**3GPP TSG-RAN WG1 Meeting #118** ***R1-24xxxxx***

**Maastricht, Netherlands, August 19th – 23rd, 2024**

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| *CR-Form-v12.3* |
| **Draft CHANGE REQUEST** |
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|  | **38.214** | **CR** |  | **rev** |  | **Current version:** | **18.3.0** |  |
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| *For* [***HELP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Editorial corrections to TS 38.214 for Rel-18 Positioning |
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| ***Source to WG:*** | Moderator (Intel Corporation) |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_pos\_enh2-Core |  | ***Date:*** | 2024-08-20 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)Rel-20 (Release 20)* |
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| ***Reason for change:*** | Clause 5.1.6.5.2:* According to the latest TS 37.355, nr-PRU-RSCP-MeasInfo, which only contains DL RSCP measurement, does not include the RSTD measurement. Thus, it doesn’t match the current description “which contains DL RSCP/RSCPD measurements together with DL RSTD, DL PRS-RSRP, and/or DL PRS-RSRPP measurement(s)”. A similar problem occurs with parameter ‘nr-PRU-DL-TDOA-MeasInfo’.

Clauses 5.1.6.5.3 and 6.2.1.4:* For bandwidth aggregation, the linked DL PRS resource sets are expected to share the same configuration on some parameters, the mentioned parameters are not described in the same format, i.e., some of them apply the IE name, while others apply the definition. The parameters description should be aligned.

Clause 6.2.1.4.1:* *SRS-PeriodicityAndOffset* can only represent the starting slot offset for periodic and semi-persistent SRS of the first hop. *slotOffset* for aperiodic SRS should also be added.
* The parameter names *SRS-PeriodicityAndOffset* and *slotOffset* can be shared by both the first hop and remaining hops, it is necessary to distinguish them by *resourceType* in the first hop and *SlotOffsetForRemainingHops* for remaining hops.

Clause 8.1:* In clause 8.1 of TS 38.214, there are brackets for the name of the field *Embedded SCI format payload.* Since the field name of *Embedded SCI format payload* in SCI format 2-D has been confirmed in TS 38.212 v18.3.0 as follows, the brackets should be removed.

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| TS 38.212 v18.3.08.4.1.4 SCI format 2-D**<<<** UNRELATED PARTS OMITTED**>>>****Embedded SCI format payload** - number of bits determined according to Table 8.4.1.4-1. This field is set to the associated payload of the embedded SCI format indicated by the ‘Embedded SCI format’ field as defined in Table 8.4.1.4-1.**<<<** UNRELATED PARTS OMITTED**>>>** |

Clause 8.2.4.2:* In clause 8.2.4.2 of TS 38.214, the names of several higher layer parameters for SL PRS resource selection in a dedicated SL PRS resource pool are pending confirmation and currently, they do not align with those in TS 38.331. And the description on the parameter *sl-SelectionWindowListDedicatedSL-PRS-RP* is also pending confirmation.
* In SL PRS resource allocation mode 2, the sensing unit is a candidate SL PRS resource, but currently in TS 38.214, the definition of candidate SL PRS resource is wrongly written as candidate “single slot resource”, wherein the candidate single slot resource is only used for SL data.

Clause 8.4.4:* The parameter description of SL-TimeStamp for DFN is not aligned with that of SFN. The number and names of parameters for SL AOA as well as its uncertainty are not correct.
* The parameter names for sidelink time stamps, ARP location info are not aligned with TS 38.331.
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| ***Summary of change:*** | Clause 5.1.6.5.2:* Replace current higher layer parameters with *NR-PRU-DL-Info* which includes *nr-PRU-RSCP-MeasInfo* and *nr-PRU-DL-TDOA-MeasInfo*.
* Add a comma after “and/or DL PRS-RSRPP measurement(s) associated with the RSCP/RSCPD measurements performed by a positioning reference unit (PRU) [20, TS 38.305]”.

Clause 5.1.6.5.3 and 6.2.1.4:* Correct the description for the parameters that share the same values in the linked DL PRS resource sets.

Clause 6.2.1.4.1:* Distinguish the separate periodicity and offset for the first hop and the remaining hops.

Clause 8.1:* Remove the brackets for the name of field *Embedded SCI format payload*.

Clause 8.2.4.2:* Align the names of the affected higher layer parameters for SL PRS resource selection in a dedicated SL PRS resource pool to those in TS 38.331.
* Confirm the description for the parameter *sl-SelectionWindowListDedicatedSL-PRS-RP* by removing brackets.
* Editorial: correct “mse” to “msec”.
* Correct the description for UE procedure in SL PRS resource allocation mode 2.

Clause 8.4.4:* Correct the description of time stamp and parameters for SL AOA.
* Align parameter names for timestamps and ARP location info as in TS 38.331.
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| ***Consequences if not approved:*** | Specification is incomplete or incorrect. |
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| ***Clauses affected:*** | 5.1.6.5.2, 5.1.6.5.3, 6.2.1.4.1, 6.2.1.4.2, 8.1, 8.2.4.2, 8.4.4 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

##### 5.1.6.5.2 PRS for carrier phase positioning

**<Unchanged text omitted>**

The UE may be provided with *NR-PRU-DL-Info* which contains DL RSCP/RSCPD measurements together with DL RSTD, DL PRS-RSRP, and/or DL PRS-RSRPP measurement(s) associated with the RSCP/RSCPD measurements performed by a positioning reference unit (PRU) [20, TS 38.305], the timestamps associated with the measurements, and the location information of the PRU.

**<Unchanged text omitted>**

5.1.6.5.3 PRS bandwidth aggregation for positioning measurements

When the UE is expected to perform aggregated measurements for bandwidth aggregation across DL PRS positioning frequency layers, the UE expects to be configured with linkage information, via higher layer parameter *nr-DL-PRS-AggregationInfo*, between DL PRS resource sets across DL PRS positioning frequency layers. For the linked DL PRS resource sets, the UE is expected to be configured with the same values of *dl-PRS-QCL-Info*, *dl-PRS-Periodicity-and-ResourceSetSlotOffset, dl-PRS-NumSymbols*,*dl-PRS-ResourceTimeGap, dl-PRS-ResourceRepetitionFactor, dl-PRS-ResourceSymbolOffset,* *dl-PRS-MutingBitRepetitionFactor,* *dl-PRS-SubcarrierSpacing, dl-PRS-CyclicPrefix*, *dl-PRS-CombSizeN*, *dl-PRS-ResourcePower*, *NR-MutingPattern*, and *NR-DL-PRS-SFN0-Offset,* and the UE is expected to be configured with DL PRS resources that maintain uniformly spaced DL PRS RE pattern within a symbol across aggregated DL PRS positioning frequency layers. The UE assumes that DL PRS resources across the linked DL PRS resource sets which satisfy the above conditions are linked for bandwidth aggregation, and the UE may assume phase continuity on the DL PRS resources on same symbol(s); otherwise, the UE does not assume that PRS resources from the linked DL PRS resource sets are linked for bandwidth aggregation.

**<Unchanged text omitted>**

6.2.1.4.1 SRS frequency hopping for positioning

The reduced capability UE may be configured via *SRS-PosTx-Hopping*, subject to UE capability, to perform transmit frequency hopping separate from the UL BWP configuration and outside of the UL BWP, where the UE may be configured with subcarrier spacing, CP and bandwidth that are different from the UL active BWP. The reduced capability UE transmit frequency hopping is configured within one SRS resource for positioning, that may be configured with a bandwidth larger than the maximum bandwidth of the reduced capability UE, in RRC\_CONNECTED or RRC\_INACTIVE mode. The reduced capability UE transmit frequency hopping, may be configured with overlapping or non-overlapping frequency hops in the frequency domain. When the reduced capability UE is configured to perform transmit frequency hopping:

- it expects to be configured with the following parameters:

- starting PRB of the first hop in time domain in *freqDomainShift*

- starting slot offset for the first hop in *SRS-PeriodicityAndOffset* for periodic and semi-persistent SRS and *slotOffset* for aperiodic SRS, starting slot offset for each hop following the first hop in *SlotOffsetForRemainingHops*, and starting symbol for each hop in *startPosition*

- number of symbols in each hop in *nrofSymbols*

- hop bandwidth in *c-SRS*

- number of overlapping resource block(s) between hops, if present, in *overlapValue*

- number of hops in *numberOfHops*.

- it does not expect to be configured with the sum of *startPosition* and *nrofSymbol*s for a hop that exceeds a slot duration.

- it expects to be configured with the same periodicity of each hop of an SRS resource with the transmit frequency hopping.

**<Unchanged text omitted>**

##### 6.2.1.4.2 SRS bandwidth aggregation for positioning measurements

The UE is expected to be configured with linkage information *SRS-PosResourceSetLinkedForAggBWList* on SRS resource sets for positioning across two or three CCs which are linked for bandwidth aggregation. For the linked SRS resource sets, the UE is expected to be configured with the same values of *startPosition, nrofSymbols,* *periodicityAndOffset, slotOffset, alpha, p0,* *spatialRelationInfoPos, resourceType*, s*ubcarrierSpacing*, c*yclicPrefix*, and *transmissionComb*, and the UE is expected to maintain phase continuity for the SRS transmission on the same symbol(s). The UE assumes that SRS resources across the linked SRS resource sets which satisfy the above conditions are linked for bandwidth aggregation, otherwise, the UE does not assume that SRS resources of the linked SRS resource sets are linked for bandwidth aggregation.

**<Unchanged text omitted>**

## 8.1 UE procedure for transmitting the physical sidelink shared channel

**<Unchanged text omitted>**

The UE shall set the contents of the SCI format 2-D as follows:

- the UE shall set value of the *'SL PRS resource ID'* field as indicated by higher layers.

- the UE shall set value of the *'SL PRS request'* field as indicated by higher layers.

- the UE shall set value of the *'Embedded SCI format'* field as indicated by higher layers.

- if *'Embedded SCI format'* indicates that SCI format 2-A is embedded within this SCI format 2-D then the UE shall include in the *'Embedded SCI format payload'* field the fields of SCI format 2-A, set as specified above.

- if *'Embedded SCI format'* indicates that SCI format 2-B is embedded within this SCI format 2-D then the UE shall include in the *'Embedded SCI format payload'* field the fields of SCI format 2-B, set as specified above.

**<Unchanged text omitted>**

### 8.2.4 SL PRS transmission procedure

The following parameters for SL PRS transmission are associated with each SL PRS resource:

- SL PRS resource ID provided by *sl-PRS-ResourceID* indicates an identity of a SL PRS resource. The SL PRS resource is identified by the SL PRS resource ID that is unique within a slot of a dedicated SL PRS resource pool. For a shared SL PRS resource pool, a SL PRS resource is uniquely identified by a combination of the SL PRS resource ID, SL PRS frequency domain allocation within a slot indicated by “frequency resource assignment” field in the associated SCI format 1-A, and a starting symbol within the slot as determined by clause 8.2.4.1.1.

- *sl-CombSize* and *sl-PRS-comb-offset* indicates a comb offset and a comb size of the SL PRS resource in a dedicated SL PRS resource pool. *sl-PRS-CombSizeN-AndReOffset* indicates a comb offset and a comb size of the SL PRS resource in a shared SL PRS resource pool.

- *sl-PRS-starting-symbol* and *sl-NumberOfSymbols* indicates the starting symbol index and the number of symbols of the SL PRS resource within a slot in a dedicated SL PRS resource pool. *mNumberOfSymbols* indicates the number of symbols of the SL PRS resource within a slot in a shared SL PRS resource pool.

**<Unchanged text omitted>**

#### 8.2.4.2 UE procedure for determining the subset of resources to be reported to higher layers in SL PRS resource selection in a dedicated SL PRS resource pool in sidelink resource allocation mode 2

In resource allocation mode 2 in a dedicated SL PRS resource pool, the higher layer can request the UE to determine a subset of resources from which the higher layer will select resources for SL PRS/PSCCH transmission. To trigger this procedure, in slot *n,* the higher layer provides the following parameters for this SL PRS/PSCCH transmission:

- the resource pool from which the resources are to be reported;

- L1 priority, $prio\_{TX}$;

- the remaining SL PRS delay budget;

- Set of SL-PRS resource ID(s);

- optionally, the resource reservation interval, $P\_{rsvp\\_TX}$, in units of msec.

- if the higher layer requests the UE to determine a subset of resources from which the higher layer will select resources for SL PRS/PSCCH transmission as part of re-evaluation or pre-emption procedure, the higher layer provides a set of resources $(r\_{0},r\_{1},r\_{2},…) $which may be subject to re-evaluation and a set of resources $(r\_{0}^{'},r\_{1}^{'},r\_{2}^{'},…) $which may be subject to pre-emption.

- it is up to UE implementation to determine the subset of resources as requested by higher layers before or after the slot $r\_{i}^{''}$ - $T\_{3}$, where $r\_{i}^{''}$ is the slot with the smallest slot index among $(r\_{0},r\_{1},r\_{2},…) $and $(r\_{0}^{'},r\_{1}^{'},r\_{2}^{'},…) $, and $T\_{3}$ is equal to $T\_{proc,1}^{SL}$, where$T\_{proc,1}^{SL} $is defined in slots in Table 8.1.4-2 where$μ\_{SL}$is the SCS configuration of the SL BWP.

The following higher layer parameters affect this procedure:

*- sl-SelectionWindowListDedicatedSL-PRS-RP*:internal parameter $T\_{2min}$ is set to the corresponding value from higher layer parameter *sl-SelectionWindowListDedicatedSL-PRS-RP* for the given value of $prio\_{TX}$.

*- sl-Thres-RSRP-ListDedicatedSL-PRS-RP*: this higher layer parameter provides an RSRP threshold for each combination $\left(p\_{i}, p\_{j}\right)$, where $p\_{i}$ is the value of the priority field in a received SCI format 1-B and $p\_{j}$ is the priority of the transmission of the UE selecting resources; for a given invocation of this procedure, $p\_{j} = prio\_{TX}$.

*- sl-PRS-ResourceReservePeriodList:* the resource reservation interval, $P\_{rsvp\\_TX}$, is set to the corresponding value from higher layer parameter in units of msec

*- sl-SensingWindowDedicatedSL-PRS-RP*: internal parameter $T\_{0}$ is defined as the number of slots corresponding to *sl-SensingWindowDedicatedSL-PRS-RP* msec

*- sl-TxPercentageDedicatedSL-PRS-RP-List*: internal parameter $X$ for a given $prio\_{TX}$ is defined as *sl-TxPercentageDedicatedSL-PRS-RP-List (*$prio\_{TX}$*)* converted from percentage to ratio

- *sl-PreemptionEnableDedicatedSL-PRS-RP*: if *sl-PreemptionEnableDedicatedSL-PRS-RP* is provided, and if it is not equal to 'enabled', internal parameter $prio\_{pre}$ is set to the higher layer provided parameter *sl-PreemptionEnableDedicatedSL-PRS-RP.*

The UE shall perform this procedure according to clause 8.1.4, with the following modifications:

- "packet delay budget" is replaced by "SL PRS delay budget",

- partial sensing is not applicable in a dedicated SL PRS resource pool,

- "candidate single-slot resource" is replaced by "candidate SL PRS resource",

- a candidate SL PRS resourcefor transmission $R\_{x,y}$ is defined as the SL PRS resource with index $x$ within the Set of SL-PRS resource ID(s) provided by the higher layer and in slot $t'\_{y}^{SL}$,

- "SCI format 1-A" is replaced by "SCI format 1-B",

- in step 5, the second condition is modified as follows: for any periodicity value allowed by the higher layer parameter *sl-PRS-ResourceReservePeriodList* and any SL PRS resource ID in the set of SL PRS resource ID(s) provided by the higher layer, and a hypothetical SCI format 1-B received in slot $t'\_{m}^{SL}$ with '*Resource reservation period*' field set to that periodicity value and indicating that SL-PRS resource ID, condition c in step 6 would be met,

- In condition b of step 6, the RSRP measurement is the PSCCH-RSRP over the DM-RS resource elements of the PSCCH;

- In condition c of step 6 "determines according to clause 8.1.5 the set of resource blocks and slots" is replaced by "determines according to clause 8.2.4.2A the set of SL PRS resources and slots ".

**<Unchanged text omitted>**

### 8.4.4 SL PRS reception procedure

The UE may be configured to measure and report one or more of the SL RSTD, SL Rx-Tx time difference, SL RTOA, SL PRS-RSRPP, for the first detected path and up to 8 additional detected paths, and SL PRS-RSRP measurements. The UE may be configured to measure and report one or more of the SL AoA, SL PRS-RSRPP for the first path and up to 2 additional detected paths, and SL PRS-RSRP measurement.

The UE may report an ARP ID associated with the reported measurements. The UE may provide the ARP location information via *ARP-LocationInfo*.

The UE uses the same ARP for both the transmission and reception of sidelink positioning reference signals while performing a SL Rx-Tx time difference measurement.

The UE may include SL PRS resource ID(s) when it reports one or more of the SL RSTD, SL Rx-Tx time difference, SL RTOA, SL AoA, SL PRS-RSRP, and SL PRS-RSRPP measurements.

For the SL RSTD, SL Rx-Tx time difference, SL RTOA, SL AoA, SL PRS-RSRP, and SL PRS-RSRPP measurements, the UE reports an associated SL PRS reception timestamp via higher layer parameter *sl-TimeStamp*. For SL Rx-Tx time difference, the UE may report an associated SL PRS transmission timestamp via higher layer parameter *tx-TimeInfo* and the UE may be configured to report a SL PRS transmission timestamp via *associatedSL-PRS-TxTimeStampRequest*. The timestamp includes the SFN, slot number, and optionally *nr-PhysCellID*, *nr-ARFCN*, *nr-CellGlobalID*, or the timestamp includes DFN, slot number, and optionally *syncSourceType*.

The UE may be configured to report up to N Rx-Tx time difference measurements for the same SL PRS transmission associated with N different SL PRS receptions for the same pair of UE(s). The UE may be configured to report up to N Rx-Tx time difference measurements for the same SL PRS reception associated with N different SL PRS transmissions for the same pair of UE(s).

The UE may report, LoS/NLoS indicator(s) via *los-NLOS-Indicator* associated with each SL RSTD, SL Rx-Tx time difference, SL RTOA, SL AoA, SL PRS-RSRP, and SL PRS-RSRPP measurements.

The UE may report synchronization source type via *syncSourceType* and/or relative time difference with the associated quality metric, via *sl-RTD-Info*. If reported *syncSourceType* is *gNB-eNB*, the UE may report cell identity information.

The UE may be provided with synchronization source type of a UE and/or the relative time difference with the associated quality metric, via *syncSourceType* and *sl-RTD-Info, respectively*.

For the SL RSTD measurement, the UE may report a reference UE information.

For SL RTOA measurement, SFN or DFN initialization time may be provided to the UE by a UE or the network.

The UE may be provided with the location information of other UEs via *anchorUE-LocationInformation*. The UE may report the location information of the UE to the network.

The UE may be provided with expected SL AoA and uncertainty range of the expected SL AoA via *expectedSL-AzimuthAoA, expectedSL-ElevationAoA, expectedSL-AzimuthAoA-Uncertainty*.

The UE may report quality metric *sl-TimingQuality* corresponding to the SL RSTD, SL RTOA or SL Rx-Tx time difference measurements. The UE may report quality metric *sl-AngleQuality* corresponding to the SL AoA measurement.

**<Unchanged text omitted>**