**3GPP TSG RAN meeting #103**  **RP-24xxxx**

**Maastricht, Netherlands, March 18th – 21st, 2024**

## Status Report to TSG

**Agenda item:** 9.4.1.9

|  |  |
| --- | --- |
| **WI / SI Name** | Work Item on expanded and improved NR positioning |
| included in this status report | Study Item: No | Core part:Yes | Performance part:Yes | Testing part:No |
| **Acronym** | NR\_pos\_enh2 |
| **Unique ID** | 981038 |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-233382 |
| **Target Completion Date****(indicate if changed)** | Study Item: N/A | Core part: 03/2024 | Performance part: 06/2024 | Testing part: N/A |
| **Overall** **Completion level** | Study Item: N/A | Core part: Overall: = 100%RAN1: 100%RAN2: 100%RAN3: 100% RAN4: 100% | Performance Part: 35% | Testing part: N/A |

Note: Overall completion level percentage numbers should use one of the colors below:

* xx%: Normal progress, no RAN plenary action needed
* xx%: Progress behind schedule, may need RAN plenary intervention. If so, SR should clearly define requested action
* xx%: Progress critically behind, RAN plenary shall intervene. SR should define requested action

**Source:**

|  |  |
| --- | --- |
| **Leading WG** | RAN1 |
| **Rapporteur** | **Name** | Debdeep Chatterjee |
| **Company** | Intel Corporation |
| **Email** | debdeep.chatterjee@intel.com |
| **Name** | Jianxiang Li |
| **Company** | CATT |
| **Email** | lijianxiang@catt.cn |
| **Name** | Florent Munier |
| **Company** | Ericsson |
| **Email** | florent.munier@ericsson.com |

## 1 Work plan related evaluation

|  |  |
| --- | --- |
| **Do you want to modify the time budget for this WI/SI compared to what was endorsed at the last RAN meeting?** | No |

*If you answered No: Then please remove the Excel file from the zip file of this status report.*

*If you answered Yes: Then please fill out the attached Excel template to request a modification of the time budgets for your WI /SI. The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI. The basis are the endorsed time budgets of the last RAN meeting. Please highlight all changes of the values.
 One time unit (TU) corresponds to ~ 2 hours in the meeting.
 If this status report covers a WI with Core and Performance part, then please have one line for each in the attached Excel table.
 Note: If no Excel table is attached, then this means no time budget change.*

**Additional explanations/motivations for the time budget changes in the attached Excel table:**

## 2. Detailed progress in RAN WGs since last TSG meeting (for all involved WGs)

 NOTE: Agreements and Open issues impacted cross-TSG aspects shall be explicitly highlighted

## 2.1 RAN1

***RAN1 work 100% completed at RAN 101. The following decisions from maintenance phase included for information as the overall core part of the WI was incomplete at the previous TSG meeting.***

#### 2.1.1 Agreements

##### 2.1.1.1 Decisions during RAN1#116

##### 2.1.1.1.1 General aspects

**Higher layer parameters for Rel-18 Positioning**

Agreement

The draft LS in R1-2401826 is endorsed. Final LS in R1-2401827.

**For response to RAN2 LS on Sidelink positioning MAC agreements in R1-2400008**

Agreement

To the following question from RAN2 in R1-2400008, RAN1 to respond as below:

* + Question from RAN2:
		- On the maximum number of parallel SL-PRS transmission
			* What is the maximum total number of parallel SL-PRS transmission on SL-PRS shared/dedicated resource pool?
	+ RAN1’s response: While the interpretation intended by RAN2 for “parallel SL PRS transmission” is not fully clear, RAN1 understands that it is referring to the number of processes similar to the number of SL processes associated with a SL HARQ entity for SL communications. There is no concept of parallel SL PRS transmission processes defined/used in RAN1 and such a concept is expected to be transparent to RAN1 specifications. Accordingly, the maximum total number of parallel SL PRS transmission in a shared/dedicated SL PRS resource pool can be up to RAN2.

Agreement

To the following question from RAN2 in R1-2400008, RAN1 to respond as below:

* + Question from RAN2:
		- On the maximum number of parallel SL-PRS transmission
			* What is the maximum number of parallel SL-PRS transmission supported on a SL-PRS shared resource pool and SL-PRS dedicated resource pool, respectively?
	+ RAN1’s response: Following from the response to the first question, the maximum number of parallel SL PRS transmission in a shared/dedicated SL PRS resource pool respectively can be up to RAN2.

Agreement

To the following question from RAN2 in R1-2400008, RAN1 to respond as below:

* + Question from RAN2:
		- When SL-PRS is transmitted on a SL-PRS shared resource pool where PSFCH is configured, if the associated PSSCH transmission is positively acknowledged, should the UE continue to perform SL-PRS retransmission?
	+ RAN1’s response: Since there is no notion of Layer 1 feedback in response to SL PRS transmission, a positive acknowledgement for an associated PSSCH may not be interpreted to indicate successful reception of SL PRS (see RAN1 conclusion from RAN1 #113 below). Accordingly, a Tx UE may continue to perform SL PRS retransmissions if it has been provided with multiple resources for (re-)transmission by the MAC layer, subject to any restrictions on the maximum number of retransmissions.

|  |
| --- |
| **Conclusion**Do not support ACK/NACK feedback for SL-PRS or lower-layer feedback-based retransmissions in Release 18. |

Agreement

The draft LS in R1-2401551 is endorsed (with the addition of the missing conclusion). Final LS in R1-2401552.

##### 2.1.1.1.2 SL positioning reference signal

**Conclusion**

Indication of whether same antenna port may be assumed for SL PRS and PSSCH to enable joint processing at UE receiver is not supported in Rel-18.

Agreement

Agree on TP#1 in section 6 of R1-2401547 for Subclause 8.4.1.6.3 of TS 38.211 to capture the transmit power for the AGC symbol associated with SL PRS resource in a dedicated SL PRS resource pool.

Agreement

Agree on TP#3 in section 6 of R1-2401547 for Subclause 8.2.4.1.2 of TS 38.214 to reflect that the bandwidth of SL PRS in a dedicated SL PRS resource pool is same as the resource pool bandwidth in number of RBs of the same resource pool.

Agreement

Agree on TP#4 in section 6 of R1-2401547 for Subclause 16.2.3A of TS 38.213 to correct the reference to higher layer parameter for controlling the maximum transmission power for SL PRS in a dedicated SL PRS resource pool and for alignment of higher layer parameter names.

Agreement

Agree on TP#5 in section 6 of R1-2401547 for Subclause 8.4.1.6.3 of TS 38.211 to improve clarity of the specifications and align with higher layer parameter names in description for mapping of SL PRS to physical resources.

Agreement

* For SL PRS transmission, the higher layer parameter *sl-FilterCoefficient* is provided on a per resource pool basis.
* Inform RAN2 to add *sl-FilterCoefficient* to *SL-PRS-ResourcePool*.

Agreement

TP#6 in Section 8 of R1-2401548 for Subclause 8.2.4 of TS 38.214 is endorsed to improve clarity of the specifications and align with higher layer parameter names for description of SL PRS resource.

##### 2.1.1.1.3 Measurements and reporting for SL positioning

Agreement

Endorse the TP 3.1-1 in section 8.1 of R1-2401611 for TS 38.214 clause 8.4.4.

Agreement

Endorse the TP 3.2-1 in section 8.1 of R1-2401611 for TS 38.214 clause 8.4.4.

Agreement

Endorse the TP 5.1-1 in section 8.1 of R1-23401611 for TS 38.214 clause 8.4.4.

##### 2.1.1.1.4 Resource allocation for SL positioning reference signal

Agreement

Feature Lead Proposal 8-v0 in section 6 of R1-2401608 is agreed with the corresponding TP for 38.214.

Agreement

Feature Lead Proposal 6-v0 in section 6 of R1-2401608 is agreed with the corresponding TP for 38.213.

Agreement

Feature Lead Proposal 10-v0 in section 6 of R1-2401608 is agreed with the corresponding TP for 38.214.

Agreement

Send an LS to RAN2 to inform them of the parameter ***sl-ThreshS-RSSI-PRS-CBR*** that needs to be introduced in TS 38.331 and is currently missing from the list of higher layer parameters in R1-2312708:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sub-feature group** | **RAN1 specification** | **Parameter name in the spec** | **New or existing?** | **Description** | **Value range** | **Per (UE, cell, TRP, …)** | **Required for initial access or IDLE/INACTIVE** | **Specification** |
| SL PRS configuration in a dedicated resource pool | 38.215 | *sl-ThreshS- RSSI-PRS-CBR* | New | Indicates the S-RSSI threshold for determining the contribution of a sub-channel to the SL PRS-CBR measurement in a dedicated SL PRS resource pool. Value 0 corresponds to -112 dBm, value 1 to -110 dBm, value n to (-112 + n\*2) dBm, and so on. | INTEGER (0..45) | Per dedicated SL PRS resource pool | Yes | 38.331 |

**Conclusion**

1-symbol PSCCH is not supported for Rel-18.

Agreement

Feature Lead Proposal 9-v0 in section 6 of R1-2401608 is agreed with the corresponding TP for 38.212.

Agreement

Feature Lead Proposal 13.4-v0 in section 6 of R1-2401608 is agreed with the corresponding TP for 38.215.

Agreement

Feature Lead Proposal 13.1-v0 in section 6 of R1-2401608 is agreed with the corresponding TP for 38.212.

Agreement

Text Proposal 1 for TS38.214 in section 16 of R1-2401792 is endorsed for the editor’s alignment CR.

Agreement

Text Proposal 2 for TS38.213 in section 16 of R1-2401792 is endorsed for the editor’s alignment CR.

Agreement

The TP below is endorsed for TS38.202.

|  |  |
| --- | --- |
| Reason for change | For the characterization of simultaneous “Reception Type” combinations for sidelink, further qualification would be necessary to describe the scope within which the numbers of simultaneous “Reception Type” combinations apply for SL PRS reception. In particular, * For a shared SL PRS resource pool, the number of simultaneous SL PRS receptions should be defined within one sub-channel to align with SL communications (*cf.* Note 1 applicable for PSSCH and PSCCH).
* For a dedicated SL PRS resource pool, the number of simultaneous SL PRS receptions should be defined within a dedicated SL PRS resource pool (analogous to a sub-channel for SL communications).
 |
| Summary of change | Clarify notes Note 3 and 4 in Table 6.3-4  |
| Consequences if not approved | Incomplete/ambiguous specifications: It is unclear as to the time-frequency region within which the maximum numbers of simultaneous receptions of SL PRS for a shared and dedicated SL PRS resource pool is defined. |

**< Unchanged text omitted >**

**Table 6.3-4: Sidelink "Reception Type" combinations**

|  |  |
| --- | --- |
| **Supported Combinations**  | **Comment** |
| A |  |
| B | Note 1, Note 2 |
| C | Note 1, Note 2 |
| E | Note 3 |
|  E | Note 4 |
|  D | Note 2 |
| B+C | Note 1, Note 2 |
| Note 1: Corresponds to simultaneous reception within one sub-channelNote 2: Depending on the UE capability, the UE may be able to perform simultaneous sidelink communication receptions of the same sidelink “Reception Type” combinations across multiple SL carriers.Note 3: Applicable for a shared SL PRS resource pool. Corresponds to simultaneous reception within one sub-channel.Note 4: Applicable for a dedicated SL PRS resource pool with M1≥1. Corresponds to simultaneous reception within one dedicated SL PRS resource pool. |

**< Unchanged text omitted >**

Working assumption

In NR Rel-18, in a band (pre)configured with SL CA, SL PRS transmission /reception can be supported:

* In a shared SL PRS resource pool in a single SL carrier.
	+ Tx power control follows the rule defined for SL CA in NR Rel-18
* In a dedicated SL PRS resource pool in a single SL carrier when the slots (pre)configured for the dedicated SL PRS resource pool do not collide with the slots (pre)configured for any other resource pool or S-SSB resource(s) in other carriers.
* FFS: new UE capability(ies) are defined for this combination of features

Note: whether this combination of features is supported in Rel-18 requires a conclusion on whether to introduce new UE capability(ies). No specification work until the FFS is resolved.

##### 2.1.1.1.5 NR DL and UL carrier phase positioning

Agreement

Endorse the TP below for TS 38.214 Clauses 5.1.6.5.

|  |  |
| --- | --- |
| ***Reason for change:*** | A Rel-17 UE can perform positioning measurements inside measurement gap or PPW. According to the agreements of the 3GPP RAN1#113, a Rel-18 UE can only perform CPP positioning measurements within measurement gap.In Rel-18, the DL RSCPD and/or DL RSCP can be reported together with the Rel-16 timing measurement (RSTD / UE Rx-Tx time difference), but it needs to be clarified at 38.214 that a Rel-18 UE can only perform CPP measurement within MG.**Agreement**Support the reuse of existing physical layer procedures for DL positioning (e.g., DL-TDOA) with the necessary enhancements in measurement configuration, request and report (e.g., adding the configuration related to the NR DL CPP) for both UE-based and UE-assisted NR DL carrier phase positioning, including* UE in RRC\_CONNECTED state with measurement gap.
* FFS: UE in RRC\_CONNECTED state without measurement gap
* UE in RRC\_ INACTIVE state

**Conclusion**From RAN1’s perspective, carrier phase positioning for UE in RRC\_CONNECTED state without measurement gap is not supported in Rel-18.**Agreement**From RAN1’s perspective, carrier phase positioning for UE in RRC\_IDLE state is supported for UE-based and UE-assisted positioning in Rel-18.* Note: No additional specification work is expected specifically related to carrier phase positioning for UE in RRC\_IDLE state in RAN1.
 |
|  |  |
| ***Summary of change:*** | In clause 5.1.6.5 of TS 38.214, add the UE behavior that a Rel-18 UE can only perform DL RSCPD and/or DL RSCP measurements in measurement gap. |
|  |  |
| ***Consequences if not approved:*** | The UE behavior for DL RSCPD and/or DL RSCP measurement is not clearly defined. |

-------------------------------------------- Start of text proposal to TS 38.214 v18.1.0 ---------------------------------------

**5.1.6.5.2 PRS for carrier phase positioning**

For DL UE positioning measurement reporting in higher layer parameter *NR-DL-TDOA-SignalMeasurementInformation,* the UE may be configured to report the DL Reference Signal Carrier Phase Difference (RSCPD) [7, TS 38.215] measurement along with the DL RSTD. When the UE reports RSCPD measurements, the reference *nr-DL-PRS-ReferenceInfo* is the same as the one reported, for the RSTD measurements. For DL UE positioning measurement reporting in higher layer parameter *NR-Multi-RTT-SignalMeasurementInformation*, the UE may be configured to report the DL Reference Signal Carrier Phase (RSCP) measurement [7, TS 38,215] along with the UE Rx-Tx time difference measurement. When the UE reports DL RSCPD measurement(s) along with DL RSTD measurement(s) or DL RSCP measurement(s) along with UE Rx-Tx time difference measurement(s), the DL RSCPD and/or DL RSCP measurement(s) should be measured from a single DL PRS positioning frequency layer. For a UE in RRC\_CONNECTED state, DL RSCP/RSCPD measurements are measured within the configured measurement gap.

-------------------------------------------- End of text proposal to TS 38.214 v18.1.0 ---------------------------------------

Agreement

The TP below is endorsed.

|  |  |
| --- | --- |
| ***Reason for change:*** | 1. In 5.1.6.5, there is a typo in “within one or more-two time window(s)”,
2. “DL carrier phase measurement” should be replaced with DL RSCP/RSCPD measurement
3. A number of IEs in brackets in 38.214 can be replaced with the IEs defined in TS 37.355.
 |
|  |  |
| ***Summary of change:*** | 1. Correct the typo
2. Replace “DL carrier phase measurement” with “DL RSCP/RSCPD measurement”
3. Replace the IEs in brackets in 38.214 with the IEs defined in TS 37.355.
 |
|  |  |
| ***Consequences if not approved:*** | The specification is not clearly defined. |

-------------------------------------------- Start of text proposal to TS 38.214 v18.1.0 ---------------------------------------

**5.1.6.5 PRS reception procedure**

===================== Unchanged parts omitted ======================

The UE, subject to UE capability, may be requested to perform DL RSCPD and/or DL RSCP measurements on indicated DL PRS resource sets occurring within one or two time window(s) indicated by *NR-DL-PRS-MeasurementTimeWindowsConfig*. Within each window indicated by *NR-DL-PRS-MeasurementTimeWindowsConfig*, the UE expects that the indicated DL PRS resource sets across all *dl-PRS-IDs* are from one DL PRS positioning frequency layer, and that the number of indicated DL PRS resource sets associated with each *dl-PRS-ID* are the same.

The UE, subject to UE capability, may be requested to perform DL RSTD, UE Rx – Tx time difference, DL PRS-RSRP, and DL PRS-RSRPP measurement on the indicated DL PRS resource sets only within the window(s) indicated by *DL-PRS-MeasurementTimeWindowsConfig*.

…===================== Unchanged parts omitted ======================

Agreement

TP#4 in R1-2401486 Section7 for TS 38.214 Clause 5.1.6.5 is endorsed.

##### 2.1.1.1.6 LPHAP (Low Power High Accuracy Positioning)

Agreement

The TP below is endorsed.

|  |  |
| --- | --- |
| **Reasons for change** | Align the higher-layer parameters. |
| **Summary of change** | Update higher-layer parameter name in TS 38.211 Clause 6.4.1.4.4. |
| **Consequences if not approved** | The higher layer parameters in TS 38.211 are not aligned with TS 38.331. |
| **Text proposal** | 6.4.1.4.4 Sounding reference signal slot configurationThroughout this clause, when the higher layer parameter *SRShoppingNrofHops* is provided for *SRS-PosResource*, the sounding reference signal slot configuration applies to a given hop.For an SRS resource configured as periodic or semi-persistent by the higher-layer parameter *resourceType*, a periodicity  (in slots) and slot offset  are configured according to the higher-layer parameter *periodicityAndOffset-p* or *periodicityAndOffset-sp* in the *SRS-Resource* IE, or *periodicityAndOffset-p* or *periodicityAndOffset-sp* in the *SRS-PosResource* IE. Candidate slots in which the configured SRS resource may be used for SRS transmission are the slots satisfyingand, if the higher-layer parameter *srs-PosHyperSFN-Index*~~XXX~~ is configured, where is given by the higher-layer parameter *srs-PosHyperSFN-Index*~~XXX~~ and is the hyper-frame number. |

Agreement

Endorse TP 6-2 in Section 6 of R1-2401628 for TS 38.213 Clause 7.3.1 to align the higher layer parameters with TS 38.331.

Agreement

Endorse TP 6-3 in Section 6 of R1-2401628 for TS 38.214 Clause 6.2.1.4 to align the higher layer parameters with TS 38.331.

Agreement

The TP below is endorsed for TS 38.211 Clause 6.4.1.4.4.

|  |  |
| --- | --- |
| **Reasons for change** | Avoid the case where there are multiple SRS instances in a hyper-frame when the period is 20480ms. |
| **Summary of change** | Add a description to avoid the case where there are multiple SRS instances in a hyper-frame when the period is 20480ms. |
| **Consequences if not approved** | The specification is not completed. |
| **Text proposal** | 6.4.1.4.4 Sounding reference signal slot configurationThroughout this clause, when the higher layer parameter *SRShoppingNrofHops* is provided for *SRS-PosResource*, the sounding reference signal slot configuration applies to a given hop.For an SRS resource configured as periodic or semi-persistent by the higher-layer parameter *resourceType*, a periodicity  (in slots) and slot offset  are configured according to the higher-layer parameter *periodicityAndOffset-p* or *periodicityAndOffset-sp* in the *SRS-Resource* IE, or *periodicityAndOffset-p* or *periodicityAndOffset-sp* in the *SRS-PosResource* IE. Candidate slots in which the configured SRS resource may be used for SRS transmission are the slots satisfyingand, if the higher-layer parameter XXX configured for periodicity larger than or equal to slots, where is given by the higher-layer parameter XXX and is the hyper-frame number.  |

Agreement

The TP below is endorsed for TS 38.214 Clause 6.2.1.

|  |  |
| --- | --- |
| **Reasons for change** | The current specification text in 38.214 does not include the description for the hyper SFN parameter of the SRS for positioning in LPHAP. |
| **Summary of change** | Include Hyper SFN parameter for SRS configuration for TS 38.214 Clause 6.2.1. |
| **Consequences if not approved** | Incomplete description of SRS configuration. |
| **Text proposal** | 6.2.1 UE sounding procedure< Unchanged parts are omitted >The following SRS parameters are semi-statically configurable by higher layer parameter *SRS-Resource* or *SRS-PosResource*.- *srs-ResourceId* or *SRS-PosResourceId* determines SRS resource configuration identity.- Number of SRS ports, as defined by the higher layer parameter *nrofSRS-Ports* and described in clause 6.4.1.4 of [4, TS 38.211]. If not configured, *nrofSRS-Ports* is 1.*-* Time domain behaviour of SRS resource configuration as indicated by the higher layer parameter *resourceType*, which may be periodic, semi-persistent, aperiodic SRS transmission as defined in clause 6.4.1.4 of [4, TS 38.211].- Slot level periodicity and slot level offset as defined by the higher layer parameters *periodicityAndOffset-p* or *periodicityAndOffset-sp* for an SRS resource of type periodic or semi-persistent. The UE is not expected to be configured with SRS resources in the same SRS resource set *SRS-ResourceSet* or *SRS-PosResourceSet* with different slot level periodicities. For an *SRS-ResourceSet* configured with higher layer parameter *resourceType* set to 'aperiodic', a slot level offset is defined by the higher layer parameter *slotOffset.* For an *SRS-ResourceSet* configured with higher layer parameter *resourceType* set to 'aperiodic', a list of up to four different available slot offset values from the reference slot *n* + *k* to the slot where the aperiodic SRS resource set is transmitted where *n* is the slot with triggering DCI and *k* is *slotOffset,* can be configured by the higher layer parameter *availableSlotOffsetList.* The parameter *availableSlotOffsetList* can be configured up to 4 different values*.* For an *SRS-PosResourceSet* configured with higher layer parameter r*esourceType* set to 'aperiodic', the slot level offset is defined by the higher layer parameter *slotOffset* for each SRS resource. - *srs-PosHyperSFN-Index* indicates whether the current hyper-frame number is even or odd for SRS for positioning transmission, if configured.< Unchanged parts are omitted > |

##### 2.1.1.1.7 Bandwidth aggregation for positioning measurements

Agreement

For PRS/SRS bandwidth aggregation, capture the “single Tx chain” (same Tx antenna) assumption in RAN1 specification. Endorse the TP 2.1-2 in section 2.1 of R1-2401594 for TS 38.214 clause 5.1.6.5.3 and 6.2.1.4.2.

Agreement

RAN1 understands that the current RRC ASN.1 only supports single “aggregated combination”, in which only one SRS resource set from each of the 2 or 3 carriers are aggregated, e.g. CC#1 SRS resource set 1 + CC#2 SRS resource set 2 + CC#3 SRS resource set 3. RAN1 suggests to extend the number of such “aggregated combinations” to up to 32. Send an LS to RAN2 and RAN3.

**Conclusion**

It is supported that the SCell not configured with DL but contain only positioning SRS in the UL to be aggregated with positioning SRS on another PCell/SCell. Send LS to RAN2.

Agreement

The draft LS to RAN2 and RAN3 in R1-2401707 is endorsed. Final LS in R1-2401708.

Agreement

Endorse the TP below for TS 38.214 clause 6.2.1.4.2

|  |  |
| --- | --- |
| Reason for change | There are brackets in the specification |
| Summary of change | Remove the whole bracket and make the spec complete |
| Consequences if not approved | The specification is not complete |
| Text proposal | ---------------------------- Start of Text Proposal for TS 38.214 ----------------------------6.2.1.4.2 SRS bandwidth aggregation for positioning measurements< Unchanged parts are omitted >When an SRS resource configured in a CC without PUSCH or PUCCH is linked for bandwidth aggregation with an SRS resource configured in an active UL BWP of another CC, there is a guard period during which the UE is not expected to transmit or receive other signals or channels, subject to UE capability.---------------------------- End of Text Proposal for TS 38.214 ---------------------------- |

Agreement

Endorse the TP 9.1-2 in section 9.1 of R1-2401594 for TS 38.214 clause 5.1.6.5.3 and 6.2.1.4.2

Agreement

Endorse the TP 10.1-1 in section 10.1 of R1-2401594 for TS 38.214 clauses 5.1.6.5.

Agreement

Endorse the TP 10.1-2 in section 10.1 of R1-2401594 for TS 38.214 clauses 5.1.6.5.3 and 6.2.1.4.2.

Agreement

TP 6.2-1 in section 6.2 of R1-2401595 for TS 38.214 clause 5.1.6.5.3 is endorsed.

This does not have LPP impact

Agreement

TP 8.1-1 in section 8.1 of R1-2401595 for TS 38.214 clause 5.1.6.5.3 is endorsed.

##### 2.1.1.1.8 Positioning for RedCap UEs

Agreement

TP 2.2-1 for 38.211 in section 2.2.1 of R1- 2401636 is endorsed.

Agreement

The TP below for 38.211 is endorsed.

|  |
| --- |
| TP 2.4-2 |
| reason for change:  | 1. is the number of OFDM symbol number within the hop if *SRShoppingNrofHops* for *SRS-PosResource* is provided other than the OFDM symbol number within the SRS resource. 2. Align the typeface and description of the two sentences in the paragraph.  |
| summary of change:  | Summary of change: Modify the is the number of OFDM symbol number within the hop if *SRShoppingNrofHops* for *SRS-PosResource* is provided, and modify the typeface of the second sentence as Times New Roman, and modify the “consecutive OFDM symbol” as “consecutive OFDM symbols”.  |
| Consequences if not approved:  | there are some typos and error issues in the specification |
| < Unchanged parts are omitted >6.4.1.4.1 SRS resource- consecutive OFDM symbols given by the field *nrofSymbols* contained in the higher layer parameter *resourceMapping*. If ,is the number of consecutive OFDM symbols per hop.< Unchanged parts are omitted > |

Agreement

TP 2.6-1 for 38.214 in section 2.6.1 of R1- 2401636 is endorsed

**Conclusion**

The network may configure positioning SRS outside the active UL BWP with Tx hopping configured with the number of hops equal to 1.

Agreement

For a RedCap UE receiving nr-DL-PRS-RxHoppingTotalBandwidth in location information request, clarify that for each DL-PRS resource, the RedCap UE performs PRS Rx frequency hopping to a bandwidth of min {the requested bandwidth in request location information, the configured DL-PRS bandwidth in the provided assistance data}.

* This clarification has no RAN1 specification impact, but may have impact to other specifications.
* Send an LS to RAN4 and RAN2 with this agreement

Agreement

The draft LS in R1-2401800 is endorsed (with the addition of RAN2 in To RAN4). Final LS in R1-2401801.

##### 2.1.1.1.9 Approved LSs

R1-2401552 Reply LS on MAC agreements for SL Positioning RAN1, Intel Corporation LS out Rel-18 NR\_pos\_enh2-Core To: RAN2 cc: None

R1-2401827 LS on higher layer parameters for SL Positioning RAN1, Intel Corporation, Qualcomm LS out Rel-18 NR\_pos\_enh2-Core To: RAN2 cc: None

R1-2401708 LS on bandwidth aggregation for positioning RAN1, ZTE LS out Rel-18 NR\_pos\_enh2-Core To: RAN2, RAN3 cc: None

R1-2401801 LS on the bandwidth used in measurements for positioning of RedCap UEs RAN1, Ericsson LS out Rel-18 NR\_pos\_enh2-Core To: RAN4, RAN2 cc: None

#### 2.1.2 Remaining Open issues

None.

## 2.2 RAN2

***RAN2 work 100% completed at RAN 102. The following decisions from maintenance phase included for information as the overall core part of the WI was incomplete at the previous TSG meeting.***

#### 2.2.1 Agreements

##### 2.2.1.1 Decisions during RAN2#125

2.2.1.1.1 Organization

Agreements:

RAN2 intend to delete the NOTE in stage 2 excluding partial coverage for SL positioning. No stage 3 impact is anticipated.

Companies are asked to investigate if the WID needs to be updated.

Agreement:

PropAgree and PropReject RILs from R2-2401239 are confirmed.

2.2.1.1.2 SLPP corrections

Agreements on SLPP RILs:

Confirmed as PropAgree, and have been captured in Rapporteur CR “R2-2400360 Miscellaneous corrections to SLPP specification”:

- A001, A002, A005,

- E001, E002,E003, E005, E007, E008, E009, E010, E011, E012

- H001, H005, H006, H007, H009, H010, H014, H017, H018

- OPPO001, OPPO002, OPPO005,

- Q001, Q007, Q008, Q009, Q011

- Rapp006, Rapp007, Rapp008, Rapp009, Rapp011, Rapp012, Rapp013, Rapp014, Rapp015, Rapp016, Rapp017, Rapp018, Rapp019, Rapp020, Rapp021

- V002

- ZTE001, ZTE002

Confirmed as PropReject:

- A004

- E003 (1), E004

- H002, H003, H004, H008, H012, H019

- OPPO007, OPPO003, OPPO004

- V001

- ZTE003

Moved to ToDo:

- Rapp010

Agreements on SLPP RILs based on R2-2400361, for baseline drafting of the rapporteur CR:

PropAgree: H006, OPPO006, Q002, Q003, Q006, Q012, Z005

PropReject: A003, E006, E013, H015, Q010,

ToDo: Q004, Q005, Rapp002, V003, H011, A006

Agreement:

Add relativeLocation as.

- In LocationInformationType , add relativeLocationEstimateRequired, relativeLocationMeasurementsRequired, relativeLocationEstimatePreferred, relativeLocationMeasurementsPreferred

- In CommonIEsProvideLocationInformation, add RelativeLocation, format to be discussed in the rapporteur CR.

Close Rapp001 provided this discussion converges.

Agreements:

Close Rapp003, move FreqBandIndicatorNR and GNSS-ID into 6.6 SLPP PDU Common SL-PRS Methods Contents.

Close Rapp004 and make SLPP field descriptions transparent to the UE role where possible (to be checked case by case).

Close Rapp005, update the SL-RTD-Info as [ASN.1 provided in R2-2400361], with sync type added.

Agreements:

The association information between ARP-ID and the already transmitted SL PRS resource(s) is placed inside the CommonSL-PRS-MethodsIEsRequestLocationInformation/CommonSL-PRS-MethodsIEsProvideLocationInformation, based on the corresponding TP of P3 from R2-2401244. To do this, the SL-PRS Tx UE can send the CommonSL-PRS-MethodsIEsProvideLocationInformation without providing any measurements. Notify RAN1 by LS.

Regarding the Anchor UE location and ARP location, do not introduce two groups of the assistance data (e.g., to avoid duplicated applicationLayerID's). agree corresponding TP of P5 from R2-2401244

LCS-GCS-Translation information in measurement report shall be common for sl-AzimuthAoA and sl-ZenithAoA, i.e. no separate parameters for sl-AzimuthAoA and sl-ZenithAoA

For SL-AoA, introduce separate request for “sl-AzimuthAoA” and “sl-ZenithAoA”

For SL-AoA, introduce separate request for “measurementReportingTypes ENUMERATED { gcs, lcsWithTranslation, lcsWithoutTranslation}

Agree the Rapp010, i.e. remove CP from the field description of sequenceNumber and acknowlegement;

Update the reason of Rapp010 in the RIL issue list to clarify that CP is supported but reliable delivery is available with all transport options.

Keep A006 “the need of applicationLayerID for capability/request assistanceData, request Location messages” as open issue.

For SL-AoA, do not introduce additional request for “sl-AngleQuality” , sl-PRS-ResourceId and sl-TimeStamp

For SL-RTT, introduce separate request for tx-TimeInfo. And do not introduce additional request for sl-PRS-ResourceId

For SL-TDOA, do not introduce additional request for sl-RSTD-FirstPathResult, sl-PRS-ResourceId , sl-TimeStamp and sl-TimingQuality

For SL-TOA, do not introduce additional request for sl-RTOA-FirstPathResult , sl-RTOA-FirstPathResult sl-PRS-ResourceId , sl-TimeStamp and sl-TimingQuality

Remove “firstPath” from all measurement results.

Regarding the format of RelativeLocation, work on the details of option 2 and take into account of the comments, e.g reference point. (Xiaomi)

Mark V003 as PropReject.

Mark Q004 as PropAgree, agree the suggested changes (P1) and the corresponding TP from R2-2401245, mark Q004 as PropAgree.

Regarding Q004, FFS on whether some clarifications are needed in stage 2.

P2/P3 from R2-2401245 can be discussed under A006.

Mark Q005 as propReject

Capture the editorial changes from P6 in R2-24006257 in Rapporteur’s CR.

Capture the editorial changes from R2-2400944 in Rapporteur’s CR.

Regarding Association of ARP-ID and transmitted SL-PRS, agree P2 and corresponding TP from R2-2401244

Regarding the Anchor UE location and ARP location, only a 2D or 3D ellipsoid point (with or without uncertainty) are allowed for the Anchor/ARP locations. Agree the corresponding TP of P4 from R2-2401244

Regarding the issue on MetaData “the specific Role(s) to be discovered”, agree to describe two use cases (“the specific Role(s) to be discovered”, and “supported UE role”) separately.

RAN2 do not have consensus on the scenario where the SL-PRS Rx UE reports measurements for multiple Rx ARP-IDs in a single measurement report. Current signalling structure cannot support this scenario, and it will be changed to accommodate it if RAN1 want to support the scenario.

For the LS to RAN1, indicate our agreements and give them the opportunity to feed back.

2.2.1.1.3 LPP corrections

Agreement:

Add DL-PRS resource set ID to the NR-AggregatedDL-PRS-ResourceSetID-Element (and set H003 to PropAgree).

Agreements:

When the field nr-AggregatedDL-PRS-ResourceSetID-List is present, how to set the DL-PRS ID within NR-DL-TDOA-MeasElement and NR-Multi-RTT-MeasElement is undefined. The spec should make clear that in this case the Rel-16 DL-PRS-ID is not meaningful; exact wording to be determined in rapporteur CR review.

LS to RAN1 should ask about the handling of the DL-PRS-ID when the IE is used in additional measurements, and whether the DL-PRS ID should not exceed the scope of DL-PRS IDs from the main measurement.

Agreement:

Do not introduce the reference point integrity bound.

Agreement:

Add a request/support indication for each integrity assistance data element. TP to be captured in the rapporteur CR.

Agreements:

Stick to RAN1’s parameter list, and delete aggregated DL PRS resource ID in UE’s measurement report.

Include in the LS to RAN1 a request to clarify the behaviour for a RedCap UE receiving nr-DL-PRS-RxHoppingTotalBandwidth in location information request, when the requested bandwidth is different from the configured bandwidth.

Agreement:

Replace the IE description for NR-DL-PRS-MeasurementTimeWindowsConfig with “The IE NR-DL-PRS-MeasurementTimeWindowsConfig provides a set of indicated time window(s) which is configured for the target device to perform measurements on indicated DL PRS resource set(s) occurring within indicated time window(s).”

2.2.1.1.4 RRC corrections

Agreement:

The PropAgree and PropReject RILs in R2-2401365 are confirmed.

Agreements:

Configure the SL-PRS shared resource pool under SIB12 and the SL-PRS dedicated resource pool under SIB23.

TP from R2-2400340 is the implementation baseline, details to be worked on in the rapporteur CR discussion.

Support segmentation of SIB23.

Agreements:

Capture the agreement “For preconfigured SRS, the configuration is released only when the network releases it explicitly” in RRC Release in order to indicate to remove all stored configuration related to preconfiguration.

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.

Dedicated SR is needed for SL-PRS request MAC CE.

Agreements:

Exceptional pool for SL-PRS transmission can be included in the SL-PRS dedicated pool configuration. Procedural impact can be further investigated towards next meeting and in CR drafting.

RAN1 to be notified in the general LS to RAN1.

2.2.1.1.5 MAC corrections

Agreements:

Multiple/single SL-PRS transmission can be triggered by the UE’s own higher layer.

Capture in the NOTE of the MAC spec that SL-PRS delay budget is provided by higher layer of the UE.

LS to RAN1/RAN4 for questions related to the MAC.

Ask RAN1 whether a new RRC parameter is needed to configure the minimum time gap between last symbol of SL PRS and the start of the first symbol of the PSFCH reception that is associated with the PSSCH transmission on SL-PRS shared resource pool.

For resource allocation scheme 2, SL-PRS resource ID selection is determined by the UE’s implementation, applicable for initial transmission and retransmission.

R17 RSRP-based TA validation for positioning SRS transmission in RRC\_INACTIVE can be reused for positioning SRS bandwidth aggregation in RRC\_INACTIVE. Check with RAN1 and RAN4 in the LS.

RAN2 understand that different carriers in SRS bandwidth aggregation belong to the same TAG, for both RRC\_CONNECTED and RRC\_INACTIVE. No spec change is needed. Check with RAN1 and RAN4 in the LS.

SL-PRS resource request MAC CE’s priority in LCP is lower than SL-BSR MAC CE but higher than MAC CE for IAB-MT Recommended Beam Indication.

For activation/deactivation of SP positioning SRS with multiple carrier indications, design a new MAC CE for activation/deactivation of SP positioning SRS across multiple carriers.

SL MAC entity cancels the triggered SL-PRS resource request upon upper layer indication of SL MAC reset.

Include the SL-PRS bandwidth in the SL-PRS resource request MAC CE for aperiodic SL-PRS transmission and RRC UAI message for periodic SL-PRS transmission.

Bandwidth, delay budget, and priority are provided to the SL-PRS Tx UE in SLPP signalling. FFS periodicity.

RAN2 will not specify anything in this release for SL-PRS bandwidth indication from LMF to gNB.

Indicate in the LS to RAN3 that the LMF is not involved in SL-PRS resource allocation.

Agreement:

The SL-PRS transmission multiplicity (single/multiple transmission) is determined by the UE’s own higher layer by implementation.

Agreements:

The reservation period for multiple SL-PRS transmission when triggered by the peer UE’s SCI is determined by the UE’s own higher layer and delivered to the MAC layer by implementation.

When SL-PRS transmission is triggered by SCI, SL-PRS priority is determined by the UE’s own higher layer and delivered to the MAC layer by implementation.

Agreement:

SL-PRS priority is provided to the MAC by the UE’s own higher layer, according to the priority sent in the SLPP parameter exchange in the sidelink positioning session, when SL-PRS transmission is triggered by its own higher layer.

2.2.1.1.6 UE capabilities

Agreements:

The UE capability on scheduled location time in SLPP is introduced per positioning mode per positioning method.

The UE capabilities for LMF based positioning integrity are not needed.

Introduce the UE capability for the on-demand PRS for bandwidth aggregation in the LPP.

Replace the ‘BOOLEAN’ with ‘ENUMERATED { supported }’ for the ReducedNumOfSamples fields in the UE capabilities. Change M002 to PropAgree.

The UE capability on FG 41-2-3 is for the CPP measurement and it is defined for DL-TDOA and Multi-RTT respectively.

The UE capability on FG 41-2-4 is introduced for DL-TDOA.

2.2.1.1.7 Corrections to other specifications

Agreements:

Follow legacy SL communication/discovery for SL positioning: the cell selection/reselection parameters in the concerned cell selected for sidelink operations should be used for evaluation. TP in R2-2400339 is the baseline; CR to be developed in post-meeting discussion.

RAN2 will not implement anything to enable SL positioning for a UE in limited service in this release.

2.2.1.1.8 Approved LSs

[R2-2401643](file:///C%3A%5C%5CUsers%5C%5Cmtk16923%5C%5CDocuments%5C%5C3GPP%20Meetings%5C%5C202402%20-%20RAN2_125%2C%20Athens%5C%5CExtracts%5C%5CR2-2401643%20Reply%20LS%20%20on%20SL-PRS%20resource%20allocation.docx%22%20%5Co%20%22C%3AUsersmtk16923Documents3GPP%20Meetings202402%20-%20RAN2_125%2C%20AthensExtractsR2-2401643%20Reply%20LS%20%20on%20SL-PRS%20resource%20allocation.docx) Reply LS on SL-PRS resource allocation Xiaomi LS out Rel-18 NR\_pos\_enh2-Core To:RAN1, RAN3 Cc:SA2

* Approved (email discussion [AT125][407])

[R2-2400682](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202402%20-%20RAN2_125%2C%20Athens%5CExtracts%5CR2-2400682%20draft%20reply%20LS%20on%20coverage%20condition%20for%20Ranging%20Sidelink%20Positioning.docx) Draft reply LS on coverage condition for Ranging Sidelink Positioning ZTE Corporation LS out Rel-18 NR\_pos\_enh2 To:SA2 Cc:RAN3

* Add “RAN2 have determined to remove the NOTE excluding partial coverage in stage 2.”
* Approved with this change as R2-2401629

[R2-2401644](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202402%20-%20RAN2_125%2C%20Athens%5CExtracts%5CR2-2401644%20Questions%20on%20RAN1%20parameter%20list.docx) Questions on RAN1 parameter list CATT LS out Rel-18 NR\_pos\_enh2-Core To:RAN1 Cc:RAN3, RAN4

* Approved (email discussion [AT125][408])

#### 2.2.2 Remaining Open issues

None.

## 2.3 RAN3

#### 2.3.1 Agreements

2.3.1.1 Decisions during RAN3#123

2.3.1.1.1 General aspect

The following BL CRs are endorsed online：

* R3-240988 (BL CR to 38.413) Support of NR Positioning Enhancements (ZTE, CATT, Huawei, Nokia, Nokia Shanghai Bell, Ericsson) Endorsed as BL CR
* R3-240036 (BL CR to 38.423) Support of NR Positioning Enhancements (Huawei, CATT, ZTE, Nokia, Nokia Shanghai Bell, Ericsson) Endorsed as BL CR
* R3-240037 (BL CR to 38.455) Support of NR Positioning Enhancements (CATT, Huawei, Ericsson, Nokia, Nokia Shanghai Bell, ZTE, Xiaomi, Samsung, China Telecom) Endorsed as BL CR
* R3-240038 Support of NR Positioning Enhancements (Ericsson, CATT, Huawei, ZTE, Nokia, Nokia Shanghai Bell, Xiaomi, Samsung) Endorsed as BL CR
* R3-240039 (BL CR to TS 38.470) Support of NR Positioning Enhancements (Samsung, Huawei, CATT, Ericsson, Nokia, Nokia Shanghai Bell, ZTE, Xiaomi) Endorsed as BL CR
* R3-240040 (BL CR to TS 38.305) Support of NR Positioning Enhancements (Nokia, Nokia Shanghai Bell, CATT, Huawei, Ericsson, Xiaomi, ZTE, Samsung) Endorsed as BL CR

After Post-meeting TP implementation, CR review and update, final CRs and draft CRs have been uploaded.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Spec.** | **Allocated  Tdoc#** | **Allocated CR#(\*same as original CR)** | **Allocated CR Rev#** | **Allocated Title for final CR (\*changeable to proper one)** | Classification | **TDoc** |
| 38.305 | **R3-241192** | draftCR |   | Support of NR Positioning Enhancements | **BL CR** | [**R3-240040**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240040.zip) |
| **TP** | [**R3-240902**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240902.zip) |
| 38.413 | **R3-241194** | 0991 | **10** | Support of NR Positioning Enhancements | **BL CR** | [**R3-240988**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240988.zip) |
| **TP** | [**R3-240911**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240911.zip) |
| 38.423 | **R3-241195** | 1061 | **9** | Support of NR Positioning Enhancements | **BL CR** | [**R3-240036**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240036.zip) |
| 38.455 | **R3-241196** | 0113 | **7** | Support of NR Positioning Enhancements | **BL CR** | [**R3-240037**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240037.zip) |
| **TP** | [**R3-240903**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240903.zip) |
| **TP** | [**R3-240905**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240905.zip) |
| **TP** | [**R3-240912**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240912.zip) |
| **TP** | [**R3-241162**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-241162.zip) |
| 38.470 | **R3-241197** | 0122 | **3** | Support of NR Positioning Enhancements | **BL CR** | [**R3-240039**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240039.zip) |
| **TP** | [**R3-240904**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240904.zip) |
| 38.473 | **R3-241198** | 1180 | **11** | Support of NR Positioning Enhancements | **BL CR** | [**R3-240038**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240038.zip) |
| **TP** | [**R3-240906**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240906.zip) |
| **TP** | [**R3-240907**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-240907.zip) |
| **TP** | [**R3-241161**](https://www.3gpp.org/ftp/TSG_RAN/WG3_Iu/TSGR3_123/Docs/R3-241161.zip) |

With above, RAN3 Chair announced in the RAN3 reflector that the R18 Positioning WI is completed in RAN3.

2.3.1.1.2 SL positioning

On LMF involvement for SL-PRS resource allocation, according to the agreement of RAN2, LMF is not involved in the SL-PRS allocation in Rel-18.

2.3.1.1.3 LPHAP

The following agreements are achieved for LPHAP:

* In POSITIONING INFORMATION REQUEST, combine the new added parameters in *Requested SRS Transmission Characteristics* IE to a new IE, e.g. *Validity Area specific SRS Information.*
* Add new IE in Positioning Information Request in NRPPa/F1AP to provide pre-configured SRS information (requested SRS transmission characteristics, including the VA), a new IE listed 16 SRS characteristics.
* Add a list of preconfigured SRS configuration, each of them is associated to a VA in Positioning Information Response in NRPPa and F1AP.
* Introduce SRS Reservation Notification in NRPPa and F1AP
* Use the *Requested SRS Transmission Characteristics* IE instead of the *SRS Config* in SRS INFORMATION RESERVATION NOTIFICATION.
* For area-specific SRS allocation, the cell list of positioning validity area is signaled to gNB-DU in POSITIONING INFORMATION REQUEST. (It’s not needed in the POSITIONING INFORMATION RESPONSE.)
* The cell list of positioning validity area is provided to gNB-DU in F1AP SRS INFORMATION RESERVATION NOTIFICATION for the purpose of SRS reservation.

Corresponding TPs are agreed:

* R3-240902 (TP to BL CR for TS 38.305) Support of LPHAP Agreed
* R3-240903 (TP to BL CR for TS 38.455) Support of LPHAP Agreed
* [R3-241161](file:///C%3A%5CUsers%5Csunjiancheng%5CAppData%5CLocal%5CTemp%5C360zip%24Temp%5C360%246%5CInbox%5CR3-241161.zip) (TP to BL CR for TS 38.473) Support of LPHAP Agreed
* [R3-240904](file:///C%3A%5CUsers%5Csunjiancheng%5CAppData%5CLocal%5CTemp%5C360zip%24Temp%5C360%246%5CInbox%5CR3-240904.zip) (TP to BL CR for TS 38.470) Support of LPHAP Agreed
* [R3-240911](file:///C%3A%5CUsers%5Csunjiancheng%5CAppData%5CLocal%5CTemp%5C360zip%24Temp%5C360%246%5CInbox%5CR3-240911.zip) (TP to BL CR for TS 38.423) Support of LPHAP Agreed

2.3.1.1.4 RedCap positioning, Carrier Phase Positioning, and Bandwidth aggregation

The following agreements are achieved for RedCap Positioning, CPP and BW aggregation:

* Support new Reporting Granularity Factor {-3, -4, -5, -6} in addition to {-1, -2}.
* Rename *PRS Bandwidth Aggregation Request Information* IE to *PRS Bandwidth Aggregation Request Indication* IE.
* Existing *Bandwidth* in *Requested SRS Transmission Characteristics* IE is used to implicitly indicate the RedCap with Tx FH configuration, no new sub-IE is needed.
* Introduce a new *Tx Hopping Configuration* IE in the *Positioning SRS Resource* IE that is aligned with RRC (TxHoppingConfig-r18).
* Introduce a new *SRS Periodicity* IE which can be reused within the *Requested SRS Transmission Characteristics* IE, *Positioning SRS Resource* IE, and *Tx Hopping Configuration* IE (in alignment with RRC).
* Add new IE in *TRP Measurement Result* to indicate either a single-hop or multi-hops measurement. (e.g. define it as ENUMERATED (singleHop, multiHop, …) )
* The IE IDs are missing for the *Additional Path List* IE and *Extended Additional Path List* IE in the NRPPa BL CR. They should be added, e.g. id-ReportingGranularitykminus1AdditionalPath.
* In NRPPa, add enumerated value UL RSCP for TRP Measurement Type, both to tabular and ASN.1.

Corresponding TPs are agreed:

* R3-240905 (TP to BL CR for TS 38.455) Support of RedCap Positioning Agreed
* R3-240906 (TP to BL CR for TS 38.473) Support of RedCap Positioning Agreed
* R3-240912 (TP to BL CR for TS 38.455) Support of BW Aggregation Agreed
* R3-240907 (TP to BL CR for TS 38.473) Support of BW Aggregation Agreed
* R3-241162 (TP to BL CR for TS 38.455) Support of CPP Agreed

2.3.1.1.5 Approved LSs

None.

2.3.2 Remaining Open issues

None.

## 2.4 RAN4

***RAN4-core part work 100% completed at RAN 102. The following decisions from maintenance phase included for information as the overall core part of the WI was incomplete at the previous TSG meeting.***

#### 2.4.1 Agreements

2.4.1.1 Decisions during RAN4#110

##### 2.4.1.1.1 General aspects

##### 2.4.1.1.2 RF

* Discussions focused on Rel-18 UE features. And the agreements are listed below.
	+ Difference between the RAN1 feature 41-4-6 and 41-4-7:
		- CA capability is pre-requisite for a UE supporting feature 41-4-6.
		- 41-4-7 is decoupled with CA.
	+ Other agreements related to 41-4-6 and 41-4-7:
		- No new RF requirement need be specified for 41-4-6.
		- Parameter defined in feature 41-4-6 needs to be in line with CA capability.
		- The power class to transmit the SRS aggregated CCs needs to be reported.
		- Add a new sentence in clause 6.1A for feature 41-4-7.
	+ The detail agreement is captured in LS R4-2403654.
* An LS is approved in R4-2403654 reflecting RAN4 agreements:
	+ RAN4 agreed that the UL CA capability shall be the pre-requisite for a UE support RAN1 feature 41-4-6 and parameter defined in feature 41-4-6 needs to be in line with parameters reported in UL CA capability.
	+ For RAN1 feature 41-4-7, RAN4 agreed that the capability on UE power class to transmit the SRS aggregated CCs needs to be reported to the network. The reported power class can be PC2 or PC3 and applicable to FR1 only. For the case when UE can support aggregation of 2 and 3 SRS CCs, and if the power class for 2 aggregated CCs is different with power class for 3 aggregated CCs, both power class should be indicated to the network.
* Maintenance draftCR is endorsed.

##### 2.4.1.1.3 RRM

* The following agreements were made for RedCap positioning core and performance RRM requirements (R4-2403529):
	+ Number of hops within a single MG occasion. The requirements shall support the following Rx frequency hopping cases:
		- 1 hop per slot.
		- 2 hops per slot.
		- 1 hop every 2 slots.
	+ The number of Rx hops measured by the UE in a MG instance is given by:
		- where
			* is the maximum number of Rx hops signaled in the UE capability (FG 41-5-1).
			* is the effective number of Rx hops within a MG instance.
	+ How to use Rel. 17 core requirement as baseline, the time duration of available PRS is derived by:
		- where
			* is the number of hops in a single MG occasion.
			* is the time duration of available PRS per hop (i.e., excluding RF retuning time).
	+ The minimum PRS BW expected to be measured with Rx hopping is given by where
		- * is determined by the min. among 1) the configured PRS BW, 2) UE capability (Component 1 of FG 41-5-1), and 3) total BW of all hops requested by LMF.
			* is the BW per hop signaled in the UE capability.
			* is the minimum hop overlap signaled in the UE capability.
			* is the number of Rx hops measured by the UE within a MG instance.
	+ Side conditions and channel models for RSTD and UE Rx-Tx measurements for 1Rx UE without Rx FH
		- The brackets in the side conditions for 1Rx without FH under fading propagation condition can be removed, i.e., the side conditions should be:
			* RSTD accuracy requirement for 1Rx RedCap UE under fading propagation condition is defined for SINR values of -6 dB for the reference cell and -10 dB for the target cell and is based on 4 samples.
			* UE Rx-Tx accuracy requirement for 1Rx RedCap UE under fading propagation condition is defined for SINR values of -3 dB and -10 dB and is based on 4 samples.
	+ Side conditions and channel models for RSRP measurements for 1Rx UE without Rx FH
		- PRS-RSRP accuracy requirements for 1 Rx RedCap UE without Rx FH:
			* Side conditions: -3 dB, -10 dB.
			* 4 samples.
			* Generic requirements, not limited to specific propagation conditions.
	+ Side conditions and channel models for RSRPP measurements for 1Rx UE without Rx FH
		- PRS-RSRPP accuracy requirements for 1 Rx RedCap UE without Rx FH:
			* Side conditions: -3 dB, -10 dB,
			* 2-tap channel model from Rel-17 with Nsamples = 4.
	+ Accuracy requirements for Rx FH and without Rx FH
		- Accuracy requirements will be defined also for the case with FH.
			* The BW set will be extended for the FH case in the accuracy requirements.
			* FFS: whether the accuracy requirements are the same or different for the cases with and without FH.
	+ Channel model for Rx FH in FR2
		- Accuracy requirement for RedCap positioning with FH in FR2 is defined for TDL-C instead of TDL-A (60 ns delay spread, 300 Hz).
			* Update simulation assumptions from R4-2314460 accordingly (Ericsson will request a tdoc number and updated the sim. assumptions).
			* Updated simulation assumptions are captured in R4-2403471.
* The following agreements were made for PRS/SRS bandwidth aggregation RRM requirements (R4-2403529):
	+ Nominal channel spacing for PRS aggregation:
		- A note on nominal channel spacing can be added in the accuracy requirements to clarify the applicability of the requirements.
			* Simulations assumptions in R4-2321461 are already covering the nominal channel spacing.
	+ Impact of PRS collision with other signals on PRS bandwidth aggregation requirement:
		- Do not define UE behavior for the case of PRS collision with other signals on PRS bandwidth aggregation. For the case of PRS collision with other signals a longer measurement period can be expected.
	+ Interruption due to guard period for SRS aggregation:
		- If no RAN1 solution is defined to handle the impact of SRS transmission for BW aggregation on other channels/signals the RAN4 will define interruption requirements for SRS transmission for BW aggregation on CC without PUSCH/PUCCH.
		- Send LS to RAN1 to explain the technical issue and check if there will be a RAN1 solution to handle it.
		- LS to RAN1 in R4-2403489 is agreed.
	+ Bandwidth configuration to define accuracy requirements for positioning measurements based on bandwidth aggregation
		- For PRS BW aggregation for RSTD and UE Rx-Tx, the requirements are to be defined at least for the following per-PFL BWs:
			* 15 kHz SCS: 104 PRBs (20 MHz)
			* 30 kHz SCS: 132 PRBs (50 MHz), 272 (100 MHz)
			* 60 kHz SCS FR1: 64 PRBs (50 MHz), 132 (100 MHz)
			* 60 kHz SCS FR2: 64 PRBs (50 MHz), 132 (100 MHz)
			* 120 kHz SCS: 64 PRBs (100 MHz), 128 (200 MHz)
		- Note: The aggregated PFLs will have the same SCS.
		- FFS: Other BWs.
	+ Separate accuracy requirement for positioning measurements based on bandwidth aggregation depending on the number of PFLs
		- Accuracy requirements shall cover 2 and 3 PFLs.
			* FFS: For the same BW, the same accuracy requirements (table) apply for 2 PFLs and 3 PFLs
			* Accuracy requirements can be different for different BWs.
	+ Measurements for which accuracy requirements are defined
		- For PRS/SRS BW aggregation, RAN4 will define accuracy requirements for:
			* PRS-based RSTD and UE Rx-Tx,
			* PRS-RSRP and PRS-RSRPP (existing requirements shall apply for both).
* The following agreements were made for NR sidelink positioning core and performance RRM requirements (R4-2403368):
	+ Clarification on the formula of SL PRS measurement period requirements:
		- The start of measurement period for a Tx UE is defined as when the Rx UE receives the first SCI from the Tx UE triggering SL PRS measurement, while both the number of active slots and number of active resources per slot for the ongoing measurement are below the UE capabilities.
		- UE may drop the SL PRS measurement samples if the number of active slots and number of active resources per slot for the ongoing SL PRS measurement exceed the UE capabilities
			* For the case of single sample measurement the whole measurement is not performed
		- Update the measurement period as marked in red.
			* The definition of S is S=N\_sample assuming the UE measures the SL-PRS for at least one UE.
			* T\_(effect,s)=t\_(s+1)-t\_s, where t\_s and t\_(s+1) are the start of the s-th and (s+1)-th slot where UE receives SCI from a Tx UE triggering SL PRS measurement, while both the number of active slots and number of active resources per slot for the ongoing measurement are within the UE capabilities
			* T\_last=〖T\_(dur,S)+T〗\_(SL\_processing), which includes both the duration (T\_(dur,S)) of SL-PRS resources of the S-th slot where UE receives SCI from a Tx UE triggering SL PRS measurement, while both the number of active slots and number of active resources per slot for the ongoing measurement are within the UE capabilities, and minimum processing time.
			* Note: for CR stage the references to specific UE capabilities will be added
		- In the measurement period formula for SL PRS measurements, clarify that the duration of one SL PRS sample T\_(dur,s) is one slot.
		- The measurement period formula (T\_(SL RSTD)) agreed in RAN4#109 applies for each individual SL PRS resource measured by a UE.
		- The common understanding is that UE shall receive multiple PRS resources in parallel without impact on the PRS measurement period while both the number of active slots and number of active resources per slot for the ongoing measurement are within the UE capabilities.
	+ The definition of Nsample for one Tx UE:
		- N\_sample = 1 for SL-PRS BW > 48 PRBs,
		- N\_sample = 4 for SL-PRS BW ≤ 48 PRBs
	+ Applicability of SL PRS measurement period requirements:
		- Measurement requirements for SL Rx-Tx apply for maximum delay (Dmax) between the PRS transmission and the reception of the SL PRS from the Tx UE. Dmax is 160 ms.
	+ Measurement types to be defined accuracy requirements:
		- Define accuracy requirements for SL-PRS based RSTD, SL-PRS based UE Rx-Tx time difference, SL-PRS based RSRP and SL-PRS based RSRPP.
		- Do not define accuracy requirements for SL PRS based RTOA and AOA/ZOA measurement in Rel-18.
	+ Assumptions to define SL PRS measurement accuracy requirements:
		- SL measurement accuracy requirements are defined for all supported SL PRS comb configurations (comb sizes and fully/partially staggered comb configurations).
	+ Test case list:
		- Define measurement delay test cases for SL RSTD, SL RTOA, SL Rx-Tx and SL-AoA/ZoA.
		- Define measurement accuracy test cases for SL RSTD, SL Rx-Tx.
		- Further discuss whether and how to define delay test cases for SL RSRP and SL RSRPP.
		- Further discuss whether and how to define accuracy test cases for SL RSRP and SL RSRPP.
	+ Specification structure:
		- A new separate section is created for SL positioning measurement performance in clause 10, e.g.:
			* 10.4A NR Sidelink Measurements for Positioning.
		- The draft CR is endorsed in R4-2403292.
* The following agreements were made for carrier phase positioning core and performance RRM requirements (R4-2403368):
	+ Clarification on the PRS measurement period requirements for DL RSCP/DL RSCPD:
		- Define CPP measurement requirements with multiple PFLs used for legacy measurements and CPP measurements done on a single PFL
		- When LMF does not configure measurement time window(s) for a PFL or UE does not support FG 41-2-3 (Measurement on indicated DL PRS resource sets within the indicated time window(s) for UE based and UE assisted):
			* For a single PFL: existing requirements without time window apply.
			* FFS: When multiple PFLs are configured for legacy measurements.
	+ Clarification on the measurement reporting requirements:
		- RAN4 to adjust the measurement reporting requirements for CPP such that up to 2 RSCPD/DL RSCP measurements in case of reduced latency (case 1) and else up to 4 RSCPD/DL RSCP measurements (case 2) are reported along with 1 RSTD/UE Rx-Tx time difference measurement to LMF.
			* FFS: Side conditions for each case
			* Number of samples: 1 for accuracy requirements, upon configuration for measurement period requirements.
	+ The impact of carrier frequency offset:
		- Frequency errors in general are already in the latest simulation assumptions.
		- The issue can be more relevant for larger separation in time.
		- The interested companies can bring simulation results, showing the difference compared to the baseline simulations results (current simulation results).
		- All companies: to clarify their assumptions on frequency errors, if any.
		- The current baseline for defining accuracy requirements: the agreed simulation assumption in R4-2321459.
	+ Measurement gap configuration:
		- The gap pattern depends on NW configuration. No need to specify the mapping between time windows and gap patterns in the specification.
	+ Additional reporting:
		- The additional reporting for UE Rx-Tx time difference / RSTD / UL RTOA / gNB Rx-Tx time difference measurement in LS R4-2400004 (R1- 2312393) means the reporting based on additional resources not for additional path.
	+ Channel model for accuracy requirements:
		- Define accuracy requirements for DL RSCPD measurement and relative DL RSCP under 2-Tap channel.
			* FFS: whether to define an accuracy test case for RSCPD/RSCP jointly with another measurement (note: the requirement of the other non-CPP measurement may not need to be verified in these test cases or the existing accuracy requirements for fading channel are verified for these other measurements).
		- Define accuracy requirements for DL RSCPD measurement and relative DL RSCP under AWGN channel.
	+ Report mapping:
		- DL-RSCPD measurement report mapping table is defined as:

|  |  |  |
| --- | --- | --- |
| **Reported value** | **Measured quantity value (DL-RSCPD)** | **Unit** |
| DL-RSCPD\_0000 | -180 ≤ DL-RSCPD < -179.9 | Degree |
| DL-RSCPD\_0001 | -179.9 ≤ DL-RSCPD < -179.8 | Degree |
| DL-RSCPD\_0002 | -179.8 ≤ DL-RSCPD < -179.7 | Degree |
| … | … | … |
| DL-RSCPD\_1798 | -0.2 ≤ DL-RSCPD < -0.1 | Degree |
| DL-RSCPD\_1799 | -0.1 ≤ DL-RSCPD < 0 | Degree |
| DL-RSCPD\_1800 | 0 ≤ DL-RSCPD < 0.1 | Degree |
| DL-RSCPD\_1801 | 0.1 ≤ DL-RSCPD < 0.2 | Degree |
| DL-RSCPD\_1802 | 0.2 ≤ DL-RSCPD < 0.3 | Degree |
| … | … | … |
| DL-RSCPD\_3598 | 179.8 ≤ DL-RSCPD < 179.9 | Degree |
| DL-RSCPD\_3599 | 179.9 ≤ DL-RSCPD < 180 | Degree |

* + - DL-RSCP measurement report mapping table is defined as:

|  |  |  |
| --- | --- | --- |
| **Reported value** | **Measured quantity value (DL-RSCP)** | **Unit** |
| DL-RSCP\_0000 | 0 ≤ DL-RSCP < 0.1 | degree |
| DL-RSCP\_0001 | 0.1 ≤ DL-RSCP < 0.2 | degree |
| DL-RSCP\_0002 | 0.2 ≤ DL-RSCP < 0.3 | degree |
| … | … | … |
| DL-RSCP\_3598 | 359.8 ≤ DL-RSCP < 359.9 | degree |
| DL-RSCP\_3599 | 359.9 ≤ DL-RSCP < 360 | degree |

* + - UL-RSCP measurement report mapping table is defined as:

|  |  |  |
| --- | --- | --- |
| **Reported value** | **Measured quantity value (UL-RSCP)** | **Unit** |
| UL-RSCP\_0000 | 0 ≤ UL-RSCP < 0.1 | degree |
| UL-RSCP\_0001 | 0.1 ≤ UL-RSCP < 0.2 | degree |
| UL-RSCP\_0002 | 0.2 ≤ UL-RSCP < 0.3 | degree |
| … | … | … |
| UL-RSCP\_3598 | 359.8 ≤ UL-RSCP < 359.9 | degree |
| UL-RSCP\_3599 | 359.9 ≤ UL-RSCP < 360 | degree |

* + - Include the CPP report mapping agreement in the LS to RAN2, i.e., together with the corrected mapping for BW aggregation.
* The following agreements were made for LPHAP RRM requirements (R4-2403475):
	+ Start of PRS measurements
		- For Case 1, PRS measurement start is not limited to PTW when the PRS resource indicated in the assistance data is not within PTW.
	+ Multiple times of autonomous TA adjustments:
		- Negative TA value is not expected for one-shot autonomous TA adjustment within the positioning validity area.
	+ Accuracy requirements
		- Existing accuracy requirements are applicable for PRS measurement in INACTIVE with eDRX, and PRS measurement in IDLE.
	+ RRM testing for cell reselection requirements:
		- Define test cases for RRM measurement (cell reselection) in Case 2.
	+ Test case list
		- Test case list will be defined in next meeting based on the outcome of open issues. Companies can bring proposals on the detailed test case list.

2.3.1.1.4 Approved LSs

R4-2403489 LS on SRS BW aggregation impact on other channels/signals To: RAN1 cc: None

R4-2403654 Response to LS on SRS and PRS bandwidth aggregation for positioning on guard To: RAN1/RAN2 cc: None

#### 2.4.2 Remaining Open issues

None.

## 2.5 RAN5

#### 2.5.1 Agreements

#### 2.5.2 Remaining Open issues

#### 2.5.3 Remaining Open issues with cross-WG dependencies

## 2.6 RAN6

#### 2.6.1 Agreements

#### 2.6.2 Remaining Open issues

## 3. Detailed progress in SA/CT WGs since last TSG meeting (for all involved WGs)

NOTE: This section only needs to be filled in for WI/SIs where there is a corresponding relevant WI/SI in SA/CT.

## 3.1 SAx/CTs

#### 3.1.1 Agreements with cross-TSG impacts

#### 3.1.2 Remaining Open issues with cross-TSG impacts

NOTE: This section should also flag any critical dependencies that need TSG attention.

## 4. References

NOTE: This can be e.g. a list of all related Tdocs in the affected WGs since last TSG, references to LSs, produced TRs/TSs, the work/study item description or status reports of previous TSGs.

###### RAN1 #116

1. R1-2401759 Session notes for 8.3 (Maintenance on expanded and improved NR positioning) Ad-Hoc Chair (Huawei)
2. R1-2401827 LS on higher layer parameters for SL Positioning RAN1, Intel Corporation, Qualcomm LS out Rel-18 NR\_pos\_enh2-Core To: RAN2 cc: None
3. R1-2400008 LS on MAC agreements for SL positioning RAN2, Huawei
4. R1-2400140 Discussion on RAN2 LS on MAC agreement for SL positioning Huawei, HiSilicon
5. R1-2400212 Draft reply LS on MAC agreements for SL positioning vivo
6. R1-2400306 Discussion on RAN 2 LS on MAC agreements for SL positioning CMCC
7. R1-2400454 Discussion on MAC agreements for SL positioning CATT
8. R1-2400455 Draft reply LS on MAC agreements for SL positioning CATT
9. R1-2400698 Discussion on reply LS on MAC agreements for SL positioning Samsung
10. R1-2400967 Draft Reply LS on MAC agreements on SL positioning Intel Corporation
11. R1-2401068 Draft reply LS on MAC agreements for SL positioning ZTE
12. R1-2401381 Draft reply LS on MAC agreement for SL positioning Huawei, HiSilicon
13. R1-2401550 Moderator summary #1 on RAN2 LS on MAC agreements for SL Positioning Moderator (Intel Corporation)
14. R1-2401552 Reply LS on MAC agreements for SL Positioning RAN1, Intel Corporation LS out Rel-18 NR\_pos\_enh2-Core To: RAN2 cc: None
15. R1-2400018 Reply LS on TA validation for LPHAP RAN4, Huawei
16. R1-2400020 Reply LS on measurement definitions for positioning with bandwidth aggregation RAN4, Huawei
17. R1-2400141 Discussion on measurement definitions for positioning with bandwidth aggregation Huawei, HiSilicon
18. R1-2400213 Discussion on LS on measurement definitions for positioning with bandwidth aggregation vivo
19. R1-2401353 Discussion on Reply LS on measurement definitions for positioning with bandwidth aggregation Ericsson
20. R1-2401382 Draft reply LS on measurement definitions for positioning with bandwidth aggregation Huawei, HiSilicon
21. R1-2400023 Reply LS on guard period for SRS and PRS bandwidth aggregation for positioning RAN4, CATT
22. R1-2400138 Maintenance of expanded and improved NR positioning Huawei, HiSilicon
23. R1-2400191 Remaining issues on NR Positioning Nokia, Nokia Shanghai Bell
24. R1-2400219 Maintenance on Rel-18 Positioning vivo
25. R1-2400310 Maintenance on expanded and improved NR positioning CMCC
26. R1-2400374 Maintenance issues on Rel-18 Positioning Intel Corporation
27. R1-2400409 Maintenance on Expanded and Improved NR Positioning CATT, CICTCI
28. R1-2400539 Maintenance on Expanded and Improved NR Positioning xiaomi
29. R1-2400580 Text Proposals on Expanded and Improved NR Positioning OPPO
30. R1-2400708 Maintenance on Expanded and Improved NR Positioning Samsung
31. R1-2400989 Remaining Issues On Expanded and Improved Positioning Apple
32. R1-2401039 Discussion on remaining issues for R18 NR positioning InterDigital, Inc.
33. R1-2401073 Maintenance on expanded and improved NR positioning ZTE
34. R1-2401162 Maintenance on Resource allocation for SL PRS ASUSTeK
35. R1-2401247 Maintenance of expanded and improved NR positioning LG Electronics
36. R1-2401351 Remaining issues on expanded and improved NR positioning Ericsson
37. R1-2401418 Maintenance on Expanded and Improved NR Positioning Qualcomm Incorporated
38. R1-2401547 FL summary #1 on SL positioning reference signal Moderator (Intel Corporation)
39. R1-2401548 FL summary #2 on SL positioning reference signal Moderator (Intel Corporation)
40. R1-2401549 FL summary #3 on SL positioning reference signal Moderator (Intel Corporation)
41. R1-2401611 Summary #1 on Measurements and reporting for SL positioning Moderator (vivo)
42. R1-2401612 Summary #2 on Measurements and reporting for SL positioning Moderator (vivo)
43. R1-2401613 Summary #3 on Measurements and reporting for SL positioning Moderator (vivo)
44. R1-2401608 Moderator Summary #0 on resource allocation for SL PRS Moderator (Qualcomm)
45. R1-2401792 Moderator Summary #2 on resource allocation for SL PRS Moderator (Qualcomm)
46. R1-2401485 FL Summary #1 for maintenance on NR DL and UL carrier phase positioning Moderator (CATT)
47. R1-2401486 FL Summary #2 for maintenance on NR DL and UL carrier phase positioning Moderator (CATT)
48. R1-2401487 FL Summary #3 for maintenance on NR DL and UL carrier phase positioning Moderator (CATT)
49. R1-2401628 Summary #1 for low power high accuracy positioning Moderator (CMCC)
50. R1-2401594 Summary #1 for BW aggregation positioning Moderator (ZTE)
51. R1-2401595 Summary #2 for BW aggregation positioning Moderator (ZTE)
52. R1-2401708 LS on bandwidth aggregation for positioning RAN1, ZTE LS out Rel-18 NR\_pos\_enh2-Core To: RAN2, RAN3 cc: None
53. R1-2401636 Feature Lead summary #1 for Positioning for RedCap UEs Moderator (Ericsson)
54. R1-2401637 Feature Lead summary #2 for Positioning for RedCap UEs Moderator (Ericsson)
55. R1-2401801 LS on the bandwidth used in measurements for positioning of RedCap UEs RAN1, Ericsson LS out Rel-18 NR\_pos\_enh2-Core To: RAN4, RAN2 cc: None
56. R1-2400083 Remaining issues of Positioning UE features Nokia, Nokia Shanghai Bell
57. R1-2400139 UE features for Rel-18 positioning Huawei, HiSilicon
58. R1-2400228 Discussion on UE features for Rel-18 positioning vivo
59. R1-2400375 UE features for Rel-18 Positioning Intel Corporation
60. R1-2400415 Discussion on UE features for expanded and improved NR positioning CATT
61. R1-2400536 Discussion on UE features for expanded and improved NR positioning xiaomi
62. R1-2400585 Remaining issues on UE features for expanded and improved NR positioning OPPO
63. R1-2400719 UE features for expanded and imporved NR positionin Samsung
64. R1-2401001 Views on UE features for expanded and improved NR positioning Apple
65. R1-2401074 UE features for Rel-18 NR positioning ZTE
66. R1-2401103 Discussion on UE features for expanded and improved NR positioning NTT DOCOMO, INC.
67. R1-2401352 UE features for expanded and improved NR positioning Ericsson
68. R1-2401359 Summary of UE features for expanded and improved NR positioning Moderator (AT&T)
69. R1-2401426 UE features for expanded and improved NR positioning Qualcomm Incorporated
70. R1-2401619 Session Notes of AI 8.12.3 Ad-Hoc Chair (AT&T)

###### RAN2 #125

1. R2-2400007 LS on UE selection for Ranging\_SL (C1-240431; contact: Xiaomi) CT1 LS in Rel-18 Ranging\_SL To:SA2 Cc:RAN2
2. R2-2400086 Reply LS on security aspects for Ranging/Sidelink Positioning (S2-2401651; contact: Sony) SA2 LS in Rel-18 Ranging\_SL To:SA3 Cc:CT1, RAN2
3. R2-2400052 Reply LS on TA validation for LPHAP (R4-2321464; contact: Huawei) RAN4 LS in Rel-18 NR\_pos\_enh2 To:RAN2 Cc:RAN1
4. R2-2400053 Response to reply LS on SRS and PRS bandwidth aggregation for positioning (R4-2321545; contact: Ericsson) RAN4 LS in Rel-18 NR\_pos\_enh2-Core To:RAN2, RAN3 Cc:RAN1
5. R2-2400074 LS to RAN2/CT WGs on RAN&CT alignment issues (S2-2313889; contact: Xiaomi) SA2 LS in Rel-18 Ranging\_SL To:RAN2, CT1, CT4 Cc:RAN3, SA3
6. R2-2400084 LS reply on introduction of RAT-Dependent integrity (S2-2401589; contact: CATT) SA2 LS in Rel-18 5G\_eLCS\_Ph3 To:RAN2 Cc:CT4, RAN1
7. R2-2400027 LS on the request for specific SL PRS resource characteristic(s)/SL-PRS resource configuration (R1-2312630; contact: Qualcomm) RAN1 LS in Rel-18 NR\_pos\_enh2-Core To:RAN2, RAN3
8. R2-2401236 Request for specific SL-PRS resource characteristic(s)/SL-PRS resource configuration [LS in R2-2400027 (R1-2312630)] Qualcomm Incorporated discussion
9. R2-2400038 LS on LMF involvement in SL-PRS resource allocation (R3-237860; contact: Xiaomi) RAN3 LS in Rel-18 NR\_pos\_enh2 To:RAN2 Cc:RAN1, SA2
10. R2-2400282 Discussion on RAN3 and SA2 LSs for SL positioning Xiaomi discussion Rel-18 NR\_pos\_enh2
11. R2-2400281 Draft Reply LS on LMF involvement in SL-PRS resource allocation Xiaomi LS out Rel-18 NR\_pos\_enh2 To:RAN3 Cc:RAN1, SA2
12. R2-2400067 Reply LS on security aspects for Ranging/Sidelink Positioning (S3-235078; contact: Xiaomi) SA3 LS in Rel-18 Ranging\_SL To:SA2, RAN2
13. R2-2400076 LS on coverage condition for Ranging/Sidelink Positioning (S2-2401383; contact: ZTE) SA2 LS in Rel-18 Ranging\_SL To:RAN2 Cc:RAN3
14. R2-2400679 Discussion on SA2 LS on partial coverage ZTE Corporation discussion Rel-18 NR\_pos\_enh2
15. R2-2400682 Draft reply LS on coverage condition for Ranging Sidelink Positioning ZTE Corporation LS out Rel-18 NR\_pos\_enh2 To:SA2 Cc:RAN3
16. R2-2400206 LS on confirmation of DL measurements for RedCap and BW CATT LS out Rel-18 NR\_pos\_enh2 To:RAN1 Cc:RAN3
17. R2-2400967 Support of SRS pre-configuration in RAN3 Samsung discussion Rel-18 NR\_pos\_enh2
18. R2-2400677 Discussion on LSs of LMF involvement in SL positioning ZTE Corporation discussion Rel-18 NR\_pos\_enh2
19. R2-2401465 Discussion on reply to SA3 LS on security aspects for Ranging Sidelink Positioning OPPO discussion Rel-18 NR\_pos\_enh2 Late
20. R2-2400338 Editorial corrrections to MAC CR for R18 positioning Huawei, HiSilicon CR Rel-18 38.321 18.0.0 1739 - F NR\_pos\_enh2-Core
21. R2-2401241 LPP Class 0 Issues Qualcomm Incorporated draftCR Rel-18 37.355 18.0.0 F NR\_pos\_enh2
22. R2-2401239 LPP ASN.1 Review File and Consolidated RIL List Qualcomm Incorporated other
23. R2-2401082 Corrections to TS 37.355 (rapporteur's CR) CATT CR Rel-18 37.355 18.0.0 0490 - F NR\_pos\_enh2-Core
24. R2-2401318 RRC Positioning Corrections based upon RILs Ericsson CR Rel-18 38.331 18.0.0 4599 - F NR\_pos\_enh2
25. R2-2400683 Discussion on stage-2 procedure corrections ZTE Corporation discussion Rel-18 NR\_pos\_enh2
26. R2-2400987 Solution for some key RIL issues impacting stage-2 Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_pos\_enh2-Core
27. R2-2401009 Discussion on correction for TS 38.305 InterDigital, Inc. discussion Rel-18 NR\_pos\_enh2
28. R2-2401243 Miscellaneous Stage 2 Corrections and Alignments Qualcomm Incorporated CR Rel-18 38.305 18.0.0 0158 - F NR\_pos\_enh2
29. R2-2400359 [POST124][POS] [TS 38.355] Open Issue list and ASN.1 review Intel Corporation discussion Rel-18 NR\_pos\_enh2
30. R2-2400361 Further considerations on SLPP open issues Intel Corporation discussion Rel-18 NR\_pos\_enh2
31. R2-2400360 Miscellaneous corrections to SLPP specification Intel Corporation CR Rel-18 38.355 18.0.0 0001 - F NR\_pos\_enh2-Core
32. R2-2400285 Draft CR 38.355 for SLPP capability Xiaomi draftCR Rel-18 38.355 18.0.0 B NR\_pos\_enh2
33. R2-2400154 Discussion on SLPP open issues vivo discussion Rel-18 FS\_NR\_pos\_enh2
34. R2-2400284 Discussion on SLPP open issues Xiaomi discussion Rel-18 NR\_pos\_enh2
35. R2-2400336 Discussion on the remaining issues for SLPP Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
36. R2-2400583 Open issues in SLPP Nokia, Nokia Shanghai Bell discussion Rel-18
37. R2-2400625 Discussion on open issues in SLPP Lenovo discussion Rel-18 NR\_pos\_enh2
38. R2-2400681 Discussion on SLPP corrections ZTE Corporation discussion Rel-18 NR\_pos\_enh2
39. R2-2400961 Remaining issues on SLPP Samsung discussion Rel-18 NR\_pos\_enh2
40. R2-2401107 Open issues on SLPP specification LG Electronics Inc. discussion Rel-18 38.355
41. R2-2400943 [A006], [Rapp004] SLPP Issues Apple discussion Rel-18 NR\_pos\_enh2
42. R2-2401244 [RILs Q001, Q002] Common SL-PRS Request/Provide Assistance Data Qualcomm Incorporated discussion
43. R2-2401245 [RILs Q004, Q006] SL-RTT Request/Provide Location Information Qualcomm Incorporated discussion
44. R2-2401246 [RILs Q003, Q005, Q012] Various SLPP Corrections Qualcomm Incorporated discussion
45. R2-2400944 Miscellaneous SLPP corrections Apple discussion Rel-18 NR\_pos\_enh2
46. R2-2401464 Discussion on including the server UE positioning method in the discovery message OPPO discussion Rel-18 NR\_pos\_enh2 Late
47. R2-2401466 Discussion on reporting multiple Rx-Tx measurement for the sidelink positioning OPPO discussion Rel-18 NR\_pos\_enh2 Late
48. R2-2401496 LPP RIL list for Rel-18 Positioning CATT discussion Rel-18 NR\_pos\_enh2-Core Late
49. R2-2401444 [POST124][POS][37355] Open Issue list and RIL CATT discussion Rel-18 NR\_pos\_enh2-Core Late
50. R2-2401247 LPP Open Issue: DL-PRS–DRX Alignment Qualcomm Incorporated discussion
51. R2-2400362 Further considerations on LPP open issues Intel Corporation discussion Rel-18 NR\_pos\_enh2
52. R2-2400155 Discussion on LPP open issues vivo discussion Rel-18 FS\_NR\_pos\_enh2
53. R2-2400303 Open issues for LPP spec Spreadtrum Communications discussion Rel-18
54. R2-2400678 Discussion on Rel-18 corrections in LPP ZTE Corporation discussion Rel-18 NR\_pos\_enh2
55. R2-2400713 LPP Maintenance issues Lenovo discussion Rel-18
56. R2-2401248 LPP Open Issue: PRU Operation Qualcomm Incorporated discussion
57. R2-2401321 Addressing sidelink open issues and various LS Ericsson discussion Rel-18
58. R2-2400203 [C001] Correction to need code of the IE NR-PeriodicControlParam CATT CR Rel-18 37.355 18.0.0 0487 - F NR\_pos\_enh2-Core
59. R2-2400345 [H023][H024][H025] Correction to measurement report for CA positioning Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
60. R2-2400346 [H015] Per error source Integrity service paremeters Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
61. R2-2400425 [M001] Definition of PRU in 37.355 MediaTek Inc. discussion Rel-18 NR\_pos\_enh2-Core
62. R2-2400942 [A001], [A002], [A003], [A006] LPP Issues Apple discussion Rel-18 NR\_pos\_enh2
63. R2-2400988 Solution for some key RIL issues impacting LPP Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_pos\_enh2-Core
64. R2-2401083 [V300] Correction on integrityBeamInfoBounds CATT, vivo CR Rel-18 37.355 18.0.0 0491 - F NR\_pos\_enh2-Core
65. R2-2401163 [H003] Discusson on the CA positioning resource set indication Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2-Core
66. R2-2401182 [H018] Discussion on the integrity parameters Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2-Core
67. R2-2401184 [H006] Disucssion on the TRP ID for CA POS Huawei HiSilicon discussion Rel-18 NR\_pos\_enh2-Core
68. R2-2401186 [H001] Disucssion on PRU modeling Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2-Core
69. R2-2401249 [RILs Q018, Q026, Q027] Integrity Assistance Data Request/Support Qualcomm Incorporated, CATT discussion
70. R2-2401250 [RILs Q019, Q024, Q028] Clarification of field description for aggregated and hopping measurement results Qualcomm Incorporated discussion
71. R2-2401310 RIL E100 LPP and E013 SLPP capability for hybrid positioning Ericsson discussion Rel-18
72. R2-2401311 RIL E101 Discussion on Optional or conditional for field nr-DL-PRS-MeasurementTimeWindowsConfig Ericsson discussion Rel-18
73. R2-2401312 RIL E103 Missing RedCap capability for RRC Connected mode Ericsson discussion Rel-18
74. R2-2401313 Discussion related to LPP RILs E001-E003 and Q033 [LocalCoords] Ericsson discussion Rel-18
75. R2-2401314 Discussions related to LPP RIL E004 on Integrity Bounds Ericsson discussion Rel-18
76. R2-2401010 Discussion on correction for LPP InterDigital, Inc. discussion Rel-18 NR\_pos\_enh2
77. R2-2401325 Addressing Remaining Integrity Issues Ericsson discussion Rel-18
78. R2-2401365 RRC Positioning RIL List Ericsson discussion Rel-18
79. R2-2401317 Open issues list For RRC Positioning Ericsson discussion Rel-18
80. R2-2400202 Discussion on the release of SRS configuration CATT, Samsung, LG Electronics Inc discussion Rel-18 NR\_pos\_enh2
81. R2-2400156 Discussion on RRC open issues for POS vivo discussion Rel-18 FS\_NR\_pos\_enh2
82. R2-2401252 Remaining issues for pre-configured SRS Qualcomm Incorporated discussion
83. R2-2400205 [C414] Activation of SP SRS when configured with validity CATT discussion Rel-18 NR\_pos\_enh2
84. R2-2400340 [H571][H901][H902] Discussion on SIB23 Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
85. R2-2400341 [H573] [H574] [H575] Discussion on SRS configuration/activation request Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
86. R2-2400342 [H577] Discussion on UAI for SL positoning Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
87. R2-2400344 [H903] Disucssion on collision handlig for SL-PRS Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
88. R2-2400347 [H581][H590] Discusison on SUI for SL positioning Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
89. R2-2400676 Discussion on LPHAP, SL pos and BW aggregation in RRC ZTE Corporation discussion Rel-18 NR\_pos\_enh2
90. R2-2400968 [S207][Z156] Remaining issues on RRC Samsung discussion Rel-18 NR\_pos\_enh2
91. R2-2400989 Solution for some key RIL issues impacting RRC Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_pos\_enh2-Core
92. R2-2400970 Discussion on the validity timer for the SRS with validity area Beijing Xiaomi Electronics discussion NR\_pos\_enh2
93. R2-2401612 (Report from [401]) Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2-Core
94. R2-2401189 MAC spec open issue list for R18 POS Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2-Core
95. R2-2400157 Discussion on MAC open issues for POS vivo discussion Rel-18 FS\_NR\_pos\_enh2
96. R2-2400204 Discussion on the remaining issues on bandwidth aggregation for SRS CATT discussion Rel-18 NR\_pos\_enh2
97. R2-2400229 Discussion on MAC open issue [CA#02] for NR Pos Lenovo discussion Rel-18
98. R2-2400261 Discussion on MAC issues for SL positioning InterDigital, Inc. discussion Rel-18 NR\_pos\_enh2
99. R2-2400283 Discussion on positioning MAC open issues Xiaomi discussion Rel-18 NR\_pos\_enh2
100. R2-2400337 Discussion on the remaining issues for R18 positioning MAC spec Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
101. R2-2400363 Further considerations on MAC open issues Intel Corporation discussion Rel-18 NR\_pos\_enh2
102. R2-2400680 Discussion on SL pos and BW in MAC ZTE Corporation discussion Rel-18 NR\_pos\_enh2
103. R2-2400716 SL Positioning MAC Maintenance issues Lenovo discussion Rel-18
104. R2-2400884 Remaining issues on SL-PRS transmission ASUSTeK discussion Rel-18 38.321 NR\_pos\_enh2
105. R2-2400885 Discussion and correction regarding SL PRS resource request ASUSTeK discussion Rel-18 38.321 NR\_pos\_enh2
106. R2-2400969 Remaining issues on MAC Samsung discussion Rel-18 NR\_pos\_enh2
107. R2-2401056 MAC related remaining issues of SL positioning Sharp discussion
108. R2-2401108 Open issues on MAC specification LG Electronics Inc. discussion Rel-18 38.321
109. R2-2401253 MAC Open Issue CA#02: MAC CE for activation/deactivation of aggregated SP SRS for positioning Qualcomm Incorporated discussion
110. R2-2401322 Addressing MAC open issues Ericsson discussion Rel-18
111. R2-2401467 Discussion on Sidelink positioning MAC open issues OPPO discussion Rel-18 NR\_pos\_enh2 Late
112. R2-2400958 Open issue list for Rel-18 positioning capability Xiaomi discussion Rel-18 NR\_pos\_enh2
113. R2-2400915 draft 38.306 CR for Positioning Capability Xiaomi draftCR Rel-18 38.306 18.0.0 B NR\_pos\_enh2
114. R2-2400953 Draft 38.331 CR for positioning capability Xiaomi draftCR Rel-18 38.331 18.0.0 B NR\_pos\_enh2
115. R2-2400954 draft LPP CR for Positioning Capability Xiaomi draftCR Rel-18 37.355 18.0.0 B NR\_pos\_enh2
116. R2-2400364 Further considerations on UE capability open issues Intel Corporation discussion Rel-18 NR\_pos\_enh2
117. R2-2400339 Discussion on the remaining issues for idle mode procedure Huawei, HiSilicon discussion Rel-18 NR\_pos\_enh2
118. R2-2400365 Further considerations on TS 38.304 open issues Intel Corporation discussion Rel-18 NR\_pos\_enh2
119. R2-2401324 Addressing SL cell reselection open issues Ericsson discussion Rel-18

###### RAN3 #123

1. R3-240035 (BL CR to 38.413) Support of NR Positioning Enhancements (ZTE, CATT, Huawei, Nokia, Nokia Shanghai Bell, Ericsson)
2. R3-240036 (BL CR to 38.423) Support of NR Positioning Enhancements (Huawei, CATT, ZTE, Nokia, Nokia Shanghai Bell, Ericsson)
3. R3-240037 (BL CR to 38.455) Support of NR Positioning Enhancements (CATT, Huawei, Ericsson, Nokia, Nokia Shanghai Bell, ZTE, Xiaomi, Samsung, China Telecom)
4. R3-240038 Support of NR Positioning Enhancements (Ericsson, CATT, Huawei, ZTE, Nokia, Nokia Shanghai Bell, Xiaomi, Samsung)
5. R3-240039 (BL CR to TS 38.470) Support of NR Positioning Enhancements (Samsung, Huawei, CATT, Ericsson, Nokia, Nokia Shanghai Bell, ZTE, Xiaomi)
6. R3-240040 (BL CR to TS 38.305) Support of NR Positioning Enhancements (Nokia, Nokia Shanghai Bell, CATT, Huawei, Ericsson, Xiaomi, ZTE, Samsung)
7. R3-240540 (TP to 38.455 etc ) Discussion on SRS Reservation Procedure (Huawei)
8. R3-240331 (TP for TS 38.455 BL CR) Coordination of area-specific SRS (Nokia, Nokia Shanghai Bell)
9. R3-240575 (TP to NRPPa BL CR) Addressing remaining LPHAP outstanding issues (Ericsson)
10. R3-240293 (TP for 38.455) Support of LPHAP (Xiaomi)
11. R3-240524 (TP to BL 38.305) Support of LPHAP (Xiaomi)
12. R3-240238 Remaining issues on LPHAP (Samsung)
13. R3-240239 TP for BLCR to 38.470 on LPHAP (Samsung)
14. R3-240222 (TP to BL CR for TS 38.455, 38.423, 38.305) On remaining issues for LPHAP (CATT)
15. R3-240597 Discussion on remaining issue on LPHAP (ZTE)
16. R3-240007 Reply LS on CPP (RAN1(CATT))
17. R3-240009 LS on the request for specific SL PRS resource characteristic(s)/SL-PRS resource configuration (RAN1(Qualcomm))
18. R3-240041 LS on coverage condition for Ranging/Sidelink Positioning (SA2(ZTE))
19. R3-240518 [TP to 38.455 & 38.473] LMF involvement in SL positioning (ZTE)
20. R3-240294 (TP for 38.455) Support of Sidelink Positioning (Xiaomi)
21. R3-240576 (TP for F1AP BL CR) Support of Sidelink Positioning (Ericsson, Xiaomi)
22. R3-240240 Remaining issues on SL-PRS resource allocation (Samsung)
23. R3-240541 (TP to BL 38.423 etc ) Discussion on SL Positioning (Huawei)
24. R3-240224 (TP to BL CR for TS 38.455) SL Positioning and BW aggregation (CATT)
25. R3-240223 (TP to BL CR for TS 38.455) Support of Redcap Positioning (CATT)
26. R3-240332 (TP for TS 38.455 BL CR) Resolution of open issues for BW aggregation and RedCap UEs (Nokia, Nokia Shanghai Bell)
27. R3-240333 (TP for TS 38.473 BL CR) F1AP updates for NR positioning (Nokia, Nokia Shanghai Bell)
28. R3-240577 Support of RedCap Positioning (Ericsson)
29. R3-240542 (TP to 38.455 etc.) Discussion on Redcap positioning (Huawei)
30. R3-240519 [TP to 38.455 & 38.473] Bandwidth Aggregation (ZTE)
31. R3-240094 [TPs to BL CR for TS38.305, 38.455] Various Corrections to NR Positioning Enhancements (Qualcomm Incorporated)
32. R3-240902 (TP to BL 38.305) Support of LPHAP (Xiaomi, Ericsson, Samsung, Huawei, ZTE, Nokia, Nokia Shanghai Bell, CATT)
33. R3-240903 (TP to BL CR for TS 38.455) Support of LPHAP (CATT, Ericsson, Xiaomi, Nokia, Nokia Shanghai Bell, Huawei, ZTE, Samsung)
34. R3-240904 (TP to BL CR for TS 38.470) Support of LPHAP (Samsung, CATT, Ericsson, ZTE, Huawei, Nokia, Nokia Shanghai Bell, Xiaomi)
35. R3-240905 (TP to BL CR for TS 38.455) Support of RedCap Positioning (Nokia, Nokia Shanghai Bell, CATT, Ericsson, Huawei, Samsung, Xiaomi, ZTE)
36. R3-240906 (TP to BL CR for TS 38.473) Support of RedCap Positioning (Ericsson, Nokia, Nokia Shanghai Bell, Huawei, ZTE, CATT, Qualcomm Inc., Xiaomi, Samsung)
37. R3-240907 (TP to BL CR for TS 38.473) Support of BW Aggregation (ZTE, CATT, Huawei, Nokia, Nokia Shanghai Bell, Ericsson, Samsung, Xiaomi)
38. R3-240908 (TP to BL CR for TS 38.455) Support of CPP (Qualcomm Incorporated)
39. R3-240909 Summary of Positioning R18 offline discussion (CATT)
40. R3-240910 (TP to BL CR for TS 38.473) Support of LPHAP (Huawei)
41. R3-240911 (TP to BL CR for TS 38.413) Support of LPHAP (Nokia, Nokia Shanghai Bell, CATT, Ericsson, Huawei, Samsung, Xiaomi, ZTE)
42. R3-240912 (TP to BL CR for TS 38.455) Support of BW Aggregation (CATT, Ericsson, Xiaomi, Nokia, Nokia Shanghai Bell, Huawei, ZTE, Samsung)
43. R3-241161 (TP to BL CR for TS 38.473) Support of LPHAP (Huawei , Ericsson, CATT, Nokia, Nokia Shanghai Bell, Xiaomi, ZTE, Samsung)
44. R3-241162 (TP to BL CR for TS 38.455) Support of CPP (Qualcomm Incorporated, CATT, Huawei)

###### RAN4 #110

1. R4-2400044 Discussion on remaining UE RF issues for positioning CATT
2. R4-2400081 Discussion on Core requirements of RedCap UE positioning CATT
3. R4-2400082 (NR\_pos\_enh2-Core) CR on correction of measurement period requirements for RedCap UE with FH CATT
4. R4-2400083 Discussion on Core requirements of PRS SRS bandwidth aggregation CATT
5. R4-2400084 (NR\_pos\_enh2-Core) CR on correction of measurement period requirements with BWA CATT
6. R4-2400085 Discussion on Performance requirements of RedCap UE positioning CATT
7. R4-2400086 Discussion on Performance requirements of PRS SRS bandwidth aggregation CATT
8. R4-2400114 Discussion on core requirements maintenance for sidelink positioning CATT
9. R4-2400115 Discussion on core requirements maintenance for LPHAP CATT
10. R4-2400117 (NR\_pos\_enh2-Core) CR on core requirements for sidelink positioning CATT
11. R4-2400118 (NR\_pos\_enh2-Perf) CR on performance requirements for LPHAP CATT
12. R4-2400119 (NR\_pos\_enh2-Core) CR on core requirements for carrier phase positioning CATT
13. R4-2400120 Discussion on performance requirements for sidelink positioning CATT
14. R4-2400121 Discussion on performance requirements for LPHAP CATT
15. R4-2400122 Discussion on performance requirements for carrier phase positioning CATT
16. R4-2400199 Simulation results for PRSSRS BW aggregation CATT
17. R4-2400200 Simulation results for CPP measurement CATT
18. R4-2400753 Topic summary for [110][217] NR\_pos\_enh2\_part1 Moderator (Ericsson)
19. R4-2400754 Topic summary for [110][218] NR\_pos\_enh2\_part2 Moderator (CATT)
20. R4-2400755 Topic summary for [110][219] NR\_pos\_enh2\_part3 Moderator (Huawei)
21. R4-2401005 Discussion on SL positioning OPPO
22. R4-2401006 Discussion on LPHAP use case OPPO
23. R4-2401007 CR on carrier phase positioning OPPO
24. R4-2401047 (NR\_pos\_enh2-Perf) Discussion on performance requirements for sidelink positioning CMCC
25. R4-2401048 (NR\_pos\_enh2-Perf) Discussion on performance requirements for positioning with RedCap CMCC
26. R4-2401049 (NR\_pos\_enh2-Perf) Discussion on performance requirements for LPHAP CMCC
27. R4-2401050 (NR\_pos\_enh2-Perf) Discussion on performance requirements for CPP CMCC
28. R4-2401051 (NR\_pos\_enh2-Perf) Discussion on performance requirements for bandwidth aggregation for positioning CMCC
29. R4-2401052 (NR\_pos\_enh2-Core) Discussion on LPHA positioning CMCC
30. R4-2401053 (NR\_pos\_enh2-Core) Draft CR on UE transmit timing for positioning measurements CMCC
31. R4-2401087 Topic summary for [110][128] NR\_pos\_enh2\_UERF Moderator(CATT)
32. R4-2401198 Discussion on Bandwidth Aggregation for Positioning xiaomi
33. R4-2401199 Rel-18 RAN4 UE feature list for Rel18 Positioning WI xiaomi
34. R4-2401201 Draft CR # 16:PRS measurement requirements for RedCap positioning in RRC INACTIVE state (PRS RSRP measurement requirements) xiaomi
35. R4-2401220 On RRM core maintenance for SL positioning Qualcomm Incorporated
36. R4-2401221 On performance requirements for SL positioning Qualcomm Incorporated
37. R4-2401222 Additional simulation results for SL positioning Qualcomm Incorporated
38. R4-2401223 On RRM core requirements for LPHAP Qualcomm Incorporated
39. R4-2401224 On RRM core maintenance for RedCap positioning Qualcomm Incorporated
40. R4-2401225 On performance requirements for RedCap positioning Qualcomm Incorporated
41. R4-2401226 Simulation results for RedCap positioning with FH Qualcomm Incorporated
42. R4-2401227 On RRM core maintenance for PRS/SRS BW aggregation Qualcomm Incorporated
43. R4-2401228 Simulation results for PRS/SRS BW aggregation Qualcomm Incorporated
44. R4-2401229 On RRM core maintenance for carrier phase positioning Qualcomm Incorporated
45. R4-2401230 Correction to UE autonomous TA adjustment for positioning SRS transmission within the SRS validity area in RRC\_INACTIVE Qualcomm Incorporated
46. R4-2401231 Correction to CSSF for SSB when PRS measurements are configured for RedCap UE Qualcomm Incorporated
47. R4-2401232 Corrections to core requirements for Sidelink positioning Qualcomm Incorporated
48. R4-2401613 Discussion on remainaining issues for sidelink positioning requirements vivo
49. R4-2401614 (NR\_pos\_enh2-Core) Draft CR on core requirement for SL AoA and SL RTOA measurement requirements vivo
50. R4-2401615 Discussion on performance requirements for sidelink positioning vivo
51. R4-2401820 RRM aspects in the study on Redcap positioning ZTE Corporation
52. R4-2401824 Discussion on RRM impacts on PRS/SRS bandwidth aggregation ZTE Corporation
53. R4-2401869 General aspects for RRM core maintenance Nokia, Nokia Shanghai Bell
54. R4-2401870 RRM core maintenance for SL positioning Nokia, Nokia Shanghai Bell
55. R4-2401871 RRM core maintenance for PRS/SRS Bandwidth Aggregation Nokia, Nokia Shanghai Bell
56. R4-2401872 CR 38.133 Corrections to measurement period requirements for PRS BW aggregation Nokia, Nokia Shanghai Bell
57. R4-2401873 RRM core maintenance for NR Carrier Phase Positioning Nokia, Nokia Shanghai Bell
58. R4-2401874 Simulation results for PRS Bandwidth Aggregation Nokia, Nokia Shanghai Bell
59. R4-2401875 Simulation results for DL RSCPD Nokia, Nokia Shanghai Bell
60. R4-2402175 Discussion on RRM requirements for SL positioning Huawei, HiSilicon
61. R4-2402176 Updated simulation results for SL positioning Huawei, HiSilicon
62. R4-2402177 draftCR on RRM requirements for SL positioning Huawei, HiSilicon
63. R4-2402178 Discussion on RRM requirements for LPHAP Huawei, HiSilicon
64. R4-2402179 draftCR on RRM requirements for LPHAP Huawei, HiSilicon
65. R4-2402180 Discussion on RedCap positioning Huawei, HiSilicon
66. R4-2402181 draftCR on RRM requirements for RedCap positioning Huawei, HiSilicon
67. R4-2402182 Discussion on PRS/SRS Bandwidth Aggregation Huawei, HiSilicon
68. R4-2402183 draftCR on RRM requirements for PRS CA Huawei, HiSilicon
69. R4-2402184 Simulation results for Bandwidth Aggregation Huawei, HiSilicon
70. R4-2402185 Discussion on RRM requirements for CPP Huawei, HiSilicon
71. R4-2402186 draftCR on RRM requirements for CPP Huawei, HiSilicon
72. R4-2402187 On performance requirements for SL positioning Huawei, HiSilicon
73. R4-2402188 On performance requirements for LPHAP Huawei, HiSilicon
74. R4-2402189 On performance requirements for RedCap positioning Huawei, HiSilicon
75. R4-2402190 On performance requirements for SRS/SRS CA Huawei, HiSilicon
76. R4-2402191 On performance requirements for CPP Huawei, HiSilicon
77. R4-2402503 Response to LS on SRS and PRS bandwidth aggregation for positioning on guard Ericsson
78. R4-2402504 Draft CR to 38.101-1 for SRS aggregation for positioning Ericsson
79. R4-2402603 Positioning Error Due to Carrier Frequency Offset Lenovo
80. R4-2402676 DraftCR to 38.133 to implement measurement gap patterns for RedCap positioning Ericsson
81. R4-2402677 On remaining issues related to LPHAP core requirements Ericsson
82. R4-2402678 DraftCR to 38.133 Corrections to core requirements for LPHAP Ericsson
83. R4-2402679 On remaining issues related to RedCap positioning core requirement Ericsson
84. R4-2402680 DraftCR to 38.133 Corrections to core requirements for RedCap positioning Ericsson
85. R4-2402681 On remaining issues related to PRS/SRS aggregation core requirement for positioning measurements Ericsson
86. R4-2402682 DraftCR to 38.133 Corrections to core requirements for bandwidth aggregation based positioning measurements Ericsson
87. R4-2402683 On remaining issues related to carrier phase positioning core requirement Ericsson
88. R4-2402684 DraftCR to 38.133 Corrections to core requirements for carrier phase measurement for positioning Ericsson
89. R4-2402685 Work plan for RRM performance requirements for positioning enhancement Ericsson
90. R4-2402686 On LPHAP performance requirements Ericsson
91. R4-2402687 On performance requirement for RedCap positioning Ericsson
92. R4-2402688 Additional simulation results for RedCap positioning with FH in FR2 Ericsson
93. R4-2402689 Summary of simulation results for RedCap positioning Ericsson
94. R4-2402690 On performance requirement for positioning measurements based on bandwidth aggregation Ericsson
95. R4-2402691 Simulation results for PRS aggregation Ericsson
96. R4-2402692 DraftCR to 38.133 Update to measurement report mapping for positioning measurements Ericsson
97. R4-2402693 On performance requirement for carrier phase measurement based positioning Ericsson
98. R4-2402694 Additional simulation results for carrier phase measurement Ericsson
99. R4-2402732 RRM Core Requirements for LPHAP Nokia, Nokia Shanghai Bell
100. R4-2402733 RRM Performance Requirements for LPHAP Nokia, Nokia Shanghai Bell
101. R4-2402734 RRM Core Requirements for RedCap Positioning Nokia, Nokia Shanghai Bell
102. R4-2402735 RRM Performance Requirements for RedCap Positioning Nokia, Nokia Shanghai Bell
103. R4-2402736 Simulation Results for RedCap Positioning with Frequency Hopping Nokia, Nokia Shanghai Bell
104. R4-2402799 On remaining issues for SL positioning Ericsson
105. R4-2402800 Draft CR to 38.133: corrections for SL positioning Ericsson
106. R4-2402801 Big CR remaining issues for SL positioning Ericsson
107. R4-2402802 On SL positioning performance Ericsson
108. R4-2402803 Draft CR to 38.133: SL positioning performance requirements structure Ericsson
109. R4-2402813 RRM performance requirements for PRS/SRS Bandwidth Aggregation Nokia, Nokia Shanghai Bell
110. R4-2402902 Discussion on RedCap positioning maintenance MediaTek inc.
111. R4-2402903 Draft CR on correction for Rel-18 RSTD and PRS-RSRP requirements for RedCap in RRC connected state MediaTek inc.
112. R4-2402911 RRM performance requirements for NR Carrier Phase Positioning Nokia, Nokia Shanghai Bell
113. R4-2403259 Ad-hoc minutes #1 for NR positioning Intel
114. R4-2403260 Ad-hoc minutes #2 for NR positioning Ericsson
115. R4-2403266 DraftCR to 38.133 to implement measurement gap patterns for RedCap positioning Ericsson
116. R4-2403267 (NR\_pos\_enh2-Core) CR on core requirements for sidelink positioning CATT
117. R4-2403268 Corrections to core requirements for Sidelink positioning Qualcomm Incorporated
118. R4-2403269 (NR\_pos\_enh2-Core) Draft CR on core requirement for SL AoA and SL RTOA measurement requirements vivo
119. R4-2403270 draftCR on RRM requirements for SL positioning Huawei, HiSilicon
120. R4-2403271 Draft CR to 38.133: corrections for SL positioning Ericsson
121. R4-2403272 Big CR remaining issues for SL positioning Ericsson
122. R4-2403273 (NR\_pos\_enh2-Core) Draft CR on UE transmit timing for positioning measurements CMCC
123. R4-2403274 Correction to UE autonomous TA adjustment for positioning SRS transmission within the SRS validity area in RRC\_INACTIVE Qualcomm Incorporated
124. R4-2403275 draftCR on RRM requirements for LPHAP Huawei, HiSilicon
125. R4-2403276 DraftCR to 38.133 Corrections to core requirements for LPHAP Ericsson
126. R4-2403277 (NR\_pos\_enh2-Core) CR on correction of measurement period requirements for RedCap UE with FH CATT
127. R4-2403278 Draft CR # 16:PRS measurement requirements for RedCap positioning in RRC INACTIVE state (PRS RSRP measurement requirements) xiaomi
128. R4-2403279 Correction to CSSF for SSB when PRS measurements are configured for RedCap UE Qualcomm Incorporated
129. R4-2403280 draftCR on RRM requirements for RedCap positioning Huawei, HiSilicon
130. R4-2403281 DraftCR to 38.133 Corrections to core requirements for RedCap positioning Ericsson
131. R4-2403282 DraftCR to 38.133 Corrections to core requirements for RedCap positioning Ericsson
132. R4-2403283 Draft CR on correction for Rel-18 RSTD and PRS-RSRP requirements for RedCap in RRC connected state MediaTek inc.
133. R4-2403284 (NR\_pos\_enh2-Core) CR on correction of measurement period requirements with BWA CATT
134. R4-2403285 CR 38.133 Corrections to measurement period requirements for PRS BW aggregation Nokia, Nokia Shanghai Bell
135. R4-2403286 draftCR on RRM requirements for PRS CA Huawei, HiSilicon
136. R4-2403287 DraftCR to 38.133 Corrections to core requirements for bandwidth aggregation based positioning measurements Ericsson
137. R4-2403288 (NR\_pos\_enh2-Core) CR on core requirements for carrier phase positioning CATT
138. R4-2403289 CR on carrier phase positioning OPPO
139. R4-2403290 draftCR on RRM requirements for CPP Huawei, HiSilicon
140. R4-2403291 DraftCR to 38.133 Corrections to core requirements for carrier phase measurement for positioning Ericsson
141. R4-2403292 Draft CR to 38.133: SL positioning performance requirements structure Ericsson
142. R4-2403293 (NR\_pos\_enh2-Perf) CR on performance requirements for LPHAP CATT
143. R4-2403294 DraftCR to 38.133 Update to measurement report mapping for positioning measurements Ericsson
144. R4-2403363 Updates on measurement report mapping for Positioning Enhancements WI Huawei, HiSilicon
145. R4-2403368 WF on R18 NR positioning - SL positioning and Carrier Phase Positioning CATT
146. R4-2403369 Updated summary of the simulation results for CPP CATT
147. R4-2403370 Updated summary of the simulation results for SL positioning CATT
148. R4-2403384 Ad-hoc minutes #3 for NR positioning Ericsson
149. R4-2403471 Updated simulation assumptions for RedCap Positioning with Rx FH Ericsson
150. R4-2403475 WF on R18 NR positioning – LPHAP Huawei, HiSilicon
151. R4-2403480 WF on R18 NR positioning – RedCap positioning and bandwidth aggregation for positioning measurements Ericsson
152. R4-2403489 LS on SRS BW aggregation impact on other channels/signals Huawei, HiSilicon
153. R4-2403529 WF on R18 NR positioning – RedCap positioning and bandwidth aggregation for positioning measurements Ericsson
154. R4-2403546 DraftCR to 38.133 Corrections to core requirements for bandwidth aggregation based positioning measurements Ericsson
155. R4-2403561 Correction to CSSF for SSB when PRS measurements are configured for RedCap UE Qualcomm Incorporated
156. R4-2403562 (NR\_pos\_enh2-Core) Draft CR on core requirement for SL AoA and SL RTOA measurement requirements vivo
157. R4-2403654 LS on SRS and PRS bandwidth aggregation feature for positioning Ericsson
158. R4-2403655 Draft CR to 38.101-1 for SRS aggregation for positioning Ericsson
159. R4-2403656 WF on UE RF for NR positioning enhancements CATT
160. R4-2403858 Big CR for to 38.101-1 for SRS aggregation for positioning Ericsson

 10.01.2022 minor adaptations for RAN #95e

 04.10.2021 minor adaptations for RAN #94e

 08.08.2021 minor adaptations for RAN #93e

 17.05.2021 minor adaptations for RAN #92e

 28.01.2021 minor adaptations for RAN #91e

 09.11.2020 minor adaptations for RAN #90e

 31.08.2020 minor adaptations for RAN #89e

 20.04.2020 minor adaptations for RAN #88e

 18.02.2020 minor adaptations for RAN #87e

 14.11.2019 minor adaptations for RAN #86

 18.08.2019 minor adaptations for RAN #85

 12.05.2019 minor adaptations for RAN #84

 27.02.2019 minor adaptations for RAN #83

 21.11.2018 completion levels with colours added (for RAN #82)

v04.81 31.07.2018 simplification of template and addition of cross-TSG aspects (for RAN #81)

v04.80 21.05.2018 minor adaptations for RAN #80

v04.79 26.02.2018 minor adaptations for RAN #79

v04.78 18.11.2017 minor adaptations for RAN #78

v04.77 06.08.2017 minor adaptations for RAN #77

v04.76 15.05.2017 minor adaptations for RAN #76

v04.75 31.01.2017 minor adaptations for RAN #75

v04.74 28.10.2016 minor adaptations for RAN #74

v04.73 01.09.2016 adaptations for RAN #73 (time units in extra Excel table, RAN6 reporting included)

v04.72 26.05.2016 adaptations for RAN #72 (introduction of NR & GERAN TUs)

v04.71 10.02.2016 minor adaptations for RAN #71

v04.70 30.10.2015 minor adaptations for RAN #70

v04.69 12.08.2015 minor adaptations for RAN #69

v04.68 21.05.2015 minor adaptations for RAN #68

v04.67 01.02.2015 minor adaptations for RAN #67

v04.66 16.11.2014 minor adaptations for RAN #66

v04.65 16.08.2014 minor adaptations for RAN #65

v04.64 22.05.2014 minor adaptations for RAN #64

v04.63 24.01.2014 restructuring for RAN #63 to cover Core & Perf. in one doc file

v03.62 11.11.2013 section 1.2.3 adapted for RAN #62

v03 11.08.2013 section 1.2.3 added on time budget

v02 07.05.2010 history added, some spelling corrections

v01 13.11.2009 First version of the template