3GPP TSG-RAN WG2 #116bis-bis R2-22xxxxx

Electronic meeting, 2022-01-17 - 2021-01-25

**Agenda item: 8.11.3**

**Source: Ericsson**

**Title: [AT116bis-e][617][POS] Remaining issues on positioning in RRC\_INACTIVE (Ericsson)**

**Document for: Discussion and Agreement**

# 1 Introduction

This document is to kick off the following email discussion:

* [AT116bis-e][617][POS] Remaining issues on positioning in RRC\_INACTIVE (Ericsson)

Scope: Discuss the remaining prioritised proposals from R2-2201068.

Intended outcome: Report to CB session

Deadline: Friday 2022-01-21 1600 UTC

The agreements so far in this area in RAN2#116bis-e have been provided below.

Agreements:

Proposal 1 (modified) To support UL positioning in RRC\_INACTIVE, reuse SDT TA timer mechanism (with a separate timer with similar function) for TA validation.

Proposal 2 To support UL positioning in RRC\_INACTIVE, reuse RSRP change based solution for TA validation

Proposal 3 The SRSp configuration is considered as invalid if TA is not valid.

Proposal 4 When cell reselection is performed and UE initiates RRC resume procedure to the cell which is different from the cell in which the SRSp is configured, the TA timer configuration for SRS should be released.

Proposal 5 (modified) The SRSp configuration is released when the UE sends RRCResumeRequest to a cell other than the cell where it is released to RRC\_INACTIVE state.

Proposal 6 BWP info together with the SRS-PosResourceSet IE is included in RRCRelease message for SRS configuration in RRC\_INACTIVE.

Proposal 7 RAN2 confirms RAN1 agreement that UE may be configured to transmit UL SRS for Positioning where the following parameters are additionally configured for the transmission of the SRS for Positioning during the RRC\_INACTIVE state: frequency location and bandwidth, SCS, CP length.

Proposal 8 Add the restriction on AP SRS in the field description of resourceType “The aperiodic is not applicable for the UE in RRC\_INACTIVE.”.

FFS if the TA timer configuration is invalidated upon any cell reselection.

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 Contact Information

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| --- | --- |
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# 3 Discussions

## 3.1 Stage 2 Details

### 3.1.1 For UL Positioning procedure when to provide Event Report Ack

As provided comparison in [12] for UL-only positioning the difference between the Procedure shown in Figure 1 [12] and the Procedure 2 (R2-2108383, Huawei et al.) is essentially only when the LCS Event Report Acknowledgement is provided to the UE. For Procedure 2, the LCS Event Report Acknowledgement is sent immediately after the LCS Event Report has been received by an LMF.

For the Procedure proposed in Figure 1 [12], the LCS Event Report Acknowledgement is provided once the UL-positioning has been successfully configured at the UE and TRPs. This allows the procedure more reliably be completed in RRC\_INACTIVE state.

[6] mentions that “it should be emphasized that the step 5 (event report ack) and 7 (POSITIONING INFORMATION REQUEST) are not strictly serialized. Step 7 does not necessarily need to be sent after Step 5. When the gNB receives POSITIONING INFORMATION REQUEST, it would know that the UE is performing RRC\_INACTIVE uplink positioning and would not send *RRCRelease* to the UE at that immediate moment.

There can be two alternatives to solve this deadlock:

* A note can be added in procedure proposed by [6] saying Step 5 may appear after step 7.
* It is agreed that event report ACK is provided once the UL-positioning has been successfully configured at the UE and TRPs

**Question 1: Which one of the below options on when to provide Event Report Ack.**

* **Option A: A note can be added in procedure proposed by [7] saying Step 5 may appear after step 7**
* **Option B: It is agreed that event report ACK is provided once the UL-positioning has been successfully configured at the UE and TRPs**

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| Company | Option A/B | Comments |
| Huawei, HiSilicon | OptionA | Under the framework of [6] event report ACK should be sent after the LMF receives the event report from the UE.  The original comment is as follows. The point is that the LMF can have a proper implementation to ensure that the network does not wrongly send an RRCRelease message to the UE before the LMF sends SRS configuration request (Positioning Information Request) to the serving gNB.   |  | | --- | | NOTE: Step 6 may not necessarily have to be performed after Step5. By proper implementation in the LMF, gNB can be timely acknowledged on the UE’s uplink positioning procedure by receiving POSITIONING INFORMATION REQUEST. | |
| Apple | Option A | Agree with Huawei |
| Qualcomm | Option B | Following the principles of the "Low Power Periodic and Triggered 5GC-MT-LR Procedures" in section 6.7 of TS 23.273, and the DL-only principles captured as baseline at RAN2#115-e, the Event Report ACK should normally be sent when the procedure is completed.  This would unify UL-only, DL-only and UL+DL. I.e., the SDT begins with an Event Report, and ends with an Event Report ACK.  However, if an implementation wants to send the Event Report ACK earlier, it is free to do so. Therefore, if a NOTE is needed, it should be the the other way around: The Event Report ACK may be provided before Step 13. However, this would mean that SDT is completed with the Event Report ACK, since there is no more data in the UE buffer to send and SRS configuration may have to happen in RRC\_CONNECTED state, as discussed in R2-2110823. |
| Intel | Nothing | Is this really a New issue? For instance, the positioning is triggered for a RRC\_CONNECTED mode UE, and the gNB may release the UE to RRC\_IDLE after the UE send the event report. We did not resolve this issue, why companies would like to enhance this for RRC\_INACTIVE? |
| CATT | Option A | We prefer to add a note and leave it to network implementation.  In addition, we wonder if it needs to be confirmed by SA2 if we agree something on the issue. Because according to step 26 in clause 6.3.1 of TS23.273 (deferred 5GC-MT-LR procedure), there are some descriptions on UE if LMF does not receive the event report acknowledge.  *26. When the LMF receives the event report and if it can handle this event report, the LMF updates the status of event reporting(e.g. the number of event reports so far received from the UE and/or the duration of event reporting so far) and returns a supplementary services acknowledgment for the event report to the UE. The acknowledgment may optionally include a new deferred routing identifier indicating a new serving LMF or a default (any) LMF. If the UE does not receive any response from the LMF after a predefined time, i.e. the current LMF does not support the deferred location request (for temporary or permanent reasons) or due to some radio access failures, the UE may re-send the report one or more times. If the UE sends the repeated event report more than the predefined maximum resending time and the UE still does not receive any response from AMF, the UE shall stop resending the report and reserve the event report, then record a corresponding flag to indicate that a report has been sent unsuccessfully. When the UE performs location update and detects the PLMN is changed, if the flag has been set, the UE shall send the report to the corresponding AMF, and the flag will be cleared upon a success of the sending.* |
| vivo | none | In the current SA2 spec, the UE shall send out the event report in step 25 when event trigger is detected by the UE. After the LMF receives the event report, the LMF will returns an ACK in step 26. DL measurement is performed in step 23 and other positioning procedures are performed in step 27.  Therefore, we think the procedure in [6] is align with SA2 spec and the note in option A is not essential. The procedure in [12] goes against with SA2 spec as the LMF will not send out the ACK after UL-positioning has been successfully configured, which reverses the order of step 26 and 27. If the behavior of LMF is different when UE is in different RRC state, we think it breaks the rule that RRC state is invisible to LMF. |
| Xiaomi | None | We agree with vivo the procedure in [6] aligns with SA2 spec. Moreover, RAN3 agreed some assistance information from LMF will be provided to gNB, we think the assistance information will help gNB to keep UE in Inactive. |
| OPPO | None | We share similar view that the procedure in [6] is aligned with the current SA2 spec. And there seems no strong motivation to add the note as in option A. |
| InterDigital | None | No strong view on this. However, we agree with Intel that any enhancement specific to INACTIVE state is not necessary |
| Samsung | None | We share the view with VIVO. No strong view on this though. |
| Lenovo, Motorola Mobility | Option A | A note may be added for better clarification. |
| Ericsson | None | We can leave it to SA2 to decide. |
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### Summary for Q1:

12 companies have responded. 4 companies opt for Option A. Only One company opt for Option B. 7 companies do not see the need of any of the Options. Vivo believes the description provided in Huawei et. al follows what is currently been captured in SA2 specification for deferred MT-LR procedure where an ack is sent immediately before UE positioning takes place. However, Qualcomm point to SA2 specification for low power deferred MT-LR procedure for EDT where an ack is sent only after EDT procedure is completed. SA2 basically provides both options. It is difficult to pursue this in RAN2 as SA2 input would be beneficial. If we go with majority then it should be that the description provided in Huawei et al. in [6] is fine and this can be baseline as many companies agree with vivo description. However, 4 companies are also willing to compromise with addition of Note. It could also be that we may receive some input from SA2 later on this. In order to progress for now; we can agree to have Note as below and this can be revisited later; i.e if Note can be removed.

1. If the UL-only and UL and DL positioning is agreed to capture in the specification; A note is added to say that when to send Event Report ACK is up to NW implementation

### 3.1.2 Assistance Data Delivery

[7] provides the view that how can the highlighted agreement be realized as there is no procedure to deliver this PRS to the UE during the SDT procedure.

Agreement:

Proposal 4 (modified): For positioning in RRC\_INACTIVE state, the positioning assistance data can be delivered to UE through the following ways:

- positioning system information, i.e. posSIB;(12/13)

- pre-configure assistance data when UE in RRC\_CONNECTED state;(11/13)

- send to UE in RRC\_INACTIVE during ongoing SDT procedure. (9/13)

Hence, it is proposed to discuss further which of the two options

* **Option1: Revert the previous agreement: positioning assistance data cannot be delivered to the UE in RRC\_INATIVE during SDT procedure**
* **Option2: Add the positioning assistance data delivery during SDT procedure to the stage2 procedure**

**Question 2: Which option should RAN2 to select?**

**Option A: to revert the agreement to provide AD during ongoing SDT procedure**

**Option B: add the procedure in stage2.**

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| Company | Option A/B | Comments |
| Huawei, HiSIlicon | OptionB | It is possible that the UE moved far away from its original location where the PRS configuration is delivered. So it is beneficial to allow the LMF to update the PRS AD when event is triggered. This is aligned with the current stage2 procedure for deferred MT-LR in TS 23.273 |
| Apple | Option B | Agree that such procedure is beneficial |
| Qualcomm | Modified Option B | As agreed, any LCS and LPP message can be transported using SDT. The additional assistance data request is of course possible, but usually not described in the overall positioning procedures (e.g., also not described in RRC\_CONNECTED). Instead, we propose to describe the LPP and LCS PDU transfer in RRC\_INACTIVE in 38.305, analogous to section 6.4.2 (and in R2-2108383). |
| Intel | Nothing | Should not the simple way be just add clarification in the stage 2,e.g. as below.  Positioning may be performed when a UE is in RRC\_INACTIVE. LPP PDU, LCS message can be transferred between the UE and the LMF when the UE is in RRC\_INACTIVE state and supports Small Data Transmission (SDT).  Do not see the need to repeat the procedure for RRC\_INACTIVE. |
| CATT | Option B | Ok to capture the agreement. But FFS how to capture it. |
| vivo | Option B | I think the bullet is straightforward, the LPP transmission is transparent to gNB, it is not feasible to prevent the gNB sending it to UE if there is ongoing SDT. |
| Xiaomi | Nothing | Agree with Intel. |
| ZTE | Nothing | We support to send UE the assistance data during ongoing SDT procedure, we also agree with Intel that this can be resolved by adding a note in stage 2 rather than adding the procedure in stage 2 |
| OPPO | Nothing | Agree with Intel. |
| InterDigital | Option B | We think capturing the procedure in stage2 is useful. If SDT has been activated, either via an LPP request assistance data message or any other UL message, the gNB can deliver the assistance data when UE is in INACTIVE. |
| Samsung | Nothing | Agree with intel. |
| Lenovo, Motorola Mobility | Option B | Also agree that capturing the Stage 2 procedure would be beneficial. |
| Ericsson | Nothing | Agree with Intel. |
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### Summary for Q2:

13 companies have responded. 7 companies opt for adding the procedure in stage 2. Out of which one company mentions it is not only for Positioning AD delivery but as agreed prior any LCS and LPP message can be transported using SDT and thus proposes to describe the LPP and LCS PDU transfer in RRC\_INACTIVE in 38.305. 6 companies agree to add a note as below to address this.

Note: Positioning may be performed when a UE is in RRC\_INACTIVE. LPP PDU, LCS message can be transferred between the UE and the LMF when the UE is in RRC\_INACTIVE state and supports Small Data Transmission (SDT).

1. RAN2 to decide whether note is sufficient or overall procedure needs to be captured for Positioning AD delivery using SDT

[14] mention to revert the WA: pre-configure positioning SRS in RRC\_CONNECTED (9/13) that was made in RAN2#116-e.

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)

- WA: pre-configure positioning SRS in RRC\_CONNECTED (9/13)

FFS detailed signalling for these approaches.

The paper says it is unclear as when the gNB will provide such configuration. UL SRS configuration for inactive depends upon several factors such as TA validity timer, RSRP thresholds, TA value and UL power to use for UL SRS Tx. It is beneficial if these configurations are provided as close as possible when UE is released to Inactive from connected mode. Further, there is already provision to provide UL SRS configuration via RRC Release message; in lieu of that and to minimize RRC specification impacts; there is no as such need to support pre-configuration of positioning SRS in RRC\_CONNECTED.

**Question 3: Is the support of pre-configuration of positioning SRS in RRC\_CONNECTED needed?**

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| Company | Yes/No | Comments |
| Huawei, HiSIlicon | No | Pre-configuring SRS can be studied in the future releases |
| Apple | No |  |
| Qualcomm | Yes | It is not crystal-clear what pre-configuration means. The Event Report may be sent in RRC\_CONNECTED (e.g., if SDT is not possible/allowed/supported), but the SRS config can still be provided when released to RRC\_INACTIVE (if the UE supports SRS transmission in RRC\_INACTIVE). This means in my understanding SRS configuration is (pre-)configured in RRC\_CONNECTED for use in RRC\_INACTIVE. |
| Intel | No | We assume SRS configuration in RRCRelease message should be sufficient.  RRCRelease with SuspendConfig (13/13)  - SDT DL RRC message, i.e. Msg B / Msg 4 of RA-SDT (9/13) |
| CATT | No | The network needs to release the UE into RRC\_INACTIVE anyway. The SRS configuration together with other configurations, e.g. TA validity timer, threshold for TA validity and so on, in RRCRelease message. Considering the limited time budget, we prefer not to support pre-configuration of positioning SRS for RRC\_INACTIVE in RRC\_CONNECTED in this release. |
| vivo | See comment | The definition of pre-configuration of positioning SRS is not clear to us.  If it means associate with validity criteria and used at a future time, agree with QC that it is what we are discussing.  If it means a list of SRS configured by more than one cell, agree with HW to study in the future releases. |
| Xiaomi |  | If pre-configuration of positioning SRS in RRC\_CONNECTED is supported, we are not clear how gNB determines the SRS configuration is for UE in Connected or in Idle when LMF request the SRS configuration. |
| ZTE |  | The definition of pre-configure SRS in RRC\_CONNECTED needs to be clarified.   1. SRS config is provided when released to RRC\_INACTIVE(in RRCRelease with Suspend Config), that means pre-configuration of positioning SRS in RRC\_CONNECTED. This is duplicated with the first bullet. 2. UE reuses the last SRS config of RRC\_CONNECTED in RRC\_INACTIVE. That means no new SRS config is configured for RRC\_INACTIVE. This should be the first intention of this proposal. 3. Multiple SRS configurations configured in RRC\_CONNECTED. What is the difference between this and ‘multiple SRS configurations configured in RRCRelease with Suspend Config’? |
| InterDigital | Yes | From our understanding, the procedure for pre-configuration of positioning SRS can be initiated when the UE is in RRC\_CONNECTED and the SRS configuration, along with validity criteria (e.g. TA timer), may be provided when transitioning to RRC\_INACTIVE, as described by QC and vivo. |
| Samsung | No |  |
| Lenovo, Motorola Mobility | Maybe | It may be implicitly supported already, when UE receives SRSconfig in the RRC release message. |
| Ericsson | No | Agree that the term pre-configuration is not clear. Anyway, it is simply a configuration here as UE needs to apply immediately in RRC Inactive mode as it anyway receives in RRC Release message. It is not as such in distant future etc. as in scheduled location time T which can be well in advance. |
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### Summary for Q3:

12 companies have responded. Companies express that the definition of pre-configuration for SRS config is not clear. However, in terms of stage 3, it seems it is clear that only impact as such is for below message:

RRCRelease with SuspendConfig (13/13)

For some companies, the pre-configuration could imply multiple SRS configuration, a list of SRS configured by more than one cell. This should be discussed though in Rel-18.

One of the companies expresses the WA: pre-configure SRS in RRC Connected imply that UE was already transmitting SRS in connected mode and reuses the last SRS config in Inactive mode. However, this would depend upon RAN4 as expressed by several companies (pls see Q12 and 13 summaries).

As we have limited time, it is proposed not to spend time on pre-configuration term for SRS configuration and hence it is proposed to remove the WA.

1. The agreement with WA: pre-configure positioning SRS in RRC\_CONNECTED is removed.

### 3.1.3 Stage 2 Specification

#### 3.1.3.1 How to capture the stage 2 details in specification

There are some proposals in this direction on how to specify DL, UL and UL+DL positioning in RRC Inactivate mode

1. It is not necessary to introduce the new positioning procedures in stage 2 specification for RRC inactive UE positioning [8]
2. Send LS to SA2 to let SA2 decide the spec impacts [12], [3]
3. Capture in TS 38.305 [12]

[12] further allows the UE to include in the LCS Event Report an embedded LPP Request Assistance Data message with IE *NR-Multi-RTT-RequestAssistanceData* and *nr-AdType* set to '*ul-srs*' to request an UL-SRS for Multi-RTT positioning.

**Question 4: How to capture the stage 2 details in specification**

1. **It is not necessary to introduce the new positioning procedures in stage 2 specification for RRC inactive UE positioning [8]**
2. **Send LS to SA2 to let SA2 decide the spec impacts [12, 3]. Use [R2-2200961] as baseline**
3. **Capture in TS 38.305 [12]**

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| Company | A/B/C | Comments |
| Huawei, Hislicon | C | We think the stage2 procedure should be captured in the 38305 since it is very hard for SA2 spec to capture up to the details of RRCRelease with SRS configuration, etc. This is the scope of RAN stage2 to specify |
| Apple |  | No strong view, but we are not opposed to having it in 38.305 |
| Qualcomm | Other | The deferred MT-LR procedures can be send to SA2 for TS 23.273. The LPP/LCS PDU transport (baseline from RAN2#115-e) should be captured in TS 38.305.  However, we would also be O.K. to describe the deferred MT-LR procedures in TS 38.305. |
| Intel | Nothing | We should avoid to move SA2 procedure into RAN, we should also avoid to couple SDT with positioning tightly in positioning stage 2. Simple clarification is enough,e .g.  Positioning may be performed when a UE is in RRC\_INACTIVE. LPP PDU, LCS message can be transferred between the UE and the LMF when the UE is in RRC\_INACTIVE state and supports Small Data Transmission (SDT). |
| CATT | B/C | In TS 23.273, LTE EDT optimization has already been captured in 6.7.1 (Low Power Periodic and Triggered 5GC-MT-LR Procedures with no change of LMF) in TS 23.273. In Rel-17, SDT within RRC\_INACTIVE was extended to support small signaling transmission which includes location related info. If it is not captured in TS 23.273, it may lead misunderstanding that Low Power Periodic and Triggered 5GC-MT-LR Procedures with no change of LMF only support LTE EDT with UE in RRC\_IDLE. Considering DL positioning with RRC\_INACTIVE was discussed and agreed in RAN and the general procedure of SDT with location related info is a RAN optimization, it is more suitable for RAN2 to send LS to SA2 with an example and ask SA2 to decide the spec impacts. |
| vivo | B for deferred MT-LR  C for UL | For the UL positioning, we have discussed for a few meetings about the stage2 procedure, we prefer to capture it in 38.305 to show how it works, especially for RRCRelease with SRS configuration.  For deferred MT-LR, LS to SA2 and avoid duplicated procedure in SA2 and RAN. |
| Xiaomi | A | The SDT is a solution for RRC inactive UE to transmit data, it doesn’t change positioning procedures, we don’t need to capture the SDT details in positioning spec, and as Intel said, a simple clarification is enough. |
| ZTE | Nothing | Agree with Apple and Intel that adding note to clarify ‘LPP PDU, LCS message can be transferred between the UE and the LMF when the UE is in RRC\_INACTIVE state and supports Small Data Transmission (SDT)’ |
| OPPO | C | We are fine to have the stage2 procedure for RRC\_inactive positioning, while we should avoid detailed and redundant SDT principle in positioning spec. |
| InterDigital | C | We think details related to sending positioning SRS with RRCRelease, as indicated by HW, is more suitable to be captured in 38.305 rather than SA2 spec. However, deferred MT-LR procedure can be left to SA2. |
| Samsung | Nothing | We share the view with Intel. |
| Lenovo, Motorola Mobility | C | We are fine to capture the procedures in 38.305. |
| Ericsson | Nothing | Agree with Intel |
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### Summary for Q4:

13 companies have responded. 6 companies want to capture it in stage 2 TS 38.305 specification where as 6 companies prefer that it does not need to be captured; rather a note could be sufficient. Two companies also share the view that The deferred MT-LR procedures can be send to SA2 for TS 23.273; out of which one of the companies also express that UL positioning should be captured in TS 38.305.

1. RAN2 to decide whether note is sufficient or overall procedure needs to be captured for DL, UL and UL+DL positioning in RRC Inactivate mode

#### 3.1.3.2 Baseline CR

If option C in section 3.1.3.1 is the preference, then companies are requested to provide further details

**Question 5: If there is consensus to capture the stage 2 details in TS 38.305 then the baseline can be taken from [6] (Huawei et al.) paper.**

**Answer: Agree/Disagree**

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| Company | Agree/Disagree | Comments |
| Huawei, HiSilicon | Agree | The comparison of the two solutions have been summarized by the following table. Due to the lack of time, we think it is better for R2 to support the solution in [6] as baseline. As can be seen in the comparison, solution 2.2 (in [6]) has no other stage3 impacts than supporting SRS transmission in RRC\_INACTIVE, which is common for all the solution for supporting UL positioning in RRC\_INACTIVE. Hence, we think the solution [6] has less spec impacts.  Features that have been proposed in [12] can be discussed in the future releases.  C:\Users\y00397895\AppData\Roaming\eSpace_Desktop\UserData\y00397895\imagefiles\originalImgfiles\FA1B23D6-0008-4BB9-B2A7-1CC4CDDE1ADB.png |
| Qualcomm | Disagree | The compromise proposal in [12] has also no additional Stage 3 impacts and allows the same UE procedure/behaviour independent on the positioning method, and the same NW procedures as in RRC\_CONNECTED. In particular, there is no need to send a LPP Request Location Information each time an (e.g., periodic) event is triggered, and the measurement reporting phase can be the same as in DL-only.  NOTE, Huawei compared and commented above on Qualcomm's original proposal in R2-2110823 but does not consider the compromise proposal in [12] submitted to this meeting. We think the procedure described in section 3 of [12] overcomes the problems of [6], in particular for UL+DL.  The compromise in [12] uses two Event Reports, one for UL and one for DL, where the DL part is the same as for DL-only methods. Therefore, UL+DL can be the "sum" of UL-only and DL-only, and the general SDT procedure is the same for all positioning methods and the NW procedures are the same as in RRC\_CONNECTED. |
| Intel | Nothing to be captured in stage 2 | We agree to use procedure from Huawei as baseline for further discussion. But we do not see the need to repeat SA2 procedure in RAN, and do not see the need to describe SDT details in positioning stage 2. |
| CATT | Agree | For UL SRS positioning with RRC\_INACTIVE, the procedure in [6] can be taken as a baseline for further discussion. We think the main difference between [6] (Huawei et al.) and the compromise proposal in [12] (Qualcomm) has already been discussed in Q1. We can further discuss based on the outcome of Q1. |
| vivo | Agree |  |
| Xiaomi | Nothing to be captured in stage 2 | Agree with Intel |
| ZTE |  | We agree with Intel that none of these procedures should be captured in positioning stage 2 |
| OPPO | Agree |  |
| Samsung | Nothing to be captured in stage 2 | Agree with intel. |
| Lenovo, Motorola Mobility |  | No strong view , ok to capture [6] as baseline |
| Ericsson | Nothing to be captured in stage 2 |  |
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### Summary for Q5:

11 companies have responded. 5 companies prefer not to add elaborate description/flow in TS 38.305. 4 companies opt for Huawei et. al whereas one company opt for the flow as depicted by Qualcomm contribution. One company expresses no string view. It is clear there is no consensus to go for either of the options (i.e Huawei et al. or Qualcomm); though it is 4 Vs 1. Majority of the companies prefer not to adopt any one of the options; i.e no need to capture in TS 38-305. Hence, it is proposed that:

1. RAN2 to agree not to add elaborative description/flow diagrams in TS 38.305.

#### 3.1.3.3 Common flow or separate

[12] shows that UL and UL+DL positioning procedures can be depicted using one common flow whereas [7] captures using two separateflows**.**

**Question 6: If there is consensus to capture the stage 2 details in TS 38.305 then RAN2 to decide whether a common flow is used to depict UL and UL+DL positioning or separate flow is used.**

**Option A: Common**

**Option B: Separate**

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| Company | A/B | Comments |
| Huawei, HiSIlicon | A | OptionA is better from the spec impacts perspective but it would make the spec less readable.  OptionB would result in a lot of redundancies in the description in the spec.  We prefer OptionA. We think multi-RTT can include all the signalings while for UL/DL, some of the steps can be omitted |
| Apple | A | If we are to capture this flow, a common one is better |
| Qualcomm | B | No strong view, but since we currently have separate procedures for DL, UL, and UL+DL in 38.305, slightly prefer B.  If A is preferred, it should be a common procedure for DL-only, UL-only, and UL+DL. Not quite clear why UL+DL should be combined, but DL-only should be kept separate. |
| CATT | B | Share the same view with Qualcomm, prefer to have separate procedures for DL, UL, and UL+DL in 38.305. But no strong view. |
| vivo | A or B | A can be a comprise if the majority think it is redundant to capture both. |
| Xiaomi |  | A clarification for both UL and UL+DL is enough. |
| ZTE | None | Do not support to capture above stage 2 details in 38.305 |
| OPPO | A | A common stage 2 singling flow is sufficient. |
| InterDigital | B | Same understanding with QC and CATT |
| Ericsson | None |  |
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### Summary for Q6:

10 companies have responded. There is no clear consensus. It is rather 4 Vs 4 for Option A and B. Two companies opt none- However, this needs to be revisited depending upon previous proposals.

1. RAN2 to wait to decide whether to go for common flow or separate flow; i.e to be discussed after the outcome of previous proposals 4 and 5.

#### 3.1.3.4 LCS Event Report with an embedded UL-SRS Request for Multi-RTT positioning

**Question 7: If there is consensus to capture the stage 2 details in TS 38.305 then RAN2 to decide whether UE can include in the LCS Event Report an embedded LPP Request Assistance Data message with IE *NR-Multi-RTT-RequestAssistanceData* and *nr-AdType* set to '*ul-srs*' to request an UL-SRS for Multi-RTT positioning.**

**Option A: Yes, agree for such inclusion**

**Option B: No, not needed**

|  |  |  |
| --- | --- | --- |
| Company | A/B | Comments |
| Huawei, HiSilicon | Option B | There is no need for the UE to request the positioning method to LMF, by requesting the AD for ul-SRS. The positioning method adopted should be decided by LMF as what has been done today.  Also, SRS configuration is configured to the UE by RRC, so it is not clear why we use LPP to request SRS.  The above two points means major shift of paradigm so we think it is not needed. |
| Apple | Option B |  |
| Qualcomm | A | This is already Rel-16 functionality. If a UE is configured with Multi-RTT (e.g., in the deferred MT-LR preparation phase), but has no SRS (e.g., when the periodic event is triggered), it may send a LPP *NR-Multi-RTT-RequestAssistanceData* with *nr-AdType-r16* set to ' ul-srs'.  And all UE-triggered LCS messages can have up to 3 LPP PDUs embedded (according to the 3 LPP transaction types defined); see e.g. 24.080.  Therefore, as already mentioned in Question 5, there are no Stage 3 impacts, other than the Event Report may be sent using SDT. |
| Intel | Option B |  |
| CATT | No strong view | For UL SRS only in RRC\_INACTIVE, it needs to be supported that LMF itself requests SRS configuration to the gNB anyway. |
| vivo | Already supported | LPP requestlocationinformation message can be piggybacked in lcs-EventReport. |
| Xiaomi | Option B |  |
| ZTE | Option A but | We agree with QC that this is already supported in LPP Request Assistance Data in R16. However we do not support to capture such details in 38.305 |
| OPPO | Option B |  |
| InterDigital |  | No strong view but ok with what the majority decides |
| Samsung | Option B | Same view with Huawei. |
| Ericsson | No strong view |  |
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### Summary for Q7:

12 companies have responded. 7 companies prefer not to depict this in the stage 2 even though few of those companies do mention it is already supported. Only one company mentions it should be depicted. Two companies do not have any clear preference. Based upon majority view, it is proposed that

1. It is not necessary to capture explicitly in stage 2 that UE can include in the LCS Event Report an embedded LPP Request Assistance Data message with IE *NR-Multi-RTT-RequestAssistanceData* and *nr-AdType* set to '*ul-srs*' to request an UL-SRS for Multi-RTT positioning.

#### 3.1.3.5 LPP PDU and LCS Message Transfer

[12] further proposed; that the the LPP PDU and LCS message transfer procedures with SDT in RRC\_INACTIVE state are used as baseline. Since Stage 2 does currently not support LPP PDU and LCS message transfer in RRC\_INACTIVE state, the procedures should be captured in Stage 2 TS 38.305.

**Question 8:** [**RAN2 to decide the need to capture LPP PDU and LCS message transfer procedures with SDT in RRC\_INACTIVE state in Stage 2 TS 38.305 [8].**](#_Toc93136447)

**Option A: Yes, agree to capture in TS 38.305**

**Option B: No, not needed**

|  |  |  |
| --- | --- | --- |
| Company | A/B | Comments |
| Huawei, HiSilicon | OptionA | Transporting LPP/LCS message with SDT is new to the spec. it is better to give a stage2 description on these with the new UL/DL inactive positioning. |
| Apple | Maybe | No strong view; maybe a note would be sufficient? |
| Qualcomm | A | See also our comments to Questions 4. |
| Intel | No | Do not see the need, a general description or a note is sufficient. |
| CATT | A | It’s better to understand the general positioning procedure with SDT in RRC\_INACTIVE. |
| vivo | No preference | To avoid too much stage 2 spec impact, a note maybe sufficient. |
| Xiaomi | B | A note is sufficient. |
| ZTE | B | After determining the baseline of LPP PDU and LCS message transfer procedure, RAN2 finds out that there is no additional technical issues introduced(expect for SDT, which can be seen as a tool for transmission). So, adding a note for clarification is enough:  LPP PDU can LCS message can be transferred between UE and LMF when the UE is in RRC\_INACTIVE state and supports Small Data Transmission (SDT) |
| OPPO | No strong view |  |
| InterDigital | A | Same understanding with HW |
| Samsung | No | We don’t see the need to include the details over than general description like Intel’s suggestion in Q 4. Or Note seems ok. |
| Lenovo, Motorola Mobility | A | Share HW’s understanding. |
| Ericsson | B |  |
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### Summary for Q8:

13 companies have responded. 5 companies prefer a note is sufficient whereas 5 companies want to capture this in stage 2. There is equal split. 3 companies have no clear preference. This discussion is basically similar to Positioning AD delivery using SDT to be captured in stage 2 or not. Similar proposal is proposed:

1. RAN2 to decide whether note is sufficient or overall procedure needs to be captured for LPP PDU and LCS message transfer in RRC Inactivate mode

## 3.2 Segmentation

[14] mentions that the LPP data should not be segmented by LPP layer to fit the content for using SDT. Segmentation in LPP is defined to overcome NAS limitations. It is function of RLC to perform segmentation based upon TBS.

[9] mentions the issue on the LPP segmentation considering SDT operation was also discussed in the last RAN2 #116-e meeting and prefers to select Option 1.

* **Option 1: The message size threshold for LPP segmentation is up to UE implementation and has no specification impact in RAN side.**
* **Option 2: The LMF provides segmentation configuration information to the UE for ensuring suitable LPP segmentation in RRC\_INACTIVE.**

**Question 9: RAN2 to decide whether LPP Segmentation violates any architectural constrains (application layer segmenting data to enable a certain transport selection by lower layer) and if this should be allowed. Which of the option is preferred?**

**Option A: It is not allowed that LPP layer segments data to enable a certain transport selection by lower layer**

**Option B: The message size threshold for LPP segmentation is up to UE implementation and has no specification impact in RAN side.**

**Option C: The LMF provides segmentation configuration information to the UE for ensuring suitable LPP segmentation in RRC\_INACTIVE.**

|  |  |  |
| --- | --- | --- |
| Company | A/B | Comments |
| Huawei, HiSilicon | OptionB | We agree that there is no segmentation functionality in the NAS layer. We also prefer not to change the current UE behavior since it is hard for the LMF to give a reasonable size for the threshold of LPP segmentation. |
| Apple | Option B | Prefer to leave this for UE implementation |
| Qualcomm |  | Although, we prefer Option C, no further action is needed in this Release. The agreement from RAN2#115-e still holds.  Note, Option C is already supported in LPP for NB-IoT and eMTC, where the LMF can either provide the *MessageSizeLimitNB-r14* in *CommonIEsRequestLocationInformation*, or restrict the number of measurements to be reported in *OTDOA-RequestLocationInformation* (*maxNoOfRSTDmeas-r14*). |
| Intel | Option B |  |
| CATT | Option B | No strong motivation to support the optimization. |
| vivo | Option B |  |
| Xiaomi | Option B |  |
| ZTE | Option B |  |
| OPPO | Option B |  |
| InterDigital |  | Similar understanding with QC on this, with preference towards Option C. And we agree that no further changes are needed on this matter |
| Samsung | Option B |  |
| Lenovo, Motorola Mobility | Prefer Option C, ok with Option B | If not acceptable, then can be considered for future releases as there is an inevitable issue with the reporting size of the *ProvideLocationInformation* message depending on the number of positioning techniques configured. |
| Ericsson | Option A | Otherwise the DVT that NW provides can be useless. LPP layer can segment the data and ensure the size is less than DVT. |
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### Summary for Q9:

13 companies have responded. 9 companies prefer to leave it to UE implementation whereas one company prefers that LPP layer is not allowed to perform segmentation. Further few companies want more optimization and want to handle this in Rel-18. One company object saying DVT that NW provides would be useless in such case.

This is not essential for Rel-17 feature completion and this can be revisited in Rel-18.

It is proposed that segmentation related enhancements are discussed in Rel-18.

1. RAN2 to discuss segmentation in Rel-18.

## 3.3 Scope of RRC Inactive

[1] proposes to support all location service types in SDT active period including MT-LR, MO-LR, NI-LR and deferred MT-LR.

**Question 10: Which service types can be supported using SDT active period?**

|  |  |  |
| --- | --- | --- |
| Company | List service types to be supported | Comments |
| Huawei, HiSilicon | Deferred MT-LR | For the other types, we may not have sufficient time for the discussion in R17. We can leave it for further releases. |
| Apple | Deferred MT-LR | Agree with Huawei that given the time constraints that is probably the only option |
| Qualcomm | Deferred MT-LR | We only see a user case for deferred MT-LR as described in section 6.7 of TS 23.273. However, the previous RAN2 agreements that any LPP and LCS message can be transported in RRC\_INACTIVE still holds. |
| Intel | All | If we restrict it only for MT-LR, then it contradicts with agreements that all LCS/LPP message could be transferred via SDT.  If only Defferred MT-LR is allowed, then the UE has to trigger the transition to CONNECTED mode if MO-LR is triggered even if there is ongoing SDT session.  And who can trigger the UE to CONNECTED if the LMF wants to trigger MT-LR or NI-LR.  In summary, if we add this limitation, that will increase the complixity instead of reducing complexity. |
| CATT | Deferred MT-LR | From the aspect of capturing stage 2 procedure, we prefer to focus on deferred MT-LR procedure using SDT only. But according to previous agreement, any LPP and LCS message can be transported in RRC\_INACTIVE which means at least the first message of MO\_LR can be transmitted with SDT. |
| vivo | All | I think we should reach a consensus about the support of positioning in RRC\_INACTIVE using SDT active period:  Alt 1: The UE is not allowed to transition to RRC\_CONNECTED at least from DL measurement/ UL transmission to provide location info.  Alt 2: Any positioning procedure can be performed when UE is in RRC\_INACTIVE, the UE can transition to RRC\_CONNECTED when it has to.  Our understanding is Alt2. As to Alt 1, even for deferred MT-LR, no one can ensure the UE will stay RRC\_INACTIVE, e.g., when the event report exceeds the SDT size limit. |
| Xiaomi | All | For MO-LR, RRC inactive UE can send LCS and LPP message to LMF and then LMF also can send LCS and LPP message to UE since UE initiate data transmission using UL SDT. For MT-LR, the LPP message or NRPPa message can be sent to the anchor gNB of the RRC inactive UE, and the anchor gNB decide how to forward the messages to UE. |
| ZTE | All | When UE is in SDT active period, it has been agreed the network can send DL LCS, LPP message and RRC message to the UE. Therefore, NI-LR and MT-LR are feasible to be supported in RRC\_INACTIVE. UE also can send UL NAS message to the network in RRC\_INACTIVE via SDT. Thus, MO-LR can be supported, too.  Since these service types has no additional spec impact to 38.305 or 23.273, we think all of them should be supported in R17 to reduce R18 payload |
| OPPO | All | RAN2 has agreed that any LPP/LCS can be transmitted in RRC inactive state via SDT, we see no problem to support all service types. |
| InterDigital | All | As Intel indicated, we do not see the benefit of restricting the support for any one of the procedures (e.g. Deferred MT-LR only) when SDT is activated |
| Samsung | Deferred MT-LR | Agree with Huawei on time limitation for the look into other cases. |
| Lenovo, Motorola Mobility | All |  |
| Ericsson | Deferred MT-LR |  |
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### Summary for Q10:

13 companies have responded. 6 companies prefer that only deferred MT-LR is in the scope whereas 7 companies prefer that all the procedures are in scope. There is also general view that previous agreement made by RAN2 that any LCS message can be transmitted using SDT still holds even when the procedure is described limited to deferred MT-LR Procedure. One of the companies expresses the view that it adds more complexity if we limit it to only deferred MT-LR. It may so happen that there is no time to discuss further other service types etc; and the use case is only for deferred MT-LR; there is no problem so far described as why for other service type it may not work and as there is already RAN2 agreement to support LCS msg transfer for all messages in RRC Inactive; it is proposed that.

1. All LCS service types are allowed to use SDT.

[13], [15] provides Observation that UE-assisted DL NR E-CID measurements should be supported in RRC\_INACTIVE state at least in the case of SS-RSRP and SS-RSRQ measurements.

**Question 11: Whether support of RRC\_INACTIVE reporting of RRM measurements along with other DL-based positioning methods is preferred?**

|  |  |  |
| --- | --- | --- |
| Company | Yes (support): No (do not support) | Comments |
| Huawei, HiSilicon |  | We think DL E-CID can be beneficial and there might not be stage3 changes needed for this. However, the UE needs to support R16 eDCCA in order to report the RRM measurements and the application scenario for this is thus quite limited. |
| Apple |  | What’s the specification impact of this proposal? |
| Qualcomm |  | Similar to our response to Question 7, this is Release-16 functionality (assuming RRM means E-CID). It is up to the LMF which positioning method(s) to request in the deferred MT-LR preparation phase and depends on which measurements can be supported in RRC\_INACTIVE by RAN1/4. |
| Intel |  | No strong opinion, assume no additional impact. |
| CATT |  | Share the same view with Apple. |
| vivo |  | Depends on whether UE can perform RRM in RRC\_INACTIVE and RRM report can be send via SDT |
| ZTE |  | Agree with QC |
| OPPO |  | Agree with QC |
| InterDigital |  | No preference, but ok if no additional impacts are foreseen |
| Samsung |  | Agree with QC |
| Lenovo, Motorola Mobility |  | Share the support of reporting DL-ECID in Inactive, may be added clarification is needed Rel-16 functionality is assumed and no impacts are foreseen. |
| Ericsson |  | Agree with QC |
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### Summary for Q11:

12 companies have responded. Many companies express the view that this should be legacy functionality. UE may have SSB RSRP measurement results during RRC Inactive state and this can be provided. If there are spec impacts; the proponent companies should provide that else, it is assumed that legacy procedure is fine, and no change is needed. Hence no proposal is made here.

## 3.4 State Transition

[1] expresses the need for network to give UE an indication on whether to continue transmitting the periodic SRS in RRC\_INACTIVE state for power savings. The indication can be a 1 bit parameter with value 0 or 1. with this indication, UE may follow NW’s guidance on transmitting SRS efficiently.

[14] mentions UE UL SRS configuration applicability in various RRC modes should be discussed; when UE states Transition while configured to transmit UL SRS. Can UE continue UL SRS Tx that was configured for inactive mode when UE switches from Inactive mode to Connected mode.

**Question 12: RAN2 to discuss whether UE UL SRS configuration provided in one mode is applicable in other**

|  |  |  |
| --- | --- | --- |
| Company | Yes (applicable): No (no needs to be released) | Comments |
| Huawei, HiSilicon | No | Based on the current stage2 that has been proposed, the above enhancements are not needed. We also think the current proposal is too generic that more details needs to be given |
| Apple | No |  |
| Qualcomm |  | This seems RAN4 business. |
| Intel |  | This is RAN4 business. From RAN2 perspective we do not see the limitation on this. |
| CATT | No | It depends on RAN4 whether the requirements in inactive mode and connected mode are different. In addition, after the UE switched from inactive mode to connected mode, the active BWP(s) maybe different from that for inactive mode, we need to discuss how to handle it if we support the UE UL SRS configuration for RRC\_INACTIVE is applicable to RRC\_CONNECTED. Considering the limited time budget, we prefer not to discuss the further optimization. |
| vivo |  | Agree with intel |
| Xiaomi |  | Agree with Intel. |
| ZTE |  | It depends on which mode is in the front.  For SRS config in RRC\_CONNECTED to be reused in RRC\_INACTIVE, there is already an working assumption. So we are supportive of this  For SRS config in RRC\_INACITVE to be reused in next RRC\_CONNECTED, we think there is no need. In RRC\_CONNECTED, NW will send new SRS configuration to UE. If not, since the SRS configuration is ‘need M’, the SRS configuration in the last RRC\_CONNECTED can still be used. |
| OPPO |  | It is RAN4 issue. |
| InterDigital | No |  |
| Samsung | No | Agree with others that this is RAN4 realm. |
| Ericsson |  | We can check with RAN4 |
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### Summary for Q12:

12 companies have responded. 8 companies express the view that it should be RAN4 who should decide whether the requirements in inactive mode and connected mode are different. It is proposed to send as LS to RAN4.

1. Send an LS to RAN4 asking whether the (measurement) requirements in inactive mode and connected mode are different.

**Question 13: RAN2 to decide further (provided that UE UL SRS configuration in one mode is applicable in other; i.e the answer selected to question 12 is Yes); then whether an indication can be used from NW to UE to support such continuity.**

|  |  |  |
| --- | --- | --- |
| Company | Yes (UL SRS can be continued and NW indication is needed): No (no need for such indication) | Comments |
| Huawei, HISIlicon | No |  |
| Apple | No |  |
| Intel | No |  |
| vivo | No | In our understanding, the MAC is reset when UE enters RRC\_INACTIVE, upon that, the Time alignment timer is considered as expired. then the MAC will notify RRC to release SRS configuration. Therefore, we suppose no SRS configuration received in RRC\_CONNECTED via RRCReconfiguration will be stored when UE enters RRC\_INACTIVE. |
| Xiaomi | No |  |
| ZTE | Yes | In our contribution, our intention is, if UE transmits periodic SRS according to the SRS configuration in RRC\_CONNECTED, support network to give the UE an indication on whether to continue transmitting the periodic SRS when entering the RRC\_INACTIVE state.  That is a way to let UE know whether to transmit periodic SRS in the upcoming RRC\_INACTIVE using SRS config of RRC\_CONNECTED. This is also benefit for power saving since UE will start to transmit periodic SRS only with gNB’s permit, rather than UE transmits periodic SRS in RRC\_INACTIVE automatically |
| OPPO | No |  |
| InterDigital | No |  |
| Samsung | No |  |
| Ericsson |  | Agree with ZTE but this needs to be checked with RAN4 first |
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### Summary for Q13:

10 companies have responded. 8 companies view that there is no need to indicate the continuity for UL SRS Tx when transiting from one mode to other.

1. No indication is added from NW to UE for the continuity of UL SRS Tx when transiting from one mode to other.

# 4 Conclusion

Based on the discussion in the previous sections we propose the following:

Based on the discussion in the previous sections we propose the following:

[Proposal 1 If the UL-only and UL and DL positioning is agreed to capture in the specification; A note is added to say that when to send Event Report ACK is up to NW implementation](#_Toc93849239)

[Proposal 2 RAN2 to decide whether note is sufficient or overall procedure needs to be captured for Positioning AD delivery using SDT](#_Toc93849240)

[Proposal 3 The agreement with WA: pre-configure positioning SRS in RRC\_CONNECTED is removed.](#_Toc93849241)

[Proposal 4 RAN2 to decide whether note is sufficient or overall procedure needs to be captured for DL, UL and UL+DL positioning in RRC Inactivate mode](#_Toc93849242)

[Proposal 5 RAN2 to agree not to add elaborative description/flow diagrams in TS 38.305.](#_Toc93849243)

[Proposal 6 RAN2 to wait to decide whether to go for common flow or separate flow; i.e to be discussed after the outcome of previous proposals 4 and 5.](#_Toc93849244)

[Proposal 7 It is not necessary to capture explicitly in stage 2 that UE can include in the LCS Event Report an embedded LPP Request Assistance Data message with IE *NR-Multi-RTT-RequestAssistanceData* and *nr-AdType* set to '*ul-srs*' to request an UL-SRS for Multi-RTT positioning.](#_Toc93849245)

[Proposal 8 RAN2 to decide whether note is sufficient or overall procedure needs to be captured for LPP PDU and LCS message transfer in RRC Inactivate mode](#_Toc93849246)

[Proposal 9 RAN2 to discuss segmentation in Rel-18.](#_Toc93849247)

[Proposal 10 All LCS service types are allowed to use SDT.](#_Toc93849248)

[Proposal 11 Send an LS to RAN4 asking whether the (measurement) requirements in inactive mode and connected mode are different.](#_Toc93849249)

[Proposal 12 No indication is added from NW to UE for the continuity of UL SRS Tx when transiting from one mode to other.](#_Toc93849250)

# 5 Proposal Category

**Potential Stage 3 related for UL SRS Tx In RRC Inactive:**

[Proposal 3 The agreement with WA: pre-configure positioning SRS in RRC\_CONNECTED is removed.](#_Toc93847449)

[Proposal 12 No indication is added from NW to UE for the continuity of UL SRS Tx when transiting from one mode to other.](#_Toc93849070)

[Proposal 11 Send an LS to RAN4 asking whether the (measurement) requirements in inactive mode and connected mode are different.](#_Toc93847457)

**Scope of RRC Inactive:**

[Proposal 10 All LCS service types are allowed to use SDT.](#_Toc93847456)

**Stage 2 Note Only or Detailed Description:**

[Proposal 4 RAN2 to decide whether note is sufficient or overall procedure needs to be captured for DL, UL and UL+DL positioning in RRC Inactivate mode](#_Toc93847450)

[Proposal 2 RAN2 to decide whether note is sufficient or overall procedure needs to be captured for Positioning AD delivery using SDT](#_Toc93847448)

[Proposal 8 RAN2 to decide whether note is sufficient or overall procedure needs to be captured for LPP PDU and LCS message transfer in RRC Inactivate mode](#_Toc93847454)

[Proposal 5 RAN2 to agree not to add elaborative description/flow diagrams in TS 38.305.](#_Toc93847451)

**Stage 2 Other Proposal dependent upon above P4, P2, P8 and P5 :**

[Proposal 1 If the UL-only and UL and DL positioning is agreed to capture in the specification; A note is added to say that when to send Event Report ACK is up to NW implementation](#_Toc93847447)

[Proposal 6 RAN2 to wait to decide whether to go for common flow or separate flow; i.e to be discussed after the outcome of previous proposals 4 and 5.](#_Toc93847452)

[Proposal 7 It is not necessary to capture explicitly in stage 2 that UE can include in the LCS Event Report an embedded LPP Request Assistance Data message with IE *NR-Multi-RTT-RequestAssistanceData* and *nr-AdType* set to '*ul-srs*' to request an UL-SRS for Multi-RTT positioning.](#_Toc93847453)

**Potential Rel-18 Discussion:**

[Proposal 9 RAN2 to discuss segmentation in Rel-18.](#_Toc93847455)

# 6 References

[1] R2-2200257 Discussion on positioning in RRC INACTIVE state ZTE discussion

[2] R2-2200280 Support of UL&UL+DL positioning in RRC\_INACTIVE Intel Corporation discussion Rel-17 NR\_pos\_enh-Core

[3] R2-2200295 Impact on SA2 with DL NR positioning in RRC\_INACTIVE CATT, Ericsson discussion Rel-17 NR\_pos\_enh-Core

[4] R2-2200296 Discussion on UL NR Positioning in RRC\_INACTIVE state CATT discussion Rel- 17 NR\_pos\_enh-Core

[5] R2-2200327 Discussion on positioning in RRC\_INACTIVE vivo discussion Rel-17 NR\_pos\_enh-Core

[6] R2-2200424 Way-forward for RRC\_INACTIVE positioning Huawei, CATT, China Unicom, CMCC, Fraunhofer, Futurewei, HiSilicon, Intel Corporation, Spreadtrum Communications, OPPO, VIVO, Xiaomi, ZTE Corporation discussion Rel-17 NR\_pos\_enh-Core

[7] R2-2200425 Remaining issues on RRC\_INACTIVE DL Postioning Huawei, HiSilicon discussion Rel-17 NR\_pos\_enh-Core

[8] R2-2200710 Discussion on positioning for UE in RRC Inactive Xiaomi discussion

[9] R2-2200731 Discussion on the measurement reporting in RRC\_INACTIVE Samsung discussion Rel-17 NR\_pos\_enh-Core

[10] R2-2200781 Discussion on Positioning in RRC\_INACTIVE state OPPO discussion Rel-17 NR\_pos\_enh-Core

[11] R2-2200957 Remaining Details for RRC\_INACTIVE Positioning in Uplink Fraunhofer IIS; Fraunhofer HHI discussion Rel-17 R2-2110249

[12] R2-2200963 Remaining issues for positioning of UEs in RRC\_INACTIVE State Qualcomm Incorporated discussion

[13] R2-2200989 Remaining aspects on RRC\_INACTIVE Positioning Lenovo, Motorola Mobility discussion Rel-17

[14] R2-2201065 Discussion on RRC Inactive mode Positioning Ericsson discussion Rel-17

[15] R2-2201186 Discussion on Positioning in RRC INACTIVE state InterDigital, Inc. discussion Rel- 17 NR\_pos\_enh-Core

[16] R2-2201528 Positioning in RRC\_INACTIVE Nokia Germany discussion Rel-17