3GPP TSG-RAN WG2 #124 R2-23xxxxx

**Chicago, USA, 13th – 17th November 2023**

Agenda Item: 7.2.1

Source: Ericsson

Title: [Post124][415][POS] Rel-18 Positioning 38.331 CR (Ericsson)

Document for: Discussion, Decision

# Introduction

This is to kick off the email discussion.

* [Post124][415][POS] Rel-18 Positioning 38.331 CR (Ericsson)

Scope: Finalise and check the Rel-18 positioning 38.331 CR (including taking into account parameter list updates).

Intended outcome: Agreed CR

Deadline: Short (for RP)

# 2 Discussion

## 2.1 Bandwidth Aggregation CR

Please provide your comments on the CR for BWA. The changes are track marked with “BandwidthAggregation”

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| Company Name | Comments |
| Huawei, HiSilicon | 1/ should consdier NUL and SUL in the candicate SRS configurations for linked SRS. Also need to consdier BWP configurations. Can consider to align with the SRS configurations that we introdue in R17 for RRC\_INACTIVE  SRS-PosResSetLinkedForAggBWInactiveList-r18 ::= SEQUENCE (SIZE(1..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r18  SRS-PosRRC-AggBW-InactiveConfigList-r18 ::= SEQUENCE (SIZE (2..3)) OF SRS-PosRRC-AggBW-InactiveConfig-r18  SRS-PosRRC-AggBW-InactiveConfig-r18 ::= SEQUENCE {  srs-PosConfig-r18 SRS-PosConfig-r17,  freqInfoAdditionalCcList-r18 ARFCN-ValueNR  }  Rapp: yes agree with ZTE below that SUL is not used for BW aggregation. It is RAN1 led item so if RAN1 thinks it is applicable then they can inform us.  [HW] There is no RAN1 agreement on this. Although i understand the current CR might be OK not adding the SUL configuraiton to the SRS configuration. |
| ZTE | To HW, SUL carrier can not be used for SRS BW aggregation. |
| ZTE | For SRS BW aggregation in RRC INACTIVE:  SRS-PosResSetLinkedForAggBWInactiveList-r18 should be deleted since it is duplicated with srs-PosConfig-r18;  **Rapporteur: Not sure if that is right; since srs-PosConfig-r18 does not contain SRS-PosResSetLinkedForAggBWInactiveList-r18**  SRS-PosRRC-AggBW-InactiveConfigList-r18 should be in SRS-PosRRC-InactiveConfig and SRS-PosRRC-InactiveConfig-ValidityArea, according to R1’s parameter list;  **Rapporteur: Right; this has been corrected.**  SRS-PosRRC-AggBW-InactiveConfigList-r18 should contain offset to carrier, according to R1’s parameter list  **Rapporteur: The below is already present.**  ***freqInfoAdditionalCcList***  Indiicates the frequency information offset to carrier of one or two additional carrier(s) with respective SRS configurations where the carrier and the carrier of the initial BWP should be intra-band contiguous carriers.  SRS-PosResSetLinkedForAggBWInactiveList-r18 ::= SEQUENCE (SIZE(1..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r18  SRS-PosRRC-AggBW-InactiveConfigList-r18 ::= SEQUENCE (SIZE (2..3)) OF SRS-PosRRC-AggBW-InactiveConfig-r18  SRS-PosRRC-AggBW-InactiveConfig-r18 ::= SEQUENCE {  srs-PosConfig-r18 SRS-PosConfig-r17,  **freqInfoAdditionalCcList-r18** ARFCN-ValueNR  } |
| ZTE | For RRC CONNECTED, BW aggregation of SRS should be configured under cell group?  RRCReconfiguration-v1800-IEs ::= SEQUENCE {  srs-PosResourceSetLinkedForAggBWList-r18 SetupRelease { SRS-PosResourceSetLinkedForAggBWList-r18 } OPTIONAL, -- Need M  nonCriticalExtension SEQUENCE {} OPTIONAL  }  Rapp: the SRS-Config itself will be part of Cell Group BWP Config; that is there will be multiple SRS-Config per BWP; however which SRS Resources are to be aggregated can be per UE; rather than indicated in the BWP. This is similar to TEG Report config which is per UE and configured by RRC Reconfig whereas the SRS-Config is done per BWP. However, we can revisit this if rapporteur understanding is not right. |
| ZTE | The RAN2 agreement says there should be same considerations to SRS BW, similar like PRS BW.  nrMaxNumPRS-BandWidthAggregation-r18 (Max number of linkage information) is 256. Equivalent number for SRS can be discussed in CR finalisation.  So suggest to add the FFS here, i.e., RAN2 to discuss how many linked combination of SRS sets is allowed, where each linked combination of SRS sets contains up to 3 SRS resource set.  SRS-PosResourceSetLinkedForAggBWList-r18 ::= SEQUENCE (SIZE(1..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r18  Rapporteur: Ok; we can set this to FFS- |
| Huawei, HiSIlicon | It has also been inlcued in teh RAN1 parameter list that CA positonig parameters should be per validity area    Rapp: yes it has been added also here. |
| vivo | SRS-PosResSetLinkedForAggBWInactiveList-r18 ::= SEQUENCE (SIZE(1..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r18  SRS-PosRRC-AggBW-InactiveConfigList-r18 ::= SEQUENCE (SIZE (2..3)) OF SRS-PosRRC-AggBW-InactiveConfig-r18  SRS-PosRRC-AggBW-InactiveConfig-r18 ::= SEQUENCE {  srs-PosConfig-r18 SRS-PosConfig-r17,  freqInfoAdditionalCcList-r18 ARFCN-ValueNR  }  maxNrOfLinkedSRS-PosResourceSet should not be limited to 3. As the maxNrofSRS-PosResourceSets is 16, and the bandwidth aggregation is per set, we suppose 16 link may be sufficient.  For the structure of SRS-PosRRC-AggBW-InactiveConfig, the bandwidth aggregation is per set, therefore, srs-PosConfig should be replaced by srs-PosResourceSetId.  Rapp: We call 2 times srs-PosConfig and purpose is to create two more Component Carrier (i.e adjacent to initial BWP; desinated by carrier offset (ARFCN value). Once this is created then we define linked resource set via SRS-PosResourceSetLinkedForAggBW-r18  If there is still confusion, we can discuss it next meeting including the value. Regarding maxNrOfLinkedSRS-PosResourceSet value, I agree that it should be limited to 3. But it is set as FFS based upon other companies request. |

## 2.2 RedCap

Please provide your comments on the CR. The changes are marked with “Redcap”

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| Company Name | Comments |
| Huawei, HiSilicon | 1/ setupRelase needs to be added for need M  Rapporteur: Right this has been added.  2/ need to consdier NUL and SUL  -- ASN1START  -- TAG- SRS-PosTx-Hopping-START  SRS-PosTx-Hopping-r18 ::= SEQUENCE {  srs-PosConfig-r18 SRS-PosConfig-r17,  bwp-18 BWP,  srs-PosUplinkTransmissionWindowConfig-r18 SRS-PosUplinkTransmissionWindowConfig-r18 OPTIONAL --Need M  }  SRS-PosUplinkTransmissionWindowConfig-r18 ::= SEQUENCE {  windowPeriodicityAndOffset-r18 CHOICE {  periodicityAndOffset-r18 SRS-PeriodicityAndOffset-r16,  periodicityAndOffset-Ext-r18 SRS-PeriodicityAndOffsetExt-r16  },  duration-r18 ENUMERATED {s1,s2,s4,s6},  ...  }  -- TAG-SRS-PosTx-Hopping-STOP  -- ASN1STOP  Rapporteur: Since RAN1 has not specified the applicability for SUL and this is RAN1 led feature, we suggest to ask them via liason next meeting. If they ack, we can add it. That should not be problem. |
| ZTE | In RRC\_INACTIVE, srs-PosTx-Hopping-r18 should be within SRS-PosRRC-InactiveConfig-r17, according to R1 parameter list  Rapporteur: Correct this has been corrected. |
| ZTE | semi-persistent-r18 SEQUENCE {  periodicityAndOffset-sp-r18 SRS-PeriodicityAndOffset-r16 OPTIONAL, -- Need R  periodicityAndOffset-sp-Ext-r18 SRS-PeriodicityAndOffsetExt-r16 OPTIONAL, -- Need R  ...  },  periodic-r18 SEQUENCE {  periodicityAndOffset-p-r18 SRS-PeriodicityAndOffset-r16 OPTIONAL, -- Need R  periodicityAndOffset-p-Ext-r18 SRS-PeriodicityAndOffsetExt-r16 OPTIONAL, -- Need R  Symbol offset should be added for SP and periodic SRS.  Rapp: as such the start symbol is already indicated below  ***slotOffsetForRemainingHopsList***  This field specifies the starting slot offset and starting symbol for the SRS resource with tx hopping for different resource types (aperiodic, semi-persistent or periodic SRS transmission). Each hop is configured with the same periodicity.  We can discuss this in next meeting if needed. It can be added later. |
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| Huawei, HiSilicon | 4/ The value of *nrofSymbols*, *c-SRS* and *overlapValue* should be common to all the hops if txHoppingConfig is configured.  Rapp: ok; field description is updated to include this. |
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## 2.3 LPHAP

Please provide your comments on the CR. The changes before RAN2#124 are marked with NR\_pos\_enh2 and the changes after are track marked with RAN2#124\_LPHAP

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| Company Name | Comments |
| Huawei, HiSilicon | 1/ Not sure why the editor’s NOTE is still here  Editor’s Note: For preconfigured SRS, there is no need to start the *inactivePosSRS-ValidityAreaTAT* immediately. But for Periodic SRS the above clause would be needed. Agreement says: “Periodic SRSis supported to be configured with validity area. This agreement does not affect preconfigured SRS.” How to differentiate normal and preconfigured SRS. FFS How to start/stop the timer.  Rapp: Yes this is removed.  2/ Not sure what is the agreement for this change?  Upon receiving a positioning SRS configuration for RRC\_INACTIVE release request from lower layers, the UE shall:  1> release the configured *srs-PosRRC-Inactive*, if configured;  1> release the configured *srs-PosRRC-InactiveValidityArea*, if configured.  Rapp: Ok, this is removed. We can discuss if there will be any trigger from lower layer similar to legacy in next meeting.  3/ if the trigger is from upper layer, not sure why the RRC layer determines the access category. This can be dicsused in the future meetings.  "Requst for configuration" can be removed  1> else if *srs-PosRRC-InactiveValidityAreaConfig* is configured and the resumption of the RRC connection is triggered due to upper layers request for configuration or activation of preconfigured SRS for positioning when the UE is camped in one of the cells indicated in *srs-PosConfigValidityArea*:  2> select '8' as the Access Category;  2> set the *resumeCause* to *srs-PosConfigOrActivationReq*;  Rapp: should not the LPP or upper application layer should request to RRC to request for config. Yes, thsi can be discussed in next meeting.  4/ should be "indicate to the lower layer to update TA and stored RSRP"  1> else if cell reselection occurs when *srs-PosRRC-InactiveValidityAreaConfig* is configured and if the cell is included in the *srs-PosRRC-InactiveValidityAreaConfig*:  2> if *autonomousTA-AdjustmentEnabled* is configured;  3> autonomously adjusts the time advance value and the stored RSRP for TA validation.  Rapp: Ok.  5/ the realed UE behavior seems to have already been covered in TS 38.213    Rapp: Ok; then the pathloss derivation clause can be removed.  When the UE is (pre)configured to transmit SRS for positioning in a validity area, the UE shall:  1> if the RS in *spatialRelationInfoPos* cannot be accurately measured:  2> suspend the transmission of the SRS for positioning resource.  For the power control of an SRS for positioning (pre)configuration in validity area, the UE shall:  1> if pathloss RS is provided in *pathlossReferenceRS-Pos*:  2> use the provided pathloss RS;  2> if pathloss RS cannot be accurately measured:  3> calculate pathloss based on the RS resources obtained from SS/PBCH block of the new camping cell that the UE uses to obtain MIB.  6/ The preconfigured SRS should be a list with the following agreement in the last meeting. When multiple validity areas are configured, it should also be clarified that the validity areas do not overlap.    srs-PosRRC-InactiveValidityAreaConfig-r18 SetupRelease { SRS-PosRRC-InactiveValidityAreaConfig-r18 } OPTIONAL, -- Need M  Also, there should be only a single SRS-PosRRC-InactiveValidityAreaConfig that can be configured as "not-preconfigured"  Rapp: correct thanks; this has been updated. Also in section 5.7.XX  7/ The relase of the SRS configuration does not necessarily follow RAN paging. The network can choose to release the configuration e.g., at a periodic RNAU, or SRS configuration/activation request or even e.g., SDT procedure. No need to mention about paging here    Rapp: Ok we can remove the paging.  8/ When the RACH procedure is successful, the RRC layer should indicate to the lower layer the applicable SRS configuration when pre-configured is configured for activation request and for configfuation request when the UE moves ouf of the validity area.  1> else if *srs-PosRRC-InactiveValidityAreaConfig* is configured and the resumption of the RRC connection is triggered due to cell reselection to a cell that is not included in *srs-PosConfigValidityArea* and there is an on-going SRS for positioning transmission:  2> select '8' as the Access Category;  2> set the *resumeCause* to *srs-PosConfigOrActivationReq*;  1> else if *srs-PosRRC-InactiveValidityAreaConfig* is configured and the resumption of the RRC connection is triggered due to upper layers request for configuration or activation of preconfigured SRS for positioning when the UE is camped in one of the cells indicated in *srs-PosConfigValidityArea*:  2> select '8' as the Access Category;  2> set the *resumeCause* to *srs-PosConfigOrActivationReq*;  Rapp: The change could be as below:  1> else if *srs-PosRRC-InactiveValidityAreaConfig* is configured and the resumption of the RRC connection is triggered due to upper layers request for configuration or activation of preconfigured SRS for positioning when the UE is camped in one of the cells indicated in *srs-PosConfigValidityArea*:  2> select '8' as the Access Category;  2> set the *resumeCause* to *srs-PosConfigOrActivationReq*;  **2> indicate to the lower layer the selected preconfigured SRS configuration when preconfiguration is avaialble.**  However, we need to discuss this aspect. So, lets not take this input now. Moreover, also the clause needs to be added as when the TAT timer would start for the preconfigured case. |
| CATT | 2> if *srs-PosRRC-InactiveValidityArea* is configured:  3> apply the configuration and instruct MAC to start the *inactivePosSRS-ValidityAreaTAT*;  Should be “ *srs-PosRRC-InactiveValidityAreaConfig*”.  Rapp: Done. |
| CATT | Upon receiving a positioning SRS configuration for RRC\_INACTIVE release request from lower layers, the UE shall:  1> release the configured *srs-PosRRC-Inactive*, if configured;  1> release the configured *srs-PosRRC-InactiveValidityArea*, if configured.  This has not been agreed yet. Under what condition the lower layer will send SRS release request is not clear.  Rapp: Ok. |
| CATT | SRS-PosRRC-InactiveValidityAreaConfig-r18 ::= SEQUENCE {  configType-r18 ENUMERATED {preconfig, non-preconfig},  srs-PosConfigValidityArea-r18 SEQUENCE (SIZE(1..maxNrOfCellsInVA-r18)) OF CellIdentity,  srs-PosConfigNUL-r18 SRS-PosConfig-r17 OPTIONAL, -- Need R  srs-PosConfigSUL-r18 SRS-PosConfig-r17 OPTIONAL, -- Need R  bwp-NUL-r18 BWP OPTIONAL, -- Need S  bwp-SUL-r18 BWP OPTIONAL, -- Need S  areaValidityTA-Config-r18 SetupRelease { AreaValidityTA-Config-r18 } OPTIONAL, -- Need M  srs-PosHyperSFN-Index-r18 ENUMERATED {even0, odd1} OPTIONAL, --Need S  ...  }  Rapp: Ok.  For preconfigured SRS, multiple SRS can be configured and each of them is associated with a validity area. The current structure cannot support that. |
| CATT | SRS-PosRRC-InactiveValidityAreaConfig-r18 ::= SEQUENCE {  configType-r18 ENUMERATED {preconfig, non-preconfig},  srs-PosConfigValidityArea-r18 SEQUENCE (SIZE(1..maxNrOfCellsInVA-r18)) OF CellIdentity,  srs-PosConfigNUL-r18 SRS-PosConfig-r17 OPTIONAL, -- Need R  srs-PosConfigSUL-r18 SRS-PosConfig-r17 OPTIONAL, -- Need R  bwp-NUL-r18 BWP OPTIONAL, -- Need S  bwp-SUL-r18 BWP OPTIONAL, -- Need S  areaValidityTA-Config-r18 SetupRelease { AreaValidityTA-Config-r18 } OPTIONAL, -- Need M  srs-PosHyperSFN-Index-r18 ENUMERATED {even0, odd1} OPTIONAL, --Need S  ...  }  1.We think the srs-PosHyperSFN-Index-r18 should not be included in IE SRS-PosRRC-InactiveValidityAreaConfig-r18. According to the RAN1 parameter list, the hyper SFN is contained in “ In srs-PosResource in srs-PosResourceSet in srs-PosConfig in SRS-PosRRC-InactiveConfig-ValidityArea in RRCRelease”, rather than include the hyper SFN in SRS-PosRRC-InactiveValidityAreaConfig-r18 directly. The hyper SFN is used to determine the SRS time position, so it should be only configured together with the SRS periodity in IE SRS-PosResource-r16.  Rapp: Ok; this has been deleted from here.  2.Additionally, the SRS perodicity should be extended to support 20480ms.  Rapp: Currently the SRS periodicity is defined in legacy with slots for different SCS which is provided by RAN1. It would be good if RAN1 provides the extended value if needed. |
| Huawei, HiSilicon | “srs-PosHyperSFN-Index-r18” is present in the following IEs:  SRS-PosRRC-InactiveValidityAreaConfig-r18  SRS-PosResourceSet-r16  SRS-PosResource-r16  May be the first one is OK as it’s the config during suspend. For the remaining 2 elements, may be it’s enough to include in “SRS-PosResource-r16”?  Rapp: RAN1 param list says all 3 so lets add for all 3 now.  In srs-PosResource in srs-PosResourceSet in srs-PosConfig  in SRS-PosRRC-InactiveConfig-ValidityArea in RRCRelease |
| vivo | 5.7.XX Actions for SRS for Positioning transmission in RRC\_INACTIVE in a Validity Area The UE may be configured or preconfigured with SRS for Positioning in a validity area defined by group of cells. There can be multiple preconfigured SRS for positioning that can be configured to UE where each preconfiguration belongs to different validity area. For each validity area, the UE is preconfigured with only one SRS for positioning configuration.  When the UE is (pre)configured to transmit SRS for positioning in a validity area, the UE shall:  1> if the RS in *spatialRelationInfoPos* cannot be accurately measured:  2> suspend the transmission of the SRS for positioning resource.  Agreement  For spatial relation of an SRS for positioning configuration in multiple cells for UEs in RRC\_INACTIVE state, on suspension of the transmission of an SRS resource for positioning, a UE is expected to keep monitoring the configured RS for spatial relation, and if the UE determines that it is being accurately measured, the UE resumes the SRS transmission.  The highlighted part seems missing.  Rapp:  Thanks added now as below:  1> if the RS in *spatialRelationInfoPos* cannot be accurately measured:  2> suspend the transmission of the SRS for positioning resource and monitor the configured RS;  2> if the UE determines that RS in *spatialRelationInfoPos* being accurately measured:  3> resume the SRS transmission. |
| vivo | srs-PosHyperSFN-Index  The IE seems duplicated in SRS-PosResourceSet and SRS-PosResource. And the field descriptions of srs-PosHyperSFN-Index in SRS-PosRRC-InactiveValidityAreaConfig is not needed as it is not in the configuration. Rapp: RAN1 param list says all 3 so lets add for all 3 now.  In srs-PosResource in srs-PosResourceSet in srs-PosConfig  in SRS-PosRRC-InactiveConfig-ValidityArea in RRCRelease |
| vivo | SRS-PosRRC-InactiveValidityAreaConfigList-r18 ::= SEQUENCE SIZE(1..maxNrOfVA-r18) OF SRS-PosRRC-InactiveValidityAreaConfig-r18  SRS-PosRRC-InactiveValidityAreaConfig-r18 ::= SEQUENCE {  configType-r18 ENUMERATED {preconfig, non-preconfig},  srs-PosConfigValidityArea-r18 SEQUENCE (SIZE(1..maxNrOfCellsInVA-r18)) OF CellIdentity,  srs-PosConfigNUL-r18 SRS-PosConfig-r17 OPTIONAL, -- Need R  srs-PosConfigSUL-r18 SRS-PosConfig-r17 OPTIONAL, -- Need R  bwp-NUL-r18 BWP OPTIONAL, -- Need S  bwp-SUL-r18 BWP OPTIONAL, -- Need S  areaValidityTA-Config-r18 SetupRelease { AreaValidityTA-Config-r18 } OPTIONAL, -- Need M  srs-PosRRC-AggBW-InactiveConfigList-r18 SetupRelease { SRS-PosRRC-AggBW-InactiveConfigList-r18 } OPTIONAL, -- Need M  ...  }  The structure is misleading. That is, pre-config SRS can be a list of configuration, while for the non-preconfig SRS, only one configuration can be supported rather than a list.  Rapp: right; we can solve this in field description.  ***srs-PosRRC-InactiveValidityAreaConfigList***  List of SRS for positioning configuration during RRC\_INACTIVE state which is valid across a number of cells comprising a validity area. For each validity area, the UE is preconfigured with only one SRS for positioning configuration.  The Network configures multiple validity area only when *configType* value is set *preconfig*.  Also 5.7.xx  The UE may be configured or preconfigured with SRS for Positioning in a validity area defined by group of cells. There can be multiple preconfigured SRS for positioning that can be configured to UE where each preconfiguration belongs to different validity area. For each validity area, the UE is preconfigured with only one SRS for positioning configuration. **For non-preconfigured SRS for positioning, only one validity area is configured.** |

# Conclusion

In the previous sections we made the following observations:

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

# References