**3GPP T****SG-RAN WG3 Meeting #123bis R3-242110**

**Changsha, China, 15-19 April, 2024**

**Title:** **Summary of R18 Positioning offline discussion**

**Source: CATT**

**Agenda item: 9.2.2**

**Document Type: Decision**

# 0. For Chair’s Notes

**/////////////////////////////////////////////////// Begin /////////////////////////////////////////////////////**

**To be updated later.**

**/////////////////////////////////////////////////// End /////////////////////////////////////////////////////**

# Discussion

**CB: # 3\_Positioning**

**- Discuss the solution for pre-configured SRS activation**

**- Check the IEs added in 1977 and 1928, whether they are sufficient or not?**

**- Check other issues if any**

**- Work on CRs if agreeable**

(moderator - CATT)

Summary of offline disc [R3-242110](Inbox%5CR3-242110.zip)

## Activation of pre-configured SRS activation

Contributions [1]~[4] talked about the support of activation of pre-configured SRS.

Solutions a) b) c) are mentioned in the [1].

1. **Full context relocation:** If requested by the receiving gNB, the last serving gNB provides the UE’s pre-configured SRS Information in the RETRIEVE UE CONTEXT RESPONSE.
2. **Partial context relocation:** In case of SDT is initiated, and if requested by the receiving gNB, the last serving gNB provides the UE’s pre-configured SRS Information via Partial UE Context Transfer procedure.
3. **No Context Relocation:**
4. If the receiving gNB could internally identify the pre-configured SRS to be activated for the UE, it will not request for the pre-configured SRS from the last serving gNB, the last serving gNB notifies LMF pre-configured SRS is activated for the UE, and responses RETRIEVE UE CONTEXT FAILURE without pre-configured SRS Information.

The last serving gNB associates an identifier (e.g. I-RNTI) with the pre-configured SRS configuration(s) provided in the POSITIONING INFORMATION RESPONSE. The LMF then includes the pre-configured SRS Information and associated identifier in the SRS INFORMATION RESERVATION NOTIFICATION.

1. Or else, the last serving gNB may provide the UE’s pre-configured SRS Information in RETRIEVE UE CONTEXT FAILURE.

**Moderator’s summary based on some offline discussion:**

* Partial Context Transfer (b) is not a normal case for pre-configured SRS activation, it could be down-scoped.
	+ Full Context Relocation (a) works, but some companies do not see why relocate the full UE context for pre-configured SRS activation, as for this case, no need to change the anchor, no need to update the RNA configuration, the SRS configuration for the UE.
* Only relocate the Pre-configured SRS in Retrieval UE Context Failure (c2) is also workable.
	+ For a) and c2). In the RRC, one cause value is been used for two cases, request for SRS configuration (UE moves out of VA), or request for activation of pre-configured SRS. If the receiving gNB does not know the VA(s) for area-specific or preconfigured SRS configured to UE, it does not know what’s the purpose of this *RRCResumeRequest*. Thus, only a general cause value or indicator could be introduced in the Retrieval Request, the last serving gNB to decide the real purpose of the UE. ( which means the *Preconfigured SRS Activation Request* in Retrieval Request in 1642 is not exactly correct)
* Receiving gNB identifies the “reserved” pre-configured SRS via I-RNTI (c1), no context relocation.
* The last serving gNB provides I-RNTI in Positioning Response associated to the pre-configured SRS(s) for the UE. And I-RNTI and Pre-configured SRS Info are added in the SRS Reservation Notification to let the receiving gNB aware of the pre-configured SRS for the UE in advance.
* If the “reserved” pre-configured SRS could not be successfully identified in the receiving gNB, fall back to a) or c2) as above, one code-point should be added in Retrieval Request to indicate whether Pre-configured SRS Info is requested.

Please companies provide views on how to handle the pre-configured SRS activation.

**Question 1: Any suggestion on how to proceed with the pre-configured SRS activation in RAN3?**

|  |  |
| --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Comment** |
| CATT | Not consider Partial Context Transfer solution, it’s preferred to consider a) c1) c2) as a whole package, the above info could be taken into account. |
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**Proposal 1: xxx**

## Various Corrections

### 1.2.1 measurement report for SRS Bandwidth Aggregation (1977/1928)

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| --- | --- | --- |
| [R3-241977](Docs%5CR3-241977.zip) | Correction on measurement report for SRS Bandwidth Aggregation (ZTE, CATT, Ericsson) | CR0144r, TS 38.455 v18.1.0, Rel-18, Cat. F |
| [R3-241928](Docs%5CR3-241928.zip) | Correction on measurement report for SRS Bandwidth Aggregation (CATT, ZTE, Ericsson) | CR1400r, TS 38.473 v18.1.0, Rel-18, Cat. F |

In above CRs, it’s proposed to introduce Point A + PCI, to associate to the SRS Resource ID aggregated in the TRP Measurement Report.

It seems companies are fine with the intension, however, on the changes, QC wonders whether “Point A” + “PCI” is sufficient or not, maybe some additional info needed to identify the carrier, refer to RRC parameters.

As below, in TS 38.331, RAN2 uses SRS-PosResourceSetLinkedForAggBW-r18 to indicate the aggregated SRS resource set, besides ARFCN, and SRS Resource Set ID, BWP ID and SCS specific carrier info are also used.

-- ASN1START

-- TAG- SRS-POSRESOURCESETLINKEDFORAGGBW-START

SRS-PosResourceSetLinkedForAggBW-r18 ::= SEQUENCE {

 srs-PosResourceSetLinked-r18 SRS-PosResourceSetId-r16,

 freqInfo-r18 ARFCN-ValueNR OPTIONAL, -- Need R

 ul-bwp-ID-r18 BWP-Id OPTIONAL, -- Cond ConnectedMode

 scs-SpecificCarrier-r18 SCS-SpecificCarrier OPTIONAL, -- Need R

 ...

}

-- ASN1START

-- TAG-SCS-SPECIFICCARRIER-START

SCS-SpecificCarrier ::= SEQUENCE {

 offsetToCarrier INTEGER (0..2199),

 subcarrierSpacing SubcarrierSpacing,

 carrierBandwidth INTEGER (1..maxNrofPhysicalResourceBlocks),

 ...,

 [[

 txDirectCurrentLocation INTEGER (0..4095) OPTIONAL -- Need S

 ]]

}

-- TAG-SCS-SPECIFICCARRIER-STOP

-- ASN1STOP

In TS 38.455, SRS Configuration, multiple SCS Specific Carriers maybe linked to one Point A, thus, for the measurement report, when we describe which carrier the SRS resource ID id aggregated, the relevant SCS specific carrier parameters should be used.

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| --- | --- | --- | --- | --- |
| **>SRS Carrier List Item** |  | *1..<maxnoSRS-Carriers>* |  |  |
| >>Point A | M |  | INTEGER (0..3279165) | NR ARFCN |
| **>>Uplink Channel BW-PerSCS-List** |  | *1* |  | Corresponds to *sCS-SpecificCarrierList* in TS 38.331 [13] |
| **>>>SCS Specific Carrier** |  | *1. .<maxnoSCSs>* |  |  |
| >>>>Offset To Carrier | M |  | INTEGER(0..2199,…) | First usable RB to Point A in the number of PRBs |
| >>>>Subcarrier Spacing | M |  | ENUMERATED(kHz15, kHz30, kHz60, kHz120,…, kHz480, kHz960) |  |
| >>>>Carrier Bandwidth | M |  | INTEGER(1..275,…) |  |
| **>>Active UL BWP** |  | *1* |  | Only the configuration in the active UL BWP is needed. |
| >>>Location And Bandwidth | M |  | INTEGER(0..37949,…) | Corresponds to information provided in *locationAndBandwidth* contained in *BWP* IE as defined in TS 38.331 [13] |
| >>>Subcarrier Spacing | M |  | ENUMERATED(kHz15, kHz30, kHz60, kHz120,…, kHz480, kHz960) |  |
| >>>Cyclic Prefix | M |  | ENUMERATED(Normal, Extended) |  |
| >>>Tx Direct Current Location | M |  | INTEGER(0..3301,…) |  |
| >>>Shift7dot5kHz | O |  | ENUMERATED(true,…) |  |
| >>>SRS Config |  | *1* |  | Corresponds to information provided in *SRS-Config* IE as defined in TS 38.331 [13] |
| **>>>>SRS Resource List** |  | *0..<maxnoSRS-Resources>* |  |  |

**Proposal 2: In TRP measurement report, when aggregated Positioning SRS Resource ID is reported, the “Offset To Carrier”, “Subcarrier Spacing”, “Carrier Bandwidth” should also be added besides Point A and PCI. As below:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **>>Aggregated Positioning SRS Resource ID Item** |  | 1..< *maxnoaggregatedPosSRS-Resources* > |  |  | - |  |
| >>>Positioning SRS Resource ID | M |  | INTEGER (0..63) |  |  |  |
| >>>Point A | M |  | INTEGER (0..3279165) |  |  |  |
| >>>Offset To Carrier | M |  | INTEGER(0..2199,…) |  |  |  |
| >>>Subcarrier Spacing | M |  | ENUMERATED(kHz15, kHz30, kHz60, kHz120,…, kHz480, kHz960) |  |  |  |
| >>>Carrier Bandwidth | M |  | INTEGER(1..275,…) |  |  |  |
| >>>PCI | O |  | INTEGER(0..1007) |  |  |  |

**Question 2: If companies agree with the P2? Any other parameter(s) need to be added?**

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| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Yes | BWP-ID in SRS-PosResourceSetLinkedForAggBW-r18 is not needed, as in NRPPa, only the configuration in the active UL BWP is provided.  |
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### 1.2.2 configuration of SRS Bandwidth Aggregation (1978/1884)

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| --- | --- | --- |
| [R3-241978](Docs%5CR3-241978.zip) | Correction on configuration of SRS Bandwidth Aggregation (ZTE, China Unicom, China Telecom) | CR1402r, TS 38.473 v18.1.0, Rel-18, Cat. F |
| [R3-241884](Docs%5CR3-241884.zip) | Correction on SRS Bandwidth Aggregation Configuration (ZTE, China Unicom, China Telecom) | CR0142r, TS 38.455 v18.1.0, Rel-18, Cat. F |

In above CRs, it’s proposed to change the *maxnoAggregatedPosSRSResourceSets* from 48 to 2. Which means within one combination of SRS aggregation, only one SRS resource set per carrier could be aggregated.

The below info are copied from the higher layer parameters, just for reference.

|  |  |
| --- | --- |
| Indication of the SRS for positioning resource sets in the two or three carriers that are linked for SRS for positioning BW aggregation from the gNB to the LMF | Indication of SRS for positioning resource sets in each of the Indicated 2 or 3 carriers. |

During the online and offline discussion, companies do not acknowledge with this change. The moderator understands that, with the original definition, how many SRS resource sets per carrier could be aggregated could be left to implementation.

**Proposal 3: For each SRS aggregation combination, no need to change the *maxnoAggregatedPosSRSResourceSets* from 48 to 2.**

**Question 3: If companies agree with the P3？**

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| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Yes | Further consider how to encoding the SRS/PRS aggregation the next meeting, i.e. move them to the top level of SRS/PRS configuration, and the detail encoding could take latest RAN2 specification into account. |
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### 1.2.3 Changes to DL-PRS Aggregation (1973)

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| --- | --- | --- |
| [R3-241973](Docs%5CR3-241973.zip) | Correction to DL-PRS Aggregation (Qualcomm Incorporated) | CR0143r, TS 38.455 v18.1.0, Rel-18, Cat. F |

**1st change in 1973,** move *Aggregated PRS Resource Set List* to the top level in *PRS Configuration,* and encoded it as a list by list, as below:

**9.2.44 PRS Configuration**

This information element contains the DL PRS configuration for the TRP.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| **PRS Resource Set List** |  | *1* |  |  | - |  |
| **>PRS Resource Set Item** |  | *1..<maxnoofPRSresourceSet>* |  |  | - |  |
| >>PRS Resource Set ID | M |  | INTEGER(0..7) |  | - |  |
| >>Subcarrier Spacing | M |  | ENUMERATED(kHz15, kHz30, kHz60, kHz120, …) |  | - |  |
| >>PRS bandwidth | M |  | INTEGER(1..63) | 24,28,…,272 PRBs | - |  |
| …… |  |  |  |  |  |  |
| Aggregated PRS Resource Set List | O |  | 9.2.95 | Indicates the *PRS Resource Set Item* linked for PRS bandwidth aggregation. | YES | ignore |

**9.2.95 Aggregated PRS Resource Set List**

This information element is used to indicate the aggregated PRS Resource Set List.

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| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **Aggregated PRS List** |  | *1* |  |  |
| **>Aggregated PRS Resource Set List** |  | *1..<maxnoAggLists>* |  |  |
| **>>Aggregated Positioning PRS Resource Set Item** |  | *1.. < maxnoAggPosPRSResourceSets>* |  |  |
| >>>DL-PRS Resource Set Index |  |  | INTEGER(1..8) | This IE specifies the *PRS Resource Set Item'*s that are linked for DL-PRS bandwidth aggregation.The Integer Value defines an index to the *PRS Resource Set Item*in IE*PRS Configuration.* Integer value 1 defines the first entry in *PRS Resource Set Item,* Integer value 2 defines the second entry in *PRS Resource Set Item* and so on. |

| **Range bound** | **Explanation** |
| --- | --- |
| maxnoAggLists | Maximum number of aggregated lists. Value is 2 |
| maxnoAggPosPRSResourceSets | Maximum no of PRS resource sets (Frequency Layers) aggregated. Value is 3. |

The proposed change provided above is more clear, using new IE to indicate the aggregated SRS, not impact the legacy one.

**Question 3-1: Do companies agree with the changes to move the Aggregated PRS Resource Set List to the top level of the PRS Configuration, and further work on the CRs according to latest RAN2 spec the next meeting?**

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| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Yes | No strong view, the change is acceptable.However, suggest to further work on the CRs the next meeting, taking latest RAN2 specification into account. |
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2nd change in 1973, the reason of change:

The "Requested DL PRS Transmission Characteristics" can include information on the requested DL-PRS (aligned with corresponding structure/information in LPP TS 37.355). However, the "PRS Bandwidth Aggregation Request Indication" is only a flag and can not indicate which of the "Requested DL-PRS Resource Set Items" are requested for aggregation.

The moderator checked the high layer parameters:

|  |  |  |  |
| --- | --- | --- | --- |
| Indication of PRS resource sets across PFLs that are linked for DL PRS BW aggregation from the LMF to the UE | DL PRS resource set IDs used for the aggregated measurement.  | Per UE~~[~~In NR-DL-PRS-AssistanceData~~]~~ | 37.355 |
| Indication of DL PRS resource sets in the two or three DL PFLs that are linked for DL PRS BW aggregation from the NG-RAN node to the LMF | Up to three NR-DL-PRS-ResourceSetID values | Per TRPExample: in PRS Configuration (as in 9.2.44) in PRS CONFIGURATION RESPONSE message | 38.455 |

In 37.355, LMF could provide the PRS aggregation info to the UE, in NR-DL-PRS-AssistanceData. I understand the info provided to UE from LMF is just generated by the gNB in the NRPPa.

However, the proposed change here is LMF to provide clear request for PRS aggregation. Currently, there’s no clear request or agreements in RAN1/RAN2 to provide the requested

**Question 3-2: Do companies agree with the changes to NRPPa, providing *PRS Bandwidth Aggregation Request Information* in *Requested DL PRS Transmission Characteristics*?**

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| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | No | Not sure how to align with LPP.The aggregated info is decided and generated by the gNB, then provided to LMF, LMF provide it to the UE.As there’s no clear requirements/agreements in RAN1/RAN2, we understand it’s good enough to use a flag to indicate PRS bandwidth aggregation is requested/expected when request for PSR configuration from LMF to gNB.  |
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### 1.2.4 Other corrections (1906)

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| [R3-241906](Docs%5CR3-241906.zip) | Various corrections on Rel-18 Positioning (Huawei) | other |

#### Bandwidth Aggregation

In NRPPa and F1AP, the linkage information between SRS for positioning resource sets is provided in resource set level. However, RRC implementation is different that a separate field is introduced to provide the linkage information, i.e., in SRS configuration level, captured as follows:

|  |
| --- |
| RRCReconfiguration-v1800-IEs ::= SEQUENCE { needForInterruptionConfigNR-r18 ENUMERATED { enabled, disabled } OPTIONAL, -- Need M uav-Config-r18 SetupRelease { UAV-Config-r18 } OPTIONAL, -- Need M sl-IndirectPathAddChange-r18 SetupRelease { SL-IndirectPathAddChange-r18 } OPTIONAL, -- Need M n3c-IndirectPathAddChange-r18 SetupRelease { N3C-IndirectPathAddChange-r18 } OPTIONAL, -- Need M n3c-IndirectPathConfigRelay-r18 SetupRelease { N3C-IndirectPathConfigRelay-r18 } OPTIONAL, -- Need M otherConfig-v1800 OtherConfig-v1800 OPTIONAL, -- Need M srs-PosResourceSetLinkedForAggBWList-r18 SetupRelease { SRS-PosResourceSetLinkedForAggBWList-r18 } OPTIONAL, -- Need M ltm-Config-r18 SetupRelease {LTM-Config-r18} OPTIONAL, -- Need M nonCriticalExtension SEQUENCE {} OPTIONAL}\*skipped textSRS-PosResourceSetLinkedForAggBWList-r18 ::= SEQUENCE (SIZE(1..maxNrOfLinkedSRS-PosResourceSet-r18)) OF SRS-PosResourceSetLinkedForAggBW-r18 |

For better alignment, it is suggested to modify NRPPa and F1AP to provide the linkage information between SRS resource sets in per SRS configuration level, i.e., move SRS bandwidth aggregation information from *Positioning SRS Resource Set* IE to *SRS Configuration* IE.

It’s proposed to move SRS bandwidth aggregation information from *Positioning SRS Resource Set* IE to *SRS Configuration* IE to better align with RRC.

**Question 4-1: If companies agree to move SRS bandwidth aggregation information from *Positioning SRS Resource Set* IE to *SRS Configuration* IE, and further work on the CRs according to latest RAN2 spec the next meeting?**

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| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Yes, but | Similar to the discussion for DL-PRS in 1.2.3.We’re ok to move the IE to the top level, however, the change provided in 1906 is not correct. When it’s moved to the top level, we should make sure there’s two list, at most 32 aggregation combinations, and for each combination, several SRS resource sets could be aggregated (some discussion on it in 1.2.2). |
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#### LMF to flexibly activate/deactivate the aggregated carriers

For the semi-persistent SRS, the activation/deactivation of the SRS transmission is needed. The following agreements was made by RAN1 [1]:

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| AgreementConfirm the following WA:

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| --- |
| **Working assumption**For semi-persistent positioning SRS for bandwidth aggregation, a single MAC CE can activate or deactivate:* SRS resource set(s) in one or two or three of three aggregated carriers
* SRS resource set(s) in one or two of two aggregated carriers.

Note: the single spatial relation is indicated by the MAC CE for each of two or three aggregated SRS resources. |

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According to the above, the LMF should be enabled to activate all or only a part of the aggregated carriers. However, Positioning Activation/Deactivation message can indicate only a single SRS Resource Set ID. Therefore, enhancements are required to enable LMF flexibly activates/deactivates the resource set(s) across multiple carriers, e.g., one or two of two aggregated carriers. An example for NRPPa is given as follows:

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| 9.1.1.17 POSITIONING ACTIVATION REQUESTThis message is sent by the LMF to cause the NG RAN node to activate/trigger UL SRS transmission by the UE.Direction: LMF → NG-RAN node.

| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| CHOICE *SRS type* | M |  |  |  | YES | reject |
| *>Semi-persistent* |  |  |  |  |  |  |
| >>SRS Resource Set ID | M  |  | 9.2.33 |  | - |  |
| >>SRS Spatial Relation | O |  | Spatial Relation Information9.2.34 | This IE is ignored if the *Spatial Relation Information per SRS Resource* IE is present. | YES | ignore |
| >>Spatial Relation Information per SRS Resource | O |  | 9.2.60 |  | YES | ignore |
| *>Aperiodic* |  |  |  |  |  |  |
| >>Aperiodic | M |  | ENUMERATED(true,…) |  | - |  |
| >>SRS Resource Trigger | O |  | 9.2.35 |  | - |  |
| Activation Time | O |  | Relative Time 19009.2.36 | Indicates the start time when the SRS activation is requested | YES | ignore |
| Aggregated Positioning SRS Resource Set List | O |  | 9.2.94 |  | YES | ignore |

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It’s proposed to enhance Positioning Activation/Deactivation messages to support LMF to flexibly activate/deactivate the aggregated carriers, e.g., one or two of two aggregated carriers.

**Question 4-2: If companies agree to enhance Positioning Activation/Deactivation messages to support LMF to flexibly activate/deactivate the aggregated carriers, e.g., one or two of two aggregated carriers over NRPPa and F1AP?**

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| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Neutral | It seems correct, double check is preferred. |
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#### NRPPa, alignment on Measurement Characteristics Request Indicator IE

For measurements from aggregation SRS resources, based on RAN1 parameter list [2], the LMF should be able to request NG-RAN node to perform UL positioning measurements from aggregated SRS resources across multiple carriers for UL-TDOA and/or multi-RTT. In F1AP, there is one bit in *Measurement Characteristics Request Indicator* IE to request for joint UL positioning measurements, which is used to request for aggregated resource IDs in NRPPa. It is proposed to revise NRPPa to align with F1AP and RAN1parameter list.

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| 9.2.81 Measurement Characteristics Request IndicatorThis IE contains the measurement characteristic information requested by LMF.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| Measurement characteristic request indicator | M |  | BIT STRING (SIZE(16)) | Each position in the bitmap represents a requested measurement characteristic:first bit: Measurement Beam InformationSecond bit: Extended Additional Path List Third bit: UL SRS-RSRPP in Additional PathFourth Bit: Multiple UL AoA in Additional Path Fifth bit: LoS/NLoS Information Sixth bit: TRP Rx TEG association for UL-TDOASeventh bit: TRP RxTxTEG information for DL+UL positioning.Eighth bit: SRS Resource Type Ninth bit: Multiple Measurement InstancesTenth bit: Mobile TRP location informationEleventh bit: SRS bandwidth aggregation used for joint UL positioning measurement.Other bits reserved for future use. Value ‘1’ indicates ‘requested measurement characteristic’, Value ‘0’ indicates ‘not requested’. |

 |

It’s proposed that in NRPPa, the purpose of eleventh bit in *Measurement Characteristics Request Indicator* IE should be changed to align with F1AP, i.e., SRS bandwidth aggregation used for joint UL positioning measurements.

**Question 4-3: If companies agree with the Semantics Description as above?**

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| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Yes | It’s straightforward. |
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#### SRS Tx Frequency Hopping

The SRS Tx frequency Hopping Configuration is captured as below:

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9.2.100 Tx Hopping ConfigurationThis information element indicates the Tx hopping configuration.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| Overlap Value | M |  | ENUMERATED(rb0, rb1, rb2, rb4) |  |
| Number of Hops | M |  | INTEGER(1..6) |  |
| **Slot Offset for Remaining Hops List** |  | *1* |  |  |
| **>Slot Offset for Remaining Hops Item** |  | *1..<maxnoofHopsMinusOne>* |  |  |
| >>CHOICE *slot offset remaining hops* | M |  |  |  |
| >>>*aperiodic* |  |  |  |  |
| >>>>Slot Offset | O |  | INTEGER(1..32) |  |
| >>>>Start Position | O |  | INTEGER(0..13) |  |
| *>>>semi-persistent* |  |  |  |  |
| >>>>SRS Periodicity | M |  | 9.2.99 |  |
| >>>>Offset | M |  | INTEGER(0..81919, …) |  |
| *>>>periodic* |  |  |  |  |
| >>>>SRS Periodicity | M |  | 9.2.99 |  |
| >>>>Offset | M |  | INTEGER(0..81919, …) |  |

| Range bound | Explanation |
| --- | --- |
| maxnoofHopsMinusOne | Maximum no of hops that can be configured for positioning SRS transmission minus one. Value is 5. |

 |

According to RAN1 parameter list [2], the start symbol is also needed for periodic and sp-SRS, which is missing.

|  |
| --- |
| - starting slot offset and starting symbol for the SRS resource with tx hopping (first hop) for periodic and SP-SRS: slot offset: INTEGER (0,1,2…, nrof slot in periodicity) in slots (reuse the SRS-PeriodicityAndOffset IE); starting symbol: INTEGER (0, ...13) (reuse startPosition in IE resourceMapping)- starting slot offset and symbol for each of the hops following the first hop for periodic and SP-SRS:slot offset: INTEGER (0,1,2…, nrof slot in periodicity -1) in slots (new IE); starting symbol: INTEGER (0, ...13) (new IE) |

Therefore, we propose following:

Add starting symbol to indicate Tx frequency hopping for periodic and sp-SRS in *Tx Hopping Configuration* IE with clarifications on slots and symbols usages.

9.2.100 Tx Hopping Configuration

This information element indicates the SRS Tx frequency hopping configuration.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| --- | --- | --- | --- | --- | --- | --- |
| Overlap Value | M |  | ENUMERATED(rb0, rb1, rb2, rb4) |  | - |  |
| Number of Hops | M |  | INTEGER(1..6) |  | - |  |
| **Slot Offset for Remaining Hops List** |  | *1* |  |  | - |  |
| **>Slot Offset for Remaining Hops Item** |  | *1..<maxnoofHopsMinusOne>* |  |  |  |  |
| >>CHOICE *slot offset remaining hops* | M |  |  |  |  |  |
| >>>*aperiodic* |  |  |  |  |  |  |
| >>>>Slot Offset | O |  | INTEGER(1..32) |  |  |  |
| >>>>Start Position | O |  | INTEGER(0..13) | In symbols |  |  |
| *>>>semi-persistent* |  |  |  |  |  |  |
| >>>>SRS Periodicity | M |  | 9.2.99 |  |  |  |
| >>>>Offset | M |  | INTEGER(0..81919, …) | In slots |  |  |
| >>>>Start Position | O |  | INTEGER(0..13) | In symbols | YES | ignore |
| *>>>periodic* |  |  |  |  |  |  |
| >>>>SRS Periodicity | M |  | 9.2.99 |  |  |  |
| >>>>Offset | M |  | INTEGER(0..81919, …) | In slots |  |  |
| >>>>Start Position | O |  | INTEGER(0..13) | In symbols | YES | ignore |

**Question 4-4: If companies agree to Add starting symbol to indicate Tx frequency hopping for periodic and sp-SRS in Tx Hopping Configuration IE with clarifications on slots and symbols usages?**

|  |  |  |
| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Maybe No.See comment | Technically, it’s correct.Not very sure whether the change is necessary.In RAN1’s high layer parameters, it’s clearly said the starting symbol is needed for periodic and sp-SRS, but it’s also said, reuse startPosition in IE resourceMapping, as below:starting symbol: INTEGER (0, ...13) (reuse startPosition in IE resourceMapping) |
|  |  |  |
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|  |  |  |
|  |  |  |

#### Positioning SIB Type

New positioning SIBs are introduced in Rel-18. Therefore, Positioning SIB Type should be enhanced. It’s proposed to add new positioning SIB types introduced for Rel-18 to NRPPa.

9.2.22 Positioning SIB Type

This parameter defines a specific positioning SIB, as defined in TS 38.331 [13].

| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| --- | --- | --- | --- | --- |
| Positioning SIB Type | M |  | ENUMERATED (posSibType1-1, posSibType1-2, posSibType1-3, posSibType1-4, posSibType1-5,posSibType1-6, posSibType1-7, posSibType1-8,posSibType2-1, posSibType2-2, posSibType2-3,posSibType2-4, posSibType2-5, posSibType2-6, posSibType2-7, posSibType2-8,posSibType2-9, posSibType2-10, posSibType2-11, posSibType2-12, posSibType2-13, posSibType2-14, posSibType2-15, posSibType2-16,posSibType2-17, posSibType2-18, posSibType2-19, posSibType2-20, posSibType2-21, posSibType2-22, posSibType2-23, posSibType2-24,posSibType2-25,posSibType3-1, posSibType4-1,posSibType5-1, posSibType6-1, posSibType6-2,posSibType6-3, ...,posSibType1-9, posSibType1-10,posSibType6-4, posSibType6-5, posSibType6-6,posSibType1-11, posSibType1-12, posSibType2-27,posSibType6-7,posSibType7-1,posSibType7-2,posSibType7-3,posSibType7-4) |  |

**Question 4-5: If companies agree to add new positioning SIB types introduced for Rel-18 (as above) to NRPPa?**

|  |  |  |
| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Yes |  |
|  |  |  |
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#### Measurement Characteristics Request Indicator

This IE contains the measurement characteristic information requested by LMF.

| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| --- | --- | --- | --- | --- |
| Measurement characteristic request indicator | M |  | BIT STRING (SIZE(16)) | Each position in the bitmap represents a requested measurement characteristic:first bit: Measurement Beam InformationSecond bit: Extended Additional Path List Third bit: UL SRS-RSRPP in Additional PathFourth Bit: Multiple UL AoA in Additional Path Fifth bit: LoS/NLoS Information Sixth bit: TRP Rx TEG association for UL-TDOASeventh bit: TRP RxTxTEG information for DL+UL positioning.Eighth bit: SRS Resource Type Ninth bit: Multiple Measurement InstancesTenth bit: Mobile TRP location informationEleventh bit: SRS bandwidth aggregation used for joint UL positioning measurement.Other bits reserved for future use. Value ‘1’ indicates ‘requested measurement characteristic’, Value ‘0’ indicates ‘not requested’. |

**Question 4-6: If companies agree with the change above to the Measurement Characteristics Request Indicator?**

|  |  |  |
| --- | --- | --- |
| [**Company**](Docs%5CR3-241978.zip) | **Yes/No** | **Comment** |
| CATT | Yes |  |
|  |  |  |
|  |  |  |
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#### ASN.1 correction for the Requested SRS Preconfiguration Characteristics List

The Requested SRS Preconfiguration Characteristics List IE is defiend in the tabular fro the Positioning Information Request message, but missing in ASN.1

Proposal 9: Correct ASN.1 for the Requested SRS Preconfiguration Characteristics List.

# 2. Reference

1. R3-241929 Discussion on pre-configured SRS activation (CATT) discussion
2. R3-241642 Support of pre-Configured SRS activation using full context relocation (Ericsson, Xiaomi, Nokia, Qualcomm Incorporated) CR1246r, TS 38.423 v18.1.0, Rel-18, Cat. F
3. R3-241658 Support of the pre-Configured SRS activation (Xiaomi, Ericsson, Nokia, Qualcomm Incorporated) CR0140r, TS 38.455 v18.1.0, Rel-18, Cat. F
4. R3-241705 Missing procedure description for pre-configured SRS activation (Qualcomm Incorporated, Ericsson, Nokia, Xiaomi) draftCR
5. R3-241977 Correction on measurement report for SRS Bandwidth Aggregation (ZTE, CATT, Ericsson) CR0144r, TS 38.455 v18.1.0, Rel-18, Cat. F
6. R3-241928 Correction on measurement report for SRS Bandwidth Aggregation (CATT, ZTE, Ericsson) CR1400r, TS 38.473 v18.1.0, Rel-18, Cat. F
7. R3-241978 Correction on configuration of SRS Bandwidth Aggregation (ZTE, China Unicom, China Telecom) CR1402r, TS 38.473 v18.1.0, Rel-18, Cat. F
8. R3-241884 Correction on SRS Bandwidth Aggregation Configuration (ZTE, China Unicom, China Telecom) CR0142r, TS 38.455 v18.1.0, Rel-18, Cat. F
9. R3-241973 Correction to DL-PRS Aggregation (Qualcomm Incorporated) CR0143r, TS 38.455 v18.1.0, Rel-18, Cat. F
10. R3-241906 Various corrections on Rel-18 Positioning (Huawei) other