**3GPP TSG- Meeting #126R2-24xxxxx**

**Fukuoka, Japan, 20th – 24th May 2024**

Agenda Item: 7.2.1

Source: Ericsson

Title: [Post126][407][POS] Rel-18 positioning RRC CR (Ericsson)

Document for: Discussion, Decision

# Introduction

This is to kick off the email discussion.

* [Post126][407][POS] Rel-18 positioning RRC CR (Ericsson)

 Scope: Update the CR in R2-2405257 in line with decisions of this meeting, including implementation of constraints on configuration of SL-PRS carrier in SIB23/preconfiguration. Late-arriving parameter updates from RAN1 can be taken into account if possible.

 Intended outcome: Agreed CR in R2-2405884

 Deadline: Short (for RP)

# 2 Discussion

## 2.1 LPHAP

Please provide your comments on the LPHAP changes

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| Company Name | Comments  |
| Samsung | [Application of SRS pre-configuration after receiving RRCRelease message]Regarding the activation of pre-configured SRS, the following agreements are made in RAN2.* For preconfigured multiple SRS configurations, confirm the WA, i.e. UE sends a new ResumeCause of RRCResumeRequest message to indicate the change or activations of SRS configuration when different SRS configuration is selected due to change of validity area, or when a new SRS configuration is selected where none was previously in use.
* For preconfigured SRS, when the UE moves to a new validity area, it does not continue transmitting SRS until it has gone through RRCResumeRequest/RRCRelease procedure. No additional acknowledgement message is needed for the activation request, i.e., the UE can apply the preconfiguration after it receives the RRCRelease.
* The access category for RRCResumeRequest is provided by the upper layer when the RRCResumeRequest is triggered by SRS configuration activation request. H906 moves to Agreed.

Based on the agreement above, the UE procedure to apply the SRS pre-configuration should be like below.1. Upon moving to a new validity area or request from upper layer, the UE sends RRCResumeRequest message with the new resume cause.2. For the case of moving to a new validity area, the UE stops transmitting SRS.3. For the case of moving to a new validity area, the UE can apply the pre-configuration after receiving RRCRelease message,.In our view, some of the above procedure are not captured correctly in the current RRC CR and thus we propose the following corrections.**- Proposal 1 (to capture the blue part correctly):**

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| [5.3.13.6]3> if the selected cell and previously camped cell are in the different *srs-PosConfigValidityArea*; 4> indicate to the lower layer to stop *inactivePosSRS-ValidityAreaTAT.*  4> initiate RRC connection resume procedure in 5.3.13.2. |

**-Proposal 2 (to capture the 3rd procedure correctly):**\* With the current description in 5.7.X, the UE can apply the SRS pre-configuration only when there is a request from upper layer.\* However, for the yellow case of moving to a new validity area, there is no request from upper layer. In this case, the UE should be able to apply the pre-configuration upon receiving *RRCRelease* meesage if the last RRC Resume procedure was initiated for activation of preconfigured SRS for Positioning.

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| [5.7.X]When configured with *srs-PosRRC-InactiveValidityAreaPreConfigList*, the UE shall:1> upon receiving request from upper layers that would require transmission of SRS for positioning; or1> upon receiving *RRCRelease* message after sending the *RRCResumeRequest* message with the *resumeCause* set to *srs-PosConfigOrActivationReq*:2> if the current camped cell is included in any *srs-PosConfigValidityArea* in the *srs-PosRRC-InactiveValidityAreaPreConfigList*:3> apply the corresponding *srs-PosRRC-InactiveValidityAreaPreConfig* and instruct lower layers to initiate SRS for Positioning transmission. |

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| Qualcomm | Generally agree with Samsung comments above. The new section 5.7.x is rather confusing/unclear. I gives the impression that a UE can "autonomously" transmit SRS "upon receiving a request from upper layers". However, as summarized by Samsung above, the UE should await the RRCRelease:"No additional acknowledgement message is needed for the activation request, i.e., the UE can apply the preconfiguration after it receives the RRCRelease"In addition:"the transmission of SP SRS is activated by MAC CE as legacy".The receiving gNB would need to inform the LMF that the UE is now transmitting SRS. Therefore, the text proposed by Samsung above should remove the 1st ">1":[5.7.X]When configured with *srs-PosRRC-InactiveValidityAreaPreConfigList*, the UE shall:1> upon receiving *RRCRelease* message after sending the *RRCResumeRequest* message with the *resumeCause* set to *srs-PosConfigOrActivationReq*:2> if the current camped cell is included in any *srs-PosConfigValidityArea* in the *srs-PosRRC-InactiveValidityAreaPreConfigList*: 3> apply the corresponding *srs-PosRRC-InactiveValidityAreaPreConfig* and instruct lower layers to initiate SRS for Positioning transmission.I.e., the "request from upper layers" is to send the *RRCResumeRequest*, but SRS transmission happens when *RRCRelease* (possibly with MAC-CE) has been received. I.e., this part in 5.3.13.2 should not be deleted:2> if the resumption of the RRC connection is triggered for activation of *srs-PosRRC-InactiveValidityAreaPreConfigList* when the UE is camped in one of the cells indicated in *srs-PosConfigValidityArea*:If a change is needed, I would suggest something like this:2> if the resumption of the RRC connection is triggered upon request from upper layers for activation of *srs-PosRRC-InactiveValidityAreaPreConfigList* when the UE is camped in one of the cells indicated in *srs-PosConfigValidityArea*: |
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## 2.2 Sidelink

Please provide your comments on Sidelink changes.

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| Company Name | Comments  |
| ZTE | SIB23:

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| ***sl-PosFreqInfoList***This field indicates the NR sidelink positioning carrier frequencies for SL-PRS transmission and reception. In this release, only one entry of *sl-PosFreqInfoList* is configured with *sl-BWP-PRS-PoolConfig*. |

If only one entry of *sl-PosFreqInfoList* can be associated with dedicated pool BWP, then why the SIB23 has to contain multiple entries(a list) of *sl-PosFreqInfoList*? SIB23 is to indicate frequency of dedicate pool, so we think the following should be adopted:

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| ***sl-PosFreqInfoList***This field indicates the NR sidelink positioning carrier frequencies for SL-PRS transmission and reception. In this release, only one entry of SL-FreqConfigCommon is contained in sl-PosFreqInfoList-r18. |

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| vivo01 | 6.3.1/9.3In response to ZTE’s comment, the initial CR is derived based on the current text in 5.8.18.3, “2> if the frequency used for NR sidelink positioning is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or includedin *sl-PosConfigCommonNR* within *SIB23*”. That is, UE would only refer to SIB23 for SL frequency allowed for SL-PRS transmission. In this understanding, based on the design of shared resource pool (i.e., to be configured on multiple SL frequencies to align with SL-CA in *sl-FreqInfoListSizeExt-v1800*), UE should be allowed with multiple SL frequencies in SIB23. When these SL frequencies are also included in SIB12 and configured with shared resource pools, then UE can use such pools for SL-PRS transmission.HOWEVER, we believe it is feasible to confine that only one entry is included in *sl-PosFreqInfoList* and *sl-PosPreconfigFreqInfoList-r18* in this release, which is introduced to include dedicated resource pool not supporting SL-CA. THEN, there should be a correlated change in 5.8.18.3 as vivo02. |
| vivo02 | 5.8.18.3A UE capable of NR sidelink positioning that is configured by upper layers to transmit SL-PRS shall:1> if the conditions for NR sidelink positioning operation as defined in 5.8.2 are met:2> if the frequency used for NR sidelink positioning is included in *sl-FreqInfoToAddModList* in *sl-ConfigDedicatedNR* within *RRCReconfiguration* message or includedin *sl-PosConfigCommonNR* within *SIB23* or includedin *sl-PosConfigCommonNR* within SIB12: |
| vivo03 | 5.8.2As implied online, the checking condtion in this branch targets for UE to perform NR sidelink operations in limited service. If UE does not support sidelink positioning in limited service, there is yet no need to check whether the serving cell provides frequency for OOC UE to perform sidelink positioning.1> if the UE's serving cell (RRC\_IDLE or RRC\_CONNECTED) fulfils the conditions to support NR sidelink communication/discovery in limited service state as specified in TS 23.287 [55]; and if either the serving cell is on the frequency used for NR sidelink communication/discovery operation or the UE is out of coverage on the frequency used for NR sidelink communication/discovery operation as defined in TS 38.304 [20] and TS 36.304 [27]; or |
| vivo03 | 5.8.3Figure 5.8.3.1-1: Sidelink UE information for NR sidelink communication/discoveryThe figure needs to be improved as:Change “XX” into “23”;Add”/positioning” in the figure title. |
| vivo04 | 5.8.18.2/3Change all the places referred SIB12/23 with conjunction “and/or”, to indicate that UE is able to use configuration provided only SIB12, only SIB23, or both for SL-PRS transmission/reception. |
| HW | RAN1 agreed on the following the RRC configuration for SLAgreementSend an LS to RAN2 indicating that RAN1 agrees to introduce the 4th codepoint for *formats3-1-And-3-2* * Up to RAN2 to decide whether this codepoint can be added in the existing parameter of *dci-FormatsSL* or not.

AgreementSend an LS to RAN2 with the following action item(s):* **Action Item 1:** Include the additional values for the value range of “sl-PRS-ResourceReservePeriodList”: {ms160, ms320, ms640, ms1280, ms2560, ms5120, ms10240}.
* **Action Item 2:** Suggest the removal of the sentence “The possible resource reservation period are periodicities for SL communication and the ones defined for DL-PRS” in the description of the sl-PRS-ResourceReservePeriodList field
* **Action Item 3:** Suggest the addition of the following sentence “The value ms0 is always configured” in the description of the sl-PRS-ResourceReservePeriodList field
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## 2.3 Bandwidth Aggregation

Please provide your comments on the bandwidth aggregation changes.

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| Company Name | Comments  |
| ZTE | SRS-PosResourceSetLinkedForAggBWList-r18 ::= SEQUENCE (SIZE(1..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r18The yellow part should be 2, since when the list only contains one entry of SRS-PosResourceSetLinkedForAggBW-r18, there is only one SRS resource set configured. But an aggregation requires at least 2 entries, i.e., two aggregated SRS resource sets. |
| ZTE |  SRS-InactivePosResourceSetLinkedForAggBWList-r18 ::= SEQUENCE (SIZE (1..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r18If here in RRC INACTIVE, the yellow part is changed to 3, then the one of the configured aggregated carriers in this Rel-18 IE should compulsively contain the Rel-17 configured carrier (i.e., configured in SRS-PosRRC-InactiveConfig-r17).It is not a good design from configuration/signaling perspective. So we suggest to change the yellow IE to be 2 |
| HW | *RAN1 as agreed on the following for the number of linkages configurable for RRC\_INACTIVE*AgreementReply RAN2 LS that up to 32 aggregated combinations are applicable to RRC\_CONNECTED state. RAN1 thinks up to 16 aggregated combinations should be sufficient for RRC\_INACTIVE state. |
| CATT | SRS-PosResourceSetLinkedForAggBWList-r18 ::= SEQUENCE (SIZE(2..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r18SRS-InactivePosResourceSetLinkedForAggBWList-r18 ::= SEQUENCE (SIZE (2..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r182 or 3 Resourcesets are combined in each combination set, according to RAN1 RRC parameter list:AgreementFor SRS bandwidth aggregation across two or three carriers, support• Option 2: Per SRS resource set basis. o Support new signaling to indicate which SRS resource sets across carriers are linked. |
| CATT | – *SRS-Pos**ResourceSetLinkedForAggBW*The IE *SRS-PosResourceSetLinkedForAggBW* provides the SRS Positioning Resource Sets that are linked across two or three CCs for bandwidth aggregation. |
| CATT | ***ul-bwp-ID*** can be deleted in*SRS-PosResourceSetLinkedForAggBW* field descriptions table.Please also update this table following the updates of asn.1. |
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## 2.4 REDCAP

Please provide your comments on the RedCap changes

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| Company Name | Comments  |
| ZTE | SRS-PosTx-Hopping-r18 ::= SEQUENCE { srs-PosConfig-r18 SRS-PosConfig-r17, bwp-r18 BWP OPTIONAL, -- Need R inactivePosSRS-TimeAlignmentTimer-r18 TimeAlignmentTimer OPTIONAL, -- Need M inactivePosSRS-RSRP-ChangeThreshold-r18 RSRP-ChangeThreshold-r17 OPTIONAL, -- Need M srs-PosUplinkTransmissionWindowConfig-r18 SetupRelease { SRS-PosUplinkTransmissionWindowConfig-r18 } OPTIONAL, -- Need M ...}Why the inactivePosSRS-TimeAlignmentTimer and inactivePosSRS-RSRP-ChangeThreshold are configured in hopping configuration?? |
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## 2.5 Any other comments

Please provide any other comments below.

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| Company Name | Comments |
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# Conclusion

In the previous sections we made the following observations:

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

# References