**3GPP TSG-RAN WG2 Meeting #117 R2-220xxxx**

**Electronic Meeting, February 21 – March 3, 2022**

**Agenda item:** 8.11.2.2

**Source:** InterDigital Inc.

**Title:** Email discussion Report on [AT117-e][630][POS] Remaining proposals on RRC\_INACTIVE (InterDigital)

**Document for:**  Discussion

# 1. Introduction

This document summarizes the following email discussion:

* [AT117-e][630][POS] Remaining proposals on RRC\_INACTIVE (InterDigital)

Scope:

* Discuss P8 and P10 of R2-2203524 and attempt to reach consensus.
* Check the LS in R2-2202166 and determine if there is impact to our specs.

Intended outcome: Report to Monday CB session

Deadline: Friday 2022-02-25 1200 UTC

**Deadline for initial comments (companies inputs/views):** Thursday 2022-02-24 1200 UTC;

**Deadline for further comments (mainly for further discussion on LS from RAN4):** Friday 2022-02-25 1200 UTC

Please provide the contact information in the following Table:

|  |  |  |
| --- | --- | --- |
| **Company** | **Point of contact** | **Email address** |
| vivo | Xiang Pan | panxiang@vivo.com |
| Xiaomi | Xiaolong Li | lixiaolong1@xiaomi.com |
| Huawei, HiSilicon | Yinghao Guo | yinghaoguo@huawei.com |
| ZTE | Yu Pan | pan.yu24@zte.com.cn |
| CATT | Jianxiang Li | lijianxiang@catt.cn |
| Apple | Sasha Sirotkin | ssirotkin@apple.com |
| Lenovo, Motorola Mobility | Robin Thomas | rthomas7@lenovo.com |
| OPPO | Xin You | youxin@oppo.com |
| Nokia | Mani Thyagarajan | mani.thyagarajan@nokia.com |
| Intel | Yi Guo | Yi.guo@intel.com |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# 2. Discussion

The scope of this email discussion is to discuss the potential remaining issues related to positioning in RRC\_INACTIVE which are identified in the following documents:

* [1] R2-2203524, Email discussion Report on [Pre117-e][609][POS] Open issues on positioning in RRC\_INACTIVE (InterDigital)
* [2] R2-2202166, LS on DRX cycle used in PRS measurement in RRC\_INACTIVE state

## 2.1 TA Timer associated with SRSp

During the pre-meeting open issues discussion [1], vivo indicated the following open issue:

|  |  |  |
| --- | --- | --- |
| **Company** | **Open Issue** | **Comments** |
| vivo | Whether the inactivePosSRS-TAT will be restarted when a Timing Advance Command is received during SDT. | In the running CR, the inactivePosSRS-TAT can be restarted only when the configuration for inactivePosSRS-TAT is received. However, the CG-SDT TAT will be restarted when a Timing Advance Command MAC CE is received. We are wondering whether the solutions shall be aligned. |

Based on the comments from vivo, the following proposal was formulated in [1] for further discussion:

“**Proposal 8: TA Timer for SRS for positioning is restarted upon reception of TA command in RRC\_INACTIVE state”**

In a contribution from Oppo (R2-2202338 [3]), it was indicated that for positioning in RRC\_INACTIVE state, a TA command may also be received if an SDT procedure has been initiated. It was also mentioned in [3] that RAN2 has agreed that the SRSp configuration is considered as invalid if TA is not valid, and that since the TA is available upon reception TA command, it is straightforward to restart the SRS TA timer for SRS configuration maintenance.

The agreement made in SDT WI during RAN2#113e for restarting the TAT-SDT, which may be relevant for positioning, is as follows:

**Agreements**

1. TAT-SDT is started upon receiving the TAT-SDT configuration from gNB, i.e. RRCrelease message, and can be (re)started upon reception of TA command.

In this regard, the following is to be discussed:

**Question 1: Do companies agree to follow SDT solution that the TA timer associated with SRS for positioning (SRSp) is restarted upon reception of TA command in RRC INACTIVE?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| vivo | Yes | Prefer to align with CG-SDT as it’s beneficial to maintain the SRS. |
| Xiaomi | Yes |  |
| Huawei, HiSIlicon | Yes |  |
| ZTE | Yes |  |
| CATT | Yes |  |
| Apple | yes |  |
| Lenovo, Motorola Mobility | Yes |  |
| OPPO | Yes |  |
| Nokia | Yes |  |
| Intel | Yes |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 2.1.1 Moderator’s summary

The moderator thanks the companies for providing their views and comments. The following is the summary of the companies’ views:

* 10/10 companies agree to follow SDT solution for restarting the SRSp TA timer when receiving TA Command in RRC INACTIVE

**Moderator’s views**

Given the consensus in the inputs provided by companies, the moderator proposes the following:

**Proposal 1: Follow SDT solution that the TA Timer for SRS for positioning (SRSp) is restarted upon reception of TA command in RRC\_INACTIVE (10/10)**

## 2.2 RRC message for providing SRSp configuration in RRC\_INACTIVE

During the pre-meeting open issues discussion [1], Oppo indicated the following open issue:

|  |  |  |
| --- | --- | --- |
| **Company** | **Open Issue** | **Comments** |
| OPPO | Whether SRS for positioning in RRC\_INACTIVE state can be configured through RRC reconfiguration message. | Currently, SRS configuration can be carried in either RRC reconfiguration message or RRC release message, and both of the RRC message types have not been excluded based on the agreements made in positioning session.  Meanwhile, SDT has made the restriction on the RRC message that supported during an SDT procedure, that is, no RRCReconfiguration and RRCReconfigurationComplete are allowed during SDT session.  As positioning in RRC\_INACTIVE relies on the SDT for positioning related message transmission, it is suggested to align positioning agreements with SDT, i.e. SRS for positioning in RRC\_INACTIVE state can only be configured through RRC release message. |

Based on the comments from Oppo, the following proposal was formulated in [1] for further discussion:

**“Proposal 10: SRS for positioning in RRC\_INACTIVE state can only be configured through RRC release message”**

In a contribution from Oppo (R2-2202338 [3]), it was also indicated that SRS for positioning in RRC\_INACTIVE state can be configured through the following ways as agreed in previous positioning meeting. It was mentioned in [3] that for SDT DL message, it is not clear which RRC message is used according to the agreements. Also in [3], it was indicated that currently SRS configuration can be carried in either RRC reconfiguration message or RRC release message, and both of the RRC message types have not been excluded based on the agreements made in positioning session.

The relevant positioning agreement made during RAN2#116-e is as follows:

Agreement:

Proposal 6: SRS for positioning in RRC\_INACTIVE state can be configured through the following ways:

- RRCRelease with SuspendConfig (13/13)

- SDT DL RRC message, i.e. Msg B / Msg 4 of RA-SDT (9/13)

During RAN2#116bis-e, the following agreement was made in SDT WI on the RRC message that is supported during an SDT procedure:

**Agreement**

RRCReconfiguration and RRCReconfigurationComplete are not supported during an SDT session

For clarifying the previous agreement above in positioning and whether to align the positioning agreement with SDT agreement, the following is to be discussed:

**Question 2: Do companies agree to follow SDT solution that SRS for positioning (SRSp) in RRC\_INACTIVE state can only be configured through RRC Release message (i.e. RRCReconfiguration and RRCReconfigurationComplete are not used for configuring SRSp)?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| vivo | Yes | Follow the restriction of SDT, and no need to enhance SDT at this stage. |
| Xiaomi | Yes |  |
| Huawei, HiSIlicon | Yes |  |
| ZTE | Yes | Ok to exclude SDT DL RRC messages as this is the last R17 meeting. POS/SDT CR have to be completed timely |
| CATT | Yes | TA configuration and RSRP change threshold are included in configuration of SRS for positioning in RRC\_INACTIVE state, while they are not included in current connected configuration. |
| Apple | Yes |  |
| Lenovo, Motorola Mobility | Yes |  |
| OPPO | Yes |  |
| Nokia | Yes |  |
| Intel | Yes |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 2.1.2 Moderator’s summary

The moderator thanks the companies for providing their views and comments. The following is the summary of the companies’ views:

* 10/10 companies agree to follow SDT solution that SRSp in RRC\_INACTIVE can only be configured through RRC Release message (i.e. RRCReconfiguration and RRCReconfigurationComplete are not used for configuring SRSp)
  + vivo indicated to follow the SDT restriction
  + ZTE indicated it is ok to exclude (other) SDT DL RRC messages since this is the last meeting in Rel-l17
  + CATT mentioned that TA configuration and RSRP change threshold are included in configuration of SRSp in RRC\_INACTIVE state, while they are not included in current connected configuration.

**Moderator’s views**

Given the consensus in the inputs provided by companies, the moderator proposes the following:

**Proposal 2: Follow SDT solution that SRS for positioning (SRSp) in RRC\_INACTIVE state can only be configured through RRC Release message (i.e. RRCReconfiguration and RRCReconfigurationComplete are not used for configuring SRSp) (10/10)**

## 2.3 RAN4 LS: DRX cycle used in PRS measurement in RRC\_INACTIVE state

During RAN2#117-e, an LS (R4-2202686 [2]) was received from RAN4, indicating the following RAN4 agreement regarding UE requirements for NR positioning measurements performed while the UE is in RRC\_INACTIVE state:

|  |  |
| --- | --- |
| |  | | --- | | Agreement   * DRX cycle should be considered in the positioning measurement delay requirements in RRC\_INACTIVE state. |   RAN4 also observes that DRX cycle may be different in different cells. RAN4 is further discussing the impact of DRX cycle on positioning measurement delay requirements under cell reselection in RRC\_INACTIVE state.  RAN4 respectfully asks RAN2 and RAN3 to take into account the above agreements and observations, and to determine if there would be any impact on their specifications, including potential impact to signalling. |

In RAN2#117-e under AI 8.11.2.2 (RRC\_INACTIVE), there were no contributions submitted to describe the relationship between DRX cycle and positioning measurement delay requirements in RRC\_INACTIVE state or relevant solutions. The moderator would like to open the discussion to collect company inputs with the following question:

**Question 3: Do companies think that the agreement made in RAN4 described in R4-2202686 [2] has an impact on stage 2/stage 3 specification. If your answer is “yes”, please explain the details of specification impacts.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| vivo | Yes | The LMF shall send the QoS requirement (e.g., response time) to gNB, and gNB may decide whether release the UE to RRC\_INACTIVE based on the DRX cycle and delay requirement.  However, the above solution is in the RAN3 scope. If RAN3 will introduce the enhancement, RAN2 can further discuss whether there is stage 2 impact. |
| Xiaomi | No | We admit the DRX cycle may lead positioning latancy but we don’t have enough time to resolve it at this stage. |
| Huawei, HiSilicon | No | If the RRC\_INACTIVE measurement cannot satisfy the QoS, the UE can trigger legacy RRCResumeRequest so that the UE can go to RRC\_CONNECTED. No spec imapcts are needed. |
| ZTE | No | Agree with HW |
| CATT | No | From RAN2 point of view, RRC state is invisible to LPP. So the LMF cannot take DRX cycle into account. gNB may decide whether release the UE to RRC\_INACTIVE state based on the period of deferred MT\_LR. But it is up to RAN3 discussion and RAN3 has already agreed that LMF can provide the periodicity of deffered MT-LR to the gNB. |
| Apple | No | No spec impacts have been identified for now. Companies that think otherviews can bring contributions to the next meeting. |
| Lenovo, Motorola Mobility | Yes | We still believe that goal of Rel-17 ePos was reduced latency and energy efficient positioning and knowledge of the UE’s DRX configuration at the LMF is a step in that direction. This would assist the LMF in providing a PRS configuration that would better meet the configured response time, i.e QoS during RRC\_INACTIVE state. Triggering a Resume request to RRC\_CONNECTED is not energy efficient from a positioning point of view. In addition, the PRS measurements would be better aligned with DRX active time instead of the current blind approach where the LMF has no idea on the DRX parameters/RRC state of the UE. We also agree with vivo that this needs to be coordinated with RAN3. On spec impacts it depends on whether the gNB (directly) or UE (indirectly) shares the DRX information with the LMF. |
| OPPO | No | Agree with HW. |
| Nokia | No | Not aware of any signaling impacts in RAN2 specifications. But, this LS is also not about any recommendations for a new enhancement that RAN2 should consider. We should wait for RAN4 to complete the discussions (they say they are still discussing the impact of DRX cycle on positioning measurement delay requirements) and have them request RAN2 for any specific siganlling support. |
| Intel | No | RAN2 already agreed, no enhancements from RAN2.  Agreement:  RAN2 will not make additional effort to make the gNB aware of when to transit the UE to RRC\_INACTIVE (left to gNB implementation and RAN3 solution). |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 2.1.3 Moderator’s summary

The moderator thanks the companies for providing their views and comments. The following is the summary of the companies’ views:

* 8/10 companies think that the RAN4 agreement (R4-2202686) has NO impact on stage 2/stage 3 specification
  + Xiomi mentioned the DRX cycle may lead positioning latancy but we don’t have enough time to resolve it at this stage.
  + Huawei mentioned that if the RRC\_INACTIVE measurement cannot satisfy the QoS, the UE can trigger legacy RRCResumeRequest so that the UE can go to RRC\_CONNECTED. Hence, no spec impacts are needed. ZTE and Oppo agree with Huawei
  + CATT indicated that from RAN2 point of view, RRC state is invisible to LPP. So the LMF cannot take DRX cycle into account. They also mentioned that it is up to RAN3 discussion and RAN3 has already agreed that LMF can provide the periodicity of deffered MT-LR to the gNB.
  + Apple mentioned no spec impacts have been identified for now. Companies that think otherwise can bring contributions to the next meeting.
  + Nokia indicated they are not aware of any signaling impacts in RAN2 specifications. They also said that this LS is also not about any recommendations for a new enhancement that RAN2 should consider. They said should wait for RAN4 to complete the ongoing discussions and have them request RAN2 for any specific siganlling support.
  + Intel indicated the previous agreement that RAN2 will not make additional effort to make the gNB aware of when to transit the UE to RRC\_INACTIVE (left to gNB implementation and RAN3 solution).
* 2/10 companies think the RAN4 agreement has an impact on stage 2/stage 3 specification
  + vivo mentioned a solution in RAN3 scope where the LMF sends the QoS requirement (e.g., response time) to gNB, and gNB may decide whether release the UE to RRC\_INACTIVE based on the DRX cycle and delay requirement. They also said that if RAN3 will introduce the enhancement, RAN2 can further discuss whether there is stage 2 impact.
  + Lenono indicated that they believe that goal of Rel-17 ePos was reduced latency and energy efficient positioning and knowledge of the UE’s DRX configuration at the LMF is a step in that direction. They also agree with vivo that discssion on a solution needs to be coordinated with RAN3 and that on spec impacts it depends on whether the gNB (directly) or UE (indirectly) shares the DRX information with the LMF.

**Moderator’s views**

Considering the agreement made in RAN2#116bis-e (i.e. RAN2 will not make additional effort to make the gNB aware of when to transit the UE to RRC\_INACTIVE; left to gNB implementation and RAN3 solution) and from ongoing RAN4 discussion, no specification impacts in RAN2 concerning the LS from RAN4 are identified by the majority of the companies (8/10). Based on the inputs provided by companies, the moderator would like to conclude the discussion with the following proposal:

**Proposal 3: No specification impacts are identified by RAN2 in Rel-17 for handling the relationship between DRX cycle and positioning measurement delay requirements in RRC\_INACTIVE (8/10)**

# 4 Summary

The following is the summary containing the proposals derived from the discussion above:

**Potentially easy to agree**

**Proposal 1: Follow SDT solution that the TA Timer for SRS for positioning (SRSp) is restarted upon reception of TA command in RRC\_INACTIVE (10/10)**

**Proposal 2: Follow SDT solution that SRS for positioning (SRSp) in RRC\_INACTIVE state can only be configured through RRC Release message (i.e. RRCReconfiguration and RRCReconfigurationComplete are not used for configuring SRSp) (10/10)**

**Proposal 3: No specification impacts are identified by RAN2 in Rel-17 for handling the relationship between DRX cycle and positioning measurement delay requirements in RRC\_INACTIVE (8/10)**

# 5 Reference

1. R2-2203524, Email discussion Report on [Pre117-e][609][POS] Open issues on positioning in RRC\_INACTIVE (InterDigital)
2. R2-2202166, LS on DRX cycle used in PRS measurement in RRC\_INACTIVE state
3. R2-2202338, Open issues on positioning in RRC\_INACTIVE state, Oppo, Feb 2022
4. RAN2 chairman notes RAN2#114-e, May 2021
5. RAN2 chairman notes RAN2#116-e, Nov 2021
6. RAN2 chairman notes RAN2#116bis-e, Jan 2022