**3GPP TSG-RAN WG2 Meeting # 127 *R2-240xxxx***

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **37.355** | **CR** | **0512** | **rev** | **1** | **Current version:** | **18.2.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Miscellaneous corrections to LPP specification | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | CATT | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***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 can be 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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. The IE names don't align with the names defined in asn.1.  2. The description of *nr-MeanTRP-FaultDuration* is not clear enough.  3. ‘Local Cartesian coordinates’ is used in this specification, instead of ‘Relative Cartesian coordinates’.    4. Some editorial issues are spotted and clean-up of the ASN.1 text alignment of IE *NR-UL-SRS-Capability* to enhance readability.  5. Corrections agreed at RAN2#127, including:  The field description for *onDemandDL-PRS-AggregationList* is not accurate as it does not clearly convey that it is actually a list of DL-PRS bandwidth aggregation information.  The field descriptions for *dl-PRS-AggregationID-PrefList* and *nr-OnDemandDL-PRS-AggregationReqList* are difficult to comprehend and the difference between the use of the two fields in *NR-On-Demand-DL-PRS-Request* is not very clear. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Updates of the IE names which align with the names defined in asn.1.  2. Update of description of *nr-MeanTRP-FaultDuration*.  3. Update of Local Cartesian coordinates  4. Editorial updates including the agreed updates in R2-2407149.  5. Corrections agreed in RAN2#127, including:  Corrected the field description for *onDemandDL-PRS-AggregationList*.  Clarified the field descriptions for *dl-PRS-AggregationID-PrefList* and *nr-OnDemandDL-PRS-AggregationReqList* and brought out the difference in the list contents for the two fields.  **Impact analysis:**  Impacted 5G architecture options:  SA, NSA  Impacted functionality:  Positioning  Inter-operability:  1. If the UE is implemented according to this CR but the network is not,  there is no inter-operability issue foreseen.  2. If the network is implemented according to this CR but the UE is not there is no inter-operability issue foreseen. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Wrong UE behaviours are specified, which may cuase some confusions. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6 6.4.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Revision of R2-2406950 | | | | | | | | |

*START OF CHANGE*

### 6.4.3 Common NR Positioning Information Elements

#### – *NR-DL-PRS-AssistanceData*

The IE *NR-DL-PRS-AssistanceData* is used by the location server to provide DL-PRS assistance data.

NOTE 1: The location server should include at least one TRP for which the SFN can be obtained by the target device, e.g. the serving TRP.

NOTE 2: The *nr-DL-PRS-ReferenceInfo* defines the "assistance data reference" TRP whose DL-PRS configuration is included in *nr-DL-PRS-AssistanceDataList*. The *nr-DL-PRS-SFN0-Offset's* and *nr-DL-PRS-expectedRSTD's* in *nr-DL-PRS-AssistanceDataList* are provided relative to the "assistance data reference" TRP.

NOTE 3: The network signals a value of zero for the *nr-DL-PRS-SFN0-Offset*, *nr-DL-PRS-expectedRSTD*, and *nr-DL-PRS-expectedRSTD-uncertainty* of the "assistance data reference" TRP in *nr-DL-PRS-AssistanceDataList*.

NOTE 4: For NR DL-TDOA positioning (see clause 6.5.10) the *nr-DL-PRS-ReferenceInfo* defines also the requested "RSTD reference".

For DL-PRS processing, the LPP layer may inform lower layers to start performing DL-PRS measurements and provide to lower layers the information about the location of DL-PRS, e.g. DL-PRS-PointA, DL-PRS Positioning occasion information.

-- ASN1START

NR-DL-PRS-AssistanceData-r16 ::= SEQUENCE {

nr-DL-PRS-ReferenceInfo-r16 DL-PRS-ID-Info-r16,

nr-DL-PRS-AssistanceDataList-r16 SEQUENCE (SIZE (1..nrMaxFreqLayers-r16)) OF

NR-DL-PRS-AssistanceDataPerFreq-r16,

nr-SSB-Config-r16 SEQUENCE (SIZE (1..nrMaxTRPs-r16)) OF

NR-SSB-Config-r16 OPTIONAL, -- Need ON

...,

[[

nr-DL-PRS-AggregationInfo-r18 NR-DL-PRS-AggregationInfo-r18 OPTIONAL -- Need ON

]]

}

NR-DL-PRS-AssistanceDataPerFreq-r16 ::= SEQUENCE {

nr-DL-PRS-PositioningFrequencyLayer-r16

NR-DL-PRS-PositioningFrequencyLayer-r16,

nr-DL-PRS-AssistanceDataPerFreq-r16 SEQUENCE (SIZE (1..nrMaxTRPsPerFreq-r16)) OF

NR-DL-PRS-AssistanceDataPerTRP-r16,

...

}

NR-DL-PRS-AssistanceDataPerTRP-r16 ::= SEQUENCE {

dl-PRS-ID-r16 INTEGER (0..255),

nr-PhysCellID-r16 NR-PhysCellID-r16 OPTIONAL, -- Need ON

nr-CellGlobalID-r16 NCGI-r15 OPTIONAL, -- Need ON

nr-ARFCN-r16 ARFCN-ValueNR-r15 OPTIONAL, -- Need ON

nr-DL-PRS-SFN0-Offset-r16 NR-DL-PRS-SFN0-Offset-r16,

nr-DL-PRS-ExpectedRSTD-r16 INTEGER (-3841..3841),

nr-DL-PRS-ExpectedRSTD-Uncertainty-r16

INTEGER (0..246),

nr-DL-PRS-Info-r16 NR-DL-PRS-Info-r16,

...,

[[

prs-OnlyTP-r16 ENUMERATED { true } OPTIONAL -- Need ON

]],

[[

nr-DL-PRS-ExpectedAoD-or-AoA-r17

NR-DL-PRS-ExpectedAoD-or-AoA-r17 OPTIONAL -- Need ON

]]

}

NR-DL-PRS-PositioningFrequencyLayer-r16 ::= SEQUENCE {

dl-PRS-SubcarrierSpacing-r16 ENUMERATED {kHz15, kHz30, kHz60, kHz120, ...},

dl-PRS-ResourceBandwidth-r16 INTEGER (1..63),

dl-PRS-StartPRB-r16 INTEGER (0..2176),

dl-PRS-PointA-r16 ARFCN-ValueNR-r15,

dl-PRS-CombSizeN-r16 ENUMERATED {n2, n4, n6, n12, ...},

dl-PRS-CyclicPrefix-r16 ENUMERATED {normal, extended, ...},

...

}

NR-DL-PRS-SFN0-Offset-r16 ::= SEQUENCE {

sfn-Offset-r16 INTEGER (0..1023),

integerSubframeOffset-r16 INTEGER (0..9),

...

}

NR-DL-PRS-ExpectedAoD-or-AoA-r17 ::= CHOICE {

expectedAoD-r17 SEQUENCE {

expectedDL-AzimuthAoD-r17 INTEGER (0..359),

expectedDL-AzimuthAoD-Unc-r17 INTEGER (0..60) OPTIONAL, -- Need OP

expectedDL-ZenithAoD-r17 INTEGER (0..180),

expectedDL-ZenithAoD-Unc-r17 INTEGER (0..30) OPTIONAL -- Need OP

},

expectedAoA-r17 SEQUENCE {

expectedDL-AzimuthAoA-r17 INTEGER (0..359),

expectedDL-AzimuthAoA-Unc-r17 INTEGER (0..60) OPTIONAL, -- Need OP

expectedDL-ZenithAoA-r17 INTEGER (0..180),

expectedDL-ZenithAoA-Unc-r17 INTEGER (0..30) OPTIONAL -- Need OP

}

}

NR-DL-PRS-AggregationInfo-r18 ::= SEQUENCE (SIZE (1..nrMaxNumPRS-BandWidthAggregation-r18)) OF

NR-linkedDL-PRS-ResourceSetID-PRS-AggregationList-r18

NR-linkedDL-PRS-ResourceSetID-PRS-AggregationList-r18 ::= SEQUENCE (SIZE (2..3)) OF

NR-DL-PRS-AggregationElement-r18

NR-DL-PRS-AggregationElement-r18 ::= SEQUENCE {

nr-DL-PRS-FrequencyLayerIndex-r18 INTEGER (0..nrMaxFreqLayers-1-r16),

nr-DL-PRS-TRP-Index-r18 INTEGER (0..nrMaxTRPsPerFreq-1-r16),

nr-DL-PRS-ResourceSetIndex-r18 INTEGER (0..nrMaxSetsPerTrpPerFreqLayer-1-r16)

}

-- ASN1STOP

|  |
| --- |
| *NR-DL-PRS-AssistanceData* field descriptions |
| ***nr-DL-PRS-ReferenceInfo***  This field specifies the IDs of the assistance data reference TRP. |
| ***nr-DL-PRS-AssistanceDataList***  This field specifies the DL-PRS Resources for each frequency layer. |
| ***nr-SSB-Config***  This field specifies the SSB configuration of the TRPs. |
| ***nr-DL-PRS-AggregationInfo***  This field specifies the DL-PRS Resource Sets across DL-PRS Positioning Frequency Layers available for DL-PRS bandwidth aggregation. The 2 or 3 DL-PRS Resource Sets indicated by IE  *NR-linkedDL-PRS-ResourceSetID-PRS-AggregationList* is linked for bandwidth aggregation.  - ***nr-DL-PRS-FrequencyLayerIndex***: This field indicates the frequency layer provided in *nr-DL-PRS-AssistanceDataList*. Value 0 corresponds to the first frequency layer provided in *nr-DL-PRS-AssistanceDataList*, value 1 to the second frequency layer in *nr-DL-PRS-AssistanceDataList*, and so on.  - ***nr-DL-PRS-TRP-Index***: This field indicates the TRP/DL-PRS ID used for bandwidth aggregation belonging to the *nr-DL-PRS-FrequencyLayerIndex*. Value 0 corresponds to the first TRP/DL-PRS ID provided in *nr-DL-PRS-AssistanceDataPerFreq*, value 1 to the second TRP/DL-PRS ID in *nr-DL-PRS-AssistanceDataPerFreq*, and so on.  - ***nr-DL-PRS-ResourceSetIndex***: This field indicates the DL-PRS Resource Set ID used for bandwidth aggregation belonging to *nr-DL-PRS-TRP-Index*. Value 0 corresponds to the first DL-PRS Resource Set provided in *nr-DL-PRS-ResourceSetList*, value 1 to the second DL-PRS Resource Set in *nr-DL-PRS-ResourceSetList.*  NOTE: The linked DL-PRS Resource Sets from two or three Positioning Frequency Layers in a *NR-linkedDL-PRS-ResourceSetID-PRS-AggregationList* are from the same TRP. |
| ***nr-DL-PRS-PositioningFrequencyLayer***  This field specifies the Positioning Frequency Layer for the *nr-DL-PRS-AssistanceDataPerFreq* field. |
| ***nr-DL-PRS-AssistanceDataPerFreq***  This field specifies the DL-PRS Resources for the TRPs within the Positioning Frequency Layer. |
| ***dl-PRS-ID***  This field is used along with a DL-PRS Resource Set ID and a DL-PRS Resource ID to uniquely identify a DL-PRS Resource, and is associated with a single TRP. |
| ***nr-PhysCellID***  This field specifies the physical cell identity of the TRP. When the field *prs-OnlyTP* is included, this field is not included. |
| ***nr-CellGlobalID***  This field specifies the NCGI, the globally unique identity of a cell in NR, as defined in TS 38.331 [35]. When the field *prs-OnlyTP* is included, this field is not included. |
| ***nr-ARFCN***  This field specifies the NR-ARFCN of the TRP's CD-SSB (as defined in TS 38.300 [47]) corresponding to *nr-PhysCellID*. When the field *prs-OnlyTP* is included, this field is not included. |
| ***nr-DL-PRS-SFN0-Offset***  This field specifies the time offset of the SFN#0 slot#0 for the given TRP with respect to SFN#0 slot#0 of the assistance data reference TRP and comprises the following subfields:  - ***sfn-Offset*** specifies the SFN offset at the TRP antenna location between the assistance data reference TRP and this neighbour TRP.  The offset corresponds to the number of full radio frames counted from the beginning of a radio frame #0 of the assistance data reference TRP to the beginning of the closest subsequent radio frame #0 of this neighbour TRP.  - ***integerSubframeOffset*** specifies the frame boundary offset at the TRP antenna location between the assistance data reference TRP and this neighbour TRP counted in full subframes.  The offset corresponds to the number of full subframes counted from the beginning of a subframe #0 of the assistance data reference TRP to the beginning of the closest subsequent subframe #0 of this neighbour TRP.  NOTE: The location server sets the value in accordance with the defined search window for the target device using *nr-DL-PRS-ExpectedRSTD* and *nr-DL-PRS-ExpectedRSTD-Uncertainty*. |
| ***nr-DL-PRS-ExpectedRSTD***  This field indicates the RSTD value that the target device is expected to measure between this TRP and the assistance data reference TRP. The *nr-DL-PRS-ExpectedRSTD* field takes into account the expected propagation time difference as well as transmit time difference of DL-PRS positioning occasions between the two TRPs. The resolution is 4×Ts, with Ts=1/(15000\*2048) seconds. |
| ***nr-DL-PRS-ExpectedRSTD-Uncertainty***  This field indicates the uncertainty in *nr-DL-PRS-ExpectedRSTD* value.The uncertainty is related to the location server′s a‑priori estimate of the target device location. The *nr-DL-PRS-ExpectedRSTD* and *nr-DL-PRS-ExpectedRSTD-Uncertainty* togetherdefine the search window for the target device.  The resolution R is  - Ts if all DL-PRS Resources are in frequency range 2,  - 4×Ts otherwise,  with Ts=1/(15000\*2048) seconds.  The target device may assume that the beginning of the subframe for the DL-PRS of this TRP is received within the search window of size  - [*-nr-*DL*-PRS-ExpectedRSTD-Uncertainty*×R *;* *nr-DL-PRS-ExpectedRSTD-Uncertainty*×R] centred at TREF*+*1 millisecond×N+*nr-DL-PRS-ExpectedRSTD*×4×Ts,  where TREF is the reception time of the beginning of the subframe for the DL-PRS of the assistance data reference TRP at the target device antenna connector, and N can be calculated based on  - *nr-DL-PRS-SFN0-Offset*  - *dl-PRS-Periodicity-and-ResourceSetSlotOffset*  - *dl-PRS-ResourceSlotOffset.* |
| ***nr-DL-PRS-Info***  This field specifies the DL-PRS configuration of the TRP. |
| ***dl-PRS-SubcarrierSpacing***  This field specifies the subcarrier spacing of the DL-PRS Resource. 15, 30, 60 kHz for FR1; 60, 120 kHz for FR2. All DL-PRS Resources and DL-PRS Resource Sets in the same Positioning Frequency layer have the same value of *dl-PRS-SubcarrierSpacing*. |
| ***dl-PRS-ResourceBandwidth***  This field specifies the number of PRBs allocated for the DL-PRS Resource (allocated DL-PRS bandwidth) in multiples of 4 PRBs. All DL-PRS Resources of the DL-PRS Resource Set have the same bandwidth. All DL-PRS Resource Sets belonging to the same Positioning Frequency Layer have the same value of DL-PRS Bandwidth and Start PRB.  Integer value 1 corresponds to 24 PRBs, value 2 corresponds to 28 PRBs, value 3 corresponds to 32 PRBs and so on. |
| ***dl-PRS-StartPRB***  This field specifies the start PRB index defined as offset with respect to reference DL-PRS Point A for the Positioning Frequency Layer. All DL-PRS Resources Sets belonging to the same Positioning Frequency Layer have the same value of *dl-PRS-StartPRB*. |
| ***dl-PRS-PointA***  This field specifies the absolute frequency of the reference resource block for the DL-PRS. Its lowest subcarrier is also known as DL-PRS Point A. A single DL-PRS Point A for DL-PRS Resource allocation is provided per Positioning Frequency Layer. All DL-PRS Resources belonging to the same DL-PRS Resource Set have the same DL-PRS Point A. |
| ***dl-PRS-CombSizeN***  This field specifies the Resource Element spacing in each symbol of the DL-PRS Resource. All DL-PRS Resource Sets belonging to the same Positioning Frequency Layer have the same value of comb size N. |
| ***dl-PRS-CyclicPrefix***  This field specifies the Cyclic Prefix length of the DL-PRS Resource. All DL-PRS Resources Sets belonging to the same Positioning Frequency Layer have the same value of *dl-PRS-CyclicPrefix*. |
| ***prs-OnlyTP***  This field, if present, indicates that the *NR-DL-PRS-AssistanceData* is provided for a PRS-only TP. Whether the field is present or absent should be the same for all the *NR-DL-PRS-AssistanceData* of all the DL-PRS transmitted under the same TP.  The target device shall not assume that any other signals or physical channels are present for the TRP other than DL-PRS. |
| ***nr-DL-PRS-ExpectedAoD-or-AoA***  This field specifies the expected AoD or AoA in the Global Coordinate System (GCS) at the target device location together with uncertainty.  - ***expectedDL-AzimuthAoD***: This field specifies the expected azimuth angle of departure. Scale factor 1 degree; range 0 to 359 degrees.  - ***expectedDL-AzimuthAoD-Unc***: This field specifies the (single-sided) uncertainty of the expected azimuth angle of departure. If this field is absent, it indicates maximum uncertainty (60 degrees). Scale factor 1 degree; range 0 to 60 degrees.  - ***expectedDL-ZenithAoD***: This field specifies the expected elevation angle of departure. Scale factor 1 degree; range 0 to 180 degrees.  - ***expectedDL-ZenithAoD-Unc***: This field specifies the (single-sided) uncertainty of the expected elevation angle of departure. If this field is absent, it indicates maximum uncertainty (30 degrees). Scale factor 1 degree; range 0 to 30 degrees.  - ***expectedDL-AzimuthAoA***: This field specifies the expected azimuth angle of arrival.  Scale factor 1 degree; range 0 to 359 degrees.  - ***expectedDL-AzimuthAoA-Unc***: This field specifies the (single-sided) uncertainty of the expected azimuth angle of arrival. If this field is absent, it indicates maximum uncertainty (60 degrees). Scale factor 1 degree; range 0 to 60 degrees.  - ***expectedDL-ZenithAoA***: This field specifies the expected elevation angle of arrival.  Scale factor 1 degree; range 0 to 180 degrees.  - ***expectedDL-ZenithAoA-Unc***: This field specifies the (single-sided) uncertainty of the expected elevation angle of arrival. If this field is absent, it indicates maximum uncertainty (30 degrees). Scale factor 1 degree; range 0 to 30 degrees. |

*NEXT CHANGE*

#### – *NR-DL-PRS-BeamInfo*

The IE *NR-DL-PRS-BeamInfo* is used by the location server to provide spatial direction information of the DL-PRS Resources together with integrity information.

-- ASN1START

NR-DL-PRS-BeamInfo-r16 ::= SEQUENCE (SIZE (1..nrMaxFreqLayers-r16)) OF

NR-DL-PRS-BeamInfoPerFreqLayer-r16

NR-DL-PRS-BeamInfoPerFreqLayer-r16 ::= SEQUENCE (SIZE (1..nrMaxTRPsPerFreq-r16)) OF

NR-DL-PRS-BeamInfoPerTRP-r16

NR-DL-PRS-BeamInfoPerTRP-r16 ::= SEQUENCE {

dl-PRS-ID-r16 INTEGER (0..255),

nr-PhysCellID-r16 NR-PhysCellID-r16 OPTIONAL, -- Need ON

nr-CellGlobalID-r16 NCGI-r15 OPTIONAL, -- Need ON

nr-ARFCN-r16 ARFCN-ValueNR-r15 OPTIONAL, -- Need ON

associated-DL-PRS-ID-r16 INTEGER (0..255) OPTIONAL, -- Need OP

lcs-GCS-TranslationParameter-r16 LCS-GCS-TranslationParameter-r16

OPTIONAL, -- Need OP

dl-PRS-BeamInfoSet-r16 DL-PRS-BeamInfoSet-r16 OPTIONAL, -- Need OP

...

}

DL-PRS-BeamInfoSet-r16 ::= SEQUENCE (SIZE(1..nrMaxSetsPerTrpPerFreqLayer-r16)) OF

DL-PRS-BeamInfoResourceSet-r16

DL-PRS-BeamInfoResourceSet-r16 ::= SEQUENCE (SIZE(1..nrMaxResourcesPerSet-r16)) OF

DL-PRS-BeamInfoElement-r16

DL-PRS-BeamInfoElement-r16 ::= SEQUENCE {

dl-PRS-Azimuth-r16 INTEGER (0..359),

dl-PRS-Azimuth-fine-r16 INTEGER (0..9) OPTIONAL, -- Need ON

dl-PRS-Elevation-r16 INTEGER (0..180) OPTIONAL, -- Need ON

dl-PRS-Elevation-fine-r16 INTEGER (0..9) OPTIONAL, -- Need ON

...,

[[

nr-IntegrityBeamInfoBounds-r18 NR-IntegrityBeamInfoBounds-r18 OPTIONAL -- Need OP

]]

}

NR-IntegrityBeamInfoBounds-r18 ::= SEQUENCE {

meanAzimuth-r18 INTEGER (0..255),

stdDevAzimuth-r18 INTEGER (0..255),

meanElevation-r18 INTEGER (0..255),

stdDevElevation-r18 INTEGER (0..255),

...

}

-- ASN1STOP

| *NR-DL-PRS-BeamInfo* field descriptions |
| --- |
| ***dl-PRS-ID***  This field is used along with a DL-PRS Resource Set ID and a DL-PRS Resources ID to uniquely identify a DL-PRS Resource. This ID can be associated with multiple DL-PRS Resource Sets associated with a single TRP.  Each TRP should only be associated with one such ID. |
| ***nr-PhysCellID***  This field specifies the physical cell identity of the associated TRP, as defined in TS 38.331 [35]. |
| ***nr-CellGlobalID***  This field specifies the NCGI, the globally unique identity of a cell in NR, of the associated TRP, as defined in TS 38.331 [35]. The server should include this field if it considers that it is needed to resolve ambiguity in the TRP indicated by *nr-PhysCellID*. |
| ***nr-ARFCN***  This field specifies the NR-ARFCN of the TRP's CD-SSB (as defined in TS 38.300 [47]) corresponding to *nr-PhysCellID*. |
| ***associated-DL-PRS-ID***  This field specifies the *dl-PRS-ID* of the associated TRP from which the beam information is obtained. See the field descriptions of *dl-PRS-BeamInfoSet* and *lcs-GCS-TranslationParameter*. |
| ***lcs-GCS-TranslationParameter***  This field provides the angles α (bearing angle), β (downtilt angle) and γ (slant angle) for the translation of a Local Coordinate System (LCS) to a Global Coordinate System (GCS) as defined in TR 38.901 [44]. If this field and the field *associated-DL-PRS-ID* are absent, the *dl-PRS-Azimuth* and *dl-PRS-Elevation* are provided in a GCS. If this field is absent and the *associated-DL-PRS-ID field* is present, then the *lcs-GCS-TranslationParameter* for this TRP is obtained from the *lcs-GCS-TranslationParameter* of the associated TRP. |
| ***dl-PRS-BeamInfoSet***  This field provides the DL-PRS beam information for each DL-PRS Resource of the DL-PRS Resource Set associated with this TRP. If this field is absent and the field *associated-DL-PRS-ID* is present, the *dl-PRS-BeamInfoSet* for this TRP are obtained from the *dl-PRS-BeamInfoSet* of the associated TRP. |
| ***dl-PRS-Azimuth***  This field specifies the azimuth angle of the boresight direction in which the DL-PRS Resources associated with this DL-PRS Resource ID in the DL-PRS Resource Set are transmitted.  For a Global Coordinate System (GCS), the azimuth angle is measured counter-clockwise from geographical North.  For a Local Coordinate System (LCS), the azimuth angle is measured measured counter-clockwise from the x-axis of the LCS.  Scale factor 1 degree; range 0 to 359 degrees. |
| ***dl-PRS-Azimuth-fine***  This field provides finer granularity for the *dl-PRS-Azimuth*.  The total azimuth angle of the boresight direction is given by *dl-PRS-Azimuth* + *dl-PRS-Azimuth-fine.*  Scale factor 0.1 degrees; range 0 to 0.9 degrees. |
| ***dl-PRS-Elevation***  This field specifies the elevation angle of the boresight direction in which the DL-PRS Resources associated with this DL-PRS Resource ID in the DL-PRS Resource Set are transmitted.  For a Global Coordinate System (GCS), the elevation angle is measured relative to zenith and positive to the horizontal direction (elevation 0 deg. points to zenith, 90 deg to the horizon).  For a Local Coordinate System (LCS), the elevation angle is measured relative to the z-axis of the LCS (elevation 0 deg. points to the z-axis, 90 deg to the x-y plane).  Scale factor 1 degree; range 0 to 180 degrees. |
| ***dl-PRS-Elevation-fine***  This field provides finer granularity for the *dl-PRS-Elevation*.  The total elevation angle of the boresight direction is given by *dl-PRS-Elevation* + *dl-PRS-Elevation-fine.*  Scale factor 0.1 degrees; range 0 to 0.9 degrees. |
| ***nr-IntegrityBeamInfoBounds***  This field provides an overbounding model that bounds the spatial direction information of the DL-PRS Resources. If this field is absent, the *nr-IntegrityBeamInfoBounds* of this instance of the *DL-PRS-BeamInfoElement* is the same as the *nr-IntegrityBeamInfoBounds* of the previous instance of the *DL-PRS-BeamInfoElement* in *DL-PRS-BeamInfoResourceSet*. If integrity bounds are provided, this field shall be present at least in the first instance of the *DL-PRS-BeamInfoResourceSet*. It comprises the following sub-fields:  - ***meanAzimuth***: This field specifies the mean azimuth error bound which is the mean value for an overbounding model that bounds the azimuth angle error of the boresight direction in which the DL-PRS Resources associated with this DL-PRS Resource ID in the DL-PRS Resource Set are transmitted. The bound is *meanAzimuth* + K \* *stdDevAzimuth* and shall be so that the probability of it to be exceeded shall be lower than IRallocation for *ir-Minimum* < IRallocation < *ir-Maximum*, where K = normInv(IRallocation / 2) and *ir-Minimum*, *ir-Maximum* as provided in IE *NR-IntegrityServiceParameters*. This IRallocation is a fraction of the Target Integrity Risk that represents the integrity risk budget available.  Scale factor 0.1 degrees; range 0-25.5 degrees.  - ***stdDevAzimuth***: This field specifies the standard deviation azimuth error bound which is the standard deviation for an overbounding model that bounds the azimuth error of the boresight direction in which the DL-PRS Resources associated with this DL-PRS Resource ID in the DL-PRS Resource Set are transmitted.  Scale factor 0.1 degrees; range 0-25.5 degrees.  - ***meanElevation***: This field specifies the mean elevation error bound which is the mean value for an overbounding model that bounds the elevation angle error of the boresight direction in which the DL-PRS Resources associated with this DL-PRS Resource ID in the DL-PRS Resource Set are transmitted. The bound is *meanElevation* + K \* *stdDevElevation* and shall be so that the probability of it to be exceeded shall be lower than IRallocation for *ir-Minimum* < IRallocation < *ir-Maximum*, where K = normInv(IRallocation / 2) and *ir-Minimum*, *ir-Maximum* as provided in IE *NR-IntegrityServiceParameters*. This IRallocation is a fraction of the Target Integrity Risk that represents the integrity risk budget available.  Scale factor 0.1 degrees; range 0-25.5 degrees.  - ***stdDevElevation***: This field specifies the standard deviation elevation error bound which is the standard deviation for an overbounding model that bounds the elevation error of the boresight direction in which the DL-PRS Resources associated with this DL-PRS Resource ID in the DL-PRS Resource Set are transmitted.  Scale factor 0.1 degrees; range 0-25.5 degrees. |

*NEXT CHANGE*

#### *– NR-DL-PRS-ProcessingCapability*

The IE *NR-DL-PRS-ProcessingCapability* defines the common DL-PRS Processing capability. In the case of capabilities for multiple NR positioning methods are provided, the IE *NR-DL-PRS-ProcessingCapability* applies across the NR positioning methods and the target device shall indicate the same values for the capabilities in IEs *NR-DL-TDOA-ProvideCapabilities*, *NR-DL-AoD-ProvideCapabilities*, and *NR-Multi-RTT-ProvideCapabilities*.

The *PRS-ProcessingCapabilityPerBand* is defined for a single positioning frequency layer on a certain band (i.e., a target device supporting multiple positioning frequency layers is expected to process one frequency layer at a time).

-- ASN1START

NR-DL-PRS-ProcessingCapability-r16 ::= SEQUENCE {

prs-ProcessingCapabilityBandList-r16 SEQUENCE (SIZE (1..nrMaxBands-r16)) OF

PRS-ProcessingCapabilityPerBand-r16,

maxSupportedFreqLayers-r16 INTEGER (1..4),

simulLTE-NR-PRS-r16 ENUMERATED { supported } OPTIONAL,

...,

[[

dummy ENUMERATED { m1, m2, ... } OPTIONAL

]]

}

PRS-ProcessingCapabilityPerBand-r16 ::= SEQUENCE {

freqBandIndicatorNR-r16 FreqBandIndicatorNR-r16,

supportedBandwidthPRS-r16 CHOICE {

fr1 ENUMERATED {mhz5, mhz10, mhz20, mhz40,

mhz50, mhz80, mhz100},

fr2 ENUMERATED {mhz50, mhz100, mhz200, mhz400},

...

},

dl-PRS-BufferType-r16 ENUMERATED {type1, type2, ...},

durationOfPRS-Processing-r16 SEQUENCE {

durationOfPRS-ProcessingSymbols-r16 ENUMERATED {nDot125, nDot25, nDot5, n1,

n2, n4, n6, n8, n12, n16, n20, n25,

n30, n32, n35, n40, n45, n50},

durationOfPRS-ProcessingSymbolsInEveryTms-r16

ENUMERATED {n8, n16, n20, n30, n40, n80,

n160,n320, n640, n1280},

...

},

maxNumOfDL-PRS-ResProcessedPerSlot-r16 SEQUENCE {

scs15-r16 ENUMERATED {n1, n2, n4, n8, n16, n24, n32,

n48, n64} OPTIONAL,

scs30-r16 ENUMERATED {n1, n2, n4, n8, n16, n24, n32,

n48, n64} OPTIONAL,

scs60-r16 ENUMERATED {n1, n2, n4, n8, n16, n24, n32,

n48, n64} OPTIONAL,

scs120-r16 ENUMERATED {n1, n2, n4, n8, n16, n24, n32,

n48, n64} OPTIONAL,

...,

[[

scs15-v1690 ENUMERATED {n6, n12} OPTIONAL,

scs30-v1690 ENUMERATED {n6, n12} OPTIONAL,

scs60-v1690 ENUMERATED {n6, n12} OPTIONAL,

scs120-v1690 ENUMERATED {n6, n12} OPTIONAL

]]

},

...,

[[

supportedDL-PRS-ProcessingSamples-RRC-CONNECTED-r17 ENUMERATED { supported } OPTIONAL,

prs-ProcessingWindowType1A-r17 ENUMERATED { option1, option2, option3} OPTIONAL,

prs-ProcessingWindowType1B-r17 ENUMERATED { option1, option2, option3} OPTIONAL,

prs-ProcessingWindowType2-r17 ENUMERATED { option1, option2, option3} OPTIONAL,

prs-ProcessingCapabilityOutsideMGinPPW-r17

SEQUENCE (SIZE(1..3)) OF

PRS-ProcessingCapabilityOutsideMGinPPWperType-r17

OPTIONAL,

dl-PRS-BufferType-RRC-Inactive-r17 ENUMERATED { type1, type2, ... } OPTIONAL,

durationOfPRS-Processing-RRC-Inactive-r17 SEQUENCE {

durationOfPRS-ProcessingSymbols-r17 ENUMERATED {nDot125, nDot25, nDot5, n1,

n2, n4, n6, n8, n12, n16, n20, n25,

n30, n32, n35, n40, n45, n50},

durationOfPRS-ProcessingSymbolsInEveryTms-r17

ENUMERATED {n8, n16, n20, n30, n40, n80,

n160,n320, n640, n1280},

...

} OPTIONAL,

maxNumOfDL-PRS-ResProcessedPerSlot-RRC-Inactive-r17 SEQUENCE {

scs15-r17 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs30-r17 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs60-r17 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs120-r17 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

...

} OPTIONAL,

supportedLowerRxBeamSweepingFactor-FR2-r17 ENUMERATED { n1, n2, n4, n6 } OPTIONAL

]],

[[

supportedDL-PRS-ProcessingSamples-RRC-Inactive-r17 ENUMERATED { supported } OPTIONAL

]],

[[

prs-MeasurementWithoutMG-r17 ENUMERATED {cp, symbolDot25, symbolDot5,

slotDot5} OPTIONAL

]],

[[

maxNumOfOneSymbolPRS-ResProcessedPerSlot-RRC-Inactive-r18 SEQUENCE {

scs15-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs30-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs60-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs120-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

...

} OPTIONAL,

maxNumOfOneSymbolPRS-ResProcessedPerSlot-RRC-Connected-r18 SEQUENCE {

scs15-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs30-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs60-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs120-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

...

} OPTIONAL,

ppw-maxNumOfOneSymbolPRS-ResProcessedPerSlot-r18 SEQUENCE {

scs15-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs30-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs60-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

scs120-r18 ENUMERATED {n1, n2, n4, n6, n8, n12, n16, n24,

n32, n48, n64} OPTIONAL,

...

} OPTIONAL,

prs-BWA-TwoContiguousIntrabandInMG-RRC-Connected-r18

PRS-BWA-TwoContiguousIntrabandInMG-r18 OPTIONAL,

prs-BWA-ThreeContiguousIntrabandInMG-RRC-Connected-r18

PRS-BWA-ThreeContiguousIntrabandInMG-r18 OPTIONAL,

prs-BWA-TwoContiguousIntraband-RRC-IdleAndInactive-r18

PRS-BWA-TwoContiguousIntrabandInMG-r18 OPTIONAL,

prs-BWA-ThreeContiguousIntraband-RRC-IdleAndInactive-r18

PRS-BWA-ThreeContiguousIntrabandInMG-r18 OPTIONAL,

reducedNumOfSampleInMeasurementWithPRS-BWA-RRC-Connected-r18 ENUMERATED { supported }

OPTIONAL,

reducedNumOfSampleInMeasurementWithPRS-BWA-RRC-IdleAndInactive-r18

ENUMERATED { supported } OPTIONAL,

dl-PRS-MeasurementWithRxFH-RRC-Inactive-r18 ENUMERATED { supported } OPTIONAL,

dl-PRS-MeasurementWithRxFH-RRC-Idle-r18 ENUMERATED { supported } OPTIONAL,

reducedNumOfSampleForMeasurementWithFH-RRC-Connected-r18 ENUMERATED { supported }

OPTIONAL,

reducedNumOfSampleForMeasurementWithFH-RRC-IdleAndInactive-r18 ENUMERATED { supported }

OPTIONAL,

supportOfPRS-BWA-WithTwoPFL-Combination-r18 ENUMERATED { supported } OPTIONAL,

dl-PRS-MeasurementWithRxFH-RRC-Connected-r18 DL-PRS-MeasurementWithRxFH-RRC-Connected-r18 OPTIONAL

]]

}

PRS-ProcessingCapabilityOutsideMGinPPWperType-r17 ::= SEQUENCE {

prsProcessingType-r17 ENUMERATED { type1A, type1B, type2 },

ppw-dl-PRS-BufferType-r17 ENUMERATED { type1, type2, ... },

ppw-durationOfPRS-Processing1-r17 SEQUENCE {

ppw-durationOfPRS-ProcessingSymbolsN-r17

ENUMERATED { msDot125, msDot25, msDot5, ms1, ms2, ms4,

ms6, ms8, ms12, ms16, ms20, ms25, ms30, ms32, ms35,

ms40, ms45, ms50 },

ppw-durationOfPRS-ProcessingSymbolsT-r17

ENUMERATED { ms1, ms2, ms4, ms8, ms16, ms20, ms30, ms40, ms80,

ms160, ms320, ms640, ms1280 }

} OPTIONAL,

ppw-durationOfPRS-Processing2-r17 SEQUENCE {

ppw-durationOfPRS-ProcessingSymbolsN2-r17

ENUMERATED { msDot125, msDot25, msDot5, ms1, ms2, ms3, ms4, ms5,

ms6, ms8, ms12 },

ppw-durationOfPRS-ProcessingSymbolsT2-r17

ENUMERATED { ms4, ms5, ms6, ms8 }

} OPTIONAL,

ppw-maxNumOfDL-PRS-ResProcessedPerSlot-r17 SEQUENCE {

scs15-r17 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 }

OPTIONAL,

scs30-r17 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 }

OPTIONAL,

scs60-r17 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 }

OPTIONAL,

scs120-r17 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 }

OPTIONAL,

...

},

...,

[[

ppw-maxNumOfDL-Bandwidth-r17 CHOICE {

fr1 ENUMERATED {mhz5, mhz10, mhz20, mhz40,

mhz50, mhz80, mhz100},

fr2 ENUMERATED {mhz50, mhz100, mhz200, mhz400}

} OPTIONAL

]]

}

PRS-BWA-TwoContiguousIntrabandInMG-r18 ::= SEQUENCE {

maximumOfTwoAggregatedDL-PRS-Bandwidth-FR1-r18 ENUMERATED {mhz10, mhz20, mhz40, mhz50,

mhz80, mhz100, mhz160, mhz200}

OPTIONAL,

maximumOfTwoAggregatedDL-PRS-Bandwidth-FR2-r18 ENUMERATED {mhz100, mhz200, mhz400, mhz800}

OPTIONAL,

maximumOfDL-PRS-BandwidthPerPFL-FR1-r18 ENUMERATED {mhz5, mhz10, mhz20, mhz40,

mhz50, mhz80, mhz100} OPTIONAL,

maximumOfDL-PRS-BandwidthPerPFL-FR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz400}

OPTIONAL,

dl-PRS-BufferTypeOfBWA-r18 ENUMERATED {type1, type2},

prs-durationOfTwoPRS-BWA-Processing-r18 SEQUENCE {

prs-durationOfTwoPRS-BWA-ProcessingSymbolsN-r18

ENUMERATED {msDot125, msDot25, msDot5, ms1, ms2, ms4, ms6, ms8, ms12,

ms16, ms20, ms25, ms30, ms32, ms35, ms40, ms45, ms50},

prs-durationOfTwoPRS-BWA-ProcessingSymbolsT-r18

ENUMERATED {ms8, ms16, ms20, ms30, ms40, ms80, ms160, ms320, ms640, ms1280}

} OPTIONAL,

maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR1-r18 SEQUENCE {

scs15-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL,

scs30-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL,

scs60-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL

},

maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR2-r18 SEQUENCE {

scs60-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL,

scs120-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL

}

}

PRS-BWA-ThreeContiguousIntrabandInMG-r18 ::= SEQUENCE {

maximumOfThreeAggregatedDL-PRS-Bandwidth-FR1-r18

ENUMERATED {mhz15, mhz20, mhz30, mhz40, mhz50, mhz60, mhz80, mhz100, mhz120,

mhz140, mhz150, mhz180, mhz200, mhz240, mhz300} OPTIONAL,

maximumOfThreeAggregatedDL-PRS-Bandwidth-FR2-r18

ENUMERATED {mhz150, mhz200, mhz300, mhz400, mhz600, mhz800, mhz1000,

mhz1200} OPTIONAL,

maximumOfDL-PRS-BandwidthPerPFL-FR1-r18

ENUMERATED {mhz5, mhz10, mhz20, mhz40, mhz50, mhz80, mhz100} OPTIONAL,

maximumOfDL-PRS-BandwidthPerPFL-FR2-r18

ENUMERATED {mhz50, mhz100, mhz200, mhz400} OPTIONAL,

dl-PRS-BufferTypeOfBWA-r18 ENUMERATED {type1, type2},

prs-durationOfThreePRS-BWA-Processing-r18 SEQUENCE {

prs-durationOfThreePRS-BWA-ProcessingSymbolsN-r18

ENUMERATED {msDot125, msDot25, msDot5, ms1, ms2, ms4, ms6, ms8, ms12,

ms16, ms20, ms25, ms30, ms32, ms35, ms40, ms45, ms50},

prs-durationOfThreePRS-BWA-ProcessingSymbolsT-r18

ENUMERATED {ms8, ms16, ms20, ms30, ms40, ms80, ms160,

ms320, ms640, ms1280}

} OPTIONAL,

maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR1-r18 SEQUENCE {

scs15-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL,

scs30-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL,

scs60-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL

},

maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR2-r18 SEQUENCE {

scs60-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL,

scs120-r18 ENUMERATED {n1, n2, n4, n6, n8, n12,

n16, n24, n32, n48, n64 } OPTIONAL

}

}

DL-PRS-MeasurementWithRxFH-RRC-Connected-r18 ::=SEQUENCE {

maximumPRS-BandwidthAcrossAllHopsFR1-r18 ENUMERATED {mhz40, mhz50, mhz80, mhz100}

OPTIONAL,

maximumPRS-BandwidthAcrossAllHopsFR2-r18 ENUMERATED {mhz100, mhz200, mhz400} OPTIONAL,

maximumFH-Hops-r18 ENUMERATED {n2, n3, n4, n5, n6} OPTIONAL,

processingDuration-r18 SEQUENCE {

processingPRS-SymbolsDurationN3-r18 ENUMERATED {msDot125, msDot25, msDot5, ms1, ms2,

ms4, ms6, ms8, ms12,ms16, ms20, ms25,

ms30, ms32, ms35, ms40, ms45, ms50},

processingDurationT3-r18 ENUMERATED {ms8, ms16, ms20, ms30, ms40, ms80,

ms160, ms320, ms640, ms1280}

} OPTIONAL,

rf-RxRetunTimeFR1-r18 ENUMERATED {n70,n140,n210} OPTIONAL,

rf-RxRetunTimeFR2-r18 ENUMERATED {n35,n70,n140} OPTIONAL,

numOfOverlappingPRB-r18 ENUMERATED {n0,n1,n2,n4} OPTIONAL,

...

}

-- ASN1STOP

| *NR-DL-PRS-ProcessingCapability* field descriptions |
| --- |
| ***maxSupportedFreqLayers***  Indicates the maximum number of positioning frequency layers supported by UE. |
| ***simulLTE-NR-PRS***  Indicates whether the UE supports parallel processing of LTE PRS and NR DL-PRS. |
| ***dummy***  This field is not used in the specification. If received it shall be ignored by the receiver. |
| ***supportedBandwidthPRS***  Indicates the maximum number of DL-PRS bandwidth in MHz, which is supported and reported by UE. |
| ***dl-PRS-BufferType***  IndicatesDL-PRS buffering capability. Value *type1* indicates sub-slot/symbol level buffering and value *type2* indicates slot level buffering. |
| ***durationOfPRS-Processing***  Indicates the duration *N* of DL-PRS symbols in units of ms a UE can process every T ms assuming maximum DL-PRS bandwidth provided in *supportedBandwidthPRS* and comprises the following subfields:  - ***durationOfPRS-ProcessingSymbols***: This field specifies the values for *N*. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50 ms.  - ***durationOfPRS-ProcessingSymbolsInEveryTms***: This field specifies the values for *T*. Enumerated values indicate 8, 16, 20, 30, 40, 80, 160, 320, 640, 1280 ms.  See NOTE 9. |
| ***maxNumOfDL-PRS-ResProcessedPerSlot***  Indicates the maximum number of DL-PRS Resources that UE can process in a slot. SCS: 15 kHz, 30 kHz, 60 kHz are applicable for FR1 bands. SCS: 60 kHz, 120 kHz are applicable for FR2 bands. |
| ***supportedDL-PRS-ProcessingSamples-RRC-CONNECTED***  Indicates the UE capability for support of measurements based on measuring M=1 or M=2 (instances) of a DL-PRS Resource Set. The UE can include this field only if the UE supports *prs-ProcessingCapabilityBandList*. Otherwise, the UE does not include this field.  NOTE 1: This feature is supported for both UE-assisted and UE based positioning. |
| ***prs-ProcessingWindowType1A***  Indicates the supported DL-PRS processing types subject to the UE determining that DL-PRS to be higher priority for DL-PRS measurement outside MG and in a DL-PRS Processing Window.  Type 1A refers to the determination of prioritization between DL-PRS and other DL signals/channels in all OFDM symbols within the DL-PRS Processing Window. The DL signals/channels from all DL CCs (per UE) are affected across LTE and NR. Enumerated value indicates supported priority handing options of DL-PRS:  - *option1*: Support of "st1" and "st3" defined in clause 5.1.6.5 of TS 38.214 [45].  - *option2*: Support of "st1", "st2", and "st3" defined in clause 5.1.6.5 of TS 38.214 [45].  - *option3*: Support of "st1" only defined in clause 5.1.6.5 of TS 38.214 [45].  The UE can include this field only if the UE supports *prs-ProcessingCapabilityBandList*. Otherwise, the UE does not include this field.  NOTE 2: Within a DL-PRS processing window, UE measurement is inside the active DL BWP with DL-PRS having the same numerology as the active DL BWP.  NOTE 2a: When the UE determines higher priority for other DL signals/channels over the DL-PRS measurement/processing, the UE is not expected to measure/process DL-PRS. |
| ***prs-ProcessingWindowType1B***  Indicates the supported DL-PRS processing types subject to the UE determining that DL-PRS to be higher priority for DL-PRS measurement outside MG and in a DL-PRS Processing Window.  Type 1B refers to the determination of prioritization between DL-PRS and other DL signals/channels in all OFDM symbols within the DL-PRS processing window. The DL signals/channels from a certain band are affected. Enumerated value indicates supported priority handing options of DL-PRS (see *prs-ProcessingWindowType1A*).  The UE can include this field only if the UE supports prs-ProcessingCapabilityBandList. Otherwise, the UE does not include this field.  NOTE 3: Within a DL-PRS processing window, UE measurement is inside the active DL BWP with DL-PRS having the same numerology as the active DL BWP.  NOTE 3a: When the UE determines higher priority for other DL signals/channels over the DL-PRS measurement/processing, the UE is not expected to measure/process DL-PRS. |
| ***prs-ProcessingWindowType2***  Indicates the supported DL-PRS processing types subject to the UE determining that DL-PRS to be higher priority for DL-PRS measurement outside MG and in a DL-PRS Processing Window.  Type 2 refers to the determination of prioritization between DL-PRS and other DL signals/channels only in DL-PRS symbols within the DL-PRS processing window. Enumerated value indicates supported priority handing options of DL-PRS (see *prs-ProcessingWindowType1A*).  The UE can include this field only if the UE supports *prs-ProcessingCapabilityBandList*. Otherwise, the UE does not include this field.  NOTE 4: Within a DL-PRS processing window, UE measurement is inside the active DL BWP with DL-PRS having the same numerology as the active DL BWP.  NOTE 4a: When the UE determines higher priority for other DL signals/channels over the DL-PRS measurement/processing, the UE is not expected to measure/process DL-PRS. |
| ***prs-ProcessingCapabilityOutsideMGinPPW***  Indicates the DL-PRS Processing Capability outside MG of each of the supported PPW Type in the case the UE supports multiple PPW Types in a band and comprises the following subfields:  - ***prsProcessingType***: Indicates the DL-PRS Processing Window Type for which the *prs-ProcessingCapabilityOutsideMGinPPW* are provided.  - ***ppw-dl-PRS-BufferType***: Indicates DL-PRS buffering capability. Value '*type1'* indicates sub-slot/symbol level buffering and value '*type2'* indicates slot level buffering.  - ***ppw-durationOfPRS-Processing1***: Indicates the duration of DL-PRS symbols N in units of ms a UE can process every T ms assuming maximum DL-PRS bandwidth provided in *ppw-maxNumOfDL-Bandwidth* and comprises the following subfields:  - ***ppw-durationOfPRS-ProcessingSymbolsN***: This field specifies the values for *N*. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50 ms.  - ***ppw-durationOfPRS-ProcessingSymbolsT***: This field specifies the values for *T*. Enumerated values indicate 1, 2, 4, 8, 16, 20, 30, 40, 80, 160, 320, 640, 1280 ms.  - ***ppw-durationOfPRS-Processing2***: Indicates the duration of DL-PRS symbols N2 in units of ms a UE can process inT2 ms assuming maximum DL-PRS bandwidth provided in *ppw-maxNumOfDL-Bandwidth* and comprises the following subfields:  - ***ppw-durationOfPRS-ProcessingSymbolsN2***: This field specifies the values for *N2*. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 3, 4, 5, 6, 8, 12 ms.  - ***ppw-durationOfPRS-ProcessingSymbolsT2***: This field specifies the values for *T2*. Enumerated values indicate 4, 5, 6, 8 ms.  - ***ppw-maxNumOfDL-PRS-ResProcessedPerSlot:*** Indicates the maximum number of DL-PRS resources that UE can process in a slot. SCS: 15 kHz, 30 kHz, 60 kHz are applicable for FR1 bands. SCS: 60 kHz, 120 kHz are applicable for FR2 bands.  - ***ppw-maxNumOfDL-Bandwidth:*** Indicates the maximum number of DL-PRS bandwidth in MHz, which is supported and reported by UE for DL-PRS measurement outside MG within the PPW.  The UE can include this field only if the UE supports one of *prs-ProcessingWindowType1A*, *prs-ProcessingWindowType1B* and *prs-ProcessingWindowType2*. Otherwise, the UE does not include this field.  NOTE 5: A UE that supports one of *prs-ProcessingWindowType1A*, *prs-ProcessingWindowType1B* or *prs-ProcessingWindowType2* shall always include the *prs-ProcessingCapabilityOutsideMGinPPW*.  NOTE 6: The (N, T) UE capability in *ppw-durationOfPRS-Processing1* is interpreted as in NOTE 9, and the UE is expected to receive the DL-PRS within the DL-PRS processing window but the processing of the received DL-PRS may be outside a DL-PRS processing window.  NOTE 7: The (N2, T2) UE capability in *ppw-durationOfPRS-Processing2* is interpreted such that the UE is capable of measuring up to N2 ms DL-PRS within a PPW and is capable of completing the DL-PRS processing within the PPW, e.g., if the time duration from the last symbol of the measured DL-PRS Resource(s) inside the PPW to the end of PPW is not smaller than T2 ms.  NOTE 8: A UE which supports *prs-ProcessingCapabilityOutsideMGinPPW* shall support either *ppw-durationOfPRS-Processing1* or *ppw-durationOfPRS-Processing2*, but not both for each supported type in a band. |
| ***dl-PRS-BufferType-RRC-Inactive***  IndicatesDL-PRS buffering capability in RRC\_INACTIVE state. Value '*type1'* indicates sub-slot/symbol level buffering and value '*type2'* indicates slot level buffering. |
| ***durationOfPRS-Processing-RRC-Inactive***  Indicates the duration *N* of DL-PRS symbols in units of ms a UE can process every *T* ms in RRC\_INACTIVE state assuming maximum DL-PRS bandwidth provided in *supportedBandwidthPRS* and comprises the following subfields:  - ***durationOfPRS-ProcessingSymbols***: This field specifies the values for *N*. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50 ms.  - ***durationOfPRS-ProcessingSymbolsInEveryTms***: This field specifies the values for *T*. Enumerated values indicate 8, 16, 20, 30, 40, 80, 160, 320, 640, 1280 ms.  See NOTE 9. |
| ***maxNumOfDL-PRS-ResProcessedPerSlot-RRC-Inactive***  Indicates the maximum number of DL-PRS Resources a UE can process in a slot in RRC\_INACTIVE state. SCS: 15 kHz, 30 kHz, 60 kHz are applicable for FR1 bands. SCS: 60 kHz, 120 kHz are applicable for FR2 bands. |
| ***supportedLowerRxBeamSweepingFactor-FR2***  Indicates support of the lower Rx beam sweeping factor than 8 for FR2. Enumerated value indicates the number of Rx beam sweeping factors supported. |
| ***supportedDL-PRS-ProcessingSamples-RRC-Inactive***  Indicates the UE capability for support of reduced number of samples for DL-PRS measurement in RRC\_INACTIVE state. The UE can include this field only if the UE supports *prs-ProcessingRRC-Inactive* defined in TS 38.331 [35]. Otherwise, the UE does not include this field. |
| ***maxNumOfOneSymbolPRS-ResProcessedPerSlot-RRC-Inactive***  Indicates the maximum number of single-symbol DL-PRS Resources that UE can process in a slot in RRC\_INACTIVE. SCS: 15 kHz, 30 kHz, 60 kHz are applicable for FR1 bands. SCS: 60 kHz, 120 kHz are applicable for FR2 bands. A UE which supports *maxNumOfOneSymbolPRS-ResProcessedPerSlot-RRC-Inactive* shall support single-symbol DL-PRS with the comb sizes from {2,4,6,12}.  The UE can include this field only if the UE supports one of *dl-PRS-BufferType-RRC-Inactive*, *durationOfPRS-Processing-RRC-Inactive*, and *maxNumOfDL-PRS-ResProcessedPerSlot-RRC-Inactive*. Otherwise, the UE does not include this field. |
| ***maxNumOfOneSymbolPRS-ResProcessedPerSlot-RRC-Connected***  Indicates the maximum number of single-symbol DL-PRS Resources that UE can process in a slot inside a measurement gap in RRC\_CONNECTED. SCS: 15 kHz, 30 kHz, 60 kHz are applicable for FR1 bands. SCS: 60 kHz, 120 kHz are applicable for FR2 bands. A UE which supports *maxNumOfOneSymbolPRS-ResProcessedPerSlot-RRC-Connected* shall support single-symbol DL-PRS with the comb sizes from {2,4,6,12}.  The UE can include this field only if the UE supports *prs-ProcessingCapabilityBandList*. Otherwise, the UE does not include this field. |
| ***ppw-maxNumOfOneSymbolPRS-ResProcessedPerSlot***  Indicates the maximum number of single-symbol DL-PRS Resources that UE can process in a slot outside a measurement gap in RRC\_CONNECTED. SCS: 15 kHz, 30 kHz, 60 kHz are applicable for FR1 bands. SCS: 60 kHz, 120 kHz are applicable for FR2 bands. A UE which supports *ppw-maxNumOfOneSymbolPRS-ResProcessedPerSlot* shall support single-symbol DL-PRS with the comb sizes from {2,4,6,12}.  The UE can include this field only if the UE supports *prs-ProcessingCapabilityOutsideMGinPPW*. Otherwise, the UE does not include this field. |
| ***prs-MeasurementWithoutMG***  Indicates the UE capability for support of Rx timing difference between the serving cell and non-serving cell for DL-PRS measurement within a PPW. Value '*cp*' indicates one CP length, value '*symbolDot25*' indicates 0.25 symbol length, value '*symbolDot5*' indicates 0.5 symbol length and value '*slotDot5*' indicates 0.5 slot length. The UE can include this field only if the UE supports one of *prs-ProcessingWindowType1A*, *prs-ProcessingWindowType1B* and *prs-ProcessingWindowType2*. Otherwise, the UE does not include this field. |
| ***prs-BWA-TwoContiguousIntrabandInMG-RRC-Connected***  Indicates the UE capability for support of DL-PRS processing capabilities for aggregated DL-PRS processing of 2 PFLs in intra-band contiguous within a MG for RRC\_CONNECTED state and and comprises the following subfields:  - ***maximumOfTwoAggregatedDL-PRS-Bandwidth-FR1***: Indicates the maximum aggregated DL-PRS bandwidth in MHz for FR1, which is supported and reported by UE.  - ***maximumOfTwoAggregatedDL-PRS-Bandwidth-FR2***: Indicates the maximum aggregated DL-PRS bandwidth in MHz for FR2, which is supported and reported by UE.  - ***maximumOfDL-PRS-BandwidthPerPFL-FR1***: Indicates the maximum DL-PRS bandwidth in MHz for FR1, per PFL.  - ***maximumOfDL-PRS-BandwidthPerPFL-FR2***: Indicates the maximum DL-PRS bandwidth in MHz for FR2, per PFL.  - ***dl-PRS-BufferTypeOfBWA***: Indicates the DL-PRS buffering capability.  - ***prs-durationOfTwoPRS-BWA-Processing***: Indicates the duration of DL-PRS symbols N in units of ms a UE can process every T ms assuming maximum aggregated DL-PRS bandwidth in MHz, which is supported and reported by UE.  - ***prs-durationOfTwoPRS-BWA-ProcessingSymbolsN***: This field specifies the values for N. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50 ms.  - ***prs-durationOfTwoPRS-BWA-ProcessingSymbolsT***: This field specifies the values for T. Enumerated values indicate 8, 16, 20, 30, 40, 80, 160, 320, 640, 1280, 2560 ms.  - ***maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR1***: Indicates the Maximum number of aggregated DL-PRS Resources across aggregated PFLs that UE can process in a slot for FR1.  - ***maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR2***: Indicates the Maximum number of aggregated DL-PRS Resources across aggregated PFLs that UE can process in a slot for FR2.  The UE can include this field only if the UE supports *supportedBandwidthPRS, dl-PRS-BufferType, durationOfPRS-Processing* and *maxNumOfDL-PRS-ResProcessedPerSlot*. Otherwise, the UE does not include this field.  NOTE 10: *dl-PRS-BufferTypeOfBWA* follows buffering capability type reported in *dl-PRS-BufferType.*  NOTE 11: The value N should be equal or smaller than the value N reported by *durationOfPRS-ProcessingSymbols*, or this value T should be equal or larger than the value T reported by *durationOfPRS-ProcessingSymbolsInEveryTms.*  NOTE 12: Each two linked DL-PRS Resources are counted as 1 resource.  NOTE 13: *maxNumOfAggregatedDL-PRS-ResourcePerSlot* should be equal or smaller than the value reported by *maxNumOfDL-PRS-ResProcessedPerSlot.*  NOTE 14: The above parameters are reported assuming a configured measurement gap and a maximum ratio of measurement gap length (MGL)/measurement gap repetition period (MGRP) of no more than 30%. |
| ***prs-BWA-ThreeContiguousIntrabandInMG-RRC-Connected***  Indicates the UE capability for support of DL-PRS processing capabilities for aggregated DL-PRS processing of 3 PFLs in intra-band contiguous within a MG for RRC\_CONNECTED state and comprises the following subfields:  **- *maximumOfThreeAggregatedDL-PRS-Bandwidth-FR1***: Indicates the maximum aggregated DL-PRS bandwidth in MHz of for FR1, which is supported and reported by UE.  **- *maximumOfThreeAggregatedDL-PRS-Bandwidth-FR2***: Indicates the maximum aggregated DL-PRS bandwidth in MHz for FR2, which is supported and reported by UE.  **- *maximumOfDL-PRS-BandwidthPerPFL-FR1***: Indicates the maximum DL-PRS bandwidth in MHz for FR1, per PFL  **- *maximumOfDL-PRS-BandwidthPerPFL-FR2***: Indicates the maximum DL-PRS bandwidth in MHz for FR2, per PFL  **- *dl-PRS-BufferTypeOfBWA***: Indicates the DL-PRS buffering capability.  **- *prs-durationOfThreePRS-BWA-Processing***: Indicates the duration of DL-PRS symbols N in units of ms a UE can process every T ms assuming maximum aggregated DL-PRS bandwidth in MHz, which is supported and reported by UE.  **- *prs-durationOfThreePRS-BWA-ProcessingSymbolsN***: This field specifies the values for N. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50 ms.  **- *prs-durationOfThreePRS-BWA-ProcessingSymbolsT***: This field specifies the values for T. Enumerated values indicate 8, 16, 20, 30, 40, 80, 160, 320, 640, 1280, 3840 ms.  **- *maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR1***: Indicates the Maximum number of aggregated DL-PRS Resources across aggregated PFLs that UE can process in a slot for FR1.  **- *maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR2***: Indicates the Maximum number of aggregated DL-PRS Resources across aggregated PFLs that UE can process in a slot for FR2.  The UE can include this field only if the UE supports *prs-BWA-TwoContiguousIntrabandInMG-RRC-Connected****.*** Otherwise, the UE does not include this field.  NOTE15: *dl-PRS-BufferTypeOfBWA* follows buffering capability type reported in *dl-PRS-BufferType.*  NOTE16: The value N should be equal or smaller than the value N reported by *durationOfPRS-ProcessingSymbols*, or this value T should be equal or larger than the value T reported by *durationOfPRS-ProcessingSymbolsInEveryTms.*  NOTE17: Each three linked DL-PRS Resources are counted as 1 resource.  NOTE18: *maxNumOfAggregatedDL-PRS-ResourcePerSlot* should be equal or smaller than the value reported by *maxNumOfDL-PRS-ResProcessedPerSlot*.  NOTE19: The above parameters are reported assuming a configured measurement gap and a maximum ratio of measurement gap length (MGL)/measurement gap repetition period (MGRP) of no more than 30%. |
| ***prs-BWA-TwoContiguousIntraband-RRC-IdleAndInactive***  Indicates the UE capability for support of DL-PRS processing capabilities for aggregated DL-PRS processing of 2 PFLs in intra-band contiguous for RRC\_INACTIVE and RRC\_IDLE state.  The UE can include this field only if the UE supports *dl-PRS-BufferType-RRC-Inactive, durationOfPRS-Processing-RRC-Inactive and maxNumOfDL-PRS-ResProcessedPerSlot-RRC-Inactive*. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***maximumOfTwoAggregatedDL-PRS-Bandwidth-FR1***: Indicates the maximum aggregated DL-PRS bandwidth in MHz for FR1, which is supported and reported by UE.  - ***maximumOfTwoAggregatedDL-PRS-Bandwidth-FR2***: Indicates the maximum aggregated DL-PRS bandwidth in MHz for FR2, which is supported and reported by UE.  - ***maximumOfDL-PRS-BandwidthPerPFL-FR1***: Indicates the maximum DL-PRS bandwidth in MHz for FR1, per PFL.  - ***maximumOfDL-PRS-BandwidthPerPFL-FR2***: Indicates the maximum DL-PRS bandwidth in MHz for FR2, per PFL.  - ***dl-PRS-BufferTypeOfBWA***: Indicates the DL-PRS buffering capability.  - ***prs-durationOfTwoPRS-BWA-Processing***: Indicates the duration of DL-PRS symbols N in units of ms a UE can process every T ms assuming maximum aggregated DL-PRS bandwidth in MHz, which is supported and reported by UE.  - ***prs-durationOfTwoPRS-BWA-ProcessingSymbolsN***: This field specifies the values for N. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50 ms.  - ***prs-durationOfTwoPRS-BWA-ProcessingSymbolsT***: This field specifies the values for T. Enumerated values indicate 8, 16, 20, 30, 40, 80, 160, 320, 640, 1280, 2560 ms.  - ***maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR1***: Indicates the Maximum number of aggregated DL-PRS Resources across aggregated PFLs that UE can process in a slot for FR1.  - ***maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR2***: Indicates the Maximum number of aggregated DL-PRS Resources across aggregated PFLs that UE can process in a slot for FR2.  NOTE 20: *dl-PRS-BufferTypeOfBWA* follows buffering capability type reported in *dl-PRS-BufferType.*  NOTE 21: The value N should be equal or smaller than the value N reported by *durationOfPRS-ProcessingSymbols*, or this value T should be equal or larger than the value T reported by *durationOfPRS-ProcessingSymbolsInEveryTms.*  NOTE 22: Each two linked DL-PRS resources are counted as 1 resource.  NOTE 23: *maxNumOfAggregatedDL-PRS-ResourcePerSlot* should be equal or smaller than the value reported by *maxNumOfDL-PRS-ResProcessedPerSlot-RRC-Inactive.* |
| ***prs-BWA-ThreeContiguousIntraband-RRC-IdleAndInactive***  Indicates the UE capability for support of DL-PRS processing capabilities for aggregated DL-PRS processing of 3 PFLs in intra-band contiguous for RRC\_INACTIVE and RRC\_IDLE state. The UE can include this field only if the UE supports *prs-BWA-TwoContiguousIntraband-RRC-IdleAndInactive*. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  **- *maximumOfThreeAggregatedDL-PRS-Bandwidth-FR1***: Indicates the maximum aggregated DL-PRS bandwidth in MHz of for FR1, which is supported and reported by UE.  **- *maximumOfThreeAggregatedDL-PRS-Bandwidth-FR2***: Indicates the maximum aggregated DL-PRS bandwidth in MHz for FR2, which is supported and reported by UE.  **- *maximumOfDL-PRS-BandwidthPerPFL-FR1***: Indicates the maximum DL-PRS bandwidth in MHz for FR1, per PFL  **- *maximumOfDL-PRS-BandwidthPerPFL-FR2***: Indicates the maximum DL-PRS bandwidth in MHz for FR2, per PFL  **- *dl-PRS-BufferTypeOfBWA***: Indicates the DL-PRS buffering capability.  **- *prs-durationOfThreePRS-BWA-Processing***: Indicates the duration of DL-PRS symbols N in units of ms a UE can process every T ms assuming maximum aggregated DL-PRS bandwidth in MHz, which is supported and reported by UE.  **- *prs-durationOfThreePRS-BWA-ProcessingSymbolsN***: This field specifies the values for N. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50 ms.  **- *prs-durationOfThreePRS-BWA-ProcessingSymbolsT***: This field specifies the values for T. Enumerated values indicate 8, 16, 20, 30, 40, 80, 160, 320, 640, 1280, 3840 ms.  **- *maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR1***: Indicates the Maximum number of aggregated DL-PRS Resources across aggregated PFLs that UE can process in a slot for FR1.  **- *maxNumOfAggregatedDL-PRS-ResourcePerSlot-FR2***: Indicates the Maximum number of aggregated DL-PRS Resources across aggregated PFLs that UE can process in a slot for FR2.  NOTE 24: *dl-PRS-BufferTypeOfBWA* follows buffering capability type reported in *dl-PRS-BufferType.*  NOTE 25: The value N should be equal or smaller than the value N reported by *durationOfPRS-ProcessingSymbols*, or this value T should be equal or larger than the value T reported by *durationOfPRS-ProcessingSymbolsInEveryTms.*  NOTE 26: Each two linked DL-PRS resources are counted as 1 resource.  NOTE 27: *maxNumOfAggregatedDL-PRS-ResourcePerSlot* should be equal or smaller than the value reported by *maxNumOfDL-PRS-ResProcessedPerSlot-RRC-Inactive.* |
| ***reducedNumOfSampleInMeasurementWithPRS-BWA-RRC-Connected***  Indicates whether the UE supports reduced number of samples in positioning measurements with DL-PRS bandwidth aggregation for RRC\_CONNECTED. The UE can include this field only if the UE indicates the capability of maximum aggregated DL-PRS bandwidth for the supported FR1 or FR2 bands by using *maximumOfTwoAggregatedDL-PRS-Bandwidth-FR1* or *maximumOfTwoAggregatedDL-PRS-Bandwidth-FR2* of *prs-BWA-TwoContiguousIntrabandInMG-RRC-Connected****.*** Otherwise, the UE does not include this field. |
| ***reducedNumOfSampleInMeasurementWithPRS-BWA-RRC-IdleAndInactive***  Indicates whether the UE supports reduced number of samples in positioning measurements with DL-PRS bandwidth aggregation for RRC\_IDLE and RRC\_INACTIVE. The UE can include this field only if the UE indicates the capability of maximum aggregated DL-PRS bandwidth for the supported FR1 or FR2 bands by using *maximumOfTwoAggregatedDL-PRS-Bandwidth-FR1* or *maximumOfTwoAggregatedDL-PRS-Bandwidth-FR2* of *prs-BWA-TwoContiguousIntrabandInMG-RRC-Connected****.*** Otherwise, the UE does not include this field. |
| ***dl-PRS-MeasurementWithRxFH-RRC-Inactive***  Indicates the UE capability for support of DL-PRS measurement with Rx frequency hopping in RRC\_INACTIVE for RedCap UEs. The UE can include this field only if the UE supports *dl-PRS-MeasurementWithRxFH-RRC-Connected* and *prs-ProcessingRRC-Inactive* defined in TS 38.331 [35]. Otherwise, the UE does not include this field. |
| ***dl-PRS-MeasurementWithRxFH-RRC-Idle***  Indicates the UE capability for support of DL-PRS measurement with Rx frequency hopping in RRC\_IDLE for RedCap UEs. The UE can include this field only if the UE supports *dl-PRS-MeasurementWithRxFH-RRC-Connected*. Otherwise, the UE does not include this field. |
| ***reducedNumOfSampleForMeasurementWithFH-RRC-Connected***  Indicates whether the UE supports reduced number of samples for DL-PRS based positioning measurements with frequency hopping for RRC\_CONNECTED. The UE can include this field only if the UE supports *supportOfRedCap* or *supportOfERedCap* defined in TS 38.331 [35]*,* *supportedDL-PRS-ProcessingSamples-RRC-CONNECTED* and *dl-PRS-MeasurementWithRxFH-RRC-Connected*. Otherwise, the UE does not include this field. |
| ***reducedNumOfSampleForMeasurementWithFH-RRC-IdleAndInactive***  Indicates whether the UE supports reduced number of samples for DL-PRS based positioning measurements with frequency hopping for RRC\_IDLE and RRC\_INACTIVE. The UE can include this field only if the UE supports *supportOfRedCap* or *supportOfERedCap* defined in TS 38.331 [35], *supportedDL-PRS-ProcessingSamples-RRC-CONNECTED* and *dl-PRS-MeasurementWithRxFH-RRC-Connected*. Otherwise, the UE does not include this field. |
| ***supportOfPRS-BWA-WithTwoPFL-Combination***  Indicates whether the UE supports DL-PRS bandwidth aggregation with two PFL combinations. The UE can include this field only if the UE supports *prs-BWA-TwoContiguousIntrabandInMG-RRC-Connected*. Otherwise, the UE does not include this field. |
| ***dl-PRS-MeasurementWithRxFH-RRC-Connected***  Indicates the UE capability for DL-PRS measurement with Rx frequency hopping within a MG and measurement reporting in RRC\_CONNECTED for RedCap UEs. The UE can include this field only if the UE supports *supportedBandwidthPRS*, *dl-PRS-BufferType*, *durationOfPRS-Processing*, *maxNumOfDL-PRS-ResProcessedPerSlot* and one of *supportOfRedCap* and *supportOfERedCap* defined in TS 38.331 [35]. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***maximumPRS-BandwidthAcrossAllHopsFR1:*** Indicates the maximum DL-PRS bandwidth across all hops in MHz for FR1, which is supported and reported by UE.  - ***maximumPRS-BandwidthAcrossAllHopsFR2***: Indicates the maximum DL-PRS bandwidth across all hops in MHz for FR2, which is supported and reported by UE.  - ***maximumFH-Hops***: Indicates the maximum number of hops, which is supported and reported by UE.  - ***processingDuration***: Indicates the duration of DL-PRS symbols N3 in units of ms a UE can process every T3 ms.  - ***processingPRS-SymbolsDurationN3***: This field specifies the values for N3. Enumerated values indicate 0.125, 0.25, 0.5, 1, 2, 4, 6, 8, 12, 16, 20, 25, 30, 32, 35, 40, 45, 50 ms.  - ***processingDurationT3***: This field specifies the values for T3. Enumerated values indicate 8, 16, 20, 30, 40, 80, 160, 320, 640, 1280ms.  - ***rf-RxRetunTimeFR1***: Indicates the RF Rx retune times between consecutive hops for FR1. Enumerated values indicate 70, 140, 210us.  - ***rf-RxRetunTimeFR2***: Indicates the RF Rx retune times between consecutive hops for FR2. Enumerated values indicate 35, 70, 140us.  - ***numOfOverlappingPRB***: Indicates the overlapping PRB(s) between adjacent hops. Enumerated values indicate 0,1,2,4 PRBs.  NOTE 28: The maximum DL-PRS bandwidth per hop follows *supportedBandwidthPRS*.  NOTE 29: DL-PRS buffering capability follows *dl-PRS-BufferType*. |
| NOTE 9: When the target device provides the *durationOfPRS-Processing* capability (*N*, *T*) for any time window defined in TS 38.214 [45] clause 5.1.6.5, the target device should be capable of processing all DL-PRS Resources within , if  - where K is defined in the TS 38.214 [45] clause 5.1.6.5, and  - the number of DL-PRS Resources in each slot does not exceed the *maxNumOfDL-PRS-ResProcessedPerSlot*, and  - the configured measurement gap and a maximum ratio of measurement gap length (MGL) / measurement gap repetition period (MGRP) is as specified in TS 38.133 [46]. |

*NEXT CHANGE*

#### – *NR-IntegrityRiskParameters*

The IE *NR-IntegrityRiskParameters* is used by the location server to indicate the residual risks to UE.

-- ASN1START

NR-IntegrityRiskParameters-r18 ::= SEQUENCE {

nr-ProbOnsetTRP-Fault-r18 INTEGER (0..255),

nr-MeanTRP-FaultDuration-r18 INTEGER (1..3600),

...

}

-- ASN1STOP

|  |
| --- |
| *NR-IntegrityRiskParameters* field descriptions |
| ***nr-ProbOnsetTRP-Fault***  This field specifies the Probability of Onset of TRP Fault per Time Unit which is the probability of occurrence of TRP error to exceed the error bound for more than the Time to Alert (TTA).  This field specifies the onset probability that the error exceeds a bound created using the minimum allowed inflation factor *Kmin*, and bounding parameters as *mean* + *Kmin* \* *stdDev* where *Kmin* = *normInv*(*irMaximum* / 2), with *irMaximum* as provided in IE *nr-IntegrityServiceParameters*.  The probability is calculated by *P*=10-0.04*n* [hour-1] where *n* is the value of *nr-ProbOnsetTRP-Fault* and the range is 10-10.2 to 1 per hour. |
| ***nr-MeanTRP-FaultDuration***  This field specifies the Mean TRP Fault Duration which is the mean duration between when the occurrence of a TRP fault and the user being alerted by IE *NR-IntegrityServiceAlert* (or when the integrity violation is concluded).  Scale factor 1 s; range 1-3600 s. |

*NEXT CHANGE*

#### *– NR-On-Demand-DL-PRS-Configurations*

The IE *NR-On-Demand-DL-PRS-Configurations* provides a set of possible DL-PRS configurations which can be requested by the target device on-demand.

-- ASN1START

NR-On-Demand-DL-PRS-Configurations-r17 ::= SEQUENCE {

on-demand-dl-prs-configuration-list-r17 SEQUENCE (SIZE (1..maxOD-DL-PRS-Configs-r17)) OF

On-Demand-DL-PRS-Configuration-r17,

...,

[[

onDemandDL-PRS-AggregationList-r18 SEQUENCE (SIZE (1.. maxOD-DL-PRS-Configs-r17)) OF

OnDemandDL-PRS-AggregationInfo-r18 OPTIONAL-- Need OR

]]

}

On-Demand-DL-PRS-Configuration-r17 ::= SEQUENCE {

dl-prs-configuration-id-r17 DL-PRS-Configuration-ID-r17,

nr-DL-PRS-PositioningFrequencyLayer-r17 NR-DL-PRS-PositioningFrequencyLayer-r16,

nr-DL-PRS-Info-r17 NR-DL-PRS-Info-r16,

...

}

DL-PRS-Configuration-ID-r17 ::= SEQUENCE {

nr-dl-prs-configuration-id-r17 INTEGER (1..maxOD-DL-PRS-Configs-r17),

...

}

OnDemandDL-PRS-AggregationInfo-r18 ::= SEQUENCE (SIZE (2..3)) OF DL-PRS-Configuration-ID-r17

-- ASN1STOP

| *NR-On-Demand-DL-PRS-Configurations* field descriptions |
| --- |
| ***dl-prs-configuration-id***  This field identifies an *On-Demand-DL-PRS-Configuration* On-demand DL-PRS Configuration information*.* |
| ***nr-DL-PRS-PositioningFrequencyLayer***  This field, together with *nr-DL-PRS-Info*, provides the On-demand DL-PRS Configuration information.  Only the following fields in IE *NR-DL-PRS-PositioningFrequencyLayer* are applicable:  *dl-PRS-ResourceBandwidth*, *dl-PRS-CombSizeN.*  The target device shall ignore the remaining fields in IE *NR-DL-PRS-PositioningFrequencyLayer.* |
| ***nr-DL-PRS-Info***  This field, together with *nr-DL-PRS-PositioningFrequencyLayer*, provides the On-demand DL-PRS Configuration information. Only the following fields in IE *NR-DL-PRS-Info* are applicable:  DL-PRS periodicity in *dl-PRS-Periodicity-and-ResourceSetSlotOffset*, *dl-PRS-ResourceRepetitionFactor*, *dl-PRS-NumSymbols*, comb-size in *dl-PRS-CombSizeN-AndReOffset*, *dl-PRS-QCL-Info*.  The target device shall ignore the remaining fields in IE *NR-DL-PRS-Info.* |
| ***onDemandDL-PRS-AggregationList***  This field provides a list of DL-PRS bandwidth aggregation information where each entry of DL-PRS bandwidth aggregation information indicates the identities of 2 or 3 On-demand DL-PRS Configuration information for DL-PRS that are available for aggregation. |

#### – *NR-On-Demand-DL-PRS-Request*

The IE *NR-On-Demand-DL-PRS-Request* is used by the target device to request on-demand DL-PRS from a location server.

-- ASN1START

NR-On-Demand-DL-PRS-Request-r17 ::= SEQUENCE {

dl-prs-StartTime-and-Duration-r17 DL-PRS-StartTime-and-Duration-r17 OPTIONAL,

nr-on-demand-DL-PRS-Information-r17 NR-On-Demand-DL-PRS-Information-r17 OPTIONAL,

dl-prs-configuration-id-PrefList-r17 SEQUENCE (SIZE (1..maxOD-DL-PRS-Configs-r17)) OF   
 DL-PRS-Configuration-ID-r17 OPTIONAL,

...,

[[

dl-PRS-AggregationID-PrefList-r18 SEQUENCE (SIZE (1.. maxOD-DL-PRS-Configs-r17)) OF

INTEGER (1.. maxOD-DL-PRS-Configs-r17)

OPTIONAL,

nr-OnDemandDL-PRS-AggregationReqList-r18 SEQUENCE (SIZE (1.. maxOD-DL-PRS-Configs-r17)) OF

NR-OnDemandDL-PRS-AggregationReqElement-r18

OPTIONAL

]]

}

DL-PRS-StartTime-and-Duration-r17 ::= SEQUENCE {

dl-prs-start-time-r17 INTEGER (1..1024) OPTIONAL,

dl-prs-duration-r17 SEQUENCE {

seconds-r17 INTEGER (0..59) OPTIONAL,

minutes-r17 INTEGER (0..59) OPTIONAL,

hours-r17 INTEGER (0..23) OPTIONAL,

...

} OPTIONAL,

...

}

NR-OnDemandDL-PRS-AggregationReqElement-r18 ::= SEQUENCE (SIZE (2..3)) OF

INTEGER (1..nrMaxFreqLayers-r16)

-- ASN1STOP

|  |
| --- |
| *NR-On-Demand-DL-PRS-Request* field descriptions |
| ***dl-prs-StartTime-and-Duration***  This field specifies the requested start time and duration for the on-demand DL-PRS and comprises the following subfields:  - ***dl-prs-start-time*** specifies the desired start time for the requested DL-PRS. It indicates the time in seconds from the time the IE *NR-On-Demand-DL-PRS-Request* was received.  - ***dl-prs-duration*** specifies the desired duration of the requested DL-PRS. The desired duration is the sum of the *seconds*, *minutes*, *hours* fields. If this field is included, at least one of the *seconds*, *minutes*, *hours* fields shall be present. |
| ***nr-on-demand-DL-PRS-Information***  This field specifies the on-demand DL-PRS configuration information requested by the target device.  NOTE: If the network provided predefined on-demand DL-PRS configurations (*NR-On-Demand-DL-PRS-Configurations*), the target device can only request explicit parameters (*nr-on-demand-DL-PRS-Information*) within the scope of those configurations. |
| ***dl-prs-configuration-id-PrefList***  This field specifies the on-demand DL-PRS configuration associated with *DL-PRS-Configuration-ID* in IE *NR-On-Demand-DL-PRS-Configurations* the target device wishes to obtain in the order of preference. The first *DL-PRS-Configuration-ID* in the list is the most preferred configuration, the second *DL-PRS-Configuration-ID* the second most preferred, etc. |
| ***dl-PRS-AggregationID-PrefList***  This field specifies a list of identities i.e., *DL-PRS-Configuration-ID*, for On-demand DL-PRS Configuration information i.e., *On-Demand-DL-PRS-Configuration*, thatthe target device wishes to obtain, for DL-PRS aggregation, in the order of preference. The first integer value in the list is the most preferred On-demand DL-PRS Configuration information; the second integer value in the list is the second most preferred, etc. |
| ***nr-OnDemandDL-PRS-AggregationReqList***  This field specifies a list of DL-PRS for specific PFL combinations for which the DL-PRS information i.e., *NR-On-Demand-DL-PRS-Information*, is requested by the UE for DL-PRS aggregation, listed in the order of preference. The first *NR-OnDemandDL-PRS-AggregationReqElement* in the list is the most preferred PFL combination for DL-PRS aggregation; the second element in the list is the second most preferred, etc. |

*NEXT CHANGE*

#### *–* *NR-TRP-LocationInfo*

The IE *NR-TRP-LocationInfo* is used by the location server to provide the coordinates of TRPs and coordinates of the antenna reference points for a set of TRPs together with integrity information. For each TRP, the ARP location can be provided for each associated DL-PRS Resource ID per DL-PRS Resource Set.

-- ASN1START

NR-TRP-LocationInfo-r16 ::= SEQUENCE (SIZE (1..nrMaxFreqLayers-r16)) OF

NR-TRP-LocationInfoPerFreqLayer-r16

NR-TRP-LocationInfoPerFreqLayer-r16 ::= SEQUENCE {

referencePoint-r16 ReferencePoint-r16 OPTIONAL, -- Cond NotSameAsPrev

trp-LocationInfoList-r16 SEQUENCE (SIZE (1..nrMaxTRPsPerFreq-r16)) OF

TRP-LocationInfoElement-r16,

...

}

TRP-LocationInfoElement-r16 ::= SEQUENCE {

dl-PRS-ID-r16 INTEGER (0..255),

nr-PhysCellID-r16 NR-PhysCellID-r16 OPTIONAL, -- Need ON

nr-CellGlobalID-r16 NCGI-r15 OPTIONAL, -- Need ON

nr-ARFCN-r16 ARFCN-ValueNR-r15 OPTIONAL, -- Need ON

associated-DL-PRS-ID-r16 INTEGER (0..255) OPTIONAL, -- Need OP

trp-Location-r16 RelativeLocation-r16 OPTIONAL, -- Need OP

trp-DL-PRS-ResourceSets-r16 SEQUENCE (SIZE(1..nrMaxSetsPerTrpPerFreqLayer-r16)) OF

DL-PRS-ResourceSets-TRP-Element-r16 OPTIONAL, -- Need OP

...,

[[

trp-LocationCartesian-r18 RelativeCartesianLocation-r18 OPTIONAL, -- Need OP

nr-IntegrityTRP-LocationBounds-r18

NR-IntegrityLocationBounds-r18 OPTIONAL -- Need OR

]]

}

DL-PRS-ResourceSets-TRP-Element-r16 ::= SEQUENCE {

dl-PRS-ResourceSetARP-r16 RelativeLocation-r16 OPTIONAL, -- Need OP

dl-PRS-Resource-ARP-List-r16 SEQUENCE (SIZE(1..nrMaxResourcesPerSet-r16)) OF

DL-PRS-Resource-ARP-Element-r16 OPTIONAL, -- Need OP

...,

[[

dl-PRS-ResourceSetARP-Cartesian-r18 RelativeCartesianLocation-r18 OPTIONAL, -- Need OP

nr-IntegrityDL-PRS-ResourceSetARP-LocationBounds-r18

NR-IntegrityLocationBounds-r18 OPTIONAL -- Need OR

]]

}

DL-PRS-Resource-ARP-Element-r16 ::= SEQUENCE {

dl-PRS-Resource-ARP-location-r16 RelativeLocation-r16 OPTIONAL, -- Need OP

...,

[[

dl-PRS-Resource-ARP-locationCartesian-r18

RelativeCartesianLocation-r18 OPTIONAL, -- Need OP

nr-IntegrityDL-PRS-ResourceARP-LocationBounds-r18

NR-IntegrityLocationBounds-r18 OPTIONAL -- Need OR

]]

}

NR-IntegrityLocationBounds-r18 ::= SEQUENCE {

units-r18 ENUMERATED {mm, cm, m, ...},

meanLocationErrorBound-r18 SEQUENCE {

horizontal-r18 INTEGER (0..255),

vertical-r18 INTEGER (0..255)

},

stdDevLocationErrorBound-r18 SEQUENCE {

horizontal-r18 INTEGER (0..255),

vertical-r18 INTEGER (0..255)

},

...

}

-- ASN1STOP

| Conditional presence | Explanation |
| --- | --- |
| *NotSameAsPrev* | The field is mandatory present in the first entry of the *NR-TRP-LocationInfoPerFreqLayer* in the *nr-TRP-LocationInfo* list; otherwise it is optionally present, need OP. |

| *NR-TRP-LocationInfo* field descriptions |
| --- |
| ***referencePoint***  This field specifies the reference point used to define the location of TRPs provided in the *trp-LocationInfoList*. If this field is absent, the reference point is the same as in the previous entry of the *NR-TRP-LocationInfoPerFreqLayer* in the *NR-TRP-LocationInfo* list. |
| ***trp-LocationInfoList***  This field provides the antenna reference point locations of the DL-PRS Resources for the TRPs together with integrity information and comprises the following sub-fields:  - ***dl-PRS-ID***: This field is used along with a DL-PRS Resource Set ID and a DL-PRS Resource ID to uniquely identify a DL-PRS Resource, and is associated to a single TRP.  - ***nr-PhysCellID***: This field specifies the physical cell identity of the associated TRP.  - ***nr-CellGlobalID***: This field specifies the NCGI, the globally unique identity of a cell in NR, of the associated TRP.  - ***nr-ARFCN***: This field specifies the NR-ARFCN of the TRP's CD-SSB (as defined in TS 38.300 [47]) corresponding to *nr-PhysCellID*.  - ***associated-DL-PRS-ID***: This field, if present, specifies the *dl-PRS-ID* of the associated TRP from which the *trp-location* or *trp-LocationCartesian* information is adopted. If the field is present, the field *trp-Location* and *trp-LocationCartesian* shall be absent.  - ***trp-Location, trp-LocationCartesian***: This field provides the location of the TRP relative to the *referencePoint* location either in geodetic coordinates (*trp-Location*)or local Cartesian coordinates (*trp-LocationCartesian*). If none of *trp-Location*, *trp-LocationCartesian* is present, the TRP location coincides with the *referencePoint* location, unless the field *associated-dl-PRS-ID*is present, in which case the *trp-Location* or *trp-LocationCartesian* is adopted from the associated TRP indicated by *associated-dl-PRS-ID*.  - ***nr-IntegrityTRP-LocationBounds***: This field provides the mean and standard deviation TRP location error bound which is the mean value and the standard deviation of an overbounding model that bounds the TRP location error. This field comprises the following sub-fields:  - ***units***: This field specifies the units (scale factor) for the *meanLocationErrorBound* and s*tdDevLocationErrorBound*. Enumerated values mm, cm, and m correspond to 10-3 metre, 10-2 metre, and 1 metre, respectively.  - ***meanLocationErrorBound***: This field specifies the mean TRP Location Error bound in horizontal and vertical direction, which are the mean values for a set of two overbounding models that bound the TRP location error in horizontal and vertical directions.  Scale factor is 1 with units provided in *units* field.  - ***stdDevLocationErrorBound***: This field specifies the standard deviation TRP Location Error bound in horizontal and vertical direction, which are the standard deviation values for a set of two overbounding models that bound the TRP location error in horizontal and vertical directions.  Scale factor is 1 with units provided in *units* field.  - ***trp-DL-PRS-ResourceSets***: This field provides the antenna reference point location(s) of the DL-PRS Resource Set(s) associated with this TRP together with integrity information. If this field is absent, the antenna reference point location(s) of the DL-PRS Resource Set(s) coincides with the *trp-Location/trp-LocationCartesian* location. This field comprises the following sub-fields:  - ***dl-PRS-ResourceSetARP, dl-PRS-ResourceSetARP-Cartesian***: This field provides the antenna reference point location of the DL-PRS Resource Set relative to the *trp-Location* or *trp-LocationCartesian* location. If none of *dl-PRS-ResourceSetARP*, *dl-PRS-ResourceSetARP-Cartesian* is present, the antenna reference point location of this DL-PRS Resource Set coincides with the *trp-Location* or *trp-LocationCartesian* location.  - ***nr-IntegrityDL-PRS-ResourceSetARP-LocationBounds***: This field provides the mean and the standard deviation ARP of the location error bound of the DL-PRS Resource Set of an overbounding model that bounds the antenna reference point location error of the DL-PRS Resource Set. This field comprises the sub-fields *units***,** *meanLocationErrorBound,* and *stdDevLocationErrorBound****,*** as described under *nr-IntegrityTRP-LocationBounds*.  - ***dl-PRS-Resource-ARP-List***: This field provides the antenna reference point location(s) of the DL-PRS Resource(s) associated with this Resource Set of the TRP together with integrity information. If this field is absent, the antenna reference point location(s) of the DL-PRS Resources coincides with the *dl-PRS-ResourceSetARP* location or *dl-PRS-ResourceSetARP-Cartesian*. This field comprises the following sub-fields:  - ***dl-PRS-Resource-ARP-location, dl-PRS-Resource-ARP-locationCartesian***: This field provides the antenna reference point location of the DL-PRS Resource associated with the DL-PRS Resource Set of the TRP relative to the *dl-PRS-ResourceSetARP/dl-PRS-ResourceSetARP-Cartesian* location. If none of *dl-PRS-Resource-ARP-location*, *dl-PRS-Resource-ARP-locationCartesian* is present, the antenna reference point location of this DL-PRS Resource coincides with the *dl-PRS-ResourceSetARP* location or *dl-PRS-Resource-ARP-locationCartesian*.  - ***nr-IntegrityDL-PRS-ResourceARP-LocationBounds***: This field provides the mean and the standard deviation ARP of the location error bound of the DL-PRS Resources of an overbounding model that bounds the antenna reference point location error of the DL-PRS Resource. This field comprises the sub-fields *units***,** *meanLocationErrorBound,* and *stdDevLocationErrorBound****,*** as described under *nr-IntegrityTRP-LocationBounds*. |

NOTE 5: The locations may be provided in either geodetic coordinates (*RelativeLocation*) or local Cartesian coordinates (*RelativeCartesianLocation*), but not both. Local Cartesian coordinates are provided with respect to the *horizAxesOrientation* of the local origin defined by the *referencePoint* field.

*NEXT CHANGE*

#### *– NR-UL-SRS-Capability*

The IE *NR-UL-SRS-Capability* defines the UE uplink SRS capability.

-- ASN1START

NR-UL-SRS-Capability-r16 ::= SEQUENCE {

srs-CapabilityBandList-r16 SEQUENCE (SIZE (1..nrMaxBands-r16)) OF

SRS-CapabilityPerBand-r16,

srs-PosResourceConfigCA-BandList-r16 SEQUENCE (SIZE (1..nrMaxConfiguredBands-r16)) OF

SRS-PosResourcesPerBand-r16 OPTIONAL,

maxNumberSRS-PosPathLossEstimateAllServingCells-r16

ENUMERATED {n1, n4, n8, n16} OPTIONAL,

maxNumberSRS-PosSpatialRelationsAllServingCells-r16

ENUMERATED {n0, n1, n2, n4, n8, n16} OPTIONAL,

...

}

SRS-CapabilityPerBand-r16 ::= SEQUENCE {

freqBandIndicatorNR-r16 FreqBandIndicatorNR-r16,

olpc-SRS-Pos-r16 OLPC-SRS-Pos-r16 OPTIONAL,

spatialRelationsSRS-Pos-r16 SpatialRelationsSRS-Pos-r16 OPTIONAL,

...,

[[

posSRS-RRC-Inactive-InInitialUL-BWP-r17 PosSRS-RRC-Inactive-InInitialUL-BWP-r17 OPTIONAL,

posSRS-RRC-Inactive-OutsideInitialUL-BWP-r17

PosSRS-RRC-Inactive-OutsideInitialUL-BWP-r17

OPTIONAL,

olpc-SRS-PosRRC-Inactive-r17 OLPC-SRS-Pos-r16 OPTIONAL,

spatialRelationsSRS-PosRRC-Inactive-r17 SpatialRelationsSRS-Pos-r16 OPTIONAL

]],

[[

posSRS-SP-RRC-Inactive-InInitialUL-BWP-r17 PosSRS-SP-RRC-Inactive-InInitialUL-BWP-r17

OPTIONAL

]],

[[

posSRS-Preconfigured-RRC-InactiveInitialUL-BWP-r18 ENUMERATED {supported} OPTIONAL,

posSRS-Preconfigured-RRC-InactiveOutsideInitialUL-BWP-r18 ENUMERATED {supported} OPTIONAL,

posSRS-ValidityAreaRRC-InactiveInitialUL-BWP-r18 ENUMERATED {supported} OPTIONAL,

posSRS-ValidityAreaRRC-InactiveOutsideInitialUL-BWP-r18 ENUMERATED {supported} OPTIONAL,

posSRS-TxFH-RRC-Connected-r18 PosSRS-TxFrequencyHoppingRRC-Connected-r18 OPTIONAL,

posSRS-TxFH-RRC-Inactive-r18 PosSRS-TxFrequencyHoppingRRC-Inactive-r18 OPTIONAL,

posSRS-TxFH-WithTimeWindow-r18 ENUMERATED {supported} OPTIONAL,

posSRS-BWA-RRC-Inactive-r18 PosSRS-BWA-RRC-Inactive-r18 OPTIONAL

]]

}

OLPC-SRS-Pos-r16 ::= SEQUENCE {

olpc-SRS-PosBasedOnPRS-Serving-r16 ENUMERATED {supported} OPTIONAL,

olpc-SRS-PosBasedOnSSB-Neigh-r16 ENUMERATED {supported} OPTIONAL,

olpc-SRS-PosBasedOnPRS-Neigh-r16 ENUMERATED {supported} OPTIONAL,

maxNumberPathLossEstimatePerServing-r16 ENUMERATED {n1, n4, n8, n16} OPTIONAL,

...

}

SpatialRelationsSRS-Pos-r16 ::= SEQUENCE {

spatialRelation-SRS-PosBasedOnSSB-Serving-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnCSI-RS-Serving-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnPRS-Serving-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnSRS-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnSSB-Neigh-r16 ENUMERATED {supported} OPTIONAL,

spatialRelation-SRS-PosBasedOnPRS-Neigh-r16 ENUMERATED {supported} OPTIONAL,

...

}

SRS-PosResourcesPerBand-r16 ::= SEQUENCE {

freqBandIndicatorNR-r16 FreqBandIndicatorNR-r16,

maxNumberSRS-PosResourceSetsPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n12, n16},

maxNumberSRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumberPeriodicSRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maxNumberAP-SRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64}

OPTIONAL,

maxNumberSP-SRS-PosResourcesPerBWP-r16 ENUMERATED {n1, n2, n4, n8, n16, n32, n64}

OPTIONAL,

...,

[[

posSRS-BWA-RRC-Connected-r18 PosSRS-BWA-RRC-Connected-r18 OPTIONAL,

posSRS-BWA-IndependentCA-RRC-Connected-r18 PosSRS-BWA-IndependentCA-RRC-Connected-r18

OPTIONAL

]]

}

PosSRS-RRC-Inactive-InInitialUL-BWP-r17 ::= SEQUENCE {

maxNumOfSRSposResourceSets-r17 ENUMERATED {n1, n2, n4, n8, n12, n16 } OPTIONAL,

maxNumOfPeriodicAndSemiPersistentSRSposResources-r17

ENUMERATED {n1, n2, n4, n8, n16, n32, n64 }

OPTIONAL,

maxNumOfPeriodicAndSemiPersistentSRSposResourcesPerSlot-r17

ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

OPTIONAL,

maxNumOfPeriodicSRSposResources-r17

ENUMERATED {n1, n2, n4, n8, n16, n32, n64 }

OPTIONAL,

maxNumOfPeriodicSRSposResourcesPerSlot-r17

ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

OPTIONAL,

dummy1 ENUMERATED {n1, n2, n4, n8, n16, n32, n64} OPTIONAL,

dummy2 ENUMERATED { n1, n2, n3, n4, n5, n6, n8, n10, n12, n14 }

OPTIONAL,

...

}

PosSRS-RRC-Inactive-OutsideInitialUL-BWP-r17 ::= SEQUENCE {

maxSRSposBandwidthForEachSCS-withinCC-FR1-r17

ENUMERATED { mhz5, mhz10, mhz15, mhz20, mhz25, mhz30,  
 mhz35, mhz40, mhz45, mhz50, mhz60, mhz70,

mhz80, mhz90, mhz100 } OPTIONAL,

maxSRSposBandwidthForEachSCS-withinCC-FR2-r17

ENUMERATED {mhz50, mhz100, mhz200, mhz400} OPTIONAL,

maxNumOfSRSposResourceSets-r17 ENUMERATED { n1, n2, n4, n8, n12, n16 } OPTIONAL,

maxNumOfPeriodicSRSposResources-r17 ENUMERATED { n1, n2, n4, n8, n16, n32, n64 }

OPTIONAL,

maxNumOfPeriodicSRSposResourcesPerSlot-r17

ENUMERATED { n1, n2, n3, n4, n5, n6, n8, n10, n12, n14 }

OPTIONAL,

differentNumerologyBetweenSRSposAndInitialBWP-r17

ENUMERATED { supported } OPTIONAL,

srsPosWithoutRestrictionOnBWP-r17

ENUMERATED { supported } OPTIONAL,

maxNumOfPeriodicAndSemiPersistentSRSposResources-r17

ENUMERATED {n1, n2, n4, n8, n16, n32, n64} OPTIONAL,

maxNumOfPeriodicAndSemiPersistentSRSposResourcesPerSlot-r17

ENUMERATED { n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14 } OPTIONAL,

differentCenterFreqBetweenSRSposAndInitialBWP-r17

ENUMERATED { supported } OPTIONAL,

maxNumOfSemiPersistentSRSposResources-r17

ENUMERATED { n1, n2, n4, n8, n16, n32, n64 }

OPTIONAL,

maxNumOfSemiPersistentSRSposResourcesPerSlot-r17

ENUMERATED { n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14 } OPTIONAL,

switchingTimeSRS-TX-OtherTX-r17 ENUMERATED { us100, us140, us200, us300, us500 }

OPTIONAL,

...

}

PosSRS-SP-RRC-Inactive-InInitialUL-BWP-r17 ::= SEQUENCE {

maxNumOfSemiPersistentSRSposResources-r17

ENUMERATED {n1, n2, n4, n8, n16, n32, n64} OPTIONAL,

maxNumOfSemiPersistentSRSposResourcesPerSlot-r17

ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10, n12, n14}

OPTIONAL,

...

}

PosSRS-TxFrequencyHoppingRRC-Connected-r18 ::= SEQUENCE {

maximumSRS-BandwidthAcrossAllHopsFR1-r18 ENUMERATED {mhz40, mhz50, mhz80, mhz100}

OPTIONAL,

maximumSRS-BandwidthAcrossAllHopsFR2-r18 ENUMERATED {mhz100, mhz200, mhz400} OPTIONAL,

maximumTxFH-Hops-r18 ENUMERATED {n2, n3, n4, n5, n6} OPTIONAL,

rf-TxRetuneTimeFR1-r18 ENUMERATED {n70, n140, n210} OPTIONAL,

rf-TxRetuneTimeFR2-r18 ENUMERATED {n35, n70, n140} OPTIONAL,

switchTimeBetweenActiveBWP-FrequencyHop-r18 ENUMERATED {n100, n140,n200,n300,n500} OPTIONAL,

numOfOverlappingPRB-r18 ENUMERATED {n0, n1, n2, n4} OPTIONAL,

maximumSRS-ResourcePeriodic-r18 ENUMERATED {n1, n2, n4, n8, n16, n32, n64}

OPTIONAL,

maximumSRS-ResourceAperiodic-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64}

OPTIONAL,

maximumSRS-ResourceSemipersistent-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64}

OPTIONAL,

...

}

PosSRS-TxFrequencyHoppingRRC-Inactive-r18 ::=SEQUENCE {

maximumSRS-BandwidthAcrossAllHopsFR1-r18 ENUMERATED {mhz40, mhz50, mhz80, mhz100}

OPTIONAL,

maximumSRS-BandwidthAcrossAllHopsFR2-r18 ENUMERATED {mhz100, mhz200, mhz400} OPTIONAL,

maximumTxFH-Hops-r18 ENUMERATED {n2, n3, n4, n5, n6} OPTIONAL,

rf-TxRetuneTimeFR1-r18 ENUMERATED {n70, n140, n210} OPTIONAL,

rf-TxRetuneTimeFR2-r18 ENUMERATED {n35, n70, n140} OPTIONAL,

switchTimeBetweenActiveBWP-FrequencyHop-r18 ENUMERATED {n100, n140,n200,n300,n500} OPTIONAL,

numOfOverlappingPRB-r18 ENUMERATED {n0, n1, n2, n4} OPTIONAL,

maximumSRS-ResourcePeriodic-r18 ENUMERATED {n1, n2, n4, n8, n16, n32, n64}

OPTIONAL,

maximumSRS-ResourceSemipersistent-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64}

OPTIONAL,

...

}

PosSRS-BWA-RRC-Connected-r18 ::=SEQUENCE {

numOfCarriersIntraBandContiguous-r18 ENUMERATED {two, three, twoandthree},

maximumAggregatedBW-TwoCarriersFR1-r18 ENUMERATED {mhz20, mhz40, mhz50, mhz80, mhz100,

mhz160, mhz180, mhz190, mhz200}

OPTIONAL,

maximumAggregatedBW-TwoCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz400, mhz600,

mhz800} OPTIONAL,

maximumAggregatedBW-ThreeCarriersFR1-r18 ENUMERATED {mhz80, mhz100, mhz160, mhz200, mhz240,

mhz300} OPTIONAL,

maximumAggregatedBW-ThreeCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz300, mhz400,

mhz600, mhz800, mhz1000, mhz1200}

OPTIONAL,

maximumAggregatedResourceSet-r18 ENUMERATED {n1, n2, n4, n8, n12, n16},

maximumAggregatedResourcePeriodic-r18 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maximumAggregatedResourceAperiodic-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

maximumAggregatedResourceSemi-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

maximumAggregatedResourcePeriodicPerSlot-r18

ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14},

maximumAggregatedResourceAperiodicPerSlot-r18

ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14},

maximumAggregatedResourceSemiPerSlot-r18 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14},

...

}

PosSRS-BWA-IndependentCA-RRC-Connected-r18 ::=SEQUENCE {

numOfCarriersIntraBandContiguous-r18 ENUMERATED {two, three, twoandthree},

maximumAggregatedBW-TwoCarriersFR1-r18 ENUMERATED {mhz20, mhz40, mhz50, mhz80, mhz100,

mhz160, mhz180, mhz190, mhz200}

OPTIONAL,

maximumAggregatedBW-TwoCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz400, mhz600,

mhz800} OPTIONAL,

maximumAggregatedBW-ThreeCarriersFR1-r18 ENUMERATED {mhz80, mhz100, mhz160, mhz200, mhz240,

mhz300} OPTIONAL,

maximumAggregatedBW-ThreeCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz300, mhz400,

mhz600, mhz800, mhz1000, mhz1200}

OPTIONAL,

maximumAggregatedResourceSet-r18 ENUMERATED {n1, n2, n4, n8, n12, n16},

maximumAggregatedResourcePeriodic-r18 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maximumAggregatedResourceAperiodic-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

maximumAggregatedResourceSemi-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

maximumAggregatedResourcePeriodicPerSlot-r18

ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14},

maximumAggregatedResourceAperiodicPerSlot-r18

ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14},

maximumAggregatedResourceSemiPerSlot-r18 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14},

guardPeriod-r18 ENUMERATED {n0, n30, n100, n140, n200},

powerClassForTwoAggregatedCarriers-r18 ENUMERATED {pc2, pc3} OPTIONAL,

powerClassForThreeAggregatedCarriers-r18 ENUMERATED {pc2, pc3} OPTIONAL,

...

}

PosSRS-BWA-RRC-Inactive-r18 ::=SEQUENCE {

numOfCarriersIntraBandContiguous-r18 ENUMERATED {two, three, twoandthree},

maximumAggregatedBW-TwoCarriersFR1-r18 ENUMERATED {mhz20, mhz40, mhz50, mhz80, mhz100,

mhz160, mhz180, mhz190, mhz200}

OPTIONAL,

maximumAggregatedBW-TwoCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz400, mhz600,

mhz800} OPTIONAL,

maximumAggregatedBW-ThreeCarriersFR1-r18 ENUMERATED {mhz80, mhz100, mhz160, mhz200, mhz240,

mhz300} OPTIONAL,

maximumAggregatedBW-ThreeCarriersFR2-r18 ENUMERATED {mhz50, mhz100, mhz200, mhz300, mhz400,

mhz600, mhz800, mhz1000, mhz1200}

OPTIONAL,

maximumAggregatedResourceSet-r18 ENUMERATED {n1, n2, n4, n8, n12, n16},

maximumAggregatedResourcePeriodic-r18 ENUMERATED {n1, n2, n4, n8, n16, n32, n64},

maximumAggregatedResourceSemi-r18 ENUMERATED {n0, n1, n2, n4, n8, n16, n32, n64},

maximumAggregatedResourcePeriodicPerSlot-r18

ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14},

maximumAggregatedResourceSemiPerSlot-r18 ENUMERATED {n0, n1, n2, n3, n4, n5, n6, n8, n10,

n12, n14},

guardPeriod-r18 ENUMERATED {n0, n30, n100, n140, n200},

powerClassForTwoAggregatedCarriers-r18 ENUMERATED {pc2, pc3} OPTIONAL,

powerClassForThreeAggregatedCarriers-r18 ENUMERATED {pc2, pc3} OPTIONAL,

...

}

-- ASN1STOP

|  |
| --- |
| *NR-UL-SRS-Capability* field descriptions |
| ***srs-PosResourceConfigCA-BandList***  This field indicates the number of SRS for positioning resources supported by the target device. The target device includes this field for each band which belongs to the *srs-CapabilityBandList* for the current configured CA band combination. The capability signalling comprises the following parameters:  - ***freqBandIndicatorNR***indicates the current configured NR band of the target device.  - ***maxNumberSRS-PosResourceSetsPerBWP***indicates the maximum number of SRS Resource Sets for positioning supported by the target device per BWP. Enumerated values *n1*, *n2*, *n4*, *n8*, *n12*, *n16* correspond to 1, 2, 4, 8, 12, 16 SRS Resource Sets for positioning, respectively.  - ***maxNumberSRS-PosResourcesPerBWP***indicates the maximum number of periodic, semi-persistent, and aperiodic SRS Resources for positioning supported by the target device per BWP. Enumerated values *n1, n2, n4, n8, n16, n32, n64* correspond to 1, 2, 4, 8, 16, 32, 64 SRS Resources for positioning, respectively.  - ***maxNumberPeriodicSRS-PosResourcesPerBWP***indicates the maximum number of periodic SRS Resources for positioning supported by the target device per BWP. Enumerated values *n1, n2, n4, n8, n16, n32, n64* correspond to 1, 2, 4, 8, 16, 32, 64 periodic SRS Resources for positioning, respectively.  - ***maxNumberAP-SRS-PosResourcesPerBWP***indicates the maximum number of aperiodic SRS Resources for positioning supported by the target device per BWP. Enumerated values *n1, n2, n4, n8, n16, n32, n64* correspond to 1, 2, 4, 8, 16, 32, 64 aperiodic SRS Resources for positioning, respectively.  - ***maxNumberSP-SRS-PosResourcesPerBWP***indicates the maximum number of semi-persistent SRS Resources for positioning supported by the target device per BWP. Enumerated values *n1, n2, n4, n8, n16, n32, n64* correspond to 1, 2, 4, 8, 16, 32, 64 semi-persistent SRS Resources for positioning, respectively. |
| ***maxNumberSRS-PosPathLossEstimateAllServingCells***  Indicates the maximum number of pathloss estimates that the UE can simultaneously maintain for all the SRS resource sets for positioning across all cells in addition to the up to four pathloss estimates that the UE maintains per serving cell for the PUSCH/PUCCH/SRS transmissions. The UE shall include this field if the UE supports any of *olpc-SRS-PosBasedOnPRS-Serving, olpc-SRS-PosBasedOnSSB-Neigh* and *olpc-SRS-PosBasedOnPRS-Neigh.* Otherwise, the UE does not include this field. |
| ***maxNumberSRS-PosSpatialRelationsAllServingCells***  indicates the maximum number of maintained spatial relations for all the SRS resource sets for positioning across all serving cells in addition to the spatial relations maintained spatial relations per serving cell for the PUSCH/PUCCH/SRS transmissions. It is only applied for FR2. The UE can include this field only if the UE supports any of *spatialRelation-SRS-PosBasedOnSSB-Serving*, *spatialRelation-SRS-PosBasedOnCSI-RS-Serving*, *spatialRelation-SRS-PosBasedOnPRS-Serving*, *spatialRelation-SRS-PosBasedOnSSB-Neigh* or *spatialRelation-SRS-PosBasedOnPRS-Neigh*. Otherwise, the UE does not include this field. |
| ***olpc-SRS-Pos***  Indicates whether the UE supports open-loop power control for SRS for positioning. The capability signalling comprises the following parameters:  - ***olpc-SRS-PosBasedOnPRS-Serving***indicates whether the UE supports OLPC for SRS for positioning based on DL-PRS from the serving cell in the same band. The UE can include this field only if the UE supports NR-DL-*PRS-ProcessingCapability* and *srs-PosResources* TS38.331 [35] Otherwise, the UE does not include this field.  - ***olpc-SRS-PosBasedOnSSB-Neigh***indicates whether the UE supports OLPC for SRS for positioning based on SSB from the neighbouring cell in the same band. The UE can include this field only if the UE supports *srs-PosResources* TS 38.331 [35]. Otherwise, the UE does not include this field.  - ***olpc-SRS-PosBasedOnPRS-Neigh***indicates whether the UE supports OLPC for SRS for positioning based on DL-PRS from the neighbouring cell in the same band. The UE can include this field only if the UE supports *olpc-SRS-PosBasedOnPRS-Serving*. Otherwise, the UE does not include this field.  Note: A DL-PRS from a PRS-only TP is treated as DL-PRS from a non-serving cell.  - ***maxNumberPathLossEstimatePerServing***indicates the maximum number of pathloss estimates that the UE can simultaneously maintain for all the SRS resource sets for positioning per serving cell in addition to the up to four pathloss estimates that the UE maintains per serving cell for the PUSCH/PUCCH/SRS transmissions. The UE shall include this field if the UE supports any of *olpc-SRS-PosBasedOnPRS-Serving, olpc-SRS-PosBasedOnSSB-Neigh* and *olpc-SRS-PosBasedOnPRS-Neigh.* Otherwise, the UE does not include this field. |
| ***spatialRelationsSRS-Pos***  Indicates whether the UE supports spatial relations for SRS for positioning. It is only applicable for FR2. The capability signalling comprises the following parameters:  - ***spatialRelation-SRS-PosBasedOnSSB-Serving*** indicates whether the UE supports spatial relation for SRS for positioning based on SSB from the serving cell in the same band. The UE can include this field only if the UE supports *srs-PosResources* TS 38.331 [35]. Otherwise, the UE does not include this field.  - ***spatialRelation-SRS-PosBasedOnCSI-RS-Serving*** indicates whether the UE supports spatial relation for SRS for positioning based on CSI-RS from the serving cell in the same band. The UE can include this field only if the UE supports *spatialRelation-SRS-PosBasedOnSSB-Serving*. Otherwise, the UE does not include this field.  - ***spatialRelation-SRS-PosBasedOnPRS-Serving***indicates whether the UE supports spatial relation for SRS for positioning based on DL-PRS from the serving cell in the same band. The UE can include this field only if the UE supports any of DL-PRS Resources for DL-AoD, DL-PRS Resources for DL-TDOA or DL-PRS Resources for Multi-RTT, or *srs-PosResources* TS 38.331 [35]. Otherwise, the UE does not include this field.  - ***spatialRelation-SRS-PosBasedOnSRS***indicates whether the UE supports spatial relation for SRS for positioning based on SRS in the same band. The UE can include this field only if the UE supports *srs-PosResources* TS 38.331 [35]. Otherwise, the UE does not include this field.  - ***spatialRelation-SRS-PosBasedOnSSB-Neig****h* indicates whether the UE supports spatial relation for SRS for positioning based on SSB from the neighbouring cell in the same band. The UE can include this field only if the UE supports *spatialRelation-SRS-PosBasedOnSSB-Serving*. Otherwise, the UE does not include this field.  - ***spatialRelation-SRS-PosBasedOnPRS-Neigh***indicates whether the UE supports spatial relation for SRS for positioning based on DL-PRS from the neighbouring cell in the same band. The UE can include this field only if the UE supports *spatialRelation-SRS-PosBasedOnPRS-Serving*. Otherwise, the UE does not include this field.  Note: A DL-PRS from a PRS-only TP is treated as DL-PRS from a non-serving cell. |
| ***posSRS-RRC-Inactive-InInitialUL-BWP***  Indicates whether the UE supports positioning SRS transmission in RRC\_INACTIVE state for initial UL BWP. The capability signalling comprises the following parameters:  - ***maxNumOfSRSposResourceSets*** indicates the maximum number of SRS Resource Sets for positioning supported by the UE.  - ***maxNumOfPeriodicAndSemiPersistentSRSposResources*** indicates the maximum number of periodic and semi-persistent SRS Resources for positioning supported by the UE.  - ***maxNumOfPeriodicAndSemiPersistentSRSposResourcesPerSlot***indicates the maximum number of periodic and semi-persistent SRS Resources for positioning per slot supported by the UE.  - ***maxNumOfPeriodicSRSposResources***indicates the maximum number of periodic SRS Resources for positioning supported by the UE.  - ***maxNumOfPeriodicSRSposResourcesPerSlot***indicates the maximum number of periodic SRS Resources for positioning per slot supported by the UE.  - ***dummy1, dummy2***are not used in the specification. If received they shall be ignored by the receiver. |
| ***posSRS-RRC-Inactive-OutsideInitialUL-BWP***  Indicates whether the UE supports positioning SRS transmission in RRC\_INACTIVE state outside initial UL BWP. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-InInitialUL-BWP*. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***maxSRSposBandwidthForEachSCS-withinCC-FR1*** indicates the maximum SRS bandwidth in MHz supported for each SCS that UE supports within a single CC for FR1.  - ***maxSRSposBandwidthForEachSCS-withinCC-FR2*** indicates the maximum SRS bandwidth in MHz supported for each SCS that UE supports within a single CC for FR2.  - ***maxNumOfSRSposResourceSets*** indicates the maximum number of SRS Resource Sets for positioning supported by the UE.  - ***maxNumOfPeriodicSRSposResources***indicates the maximum number of periodic SRS Resources for positioning supported by the UE.  - ***maxNumOfPeriodicSRSposResourcesPerSlot***indicates the maximum number of periodic SRS Resources for positioning per slot supported by the UE.  - ***differentNumerologyBetweenSRSposAndInitialBWP***indicates whether different numerology between the SRS and the initial UL BWP is supported by the UE. If the field is absent, the UE only supports same numerology between the SRS and the initial UL BWP.  - ***srsPosWithoutRestrictionOnBWP*** indicates whether SRS operation without restriction on the BW is supported by the UE; BW of the SRS may not include BW of the CORESET#0 and SSB. If the field is absent, the UE supports only SRS BW that includes the BW of the CORESET #0 and SSB.  - ***maxNumOfPeriodicAndSemiPersistentSRSposResources*** indicates the maximum number of periodic and semi-persistent SRS Resources for positioning supported by the UE.  - ***maxNumOfPeriodicAndSemiPersistentSRSposResourcesPerSlot*** indicates the maximum number of periodic and semi-persistent SRS Resources for positioning per slot supported by the UE.  - ***differentCenterFreqBetweenSRSposAndInitialBWP*** indicates whether different center frequency between the SRS for positioning and the initial UL BWP is supported by the UE. If the field is absent, the UE only supports same center frequency between the SRS for positioning and initial UL BWP.  - ***maxNumOfSemiPersistentSRSposResources***indicates the maximum number of semi-persistent SRS Resources for positioning supported by the UE. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-InInitialUL-BWP*. Otherwise, the UE does not include this field.  - ***maxNumOfSemiPersistentSRSposResourcesPerSlot***indicates the maximum number of semi-persistent SRS Resources for positioning per slot supported by the UE. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-InInitialUL-BWP*. Otherwise, the UE does not include this field.  - ***switchingTimeSRS-TX-OtherTX*** indicates the switching time between SRS Tx and other Tx in initial UL BWP or Rx in initial DL BWP. |
| ***olpc-SRS-PosRRC-Inactive***  Indicates whether the UE supports open-loop power control for SRS for positioning in RRC\_INACTIVE state. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-InInitialUL-BWP*. Otherwise, the UE does not include this field. |
| ***spatialRelationsSRS-PosRRC-Inactive***  Indicates whether the UE supports spatial relations for SRS for positioning in RRC\_INACTIVE state on FR2. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-InInitialUL-BWP*. Otherwise, the UE does not include this field. |
| ***posSRS-SP-RRC-Inactive-InInitialUL-BWP***  Indicates whether the UE supports positioning SRS transmission in RRC\_INACTIVE state for initial UL BWP with semi-persistent SRS. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-InInitialUL-BWP*. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***maxNumOfSemiPersistentSRSposResources*** indicates the maximum number of semi-persistent SRS Resources for positioning supported by the UE.  - ***maxNumOfSemiPersistentSRSposResourcesPerSlot*** indicates the maximum number of semi-persistent SRS Resources for positioning per slot supported by the UE. |
| ***posSRS-Preconfigured-RRC-InactiveInitialUL-BWP***  Indicates whether the UE supports pre-configured SRS with validity area in RRC\_INACTIVE for initial UL BWP. The UE can include this field only if the UE supports *posSRS-ValidityAreaRRC-InactiveInitialUL-BWP*. Otherwise, the UE does not include this field. |
| ***posSRS-Preconfigured-RRC-InactiveOutsideInitialUL-BWP***  Indicates whether the UE supports pre-configured SRS with validity area in RRC\_INACTIVE outside initial UL BWP. The UE can include this field only if the UE supports *posSRS-ValidityAreaRRC-InactiveOutsideInitialUL-BWP*. Otherwise, the UE does not include this field. |
| ***posSRS-ValidityAreaRRC-InactiveInitialUL-BWP***  Indicates whether the UE supports SRS for positioning configuration in multi cells in RRC\_INACTIVE for initial UL BWP. The UE can include this field only if the UE support *posSRS-RRC-Inactive-InInitialUL-BWP*. Otherwise, the UE does not include this field. |
| ***posSRS-ValidityAreaRRC-InactiveOutsideInitialUL-BWP***  Indicates whether the UE supports SRS for positioning configuration in multi cells in RRC\_INACTIVE outside initial UL BWP. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-OutsideInitialUL-BWP* and *posSRS-ValidityAreaRRC-InactiveInitialUL-BWP****.*** Otherwise, the UE does not include this field. |
| ***posSRS-TxFH-RRC-Connected***  Indicates the UE capability for support of positioning SRS with Tx frequency hopping in RRC\_CONNECTED for RedCap UEs. The UE can include this field only if the UE supports *SRS-AllPosResources* and one of *supportOfRedCap* and *supportOfERedCap* defined in TS 38.331 [35]. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***maximumSRS-BandwidthAcrossAllHopsFR1***: Indicates the maximum positioning SRS bandwidth across all hops in MHz for FR1, which is supported and reported by UE.  - ***maximumSRS-BandwidthAcrossAllHopsFR2***: Indicates the maximum positioning SRS bandwidth across all hops in MHz for FR2, which is supported and reported by UE.  - ***maximumTxFH-Hops***: Indicates the maximum number of transmission hops, which is supported and reported by UE.  - ***rf-TxRetuneTimeFR1***: Indicates the RF Tx retune times between consecutive hops for FR1. Enumerated values indicate 70, 140, 210µs.  - ***rf-TxRetuneTimeFR2***: Indicates the RF Tx retune times between consecutive hops for FR2. Enumerated values indicate 35, 70, 140µs.  - ***switchTimeBetweenActiveBWP-FrequencyHop***: Indicates the switching time between active BWP and frequency hop. Enumerated values indicate 100, 140, 200, 300, 500µs.  - ***numOverlappingPRB***: Indicates the overlapping PRB(s) between adjacent hops. Enumerated values indicate 0,1,2,4 PRBs.  - ***maximumSRS-ResourcePeriodic***: Indicates the maximum number of periodic positioning SRS resources with Tx frequency hopping.  - ***maximumSRS-ResourceAperiodic***: Indicates the maximum number of aperiodic positioning SRS resources with Tx frequency hopping.  - ***maximumSRS-ResourceSemipersistent***: Indicates the maximum number of Semi-persistent positioning SRS resources with Tx frequency hopping.  NOTE 1: No additional UE requirements shall be specified for the case of Tx hopping with non-overlapping hops compared to the case of Tx hopping with overlapping hops, e.g., a UE is not responsible for keeping phase continuity across the hops in either case of overlapping or non-overlapping hops. |
| ***posSRS-TxFH-RRC-Inactive***  Indicates the UE capability for support of positioning SRS with Tx frequency hopping in RRC\_INACTIVE for RedCap UEs. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-OutsideInitialUL-BWP* and one of *supportOfRedCap* and *supportOfERedCap* defined in TS 38.331 [35]. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***maximumSRS-BandwidthAcrossAllHopsFR1***: Indicates the maximum positioning SRS bandwidth across all hops in MHz for FR1, which is supported and reported by UE.  - ***maximumSRS-BandwidthAcrossAllHopsFR2***: Indicates the maximum positioning SRS bandwidth across all hops in MHz for FR2, which is supported and reported by UE.  - ***maximumTxFH-Hops***: Indicates the maximum number of transmission hops, which is supported and reported by UE.  - ***rf-TxRetuneTimeFR1***: Indicates the RF Tx retune times between consecutive hops for FR1. Enumerated values indicate 70, 140, 210µs.  - ***rf-TxRetuneTimeFR2***: Indicates the RF Tx retune times between consecutive hops for FR2. Enumerated values indicate 35, 70, 140µs.  - ***switchTimeBetweenActiveBWP-FrequencyHop***: Indicates the switching time between active BWP and frequency hop. Enumerated values indicate 100, 140, 200, 300, 500µs.  - ***numOfOverlappingPRB***: Indicates the overlapping PRB(s) between adjacent hops. Enumerated values indicate 0,1,2,4 PRBs.  - ***maximumSRS-ResourcePeriodic*** indicates the maximum number of periodic positioning SRS resources with Tx frequency hopping.  - ***maximumSRS-ResourceSemipersistent*** indicates the maximum number of Semi-persistent positioning SRS resources with Tx frequency hopping.  NOTE 2: No additional UE requirements shall be specified for the case of Tx hopping with non-overlapping hops compared to the case of Tx hopping with overlapping hops, e.g., a UE is not responsible for keeping phase continuity across the hops in either case of overlapping or non-overlapping hops. |
| ***posSRS-TxFH-WithTimeWindow***  Indicates the UE capability for support of UL time window and transmission of SRS for positioning with Tx Frequency hopping within the window. The UE can include this field only if the UE supports *posSRS-TxFH-RRC-Connected*. Otherwise, the UE does not include this field. |
| ***posSRS-BWA-RRC-Connected***  Indicates the UE capability for support of positioning SRS bandwidth aggregation in RRC\_CONNECTED and comprises the support of the same SRS power reduction across aggregated carriers. The UE can include this field only if the UE supports *SRS-AllPosResources and supportedBandCombinationList* defined in TS 38.331 [35]. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***numOfCarriersIntraBandContiguous***: Indicates the number of supported aggregated carriers in intra band contiguous carriers, which is supported and reported by UE.  - ***maximumAggregatedBW-TwoCarriersFR1***: Indicates the maximum aggregated SRS bandwidth in MHz for two aggregated carriers for FR1, which is supported and reported by UE.  - ***maximumAggregatedBW-TwoCarriersFR2***: Indicates the maximum aggregated SRS bandwidth in MHz for two aggregated carriers for FR2, which is supported and reported by UE.  - ***maximumAggregatedBW-ThreeCarriersFR1***: Indicates the maximum aggregated SRS bandwidth in MHz for three aggregated carriers for FR1, which is supported and reported by UE.  - ***maximumAggregatedBW-ThreeCarriersFR2***: Indicates the maximum aggregated SRS bandwidth in MHz for three aggregated carriers for FR2, which is supported and reported by UE.  - ***maximumAggregatedResourceSet***: Indicates the max number of aggregated SRS resource sets for positioning supported by UE for SRS bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourcePeriodic***: Indicates the maximum number of aggregated periodic SRS resources for bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourceAperiodic***: Indicates the maximum number of aggregated aperiodic SRS resources for bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourceSemi***: Indicates the maximum number of aggregated semi-persistent SRS resources for bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourcePeriodicPerSlot***: Indicates the maximum number of aggregated periodic SRS resources for bandwidth aggregation per slot, which is supported and reported by UE.  - ***maximumAggregatedResourceAperiodicPerSlot***: Indicates the maximum number of aggregated aperiodic SRS resources for bandwidth aggregation per slot, which is supported and reported by UE.  - ***maximumAggregatedResourceSemiPerSlot***: Indicates the maximum number of aggregated semi-persistent SRS resources for bandwidth aggregation per slot, which is supported and reported by UE.  NOTE 3: The UE supports the simultaneous transmission in a coherent manner of 2 or 3 SRS resources in 2 or 3 intra-band contiguous CCs.  NOTE 4: Each two or three linked SRS resources are counted as 1 resource  NOTE 5: A UE that support *SRS-PosResourceAP* defined in TS 38.331 [35] must signal a non-zero value for *maximumAggregatedResourceAperiodic* and *maximumAggregatedResourceAperiodicPerSlot*;  NOTE 6: UE only reports the number on bands for the current configured CA band combination.  NOTE 6a: For *numOfCarriersIntraBandContiguous*, it shall be less than or equal to the maximum number of the component carrier associated with *ca-BandwidthClassUL-NR* in TS 38.331 [35].  NOTE 6b: For maximum aggregated UL SRS bandwidth, it shall be less than or equal to the maximum aggregated transmission bandwidth associated with *ca-BandwidthClassUL-NR* in TS 38.331 [35]. Additionally, it shall be less than or equal to the maximum aggregated bandwidth for the supported CA configuration in Table 5.5A.1-1 in TS 38.101-1 [37] for FR1 bands or Table 5.5A.1-1 in TS 38.101-2 [34] for FR2 bands for the band where aggregated SRS CCs is configured. |
| ***posSRS-BWA-IndependentCA-RRC-Connected***  Indicates the UE capability for support of positioning SRS bandwidth aggregation independent from UL communication CA in RRC\_CONNECTED and comprises the support of the same SRS power reduction across aggregated carriers. The UE can include this field only if the UE supports *SRS-AllPosResources* defined in TS 38.331 [35]. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***numOfCarriersIntraBandContiguous***: Indicates the number of supported aggregated carriers in intra band contiguous carriers, which is supported and reported by UE.  - ***maximumAggregatedBW-TwoCarriersFR1***: Indicates the maximum aggregated SRS bandwidth in MHz for two aggregated carriers for FR1, which is supported and reported by UE.  - ***maximumAggregatedBW-TwoCarriersFR2***: Indicates the maximum aggregated SRS bandwidth in MHz for two aggregated carriers for FR2, which is supported and reported by UE.  - ***maximumAggregatedBW-ThreeCarriersFR1***: Indicates the maximum aggregated SRS bandwidth in MHz for three aggregated carriers for FR1, which is supported and reported by UE.  - ***maximumAggregatedBW-ThreeCarriersFR2***: Indicates the maximum aggregated SRS bandwidth in MHz for three aggregated carriers for FR2, which is supported and reported by UE.  - ***maximumAggregatedResourceSet***: Indicates the max number of aggregated SRS resource sets for positioning supported by UE for SRS bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourcePeriodic***: Indicates the maximum number of aggregated periodic SRS resources for bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourceAperiodic***: Indicates the maximum number of aggregated aperiodic SRS resources for bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourceSemi***: Indicates the maximum number of aggregated semi-persistent SRS resources for bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourcePeriodicPerSlot***: Indicates the maximum number of aggregated periodic SRS resources for bandwidth aggregation per slot, which is supported and reported by UE.  - ***maximumAggregatedResourceAperiodicPerSlot***: Indicates the maximum number of aggregated aperiodic SRS resources for bandwidth aggregation per slot, which is supported and reported by UE.  - ***maximumAggregatedResourceSemiPerSlot***: Indicates the maximum number of aggregated semi-persistent SRS resources for bandwidth aggregation per slot, which is supported and reported by UE.  - ***guardPeriod***: Indicates the guard period in microseconds before and after aggregated SRS transmission.  - ***powerClassForTwoAggregatedCarriers***: Indicates the power class of supported two aggregated carriers in intra band contiguous carriers.  - ***powerClassForThreeAggregatedCarriers***: Indicates the power class of supported three aggregated carriers in intra band contiguous carriers.  NOTE 7: The UE supports the simultaneous transmission in a coherent manner of 2 or 3 SRS resources in 2 or 3 intra-band contiguous CCs.  NOTE 8: Each two or three linked SRS resources are counted as 1 resource  NOTE 9: UE only reports the number on bands for the current configured CA band combination.  NOTE 10: Guard period is needed before and after the aggregated SRS transmissions when SRS resource is configured within a CC without PUSCH/PUCCH is linked for aggregation with an SRS resource configured within an UL active BWP of a UL communication CC.  NOTE 11: For a given band, independent of the band combination, the UE must signal the same guard period.  NOTE 12: The power class is only applicable for FR1 bands. |
| ***posSRS-BWA-RRC-Inactive***  Indicates the UE capability for support of positioning SRS bandwidth aggregation in RRC\_INACTIVE and comprises the support of the same SRS power reduction across aggregated carriers. The UE can include this field only if the UE supports *posSRS-RRC-Inactive-OutsideInitialUL-BWP*. Otherwise, the UE does not include this field. The capability signalling comprises the following parameters:  - ***numOfCarriersIntraBandContiguous***: Indicates the number of supported aggregated carriers in intra band contiguous carriers, which is supported and reported by UE.  - ***maximumAggregatedBW-TwoCarriersFR1***: Indicates the maximum aggregated SRS bandwidth in MHz for two aggregated carriers for FR1, which is supported and reported by UE.  - ***maximumAggregatedBW-TwoCarriersFR2***: Indicates the maximum aggregated SRS bandwidth in MHz for two aggregated carriers for FR2, which is supported and reported by UE.  - ***maximumAggregatedBW-ThreeCarriersFR1***: Indicates the maximum aggregated SRS bandwidth in MHz for three aggregated carriers for FR1, which is supported and reported by UE.  - ***maximumAggregatedBW-ThreeCarriersFR2***: Indicates the maximum aggregated SRS bandwidth in MHz for three aggregated carriers for FR2, which is supported and reported by UE.  - ***maximumAggregatedResourceSet***: Indicates the max number of aggregated SRS resource sets for positioning supported by UE for SRS bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourcePeriodic***: Indicates the maximum number of aggregated periodic SRS resources for bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourceSemi***: Indicates the maximum number of aggregated semi-persistent SRS resources for bandwidth aggregation, which is supported and reported by UE.  - ***maximumAggregatedResourcePeriodicPerSlot***: Indicates the maximum number of aggregated periodic SRS resources for bandwidth aggregation per slot, which is supported and reported by UE.  - ***maximumAggregatedResourceSemiPerSlot***: Indicates the maximum number of aggregated semi-persistent SRS resources for bandwidth aggregation per slot, which is supported and reported by UE.  - ***guardPeriod***: Indicates the guard period in microseconds before and after aggregated SRS transmission.  - ***powerClassForTwoAggregatedCarriers***: Indicates the power class of supported two aggregated carriers in intra band contiguous carriers.  - ***powerClassForThreeAggregatedCarriers***: Indicates the power class of supported three aggregated carriers in intra band contiguous carriers.  NOTE 13: The power class is only applicable for FR1 bands. |

#### *– NR-PhaseQuality*

The IE *NR-PhaseQuality* defines the quality of the RSCP/RSCPD measurement.

-- ASN1START

NR-PhaseQuality-r18 ::= SEQUENCE {

phaseQualityIndex-r18 INTEGER (0..179),

phaseQualityResolution-r18 ENUMERATED {mdot1, m1,...},

...

}

-- ASN1STOP

| *NR-PhaseQuality* field descriptions |
| --- |
| ***phaseQualityIndex***  This field provides an index value for an estimate of the uncertainty of the reported phase for which the IE *NR-PhaseQuality* is provided in units of degrees. |
| ***phaseQualityResolution***  This field provides the resolution used in the *phaseQualityIndex* field. Enumerated values *mdot1* and *m1* correspond to 0.1 and 1 degrees respectively. |

*END OF CHANGE*