3GPP TSG RAN WG2 Meeting #114 R2-210xxxx

**Electronic meeting, 19th-27th May 2021**

**Agenda item:** 8.1.3

**Source:** Intel Corporation

**Title:** Summary of [AT114-e][621][POS] LS to RAN1 on UL positioning in RRC\_INACTIVE (Intel)

**Document for:**  Discussion and decision

# Introduction

This document is the summary of following offline discussion:

* [AT114-e][621][POS] LS to RAN1 on UL positioning in RRC\_INACTIVE (Intel)

 Scope: Confirm the need to send an LS to RAN1 to inform them of RAN2 agreements affecting UL positioning in RRC\_INACTIVE, and trigger the work on related open issues in RAN1.

 Intended outcome: Agreeable LS

 Deadline: Thursday 2021-05-27 0000 UTC

Rapporteur suggests to split the discussion in two phases:

Phase 1: to collect companies’ view on the need of LS, and the content of LS; Deadline for phase 1 discussion: **Wednesday 2021-05-26 0000 UTC**

Phase 2: discuss the LS details; Deadline for phase 2 discussion: **Thursday 2021-05-26 0000 UTC**

# companies’ point of contact

|  |  |  |
| --- | --- | --- |
| **Company** | **Point of contact** | **Email address** |
| Intel Corporation | Yi Guo | Yi.guo@intel.com |
| vivo | Xiang Pan | panxiang@vivo.com |
| Nokia | Mani Thyagarajan | mani.thyagarajan@nokia.com |
| Huawei, HiSilicon | Yinghao Guo | yinghaoguo@huawei.com |
| ZTE | Liu Yansheng | Liu.yansheng@zte.com.cn |
| Xiaomi | Li Xiaolong | lixiaolong1@xiaomi.com |
| CATT | Jianxiang Li | lijianxiang@datangmobile.cn |
| InterDigital | Jaya Rao, Fumihiro Hasegawa | jaya.rao@interdigital.com, fumihiro.hasegawa@interdigital.com |
| Sony | Anders Berggren | Anders.Berggren@sony.com |
| Apple | Zhibin Wu | Zhibin\_wu@apple.com |
| OPPO | Xin You | youxin@oppo.com |

# Discussion

Following was discussed and proposed in [1]:

|  |  |
| --- | --- |
| 4.3 Involvement with RAN1The following companies have also proposed to send an LS to RAN1 to trigger the relevant discussions

|  |
| --- |
| [6104, INTEL]Proposal 4: Send LS to RAN1 to confirm whether UL SRS is reused for UL positioning in RRC\_INACTIVE.[6408, VIVO]Proposal 3: LS to RAN1 to inform them that SRS is preferred to be the RS for UL positioning from RAN2 perspective and kindly ask them to take it into account.Proposal 6: LS to RAN1 to address the issues to support SRS transmission in RRC\_INACTIVE, including sync, power control, spatial relation. |

***SummaryProposal*: RAN2 should send an LS to RAN1 on RAN2’s agreement on UL positioning in RRC\_INACTIVE, and to address the issues on TA, power control, spatial relation, etc.** |

In addition, the TR 38.857 [2] captured following open issues from RAN1 perspective:

|  |
| --- |
| The details of how to enable the UE positioning in RRC\_ INACTIVE state can be further discussed during normative work. These details may include, but are not limited to the following aspects:* + UL reference signals (e.g., SRS for positioning, PRACH preambles) for UL measurements
	+ Signalling and procedures for support the assistance data delivery, DL-PRS configuration, UL reference signals for positioning resource configuration, measurement reporting, which may be developed based on the enhancements of existing signalling and procedures (e.g., existing 2-step and/or 4-step PRACH procedures, paging procedure, small data transmission).
 |

From Rapporteur perspective, at least RAN1 needs to figure out what UL reference signals should be used considering it is related to RAN2 discussion on how UL, UL+DL positioning work in RRC\_INACTIVE.

Rapporteur would like to check companies’ view:

**Discussion point 1: Do you support to send an LS to RAN1 to inform them of RAN2 agreements affecting UL positioning in RRC\_INACTIVE, and trigger the work on related open issues in RAN1?**

|  |  |  |
| --- | --- | --- |
| **Company’s name** | **Yes/No** | **Comments, if any** |
| Intel | Yes | It is useful to trigger RAN1 discussion. RAN1 at least need to resolve what UL reference signals should be used; |
| vivo | Yes | It seems to be a consensus that the conclusions related to SDT in DL positioning can applies to UL positioning, which means the LPP/LCS message for UL positioning can be transported via SDT in RRC\_INACTIVE.Then the key issue for UL positioning is which RS will be used in RRC\_INACTIVE. Assuming SRS is used, the subsequent issues may include SRS configuration, SRS activation and SRS transmission.As most of them are in RAN1 scope, we think the LS is essential to trigger RAN1 discussion.  |
| Nokia | No | It is too early to send an LS to RAN1 on positioning in RRC\_INACTIVE since RAN2 just started making high level agreements on this topic for which we are also waiting to see the progress in the SDT work item. On support of UL and DL+UL positioning in RRC\_INACTIVE, we should follow the RAN plenary guidance stated in the WID objectives, which said it should be treated “As 2nd priority”. Once we have some detailed agreements on signaling for DL positioning methods and RAT-independent methods we can focus on UL and DL+UL positioning methods and send LS to RAN1 at that stage. |
| Huawei, HiSIlicon | Yes | For UL positioning, the main spec impact would be in RAN1. With RAN2 as leading group, it is important that RAN2 should send the LS to RAN1 to trigger related discussions.  |
| ZTE | Yes | We also prefer to trigger the discussion about UL INACTIVE positioning in RAN1.  |
| Xiaomi | No | We think we should follow the WID, the UL positioning in RRC inactive is second priority, so we should first specify the DL positioning in RRC inactive, and it is too early to send LS to RAN1 on UL positioning in RRC inactive. |
| Ericsson | No | It is pre-mature. We hardly had any discussion on this. We have lot of things that have been prioritized we need to first focus on that.Besides the only agreement we had was UE can send data in UL using inactive but not UE can transmit UL SRS in Inactive. |
| CATT | Yes | We can inform RAN1 that they can start the discussion about UL positioning in INACTIVE state based on RAN2 agreements. But it is up to RAN1 to decide from which meeting to discuss this aspect. |
| InterDigital | Yes | We think RAN1 can be triggered at this stage to start discussion on open issues to be addressed for UL positioning in INACTIVE, given that discussion on delivery of positioning SRS configuration has already started in RAN2.  |
| Qualcomm | Yes | The baseline should be to enable/support the Rel-16 positioning methods in RRC\_INACTIVE. If there are other UL RS for positioning purposes (other than SRS), then RAN2 would need to know this as soon as possible, since it may affect the positioning procedures. |
| Sony | Yes | We should inform RAN1 to start discussion on UE positioning in RRC INACTIVE. |
| Apple | Too early | We think in WID UL positioning has been placed as a second priority |
| OPPO | No  | Same view as Nokia. We can follow the WID, down-prioritized the UL positioning discussion.  |

Regarding the content of the LS, as mentioned in the scope of offline discussion:

|  |
| --- |
| inform them of RAN2 agreements affecting UL positioning in RRC\_INACTIVE, and trigger the work on related open issues in RAN1. |

RAN2 made following agreements in this meeting:

RAN2 agreed that the UE in RRC\_INACTIVE can send any uplink LCS or LPP message using Rel-17 SDT frame work as:

Agreements:

Any uplink LCS or LPP message can be transported in RRC\_INACTIVE from RAN2 perspective.

RAN2 also agreed that the network may send DL messages for UE in RRC\_INACTIVE using Rel-17 SDT framework as

Agreements:

Follow Rel-17 SDT framework for INACTIVE UL and DL positioning:

 If the UE initiated data transmission using UL SDT, the network can send DL LCS, LPP message and RRC message (e.g. to configure SRS (TBD on what message is used), if UL positioning supported) to the UE.

 Otherwise, if UE did not initiate UL SDT, rely on legacy operation, i.e. the network shall transition the UE to RRC\_CONNECTED, e.g. based on RAN paging.

**Discussion point 2: Do you support to include above agreements in the LS? And pls indicate if anything is missing.**

|  |  |  |
| --- | --- | --- |
| **Company’s name** | **Yes/No** | **Comments, if any** |
| Intel | Yes |  |
| vivo | Yes | We suppose the following P12 in the summary is missing. We think it can be captured in the LS with reformulation.Reference signal configuration for UL positioning in RRC\_INACTIVE can be carried by RRCRelease message with suspendConfig.  |
| Nokia | No | See our comments to Discussion point 1. |
| Huawei, HiSilicon | Yes | The above agreement is applicable for both UL and DL. We can also include the other RAN2 agreements related to UL in the LS.  |
| ZTE | Yes |  |
| Xiaomi | No | We can send the LS on above agreements but not for the UL positioning in RRC inactive.  |
| Ericsson | No | Agree with Nokia and Xiami |
| CATT | Yes |  |
| InterDigital | Yes |  |
| Qualcomm | Yes | We should include all RAN2 agreements so far on this topic. |
| Sony | Yes |  |
| Apple | NO | Same view as Xiaomi. |
| OPPO | No  | See our Q1 reply. |

**Summary on the Discussion point 1/2 on the need of LS to RAN1 on UL positioning and include RAN2 agreements in the LS.**

12 companies provided inputs to this discussion point:

* 9 Companies (Intel, vivo, Huawei, HiSilicon, ZTE, CATT, InterDigital, Qualcomm, Sony) support to send LS to RAN1 and include agreements;
* 3 Companies (Ericsson, Xiaomi, Nokia) do not see the need to send LS to RAN1 considering it is 2nd priority in the WID;

**Rapporteur**:

Rapporteur propose to agreement on LS to RAN1 considering the large majority support.

1. **[To agree] [9/12]** send an LS to RAN1 to inform them of RAN2 agreements affecting UL positioning in RRC\_INACTIVE, and trigger the work on related open issues in RAN1;.

Regarding what should be resolved in RAN1, following are proposed in [1] and listed in [2]:

* + TA;
	+ power control;
	+ spatial relation;
	+ UL reference signals (e.g., SRS for positioning, PRACH preambles) for UL measurements
	+ Others?

Rapporteur think that RAN2 should trigger RAN1 discussion on these issues.

**Discussion point 3: In the LS, do you support to list the issues that need to be resolved in RAN1? If yes, please indicate what should be listed?**

|  |  |  |
| --- | --- | --- |
| **Company’s name** | **Yes/No** | **Comments, if any** |
| Intel | Yes | We should ask RAN1 to resolve:* + UL reference signals (SRS or PRACH)
	+ Power control
	+ Spatial relation

For TA, there is similar discussion regarding TA validity for CG-SDT in SDT WI. We can rely on the outcome from SDT WI. And therefore RAN1 does not need to check this issue separately in positioning WI.  |
| Vivo | Yes | We generally agree with Intel.In addition, we think TA is one of the key issues which should be captured in the LS, how to address it shall rely on RAN1 decision.Therefore, we should ask RAN1 to resolve:* + UL reference signals (SRS or PRACH)
	+ TA
	+ Power control
	+ Spatial relation
 |
| Nokia | No | See our comments to Discussion point 1. Positioning in RRC\_INACTIVE is a RAN2 led objective and the UL and DL+UL NR positioning methods are 2nd priority. We prefer to not to load RAN1 with efforts to work on a 2nd priority objective in RAN2. |
| Huawei, HiSilicon | Yes | The above issues should be resolved by RAN1 and RAN2 can continue to progress on the RAN2 part, e.g., configuration for UL POS.  |
| ZTE | Yes |  |
| Xiaomi | No | We agree with Nokia. |
| Ericsson | No | Same view as Nokia and Xioami |
| CATT | No | RAN1 knows what to do, so no need to specify the issues. |
| InterDigital | Yes | We have similar understanding with Intel and Huawei in that the open issues (e.g. TA, power control) can be addressed in RAN1 while RAN2 can continue the work on procedures related to configuring SRS for positioning and triggering of SRS transmission.  |
| Qualcomm | Yes | The UL RS is a secondary issue. The baseline should be Rel-16. |
| Sony | Yes | We have a similar view as Intel. We should ask RAN1 to resolve:* + UL reference signals (SRS and/or PRACH)
	+ Spatial relation
	+ Power control

RAN1 can decide their own internal priorities. |
| Apple | NO | At this early stage, we prefer RAN1 decide itself based on work load. |
| OPPO | No  | We prefer not to push RAN1 work on the UL positioning discussion. |

**Summary on the Discussion point 3 on** **list the issues that need to be resolved in RAN1 in the LS.**

12 companies provided inputs to this discussion point:

* 8 Companies (Intel, vivo, Huawei, HiSilicon, ZTE, InterDigital, Qualcomm, Sony) support to list the issues that need to be resolved in RAN1;
* 4 Companies (Ericsson, Xiaomi, Nokia, CATT) do not see the need to send LS to RAN1; 3 companies considering it is 2nd priority in the WID; 1 company think RAN1 knows what to do.

**Rapporteur**:

Rapporteur think no harm tolist the issues that need to be resolved in RAN1 in the LS even if RAN1 already knows this. And propose

1. **[To agree] [8/12]** list the issues that need to be resolved in RAN1 in the LS;.

# Conclusion

<Section to be updated by Rapporteur>

Aiming to help with the meeting discussion/progress, the proposals are categorized starting with:

* [To agree] when there is large support and hence proposed for easy agreement.
* [To discuss] when there is substantial level of support and agreement may be possible.
* [FFS] when there is low support or companies propose new solutions or other groups inputs are needed or options to possibly consider further e.g. if there is sufficient support (understanding that these topic have not been discussed by all companies when providing their views in the different discussion points).

The proposals also start with a number: for the format [x], ‘x’ represents the number of supportive companies (i.e. these solutions are marked as FFS as the proposed solutions were not discussed by all companies) and, for the format [x/y], ‘x’ represents the number of supportive companies, and (y-x) the number of companies with different view.

The proposals captured are the following:

**Proposal 1.** **[To agree] [9/12]** send an LS to RAN1 to inform them of RAN2 agreements affecting UL positioning in RRC\_INACTIVE, and trigger the work on related open issues in RAN1;.

**Proposal 2.** **[To agree] [8/12]** list the issues that need to be resolved in RAN1 in the LS;.

The following order is suggested for the online discussion:

**Proposals for potential agreement**

**Proposal 1.** **[To agree] [9/12]** send an LS to RAN1 to inform them of RAN2 agreements affecting UL positioning in RRC\_INACTIVE, and trigger the work on related open issues in RAN1;.

**Proposal 2.** **[To agree] [8/12]** list the issues that need to be resolved in RAN1 in the LS;.

**Proposals for potential discussion online**

<To be updated by Rapporteur>

**Proposals for potential discussion in future meetings**

<To be updated by Rapporteur>

# Reference

1. R2-2106576 Summary of AI 8.11.3 for INACTIVE POS Huawei, HiSilicon
2. TR 38.857