaries. Stop of Pre-discussions that collects structured company Input (rapporteurs to provide report at earliest convenient time, within 24h if possible).

Feb 17th 1800 UTC Tdocs submission deadline for Summaries

Companies please provide your comments by Feb 14th, 2359 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 |
| CATT | Jianxiang Li | lijianxiang@catt.cn |
| Xiaomi | Xiaolong Li | lixiaolong1@xiaomi.com |
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# Discussion

The intention of the pre-meeting discussion is to collect issues requiring RAN1 inputs, and send LS to RAN1 as early as possible.

Based on open issue list in R2-2202005 and R2-2201722. Rapporteur summarized the issues requiring RAN1 inputs as following:

Note: issues may be updated based on other pre-meeting discussions.

**Table: Issues requiring RAN1 inputs (FFS in RAN1 parameter list and UE feature list are not listed in the table)**

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| **Topic** | **Issue** | **Required RAN1 work** |
| **Mitigation of UE/TRP Rx/Tx timing delays** | **The definition of TEG is captured in TS38.305 as**  ***UE Rx Timing Error Group (UE Rx TEG)****: A UE Rx TEG is associated with one or more DL timing measurements, which have the Rx timing error difference within a certain margin.*  ***UE RxTx Timing Error Group (UE RxTx TEG):*** *A UE RxTx TEG is associated with one or more UE Rx-Tx time difference measurements, which have the ‘Rx timing errors+Tx timing errors’ difference within a certain margin.*  ***UE Tx Timing Error Group (UE Tx TEG)****: A UE Tx TEG is associated with the transmissions of one or more UL SRS resources for the positioning purpose, which have the Tx timing error difference within a certain margin.*  ***TRP Rx Timing Error Group (TRP Rx TEG):*** *A TRP Rx TEG is associated with one or more UL timing measurements, which have the Rx timing error difference within a certain margin.*  ***TRP RxTx Timing Error Group (TRP RxTx TEG):*** *A TRP RxTx TEG is associated with one or more gNB Rx-Tx time difference measurements, which have the ‘Rx timing errors+Tx timing errors’ difference within a certain margin.*  ***TRP Tx Timing Error Group (TRP Tx TEG):*** *A TRP Tx TEG is associated with the transmissions of one or more DL PRS resources, which have the Tx timing error difference within a certain margin.*  **Issue:** companies in RAN2 commented that the definitions for the different TEG are unclear. The emphasis seems to be about the association with certain measurement but still does not explain the relation to the resources involved and what reference is for the “error difference”. It is also not intuitive what the “group” in TEG refers to; | **RAN1 provides further clarifications and confirmation on the definition;** |
| **Periodic Tx TEG reporting/TEG change procedure**  According to RAN1 LS in R2-2200092: For UL-TDOA, "   * + *Based on a configured periodicity, a UE may report the UE Tx TEG association for the SRS resources for positioning that have already been transmitted during the configured period*      - *It is up to RAN2 to decide how to indicate the change of the Tx TEG association during the configured period (e.g., using the timestamps)*     - *It is up to RAN4 to decide when the Tx TEG association is changed*   + *The values of the configurable periodicities are up to RAN2*   ". what is needed seems an a-periodic report (i.e., a report when the TEG association has changed).  **Issue:** RAN1 already agreed that periodic reporting for UL-TDOA should be supported, ehat is the purpose of periodically reporting the same information? Or only a-periodic report is required (i.e., a report when the TEG association has changed)? | **RAN1 provides further clarifications on the issue;** |
| **PRU** | RAN2 has agreed that RAN2 will not discuss PRUs further without further guidance from RAN1 (LS or feature list). | **RAN1 to decide whether PRU is supported in Rel-17;** |
| **Preconfigured MG** | The gNB may activate the pre-configurated measurement gap upon receiving the request from a UE or LMF."  **Issue:** **FFS on whether MG activation/deactivation request from the LMF can also be applicable to pre-R16 MG configuration in addition to positioning MG preconfiguration, i.e.** Can LMF ask the gNB to configure the MG (e.g. via RRC) directly? | **RAN1 provides further clarifications on the issue;** |
| **PRS processing window** | **Issues:**  FFS:Whether PRS processing window configuration is provided per BWP or not is up to RAN1 to decide.  FFS: Whether UE can be configured with multiple PRS processing windows should be decided by RAN1.  FFS on the max number of PPW configurations (from Stage 2 discussion)  FFS: whether UE should monitor PDCCH during RAR window/msgB window ot contention resolution timer for the affected symbols by PPW | **RAN1 provides further clarifications on the issue;** |
| **FFS in RAN1 parameter list** |  | **RAN1 to resolve the FFFs.** |
| **FFS in RAN1 UE feature list** |  | **RAN1 to resolve the FFFs.** |

**Discussion point 3.1-1: Do you agree the issues requiring RAN1 inputs shown in the table? Please add in comments column if any RAN1 related issue is missing.**

**Note: We should avoid to repeat the issues which have been indicated in RAN1 parameter list and UE feature list;**

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| **Company’s name** | **Yes/No** | **Comments, if any** |
| Huawei, HiIilicon | Yes, Also see comments | On the issue below, note that it has already been included in the R2 discussion for latency enhancement. Also, for the highlighted part below, it should be “configured” instead of “activate”?  [Rapp] Updated. |
| Nokia | Yes | We are fine to send the issues in the Table to RAN1 for their inputs, but our understanding on the question of periodic or aperiodic TEG reporting is, RAN1 clearly agreed that periodic reporting for **UL-TDOA** should be supported.  [Rapp]Agree RAN1 already agreed that periodic reporting for UL-TDOA is supported. The question is to ask the purpose behind that. Clarified it is only for UL-TDOA.  On PPW, the question 9 in [Pre117-e][607] “whether UE should monitor PDCCH during RAR window/msgB window ot contention resolution timer for the affected symbols by PPW” should be added to the Table above as there seems to be a majority to send this question to RAN1.  [Rapp] Added.  On PRU, we are only waiting for answers from RAN1 for the questions (about antenna orientation information and need for LMF to signal the corrections to target UE for UE-based positioning) that we had already sent to them in LS R2-2111488. We should ask them to reply to our LS instead of asking RAN1 to decide whether PRU is supported in Rel-17.  [Rapp]We only need to inform them of RAN2 status,and leave the decision to them.  On TEG definitions, we can see how the discussions go in RAN2 but anyway send a LS to RAN1 to either ask for clarifications on the definitions or to confirm with RAN1 our understanding of the definitions based on outcome of RAN2 discussions.  [Rapp]Let’s see the discussion. |
| vivo | Yes | Regarding Nokia’s comments for PRU, except for asking them to reply to our previous LS, we think we can also ask them for the suggestion of whether PRU is supported in R17 or not(i.e., postpone it to R18) based on the current progress and difficulty of RAN2 and SA2.  [Rapp] has indicated in the table as “**RAN1 to decide whether PRU is supported in Rel-17;**” |
| CATT | Yes | 1.The definition of TEG is captured in TS38.305  RAN1 provides further clarifications and confirmation on the definition[Rapp] Added confirmation.  2. Periodic Tx TEG reporting/TEG change procedure  CATT understand that the report is to indicate the change of the Tx TEG association during the configured period (e.g., using the timestamps). The motivation of configured period is to avoid too many RRC messages to network in case the change is too frequent. So the report can be a-periodic report which is configured with reportintervals to avoid too many RRC message which is something like event trigger report in RRC.  [Rapp] Clarified that it for UL-TDOA, and we only ask the motivation behind this. |
| Xiaomi | Yes | When LMF provides the assistance information to gNB for pre-configured MG, the gNB decides the pre-conifigured MG but don’t send it to LMF successfully, the LMF may still can ask the gNB to activate the pre-configured MG. So we suggest to modifty the question as following:  Is the LMF activation of measurement gaps only for pre-configured measurement gaps? Can LMF ask the gNB to activate the MG (e.g. via RRC) even if the gNB did not provide the preconfigured measurement gaps or Can LMF ask the gNB to activate the MG even if the LMF did not provide the assistance information to gNB for pre-configured MG?  [Rapp] Updated. |

# Summary report and proposals

Based on companies’ input, following issues have been identified which require RAN1 inputs.

**Table: Issues requiring RAN1 inputs (FFS in RAN1 parameter list and UE feature list are not listed in the table)**

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| **Topic** | **Issue** | **Required RAN1 work** |
| **Mitigation of UE/TRP Rx/Tx timing delays** | **The definition of TEG is captured in TS38.305 as**  ***UE Rx Timing Error Group (UE Rx TEG)****: A UE Rx TEG is associated with one or more DL timing measurements, which have the Rx timing error difference within a certain margin.*  ***UE RxTx Timing Error Group (UE RxTx TEG):*** *A UE RxTx TEG is associated with one or more UE Rx-Tx time difference measurements, which have the ‘Rx timing errors+Tx timing errors’ difference within a certain margin.*  ***UE Tx Timing Error Group (UE Tx TEG)****: A UE Tx TEG is associated with the transmissions of one or more UL SRS resources for the positioning purpose, which have the Tx timing error difference within a certain margin.*  ***TRP Rx Timing Error Group (TRP Rx TEG):*** *A TRP Rx TEG is associated with one or more UL timing measurements, which have the Rx timing error difference within a certain margin.*  ***TRP RxTx Timing Error Group (TRP RxTx TEG):*** *A TRP RxTx TEG is associated with one or more gNB Rx-Tx time difference measurements, which have the ‘Rx timing errors+Tx timing errors’ difference within a certain margin.*  ***TRP Tx Timing Error Group (TRP Tx TEG):*** *A TRP Tx TEG is associated with the transmissions of one or more DL PRS resources, which have the Tx timing error difference within a certain margin.*  **Issue:** companies in RAN2 commented that the definitions for the different TEG are unclear. The emphasis seems to be about the association with certain measurement but still does not explain the relation to the resources involved and what reference is for the “error difference”. It is also not intuitive what the “group” in TEG refers to; | **RAN1 provides further clarifications and confirmation on the definition;** |
| **Periodic Tx TEG reporting/TEG change procedure**  According to RAN1 LS in R2-2200092: For UL-TDOA, "   * + *Based on a configured periodicity, a UE may report the UE Tx TEG association for the SRS resources for positioning that have already been transmitted during the configured period*      - *It is up to RAN2 to decide how to indicate the change of the Tx TEG association during the configured period (e.g., using the timestamps)*     - *It is up to RAN4 to decide when the Tx TEG association is changed*   + *The values of the configurable periodicities are up to RAN2*   ". what is needed seems an a-periodic report (i.e., a report when the TEG association has changed).  **Issue:** RAN1 already agreed that periodic reporting for UL-TDOA should be supported, ehat is the purpose of periodically reporting the same information? Or only a-periodic report is required (i.e., a report when the TEG association has changed)? | **RAN1 provides further clarifications on the issue;** |
| **PRU** | RAN2 has agreed that RAN2 will not discuss PRUs further without further guidance from RAN1 (LS or feature list). | **RAN1 to decide whether PRU is supported in Rel-17;** |
| **Preconfigured MG** | The gNB may activate the pre-configurated measurement gap upon receiving the request from a UE or LMF."  **Issue:** FFS on whether MG activation/deactivation request from the LMF can also be applicable to pre-R16 MG configuration in addition to positioning MG preconfiguration, i.e. Can LMF ask the gNB to configure the MG (e.g. via RRC) directly? | **RAN1 provides further clarifications on the issue;** |
| **PRS processing window** | **Issues:**  FFS:Whether PRS processing window configuration is provided per BWP or not is up to RAN1 to decide.  FFS: Whether UE can be configured with multiple PRS processing windows should be decided by RAN1.  FFS on the max number of PPW configurations (from Stage 2 discussion)  FFS: whether UE should monitor PDCCH during RAR window/msgB window ot contention resolution timer for the affected symbols by PPW | **RAN1 provides further clarifications on the issue;** |
| **FFS in RAN1 parameter list** |  | **RAN1 to resolve the FFFs.** |
| **FFS in RAN1 UE feature list** |  | **RAN1 to resolve the FFFs.** |

**Proposal:** Send LS to RAN1 containing “Table: Issues requiring RAN1 inputs (FFS in RAN1 parameter list and UE feature list are not listed in the table)”.

# Addressed open issues list

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| QC:  Measurement gap activation via LMF"  The gNB may activate the pre-configurated measurement gap upon receiving the request from a UE or LMF."  Question:  Is the LMF activation of measurement gaps only for pre-configured measurement gaps? It's not clear to me from the RAN1 LS.  [Rapp] Good question, I think the LMF may activate the measurement even if there is no preconfigured MG. But we need to discuss this. Added it as open issue. | Yes | Rapp, this can be a general issue for MG. (from stage 2 discussion)  LS to RAN1? **Pre-117-e614** |

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| Pre-configuration of PPW  FFS:Whether PRS processing window configuration is provided per BWP or not is up to RAN1 to decide.  1 FFS: Whether UE can be configured with multiple PRS processing windows should be decided by RAN1.  2 FFS on PPW configuration (R2 and R1 to resolve)  3 FFS on the max number of PPW configurations (from Stage 2 discussion) | Yes | **Status**: check the status of RRC email discussion 116bis-631  RAN2#116bis:  Proposal 7: The PRS processing window configuration is provided via RRCReconfiguration message. Whether PRS processing window configuration is provided per BWP or not is up to RAN1 to decide.  1/3 LS to RAN1? **Pre-117-e614** |

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| **PRU** | Support of PRU in Rel-17?  What solution should be adopted if support PRU in Rel-17, MT-LR, MO-LR, etc | Yes | **Status**: Hold on, wait for RAN1  LS to RAN1? **Pre-117-e614** |
| What additional information should be introduced in ProvideLocationInformation (known location information and antenna orientation information) and ProvideAssistanceData (correction information); | Yes | **Status**: Hold on, wait for RAN1  LS to RAN1? **Pre-117-e614** |

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| TEG  The definitions for the different TEG are still unclear. The emphasis seems to be about the association with certain measurement but still does not explain the relation to the resources involved and what reference is for the “error difference”. It is also not intuitive what the “group” in TEG refers to |  | LS to RAN1? **Pre-117-e614** |

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| Periodic Tx TEG reporting/TEG change procedure  According to RAN1 LS in R2-2200092: "It is up to RAN2 to decide how to indicate the change of the Tx TEG association during the configured period (e.g., using the timestamps)".  The procedure mentions "periodic report of UE TxTEG association", but what is needed seems an a-periodic report (i.e., a report when the TEG association has changed). Or what is the purpose of periodically reporting the same information?  [Rapp] Good question, RAN1 only agreed periodic report. I added this as an open issue. | Yes | From stage 2 discussion  Rapp, Would be good to understand whether the UE only needs to report upon the change or periodic although RAN1 agreed periodic reporting.  LS to RAN1? **Pre-117-e614** |

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| Nokia:  The definitions for the different TEG are still unclear. The emphasis seems to be about the association with certain measurement but still does not explain the relation to the resources involved and what reference is for the “error difference”. It is also not intuitive what the “group” in TEG refers to |  | Nokia:  We propose getting further clarifications on the definition from RAN1 and so add this to the open issues list.  **Huawei**  We just need to copy and paste the R1 agreements on the definition for all kinds of TEG into the definition, currently, there are some misalignments  LS to RAN1? **Pre-117-e614** |

# Reference

1. R1-R1-2200767 Rel17 RAN1 UE feature List
2. R4-2202400 (R4 feature list)
3. R2-2202005 Report of email discussion [Post116bis-e][634][POS] Positioning open issues list (Intel) Intel Corporation
4. R2-2201722 Summary of [Post116bis-e][628][POS] 37.355 running CR (Qualcomm)
5. R2-2201723 Running LPP CR for NR positioning enhancements draftCR Qualcomm Incorporated