**3GPP T****SG-RAN WG3 Meeting #116-e R3-22oooo**

**Electronic Meeting, May 9th – 19th, 2022**

**Agenda item:** 9.1.5.1

**Source:** Intel Corporation

**Title:** Summary of CB: # Positioning\_04\_RRC\_INACTIVEandLS

**Document for:** Discussion and Decision

# Introduction

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| [R3-223012](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223012.zip) | LS on Positioning in RRC\_INACTIVE State (RAN2) | LS in |
| [R3-223032](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223032.zip) | Reply LS on Positioning in RRC\_INACTIVE State (SA2) | LS in |
| [R3-223497](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223497.zip) | Correction for positioning measurement during INACTIVE (Intel Corporation) | discussion |
| [R3-223498](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223498.zip) | Rel-17 ePos correction on positioning measurement during INACTIVE for SRS-PosRRC-InactiveConfig-r17 (Intel Corporation) | CR0933r, TS 38.473 v17.0.0, Rel-17, Cat. F |
| [R3-223499](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223499.zip) | Correction on IE name mismatch in Rel-17 ePos Positioning Context Reservation Indication IE (Intel Corporation) | CR0934r, TS 38.473 v17.0.0, Rel-17, Cat. F |
| [R3-223505](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223505.zip) | SRS for positioning measurement (Google Inc.) | CR0936r, TS 38.473 v17.0.0, Rel-17, Cat. F |
| [R3-223276](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223276.zip) | Discussion on Positioning support in Inactive (CATT) | discussion |
| [R3-223346](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223346.zip) | Support of inactive positioning without anchor relocation (Huawei) | discussion |
| [R3-223587](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223587.zip) | Correction on Misalignment with Rel-17 changes in NRPPa (ZTE) | CR0836r, TS 38.413 v17.0.0, Rel-17, Cat. Fwithdrawn |
| **CB: # Positioning\_04\_RRC\_INACTIVEandLS****- Agree on needed corrections for Inactive positioning****- Converge on Single CR per Spec**(Intel - moderator)Summary of offline disc [R3-223712](file:///C%3A%5CFrank%5C3GPP%5CRAN3%5CTSGR3_116-e%5CInbox%5CDrafts%5CCB%20%23%20Positioning_04_RRC_INACTIVEandLS%5CInbox%5CR3-223712.zip) |

For the second round, companies are encouraged to provide comments **until May 18th (Wed) UTC 1200.**

# For the Chairman’s Notes

**The following are proposed to be captured as agreements:**

**Proposal 0: F1AP rapporteur to take care of the correction proposed in R3-223499.**

**Proposal A: Capture the following three points as agreement:**

* **The sub-fields under *SRS-PosRRC-InactiveConfig-r17* are all under the responsibility of DU.**
* **The *SRS-PosRRC-InactiveConfig-r17* is for UL positioning during INACTIVE, which is triggered by LMF (i.e. Positioning Information Exchange procedure over NRPPa).**
* **In order for CU to configure *SRS-PosRRC-InactiveConfig-r17* to the UE (via *RRCRelease*), the enhancement on the F1AP Positioning Information Exchange procedure is necessary, so that DU can generate the SRS configuration taking into the *Requested SRS Transmission Characteristics* IE account in the POSITIONING INFORMATION REQUEST message.**

**Proposal B: Send LS reply to SA2 to fix the SA2's CR S2-2203251 to be aligned with RAN3.**

**Proposal C: RAN3 to re-confirm that INACTIVE positioning in case of "without anchor relocation" is not supported in Rel-17. If in Rel-18, to be done by TEI18.**

**Proposal D: Send LS to RAN2 to check the possible scenarios supported in Rel-17 when configuring SRS-PosRRC-InactiveConfig-r17 to the UE via *RRCRelease.***

# Discussion (Round 2)

Though not treated online, the following was proposed to be agreed from the outcome of 1st round discussions:

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| Proposal 1: F1AP rapporteur to take care of the correction proposed in R3-223499.**Proposal 2-1: Capture the following three points as agreement:*** **The sub-fields under *SRS-PosRRC-InactiveConfig-r17* are all under the responsibility of DU.**
* **The *SRS-PosRRC-InactiveConfig-r17* is for UL positioning during INACTIVE, which is triggered by LMF (i.e. Positioning Information Exchange procedure over NRPPa).**
* **Moreover, in order for CU to configure *SRS-PosRRC-InactiveConfig-r17* to the UE (via *RRCRelease*), the F1AP Positioning Information Exchange procedure is necessary, so that DU can generate the SRS configuration taking into the *Requested SRS Transmission Characteristics* IE account in the POSITIONING INFORMATION REQUEST message.**

**Proposal 2-2: Enhance the F1AP Positioning Information Exchange procedure for DU to supply the *SRS-PosRRC-InactiveConfig-r17* (as well as CU to retrieve it).** **Proposal 2-3: FFS on CU-initiated or DU-initiated UE Context Modification procedure if later turns out that the enhancement on the Positioning Information Exchange procedure is not enough.**Proposal 3-1: Send LS reply to SA2 to fix the SA2's CR S2-2203251 to be aligned with RAN3 such that* **In case of SDT with anchor relocation, the UL/DL NAS PDU, if any, is directly exchanged between the receiving gNB (i.e. the new serving gNB) and AMF after N2 Path Switch procedure.**
* **In case of SDT without anchor relocation, the UL/DL NAS PDU, if any, is (not may be) forwarded between receiving gNB and the anchor gNB.**

**Proposal 4: INACTIVE positioning in case of "without anchor relocation" is discussed in Rel-18.** |

### **Q5) Any objection to agree on the above proposals from 1st round? Please share your view.**

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|  **Company** | **Preference** | **Comment** |
| Intel |  | Agree with all the proposals above.  |
| Xiaomi |  | Proposal 2-1, agree.Proposal 2-2, we don’t see the scenario that CU needs to retrieve it, the “(as well as CU to retrieve it)” part should be removed.Proposal 2-3, we understand the intension, but this is the last R17 meeting, we’re not sure whether we can have FFS at this stage, maybe it can be contribution driven in the future, as we don’t see the Positioning Information Exchange procedure is not enough so far.Proposal 3-1, generally OK. But current text is still confusing, our understanding is that in case of without anchor relocation, the NAS PDU is forwarded included in RRC message which is encapsued in PDCP PDU receiving gNB and the anchor gNB, but we don’t think SA2 need to know the details in RAN. Or maybe someone can give a better sugggestion.Proposal 4, we are ok to discuss this in R18, but similar proposal had been proposed in the last RAN3 meeting, and it finally turns to “**The RRC\_INACTIVE positioning in case of SDT without anchor relocation is not supported in R17**”. Given that it’s not appropriate for RAN3 to decide what will be discussed in R18, this can be discussed in RAN plenary, i.e. whether R18 WID need to be revised or not. |
| Ericsson |  | We fully agree with Xiaomi’s comments |
| Huawei |  | One comment to proposal 4, can we agree to change r18 to TEI18? So that we can avoid the discussion in RAN plenary.For the rest, agree to Xiaomi. |
| Samsung |  | We share view with Xiaomi. |
| CATT |  | For P3-1, LS is preferred, the details content could be revised according to the discussion in Q7.For P4, address it in TEI 18 or Rel-18 are both fine with us. |
| CMCC |  | We agree with Xiaomi. |
| ZTE |  | Share similar view with Xiaomi. |
| Google |  | Share the same view as Xiaomi. |

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### **Q5 Summary**

The moderator thanks for good comments and feedbacks. Based on the comments received and also considering discussions in Q6/Q7, the moderator proposes the following proposals to be agreed:

**Proposal 0: F1AP rapporteur to take care of the correction proposed in R3-223499.**

**Proposal A: Capture the following three points as agreement:**

* **The sub-fields under *SRS-PosRRC-InactiveConfig-r17* are all under the responsibility of DU.**
* **The *SRS-PosRRC-InactiveConfig-r17* is for UL positioning during INACTIVE, which is triggered by LMF (i.e. Positioning Information Exchange procedure over NRPPa).**
* **In order for CU to configure *SRS-PosRRC-InactiveConfig-r17* to the UE (via *RRCRelease*), the enhancement on the F1AP Positioning Information Exchange procedure is necessary, so that DU can generate the SRS configuration taking into the *Requested SRS Transmission Characteristics* IE account in the POSITIONING INFORMATION REQUEST message.**

**Proposal B: Send LS reply to SA2 to fix the SA2's CR S2-2203251 to be aligned with RAN3.**

**Proposal C: RAN3 to re-confirm that INACTIVE positioning in case of "without anchor relocation" is not supported in Rel-17. If in Rel-18, to be done by TEI18.**

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In terms of enhancing the F1AP Positioning Information Exchange procedure for DU to supply the *SRS-PosRRC-InactiveConfig-r17* (as well as CU to retrieve it), based on 1st round discussions, there are two options to consider (Proposal 2-4):

* **Option 1 (no dedicated query indicator as E/// commented)**
	+ POSITIONING INFORMATION RESPONSE to include *SRS-PosRRC-InactiveConfig-r17* (optional)
* **Option 2 (dedicated query indicator)**
	+ POSITIONING INFORMATION REQUEST to include a dedicate indicator (optional) querying *SRS-PosRRC-InactiveConfig-r17*
	+ POSITIONING INFORMATION RESPONSE to include *SRS-PosRRC-InactiveConfig-r17* (optional)

In the "To be agreed" folder, a draft CR for Option 2 has been provided. Please also comment on the CR if any.

### **Q6) Please share your preference.**

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|  **Company** | **Preference** | **Comment** |
| Intel | Option 2 | We think a dedicated query indicator in the POSITIONING INFORMATION REQUEST message is clear for CU to explicitly retrieve the complete *SRS-PosRRC-InactiveConfig-r17* configuration from DU, rather than relying on a "good" DU implementation not to duplicate information here and there.  |
| Xiaomi | Option 1 | We think option 1 is enough. According to current stage 2 specification, Inactive UL positioning relies on SDT (i.e. happens during SDT), and the DU can be aware of SDT by the RACH procedure. So, when DU receives the positioning information request during SDT, DU can know the positioning request is for Inactive UE, it will generate *SRS-PosRRC-InactiveConfig-r17* accordingly, we believe DU can take proper action without introducing any query indication. |
| Intel | Reply to Xiaomi | After further thinking, there seem some misunderstandings. The configuration we have been talking about (i.e. *SRS-PosRRC-InactiveConfig-r17*) for INACTIVE UL positioning is configured to the UE by *RRCRelease* with suspend configuration, and the UE in INACTIVE state will use SDT to transfer measurements toward LMF. We believe it is not configured only when the UE initiates SDT and only configured from DU that the UE initiated SDT.. For example, a UE can be in CONNECTED state and then it can be configured to the UE via *RRCRelease* when CU receives NRPPa from LMF and decides to send the UE to INACTIVE. In this case, the serving DU doesn't know that the UE is in INACTIVE state when receiving POSITIONING INFORMAITON REQUEST before CU sends *RRCRelease*. From this sense, we think a query indicator is necessary and should go with Option 2.  |
| Xiaomi2 | Reply to Intel | We understand the intension, but there’s no any stage2 specification shows that the scenario mentioned by Intel (i.e. Inactive positioning without SDT) is supported.In TS 38.305, it clearly states that “*If the UE initiated data transmission using UL SDT, the network can send DL LCS, LPP and RRC message (e.g. to configure SRS for UL positioning, if it is supported) to the UE.*”And if you check the Annex in the LS R2-2203949 sent from RAN2 to SA2, it also clearly shows that the Inactive UL positioning is triggered during SDT procedure.No matter how, option 1 works if the Inactive positioning happens during SDT. For the case without SDT, the scenario may need more discussion. We would like to know under what conditions the gNB knows that the UE is going to perform positioning but still releases the UE connection.  |
| Ericsson | Option1 | As a maintenance correction, option 1 is enough. We agree with Xiaomi’s comments that UL positioning in RRC\_INACTIVE state is mainly within the SDT framework. DU can know about SDT from the RACH procedure and send the *SRS-PosRRC-InactiveConfig-r17* to CU. No need for any query indication. We can revisit this in R18, if needed |
| Intel | Reply to Xiaomi and Ericsson | No, we disagree with the arguments from Xioami and Ericsson that UL positioning in RRC INACTIVE works only within SDT framework.We cross-checked with RAN2. The scenarios described in the Annex of LS R2-2203949 was just to show how positioning works when a UE is in RRC\_INACTIVE. And RAN2 did not exclude the scenario that NW may configure the SRS configuration when moving the connected UE to INACTIVE since *RRCRelease* with suspend configuration is used to move the UE to INACTIVE state. We do not have such restriction that SRS configuration cannot be configured by *RRCRelease* when NW moves the UE to INACTIVE. As a way forward, we propose to check with RAN2 by sending an LS and asking whether the scenarios described in the Annex of LS R2-2203949 is "everything" for UL INACTIVE positioning in Rel-17, or the scenario that we mentioned (that NW may configure the SRS configuration when moving the connected UE to INACTIVE since *RRCRelease* with suspend configuration is used to move the UE to INACTIVE state) or any other scenario that gNB-CU may need to retrieve *SRS-PosRRC-InactiveConfig-r17* from gNB-DU is also in the scope of Rel-17.  |
| Huawei | Either way is fine. |  |
| Samsung | Option 2 | We share view with Intel that such inactive configuration interaction between CU and DU can also be done when UE is in RRC\_CONNECTED state, at least such scenario is not restricted.Note that the stg2 description in 38.305 on UL positioning during RRC\_INACTIVE state using SDT framework does not mean that it precludes the scenario of configuration without SDT. |
| CATT | Option 2 is preferred | The SRS configuration could be allocated not only for the UE under Inactive state, it could also be allocated for the UE under connected state. |
| CMCC | Option 1 | We think the Option1 is enough. As the above explanation from Xiaomi and Ericsson, UL positioning is associated with SDT framework. DU can know the UE is in RRC\_Inactive state. Currently, there is no stage2 description for inactive positioning without SDT. If the potential scenario mentioned by Intel is provided by RAN2 in the future, we can add this query indication. |
| Xiaomi3 |  | Maybe there’s no need to check with RAN2 about the scenarios, RAN2 already had related agreement in RAN2#115-e meeting as below:*Agreement:**gNB can configure the UE with periodic SRS (assuming periodic SRS is supported in RRC\_INACTIVE) by RRCRelease with suspendConfig* ***at least when periodic event is configured for deferred MT-LR. Other cases can be further discussed.***And the related procedures for deferred MT-LR are provided in the LS R2-2203949, all of the procedures happen within SDT.Now we have clear understanding as below:In case of Inactive positioning for deferred MT-LR (which is specified in stage 2 specification), option 1 is enough.In case of Inactive positioning for other scenarios (which is not specified yet), option 2 may be needed.We suggest to adopt option 1 in R17, if new scenario is identified, we can discuss and consider option 2. |
| ZTE | Option 1 | Option 1 is enough. We can raise this indication in R18 if needed. |
| Google | Option 2 is preferred | We share the same view as Intel.Anyway, we need the DU to provide *SRS-PosRRC-InactiveConfig-r17* to the CU to make positioning in RRC\_INACTVE work. Therefore, option 1 should be agreed at least. We can discuss whether to add the query indication in the Positioning Information Request message in the next meeting. |

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### **Q6 Summary**

* Option 1 (4/8): Xiaomi, Ericsson, CMCC, ZTE
* Option 2 (3/8): Intel, Samsung, CATT
* Neutral (1/8): Huawei

No consensus is observed.

From comments/feedbacks, the moderator thinks that the key boils down onto different understandings of the scenarios supported in Rel-17 for INACTIVE positioning, in relation to configuring *SRS-PosRRC-InactiveConfig-r17* (generated from DU) to the UE as part of the suspend configuration via *RRCRelease* message. The Option 1 proponents believe that the scenarios described in LS R2-2203949 is all for Rel-17 UL INAVTIVE positioning where all the procedures happen within SDT sessions. On the other hand, the Option 2 proponents believe that SRS configuration for UL INACTIVE positioning is not just limited to those scenarios and at least can be allocated for the connected UE being moved to INACTIVE.

Since we are going to anyway get consultation from RAN2 about which RRC IE to refer to over F1AP (i.e. *SRS-PosRRC-InactiveConfig-r17* vs *SRS-PosRRC-Inactive-r17*) as part of CB # SDT2\_CGbased, even if we conclude and agree on a CR this time, further amendment deems inevitable. Considering the above and this aspect, the moderator proposes to send an LS to check with RAN2 about the possible scenarios supported in Rel-17 when configuring SRS-PosRRC-InactiveConfig-r17 to the UE via *RRCRelease*, which will help us to decide between Option 1 and Option 2.

**Proposal D: Send LS to RAN2 to check the possible scenarios supported in Rel-17 when configuring SRS-PosRRC-InactiveConfig-r17 to the UE via *RRCRelease*.**

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### **Q7) Regarding sending a LS reply to SA2 to fix the SA2's CR S2-2203251, please comment on the draft shared by CATT (captured from [7]) if any.**

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**1. Overall Description:**

RAN3 thanks RAN2 and SA2 for the LS on Positioning in RRC\_INACTIVE State.

From the CR attached in the LS, the NOTEs (Note 3 and Note 5) in section 6.7.x/6.7.y/6.7.z indicate the UL/DL NAS TRANSPORT message may be forwarded between the receiving gNB and the anchor gNB in case of receiving gNB is not the anchor gNB.

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| 6. The receiving gNB node forwards the UL NAS TRANSPORT message to the serving AMF in an N2 Uplink NAS Transport message.NOTE 3: If the receiving gNB node is not the anchor gNB node for the UE, the UL NAS TRANSPORT message may be forwarded to the serving AMF via the anchor gNB node.……9. The AMF forwards the acknowledgment to the receiving gNB node in a DL NAS TRANSPORT message which is encapsulated in an N2 Downlink NAS Transport message.NOTE 5: If the receiving gNB node is not the anchor gNB node for the UE, the DL NAS TRANSPORT message may be forwarded to the receiving gNB node via the anchor gNB node. |

This is not quite clear from RAN3 point of view, RAN3 would like to clarify the inter-RAN node behaviours for SDT transmission, where the receiving node is different with the anchor node.

* In case of SDT with anchor relocation, the UL/DL NAS PDU, if any, is directly exchanged between the receiving gNB (i.e. the new serving gNB) and AMF after N2 Path Switch procedure.
* In case of SDT without anchor relocation, the UL/DL NAS PDU, if any, is (not may be) forwarded between receiving gNB and the anchor gNB.
	+ Directly forwarding of the NAS PDU between RAN nodes is not allowed/specified.
	+ NAS PDU, if any, is included in the RRC message and then encapsued in PDCP PDU before been forwarded between RAN nodes by using RRC TRANSFER message over Xn.

We kindly request SA2 to take above into consideration, and do corresponding specification changes if needed.

**2. Actions:**

**To SA2 group.**

**ACTION:** RAN3 asks SA2 group to take the above information into account, and do corresponding specification change(s) if needed.

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|  **Company** | **Comment** |
| Ericsson | Should we inform SA2 that the RRC\_INACTIVE positioning in case of SDT without anchor relocation is not supported in R17? |
| Huawei | Reply to Ericsson:Seems no need to inform SA2 about that to avoid any confusion in SA2. |
| CATT | To Ericsson and all: It seems needed.As we agreed that SDT without anchor relocation is not supported for Positioning in R17, but only for this case the NAS PDU is transferred between gNBs.For SDT with anchor relocation case which is supported in Positioning R17, NAS PDU is not able to be transferred between gNBs.On top of the RAN3 progress in Rel-17, NAS PDU is not able to be transferred between gNBs, as we only support SDT with anchor reloation for Positioning in R17. |

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### **Q7 Summary**

No companies objected sending LS reply to SA2 to fix/align their specifications with RAN3 progress. **Proposal B is confirmed and the detail contents of the reply LS to be checked out.**

There were some diverted views, in terms of informing SA2 about RAN3's agreement not to support INACTIVE positioning during SDT without anchor relocation in Rel-17. If no consensus, then the moderator suggests to leave this information out from the LS reply.

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# Discussion (Round 1)

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| [R3-223499](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223499.zip) | Correction on IE name mismatch in Rel-17 ePos Positioning Context Reservation Indication IE (Intel Corporation) | CR0934r, TS 38.473 v17.0.0, Rel-17, Cat. F |

Intel proposed to fix the IE name mismatch on *Positioning Context Reservation Indication* IE in F1AP.

### **Q1) Any objection? Please share your view.**

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|  **Company** | **Preference** | **Comment** |
| Google |  | We are fine with the CR. |
| CATT |  | We are fine with the CR. |
| HW  |  | We are fine with the CR. |
| Samsung |  | Fine to align. |
| Ericsson | Disagree | The change is editorial. It should be added to the F1AP Rapporteur’s CR. |
| Xiaomi |  | Agree with E/// |
| Nokia |  | This should be Cat-D and merged into the F1AP rapporteur CR. |
| CMCC |  | Agree with E/// |
| ZTE |  | Fine with the CR. |
| Intel |  | OK for the F1AP rapporteur to take care of.  |

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### **Q1 Summary**

Acknowledged and F1AP rapporteur to take care.

Proposal 1: F1AP rapporteur to take care of the correction proposed in R3-223499.

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**Regarding the SRS-PosRRC-InactiveConfig-r17 from DU:**

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| [R3-223497](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223497.zip) | Correction for positioning measurement during INACTIVE (Intel Corporation) | discussion |
| [R3-223498](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223498.zip) | Rel-17 ePos correction on positioning measurement during INACTIVE for SRS-PosRRC-InactiveConfig-r17 (Intel Corporation) | CR0933r, TS 38.473 v17.0.0, Rel-17, Cat. F |
| [R3-223505](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223505.zip) | SRS for positioning measurement (Google Inc.) | CR0936r, TS 38.473 v17.0.0, Rel-17, Cat. F |

Intel and Google are talking about the same issue that the *SRS-PosRRC-InactiveConfig-r17* that RAN2 defined for positioning measurements during INACTIVE is generated by DU, but this IE is configured as part of suspend configuration in the *RRCRelease* message for a UE that is generated by CU.

So, the IE should be able to be transported to CU (via *DU to CU RRC Information* IE), and Intel further proposed a query for CU to retrieve this configuration from DU since CU is the one who decides to move the UE to INACTIVE state and also decides INACTIVE positioning measurements.

### **Q2) Any objection? Please share your view.**

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|  **Company** | **Preference** | **Comment** |
| Google |  | As described in section 8.13.9 Positioning Information Exchange procedure, the Positioning Information Request message triggers the DU to initiate a UE Context Modification Required procedure. The following is from 38.473 v17.0.0 for information.

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| 8.13.9.2 Successful Operation<unrelated part omitted>**Interaction with the UE Context Modification Required (gNB-DU initiated) procedure:**The UE Context Modification Required (gNB-DU initiated) procedure may be performed before the POSITIONING INFORMATION RESPONSE message. |

In Intel’s proposal, we think the *Positioning INACTIVE Query Indication* IE should be added in the Positioning Information Request message instead of the UE Context Modification Request message. Based on the *Positioning INACTIVE Query Indication* IE, the DU includes the *SRS-PosRRC-InactiveConfig-r17* in the DU to CU RRC Information IE in the UE Context Modification Required message. |
| CATT |  | Yes, the *SRS-PosRRC-InactiveConfig-r17* should be provided from gNB-DU for generation of the RRC Configuration for the UE.And we understand the *Positioning INACTIVE Query Indication* IE is needed to obtain the info from gNB-DU. On which message to include the query indication, maybe it should be included in both UE Context Modification Request and Positioning Information Request messages.  |
| HW | Yes with comments | It may be better to include the function within the Positioning procedure, ie, using positioning information exchange procedure. So that gNB-CU can make suggestion for the configuration of SRS resource. |
| Samsung |  | Agree that *SRS-PosRRC-InactiveConfig-r17* should be included in DU to CU RRC Information IE.For the question on whether to include query indication in POSITIONING INFORMATION REQUEST or UE CONTEXT MODIFICATION REQUEST, our understanding is that both can work so we only need to choose one of them. And we slightly prefer to introduce Positioning INACTIVE Query Indication IE in POSITIONING INFORMATION REQUEST message which makes the whole procedure more natural. |
| Ericsson | Yes with comments | Agree on the comments made by Google. Nested call flows over F1 is supported for positioning procedures. No need for any query mechanism, as this information can be already included by the gNB-DU upon the UE context modification response. Also, it creates an inconsistent habit of adding query IEs for all the Octet Strings we have in 9.3.1.26 *DU to CU RRC Information* IE… So, Google’s approach in R3-223505 is preferable. |
| Xiaomi | See comments | We think query indication is not needed and theinactive SRS related configuration i.e. *SRS-PosRRC-InactiveConfig-r17* should be included positioning related message, e.g. positioning information response. As the *SRS-PosRRC-InactiveConfig-r17* is for inactive UEs, and the Inactive UL positioning relies on SDT, we believe DU is aware of SDT, which means if DU received positioning information request from CU and there’s on-going SDT, DU can know the positioning information request is for the Inactive UE, with that, DU can generate the inactive SRS related configuration and include it in positioning information response message.There’s no need to involve UE context modification procedure, which introduce additional latency, signaling exchange and signaling overhead, as there is mandatory IE (i.e. CellGroupConfig) in the DU to CU information which is not needed for positioning.Besides, if CU obtains the *SRS-PosRRC-InactiveConfig-r17(*which includes SRS configuration*)* via UE context modification required message, the SRS configuration are duplicated transmitted, as the SRS configuration is also transmitted in positioning information exchange message.Since there’s already SRS configuration IE in positioning information response message, we thinkthere’re two ways to include the Inactive SRS related configuration.Option 1, include *SRS-PosRRC-InactiveConfig-r17 in* positioning information response messageOption 2, reuse SRS configuration IE and include the IEs except SRS configuration in *SRS-PosRRC-InactiveConfig-r17* in positioning information response message |
| Nokia |  | In our understanding, the Positioning Information Exchange procedure over F1AP is only triggered by the Positioning Information Exchange procedure over NRPPa (i.e. it extends the NRPPa procedure to the DU). So, it is not used in this case.Therefore, if the query indicator is needed, then it belongs in the UE CONTEXT MODIFICATION REQUEST.  |
| Xiaomi2 |  | Reply to Nokia, Positioning Information Exchange procedure is definitely triggered in this case, otherwise how DU generate the SRS configuration in *SRS-PosRRC-InactiveConfig-r17*, this IE should be generated by DU taking account the Requested SRS transmission characteristics in Positioning Information Request message, and this is for UL positioning which is definitely triggered by LMF (i.e. Positioning Information Exchange procedure over NRPPa) |
| Ericsson2 |  | After further checking with RAN2, we agree with Xiaomi comments that for UL positioning in INACTIVE, CU receives the request from LMF. Then, the gNB configures SRS using SRS-PosRRC-InactiveConfig-r17 in RRCRelease message, which is different than for RRC connected state configuration that is part of RRC-Reconfig.Since the *SRS Configuration* IE is optional in the POSITIONING INFORMATION RESPONSE, a “good” DU can avoid duplication of information by sending only the *SRS-PosRRC-InactiveConfig-r17* IE in that message to CU.  |
| CMCC |  | We support that SRS-PosRRC-InactiveConfig-r17 should be carried in DU to CU RRC Information IE. Also, a query indicator IE carried in the Positioning Information Request message from DU to CU seems appropriate instead of in the UE Context Modification Required message. |
| ZTE |  | Prefer to include the IE in the Positioning Information exchange procedure. |

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### **Q2 Summary**

The moderator appreciates good comments and feedbacks. Reading through, the moderator thinks that, from technical point of view, the following aspects have been clarified during the discussions:

* The sub-fields under *SRS-PosRRC-InactiveConfig-r17* are all under the responsibility of DU.
* The *SRS-PosRRC-InactiveConfig-r17* is for UL positioning during INACTIVE, which is triggered by LMF (i.e. Positioning Information Exchange procedure over NRPPa).
* Moreover, in order for CU to configure *SRS-PosRRC-InactiveConfig-r17* to the UE (via *RRCRelease*), the F1AP Positioning Information Exchange procedure is necessary, so that DU can generate the SRS configuration taking into the *Requested SRS Transmission Characteristics* IE account in the POSITIONING INFORMATION REQUEST message.

**Proposal 2-1: Capture the above three points as agreement.**

Having the above in mind, considering many preferences to handle within the positioning procedure, for now, the moderator would like to suggest focusing on enhancing the F1AP Positioning Information Exchange procedure for DU to supply the *SRS-PosRRC-InactiveConfig-r17* (as well as CU to retrieve it).

We can revisit the need for changes on CU-initiated or DU-initiated UE Context Modification procedure if later turns out that the enhancement on the Positioning Information Exchange procedure is not enough.

**Proposal 2-2: Enhance the F1AP Positioning Information Exchange procedure for DU to supply the *SRS-PosRRC-InactiveConfig-r17* (as well as CU to retrieve it).**

**Proposal 2-3: FFS on CU-initiated or DU-initiated UE Context Modification procedure if later turns out that the enhancement on the Positioning Information Exchange procedure is not enough.**

Based on the F1AP Positioning Information Exchange procedure, the moderator thinks there are two options:

* Option 1 (no dedicated query indicator as E/// commented)
	+ POSITIONING INFORMATION RESPONSE to include *SRS-PosRRC-InactiveConfig-r17* (optional)
* Option 2 (dedicated query indicator)
	+ POSITIONING INFORMATION REQUEST to include a dedicate indicator (optional) querying *SRS-PosRRC-InactiveConfig-r17*
	+ POSITIONING INFORMATION RESPONSE to include *SRS-PosRRC-InactiveConfig-r17* (optional)

**Proposal 2-4: Continue 2nd round with the two options above.**

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**Regarding LSes between RAN2 and SA2:**

|  |  |  |
| --- | --- | --- |
| [R3-223012](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223012.zip) | LS on Positioning in RRC\_INACTIVE State (RAN2) | LS in |
| [R3-223032](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223032.zip) | Reply LS on Positioning in RRC\_INACTIVE State (SA2) | LS in |
| [R3-223276](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223276.zip) | Discussion on Positioning support in Inactive (CATT) | discussion |

From LSes communicated between RAN2 and SA2 (RAN3 is cc-ed), there are no particular actions that RAN3 should take care of.

But regarding the CR S2-2203251 that SA2 has been working on, CATT found some mismatch between the CR and our design for SDT and proposed to reply the LS to clarify their CR:

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***Observation 1: For SDT with anchor relocation case, the UL/DL NAS PDU are exchanged between the receiving gNB (i.e. the new serving gNB) and AMF after path switch.***

***Observation 2: For SDT with anchor relocation, the corresponding texts for UL/DL signalling transmission in SA2 CR [3] could be aligned with our RAN designs.***

***Observation 3: For SDT without anchor relocation case, the UL/DL NAS PDU is included in the RRC message and encapsulated in PDCP PDU, then be transferred between the last serving gNB and the receiving gNB via the (Xn) RRC TRANSFER message.***

***Observation 4: From SA2 CR [3], the UL/DL NAS TRANSPORT message (NAS PDU) may be forwarded between the receiving gNB and the anchor gNB in case of receiving gNB is different with the anchor gNB.***

***Proposal 1: Reply the LS to SA2 to clarify the RAN behaviours over Xn for SDT transmission.***

RAN3 thanks RAN2 and SA2 for the LS on Positioning in RRC\_INACTIVE State.

From the CR attached in the LS, the NOTEs (Note 3 and Note 5) in section 6.7.x/6.7.y/6.7.z indicate the UL/DL NAS TRANSPORT message may be forwarded between the receiving gNB and the anchor gNB in case of receiving gNB is not the anchor gNB.

|  |
| --- |
| 6. The receiving gNB node forwards the UL NAS TRANSPORT message to the serving AMF in an N2 Uplink NAS Transport message.NOTE 3: If the receiving gNB node is not the anchor gNB node for the UE, the UL NAS TRANSPORT message may be forwarded to the serving AMF via the anchor gNB node.……9. The AMF forwards the acknowledgment to the receiving gNB node in a DL NAS TRANSPORT message which is encapsulated in an N2 Downlink NAS Transport message.NOTE 5: If the receiving gNB node is not the anchor gNB node for the UE, the DL NAS TRANSPORT message may be forwarded to the receiving gNB node via the anchor gNB node. |

This is not quite clear from RAN3 point of view, RAN3 would like to clarify the inter-RAN node behaviours for SDT transmission, where the receiving node is different with the anchor node.

* In case of SDT with anchor relocation, the UL/DL NAS PDU, if any, is directly exchanged between the receiving gNB (i.e. the new serving gNB) and AMF after N2 Path Switch procedure.
* In case of SDT without anchor relocation, the UL/DL NAS PDU, if any, is (not may be) forwarded between receiving gNB and the anchor gNB.
	+ Directly forwarding of the NAS PDU between RAN nodes is not allowed/specified.
	+ NAS PDU, if any, is included in the RRC message and then encapsued in PDCP PDU before been forwarded between RAN nodes by using RRC TRANSFER message over Xn.

We kindly request SA2 to take above into consideration, and do corresponding specification changes if needed.

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### **Q3) Any objection to reply LS to let SA2 be aligned? Comments on the content of the reply LS? Please share your view.**

|  |  |  |
| --- | --- | --- |
|  **Company** | **Preference** | **Comment** |
| Google |  | OK to send the LS. |
| CATT |  | Prefer to reply the LS, to indicate the progress in RAN3:* For positioning support in Inactive, SDT without anchor relocation is not supported in Rel-17.
* In case of SDT with anchor relocation, the NAS PDU is not forwarded between new gNB and the last serving gNB.

Therefore, we understand SA2 may need to adjust the wording of their spec accordingly. |
| HW | No | We don’t agree with CATT. The SDT procedure support the NAS PDU transfer over Xn in the case of without anchor relocation. So we don’t see any issue with the NOTE. The LS is not needed. |
| Samsung |  | We share view with CATT. |
| Ericsson |  | Share the view with Huawei |
| Xiaomi |  | We understand the intension of CATT, i.e. in case of without anchor relocation, it’s PDCP PDU (with NAS PDU encapsued) instead of NAS PDU transmitted over Xn, so the NOTE in SA2’s spec is incorrect.We’re fine to send the LS, just wondering whether SA2 needs to know the details in NG-RAN, maybe the text of LS can be further discussed.  |
| CMCC |  | Share the same view with CATT and Xiaomi, the reply LS needs further modification. |
| ZTE |  | Seems not needed. Share same view with Huawei. |
| Intel |  | OK to send the LS to fix and align SA2.  |

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### **Q3 Summary**

* OK to send LS (6/9) : Google, CATT, Samsung, Xiami, CMCC, Intel
* Don't agree (3/9) : HW, Ericsson, ZTE

It seems the consensus is more on sending LS reply to fix the SA2's CR S2-2203251 to be aligned with RAN3.

Proposal 3-1: Send LS reply to SA2 to fix the SA2's CR S2-2203251 to be aligned with RAN3 such that

* **In case of SDT with anchor relocation, the UL/DL NAS PDU, if any, is directly exchanged between the receiving gNB (i.e. the new serving gNB) and AMF after N2 Path Switch procedure.**
* **In case of SDT without anchor relocation, the UL/DL NAS PDU, if any, is (not may be) forwarded between receiving gNB and the anchor gNB.**

**Proposal 3-2: Continue 2nd round for the reply LS text details. CATT to lead on.**

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**INACTIVE positioning without anchor relocation:**

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| --- | --- | --- |
| [R3-223346](file:///D%3A%5C%E4%BC%9A%E8%AE%AE%E7%A1%AC%E7%9B%98%5CTSGR3_116-e%5CDocs%5CR3-223346.zip) | Support of inactive positioning without anchor relocation (Huawei) | discussion |

Huawei proposed to support INACTIVE positioning in the scenarios of "without anchor relocation" in Rel-17 that we have discussed before (deferred positioning and normal positioning):

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***Proposal 1: Support the scenario of without anchor relocation for Rel-17.***

***Proposal 2: Reuse the PARTIAL UE CONTEXT TRANSFER procedures to transfer positioning related information between the anchor gNB and the serving gNB.***

***Proposal 3: Agree the CR in the annex.***



Figure 1, Deferred Postioning in SDT without anchor relocation



Figure 2, normal positioning in SDT without anchor relocation

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### **Q4) Please share your view on the proposals and the CR provided in the Annex.**

|  |  |  |
| --- | --- | --- |
|  **Company** | **Preference** | **Comment** |
| CATT | Prefer to further work on this in Rel-18 | In RAN3#115e, we discussed and agreed that:**In case of without anchor relocation****The RRC\_INACTIVE positioning in case of SDT without anchor relocation is not supported in R17.**Fully support of SDT without anchor relocation for positioning need more discussion, prefer to further work on it in Rel-18, not now. |
| HW | Yes | Since SDT has finished the discussion, we can complete the scenarios for inactive positioning in R17. |
| Samsung | Prefer to discuss further in R18 | We acknowledge the issue that the anchor gNB is agnostic to the content of the UL NAS PDU when it makes the without anchor relocation decision. However, since it is the last meeting and we do not have enough time to have thorough discussion on this topic, we would like to not to revert the agreement we achieved in RAN3#115-e and propose to postpone the discussion to R18. |
| Ericsson  |  | We acknowledge the enhancement points proposed by Huawei, which can be taken as a basis for discussion. However, we must respect the agreement of last e-meeting mentioned by CATT above, otherwise we will not be consistent in our work. The right way to do this is either as part of the R18 positioning package or in TEI18. |
| Xiaomi | Prefer to discuss further in R18 | We ack the scenario and the impact, but we prefer to discuss this in R18. |
| CMCC | Prefer to discuss further in R18 | We understanding the intention of Huawei. Followed the agreements in previous meeting, we expect there will be a through discussion in Rel-18 for the scenario of RRC\_INACTIVE positioning without anchor relocation.  |
| ZTE | Prefer to discuss further in R18 | Follow the agreements in RAN3#115e. |
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### **Q4 Summary**

Though the scenarios and intention from Huawei are acknowledged, the consensus (6/7) has reached to honor the previous agreement and discuss them further in Rel-18.

**Proposal 4: INACTIVE positioning in case of "without anchor relocation" is discussed in Rel-18.**

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# Conclusion

From the 2nd round discussions:

**Proposal 0: F1AP rapporteur to take care of the correction proposed in R3-223499.**

**Proposal A: Capture the following three points as agreement:**

* **The sub-fields under *SRS-PosRRC-InactiveConfig-r17* are all under the responsibility of DU.**
* **The *SRS-PosRRC-InactiveConfig-r17* is for UL positioning during INACTIVE, which is triggered by LMF (i.e. Positioning Information Exchange procedure over NRPPa).**
* **In order for CU to configure *SRS-PosRRC-InactiveConfig-r17* to the UE (via *RRCRelease*), the enhancement on the F1AP Positioning Information Exchange procedure is necessary, so that DU can generate the SRS configuration taking into the *Requested SRS Transmission Characteristics* IE account in the POSITIONING INFORMATION REQUEST message.**

**Proposal B: Send LS reply to SA2 to fix the SA2's CR S2-2203251 to be aligned with RAN3.**

**Proposal C: RAN3 to re-confirm that INACTIVE positioning in case of "without anchor relocation" is not supported in Rel-17. If in Rel-18, to be done by TEI18.**

**Proposal D: Send LS to RAN2 to check the possible scenarios supported in Rel-17 when configuring SRS-PosRRC-InactiveConfig-r17 to the UE via *RRCRelease.***

From the 1st round discussions:

Proposal 1: F1AP rapporteur to take care of the correction proposed in R3-223499.

**Proposal 2-1: Capture the following three points as agreement:**

* **The sub-fields under *SRS-PosRRC-InactiveConfig-r17* are all under the responsibility of DU.**
* **The *SRS-PosRRC-InactiveConfig-r17* is for UL positioning during INACTIVE, which is triggered by LMF (i.e. Positioning Information Exchange procedure over NRPPa).**
* **Moreover, in order for CU to configure *SRS-PosRRC-InactiveConfig-r17* to the UE (via *RRCRelease*), the F1AP Positioning Information Exchange procedure is necessary, so that DU can generate the SRS configuration taking into the *Requested SRS Transmission Characteristics* IE account in the POSITIONING INFORMATION REQUEST message.**

**Proposal 2-2: Enhance the F1AP Positioning Information Exchange procedure for DU to supply the *SRS-PosRRC-InactiveConfig-r17* (as well as CU to retrieve it).**

**Proposal 2-3: FFS on CU-initiated or DU-initiated UE Context Modification procedure if later turns out that the enhancement on the Positioning Information Exchange procedure is not enough.**

**Proposal 2-4: Continue 2nd round with the two options below:**

* **Option 1 (no dedicated query indicator as E/// commented)**
	+ POSITIONING INFORMATION RESPONSE to include *SRS-PosRRC-InactiveConfig-r17* (optional)
* **Option 2 (dedicated query indicator)**
	+ POSITIONING INFORMATION REQUEST to include a dedicate indicator (optional) querying *SRS-PosRRC-InactiveConfig-r17*
	+ POSITIONING INFORMATION RESPONSE to include *SRS-PosRRC-InactiveConfig-r17* (optional)

Proposal 3-1: Send LS reply to SA2 to fix the SA2's CR S2-2203251 to be aligned with RAN3 such that

* **In case of SDT with anchor relocation, the UL/DL NAS PDU, if any, is directly exchanged between the receiving gNB (i.e. the new serving gNB) and AMF after N2 Path Switch procedure.**
* **In case of SDT without anchor relocation, the UL/DL NAS PDU, if any, is (not may be) forwarded between receiving gNB and the anchor gNB.**

**Proposal 3-2: Continue 2nd round for the reply LS text details. CATT to lead on.**

**Proposal 4: INACTIVE positioning in case of "without anchor relocation" is discussed in Rel-18.**

# Reference

[1] R3-223012, LS on Positioning in RRC\_INACTIVE State (RAN2)

[2] R3-223032, Reply LS on Positioning in RRC\_INACTIVE State (SA2)

[3] R3-223497, "Correction for positioning measurement during INACTIVE", Intel Corporation

[4] R3-223498, "Rel-17 ePos correction on positioning measurement during INACTIVE for SRS-PosRRC-InactiveConfig-r17", Intel Corporation

[5] R3-223499, "Correction on IE name mismatch in Rel-17 ePos Positioning Context Reservation Indication IE", Intel Corporation

[6] R3-223505, "SRS for positioning measurement", Google Inc.

[7] R3-223276, "Discussion on Positioning support in Inactive", CATT

[8] R3-223346, "Support of inactive positioning without anchor relocation", Huawei