**3GPP TSG-RAN WG2 Meeting #113-e *R2-210***

**Electronic, 25nd Jan– 05th Feb, 2021**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | 37.355 | **CR** |  | **rev** |  | **Current version:** | 16.3.0 |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

|  |
| --- |
|  |
| ***Title:***  | Correction to PRS configuration |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | RAN2 |
|  |  |
| ***Work item code:*** | NR\_Pos-Core |  | ***Date:*** | 2021-02-04 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| Reason for change: | First, for the field dl-PRS-QCL-Info, it can be indicated with dl-PRS as source for QCL. While for the current field qcl-DL-PRS-REsourceSetID, it is still unclear under which numbering space the UE should look for that DL-PRS-ResourceSet. It should be clarified that the UE should look for the DL-PRS-resourceSet under the same TRP across differenet frequency layers. Also, a field descritpion is added for nr-DL-PRS-ResourceSetID for this.Second, the maximum number of entities in the list nr-DL-PRS-ResourceSetList is indicated by the field nrMaxSetsPerTrp, but this is acrually not right since it should be number of maximum sets per TRP per frequency layer. Hence, we propose to change the name of the field to nrMaxSetsPerTrpPerFreqLayerThird, in the description of NR-SelectedDL-PRS-IndexList, the description says that “The IE NR-SelectedDL-PRS-IndexList is used by the location server to provide the selected Frequency Layer index of nr-DL-PRS-AssistanceDataList to the target device.” While this is not right that it is not used to provide the selected frequency layer index, but the DL-PRS resoruces. Fourth, in the field description of “associated-DL-PRS-ID”, it says that “The beam information from the associated TRP is considered to be in GCS if the *lcs-gcs-translation-parameter* field is not provided, and to be in LCS if the *lcs-gcs-translation-parameter* field is provided.” This is obvious that the UE needs to use the lcs-gcs-translation parameter in the TRP indicated by associated-DL-PRS-ID. It is also not clear why “beam information” is “GCS” or “LCS”. We propose that this sentence should just be removed since it is self-explanatory with the current description. Fifth, in the field description for associated-DL-PRS-ID, for the first sentence, the parameter for LCS to GCS translation is missing. Same for the last sentence that the descritpion for lcs to gcs prameter is missing. It should also be clarified that, when the field is present, the UE shall look for the field in the TRP indicated by assocaited-DL-PRS-ID and lcs-gcs-TranslationParameter and dl-PRS-BeamInfoSet shall be absent.  |
|  |  |
| ***Summary of change:*** | 1/ The following changes are made to the DL-PRS-Config* Clarify that the numbering space for NR-DL-PRS-ResourceSetID is per TRP across multiple frequency layers
* Modify the sentence "qcl-DL-PRS-ResourceSetID specifies the DL-PRS Resource Set ID" to "qcl-DL-PRS-ResourceSetID specifies DL-PRS Resource Set configured for the same TRP whose DL-PRS resource serve as the source reference signal for the DL-PRS"
* Change the name nrMaxSetsPerTRP to nr-MaxSetsPerTRP-PerFrequencyLayer
* In the sentence "The IE NR-SelectedDL-PRS-IndexList is used by the location server to provide the selected Frequency Layer index of nr-DL-PRS-AssistanceDataList to the target device.", it should be the index of PRS resources

2/ the following changes regarding the associated-DL-PRS-ID.* In the IE NR-DL-PRS-BeamInfo
	+ In the field description of associatedDL-PRS-ID, remove the sentence "The beam information from the associated TRP is considered to be in GCS if the lcs-gcs-translation-parameter field is not provided, and to be in LCS if the lcs-gcs-translation-parameter field is provided."
	+ In the field description of associatedDL-PRS-ID, clarify that when the field is present, the fields lcs-GCS-TranslationParameter and dl-PRS-BeamInfoSet shall be absent.
	+ In the field desctiption for lcs-GCS-TranslationParameter, clarify that the field’s fucntion for the current TRP is applicable when the field associatedDL-PRS-ID is absent
* In the IE NR-TRP-LocationInfo
	+ In the field description of associatedDL-PRS-ID, clarify that when the field is present, the field trp-Location shall be absent.
 |
|  |  |
| ***Consequences if not approved:*** | If the above corrections are not agreed, the descriptions for PRS will be inaccurate, which may cause misunderstanding between UE and LMF and causes positioning failure. **Impact analysis****Impacted functionality**DL-PRS configuration**Inter-operability:** If the UE is implemented according to this CR while the network is not, there is no inter-oprability issueIf the network is implemented according to this CR while the UE is not, there is no inter-oprability issue |
|  |  |
| ***Clauses affected:*** | 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:*** |  |

================================SRART OF CHANGES====================================

#### – *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.

-- 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,

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

 OPTIONAL, -- Need OP

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

 ...

}

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

 ...

}

LCS-GCS-TranslationParameter-r16 ::= SEQUENCE {

 alpha-r16 INTEGER (0..359),

 alpha-fine-r16 INTEGER (0..9) OPTIONAL, -- Cond AzElFine

 beta-r16 INTEGER (0..359),

 beta-fine-r16 INTEGER (0..9) OPTIONAL, -- Cond AzElFine

 gamma-r16 INTEGER (0..359),

 gamma-fine-r16 INTEGER (0..9) OPTIONAL, -- Cond AzElFine

 ...

}

-- ASN1STOP

| Conditional presence | Explanation |
| --- | --- |
| *AzElFine* | The field is mandatory present if *dl-PRS-Azimuth-fine* or *dl-PRS-Elevation-fine* are present; otherwise it is not present. |

| *NR-DL-PRS-Beam-Info* 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. |
| ***associated-DL-PRS-ID***This field specifies the *dl-PRS-ID* of the associated TRP from which the beam information and parameters for LCS to GCS translation are adopted. If the field is omitted, the beam information is provided via the *dl-prs-BeamInfoSet* field and the LCS to GCS translation parameter is provided via the *lcs-GCS-TranslationParameter*. If the field is present, the fields *lcs-GCS-TranslationParameter* and *dl-PRS-BeamInfoSet* shall be absent. |
| ***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 is absent, the *dl-PRS-Azimuth* and *dl-PRS-Elevation* are provided in a GCS, if *associated-DL-PRS-ID* is absent. |
| ***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. |
| ***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. |
| ***alpha***This field specifies the bearing angle α for the translation of the LCS to a GCS as defined in TR 38.901 [44].Scale factor 1 degree; range 0 to 359 degrees. |
| ***alpha-fine***This field provides finer granularity for the *alpha*.The total bearing angle α is given by *alpha* + *alpha-fine.*Scale factor 0.1 degrees; range 0 to 0.9 degrees. |
| ***beta***This field specifies the downtilt angle β for the translation of the LCS to a GCS as defined in TR 38.901 [44].Scale factor 1 degree; range 0 to 359 degrees. |
| ***beta-fine***This field provides finer granularity for the *beta*.The total downtilt angle β is given by *beta* + *beta-fine.*Scale factor 0.1 degrees; range 0 to 0.9 degrees. |
| ***gamma***This field specifies the slant angle γ for the translation of the LCS to a GCS as defined in TR 38.901 [44].Scale factor 1 degree; range 0 to 359 degrees. |
| ***gamma-fine***This field provides finer granularity for the *gamma*.The total slant angle γ is given by *gamma* + *gamma-fine.*Scale factor 0.1 degrees; range 0 to 0.9 degrees. |

==================================NEXT CHANGE======================================

#### *– NR-DL-PRS-Info*

The IE *NR-DL-PRS-Info* defines downlink PRS configuration.

-- ASN1START

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

 nr-DL-PRS-ResourceSetList-r16 SEQUENCE (SIZE (1..nrMaxSetsPerTrpPerFreqLayer-r16)) OF

 NR-DL-PRS-ResourceSet-r16,

 ...

}

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

 nr-DL-PRS-ResourceSetID-r16 NR-DL-PRS-ResourceSetID-r16,

 dl-PRS-Periodicity-and-ResourceSetSlotOffset-r16

 NR-DL-PRS-Periodicity-and-ResourceSetSlotOffset-r16,

 dl-PRS-ResourceRepetitionFactor-r16 ENUMERATED {n2, n4, n6, n8, n16, n32, ...}

 OPTIONAL, -- Need OP

 dl-PRS-ResourceTimeGap-r16 ENUMERATED {s1, s2, s4, s8, s16, s32, ...}

 OPTIONAL, -- Cond Rep

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

 dl-PRS-MutingOption1-r16 DL-PRS-MutingOption1-r16 OPTIONAL, -- Need OP

 dl-PRS-MutingOption2-r16 DL-PRS-MutingOption2-r16 OPTIONAL, -- Need OP

 dl-PRS-ResourcePower-r16 INTEGER (-60..50),

 dl-PRS-ResourceList-r16 SEQUENCE (SIZE (1..nrMaxResourcesPerSet-r16)) OF

 NR-DL-PRS-Resource-r16,

 ...

}

DL-PRS-MutingOption1-r16 ::= SEQUENCE {

 dl-prs-MutingBitRepetitionFactor-r16

 ENUMERATED { n1, n2, n4, n8, ... } OPTIONAL, -- Need OP

 nr-option1-muting-r16 NR-MutingPattern-r16,

 ...

}

DL-PRS-MutingOption2-r16 ::= SEQUENCE {

 nr-option2-muting-r16 NR-MutingPattern-r16,

 ...

}

NR-MutingPattern-r16 ::= CHOICE {

 po2-r16 BIT STRING (SIZE(2)),

 po4-r16 BIT STRING (SIZE(4)),

 po6-r16 BIT STRING (SIZE(6)),

 po8-r16 BIT STRING (SIZE(8)),

 po16-r16 BIT STRING (SIZE(16)),

 po32-r16 BIT STRING (SIZE(32)),

 ...

}

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

 nr-DL-PRS-ResourceID-r16 NR-DL-PRS-ResourceID-r16,

 dl-PRS-SequenceID-r16 INTEGER (0.. 4095),

 dl-PRS-CombSizeN-AndReOffset-r16 CHOICE {

 n2-r16 INTEGER (0..1),

 n4-r16 INTEGER (0..3),

 n6-r16 INTEGER (0..5),

 n12-r16 INTEGER (0..11),

 ...

 },

 dl-PRS-ResourceSlotOffset-r16 INTEGER (0..nrMaxResourceOffsetValue-1-r16),

 dl-PRS-ResourceSymbolOffset-r16 INTEGER (0..12),

 dl-PRS-QCL-Info-r16 DL-PRS-QCL-Info-r16 OPTIONAL,

 ...

}

DL-PRS-QCL-Info-r16 ::= CHOICE {

 ssb-r16 SEQUENCE {

 pci-r16 NR-PhysCellID-r16,

 ssb-Index-r16 INTEGER (0..63),

 rs-Type-r16 ENUMERATED {typeC, typeD, typeC-plus-typeD}

 },

 dl-PRS-r16 SEQUENCE {

 qcl-DL-PRS-ResourceID-r16 NR-DL-PRS-ResourceID-r16,

 qcl-DL-PRS-ResourceSetID-r16 NR-DL-PRS-ResourceSetID-r16

 }

}

NR-DL-PRS-Periodicity-and-ResourceSetSlotOffset-r16 ::= CHOICE {

 scs15-r16 CHOICE {

 n4-r16 INTEGER (0..3),

 n5-r16 INTEGER (0..4),

 n8-r16 INTEGER (0..7),

 n10-r16 INTEGER (0..9),

 n16-r16 INTEGER (0..15),

 n20-r16 INTEGER (0..19),

 n32-r16 INTEGER (0..31),

 n40-r16 INTEGER (0..39),

 n64-r16 INTEGER (0..63),

 n80-r16 INTEGER (0..79),

 n160-r16 INTEGER (0..159),

 n320-r16 INTEGER (0..319),

 n640-r16 INTEGER (0..639),

 n1280-r16 INTEGER (0..1279),

 n2560-r16 INTEGER (0..2559),

 n5120-r16 INTEGER (0..5119),

 n10240-r16 INTEGER (0..10239),

 ...

 },

 scs30-r16 CHOICE {

 n8-r16 INTEGER (0..7),

 n10-r16 INTEGER (0..9),

 n16-r16 INTEGER (0..15),

 n20-r16 INTEGER (0..19),

 n32-r16 INTEGER (0..31),

 n40-r16 INTEGER (0..39),

 n64-r16 INTEGER (0..63),

 n80-r16 INTEGER (0..79),

 n128-r16 INTEGER (0..127),

 n160-r16 INTEGER (0..159),

 n320-r16 INTEGER (0..319),

 n640-r16 INTEGER (0..639),

 n1280-r16 INTEGER (0..1279),

 n2560-r16 INTEGER (0..2559),

 n5120-r16 INTEGER (0..5119),

 n10240-r16 INTEGER (0..10239),

 n20480-r16 INTEGER (0..20479),

 ...

 },

 scs60-r16 CHOICE {

 n16-r16 INTEGER (0..15),

 n20-r16 INTEGER (0..19),

 n32-r16 INTEGER (0..31),

 n40-r16 INTEGER (0..39),

 n64-r16 INTEGER (0..63),

 n80-r16 INTEGER (0..79),

 n128-r16 INTEGER (0..127),

 n160-r16 INTEGER (0..159),

 n256-r16 INTEGER (0..255),

 n320-r16 INTEGER (0..319),

 n640-r16 INTEGER (0..639),

 n1280-r16 INTEGER (0..1279),

 n2560-r16 INTEGER (0..2559),

 n5120-r16 INTEGER (0..5119),

 n10240-r16 INTEGER (0..10239),

 n20480-r16 INTEGER (0..20479),

 n40960-r16 INTEGER (0..40959),

 ...

 },

 scs120-r16 CHOICE {

 n32-r16 INTEGER (0..31),

 n40-r16 INTEGER (0..39),

 n64-r16 INTEGER (0..63),

 n80-r16 INTEGER (0..79),

 n128-r16 INTEGER (0..127),

 n160-r16 INTEGER (0..159),

 n256-r16 INTEGER (0..255),

 n320-r16 INTEGER (0..319),

 n512-r16 INTEGER (0..511),

 n640-r16 INTEGER (0..639),

 n1280-r16 INTEGER (0..1279),

 n2560-r16 INTEGER (0..2559),

 n5120-r16 INTEGER (0..5119),

 n10240-r16 INTEGER (0..10239),

 n20480-r16 INTEGER (0..20479),

 n40960-r16 INTEGER (0..40959),

 n81920-r16 INTEGER (0..81919),

 ...

 },

 ...

}

-- ASN1STOP

| Conditional presence | Explanation |
| --- | --- |
| *Rep* | The field is mandatory present, if *dl-PRS-ResourceRepetitionFactor* is present. Otherwise it is not present. |

| *NR-DL-PRS-Info* field descriptions |
| --- |
| ***dl-PRS-Periodicity-and-ResourceSetSlotOffset***This field specifies the periodicity of DL-PRS allocation in slots configured per DL-PRS Resource Set and the slot offset with respect to SFN #0 slot #0 for a TRP where the DL-PRS Resource Set is configured (i.e. slot where the first DL-PRS Resource of DL-PRS Resource Set occurs). |
| ***dl-PRS-ResourceRepetitionFactor***This field specifies how many times each DL-PRS Resource is repeated for a single instance of the DL-PRS Resource Set. It is applied to all resources of the DL-PRS Resource Set. Enumerated values *n2*, *n4*, *n6*, *n8*, *n16*, *n32* correspond to 2, 4, 6, 8, 16, 32 resource repetitions, respectively. If this field is absent, the value for *dl-PRS-ResourceRepetitionFactor* is 1 (i.e., no resource repetition). |
| ***dl-PRS-ResourceTimeGap***This field specifies the offset in units of slots between two repeated instances of a DL-PRS Resource corresponding to the same DL-PRS Resource ID within a single instance of the DL-PRS Resource Set. The time duration spanned by one DL-PRS Resource Set containing repeated DL-PRS Resources should not exceed DL-PRS-Periodicity. |
| ***dl-PRS-NumSymbols***This field specifies the number of symbols per DL-PRS Resource within a slot. |
| ***dl-PRS-MutingOption1***This field specifies the DL-PRS muting configuration of the TRP for the Option-1 muting, as specified in TS 38.214 [45], and comprises the following sub-fields:- ***dl-prs-MutingBitRepetitionFactor*** indicates the number of consecutive instances of the DL-PRS Resource Set corresponding to a single bit of the *nr-option1-muting* bit map. Enumerated values *n1*, *n2*, *n4*, *n8* correspond to 1, 2, 4, 8 consecutive instances, respectively. If this sub-field is absent, the value for *dl-prs-MutingBitRepetitionFactor* is *n1*.- ***nr-option1-muting*** defines a bitmap of the time locations where the DL-PRS Resource is transmitted (value '1') or not (value '0') for a DL-PRS Resource Set, as specified in TS 38.214 [45].If this field is absent, Option-1 muting is not in use for the TRP. |
| ***dl-PRS-MutingOption2***This field specifies the DL-PRS muting configuration of the TRP for the Option-2 muting, as specified in TS 38.214 [45], and comprises the following sub-fields:- ***nr-option2-muting*** defines a bitmap of the time locations where the DL-PRS Resource is transmitted (value '1') or not (value '0'). Each bit of the bitmap corresponds to a single repetition of the DL-PRS Resource within an instance of a DL-PRS Resource Set, as specified in TS 38.214 [45]. The size of this bitmap should be the same as the value for *dl-PRS-ResourceRepetitionFactor*.If this field is absent, Option-2 muting is not in use for the TRP. |
| ***dl-PRS-ResourcePower***This field specifies the average EPRE of the resources elements that carry the PRS in dBm that is used for PRS transmission. The UE assumes constant EPRE is used for all REs of a given DL-PRS resource. |
| ***dl-PRS-SequenceID***This field specifies the sequence Id used to initialize cinit value used in pseudo random generator TS 38.211 [41], clause 5.2.1 for generation of DL-PRS sequence for transmission on a given DL-PRS Resource. |
| ***dl-PRS-CombSizeN-AndReOffset***This field specifies the Resource Element spacing in each symbol of the DL-PRS Resource and the Resource Element (RE) offset in the frequency domain for the first symbol in a DL-PRS Resource. All DL-PRS Resource Sets belonging to the same Positioning Frequency Layer have the same value of comb size. The relative RE offsets of following symbols are defined relative to the RE Offset in the frequency domain of the first symbol in the DL-PRS Resource according to TS 38.211 [41]. The comb size configuration should be aligned with the comb size configuration for the frequency layer. |
| ***dl-PRS-ResourceSlotOffset***This field specifies the starting slot of the DL-PRS Resource with respect to the corresponding DL-PRS-Resource Set Slot Offset**.** |
| ***dl-PRS-ResourceSymbolOffset***This field specifies the starting symbol of the DL-PRS Resource within a slot determined by *dl-PRS-ResourceSlotOffset*. |
| ***dl-PRS-QCL-Info***This field specifies the QCL indication with other DL reference signals for serving and neighbouring cells and comprises the following subfields:- ***ssb*** indicates the SSB information for QCL source and comprises the following sub-fields:- ***pci*** specifies the physical cell ID of the cell with the SSB that is configured as the source reference signal for the DL-PRS. The UE obtains the SSB configuration for the SSB configured as source reference signal for the DL-PRS by indexing to the field *nr-SSB-Config* with this physical cell identity.- ***ssb-Index*** indicates the index for the SSB configured as the source reference signal for the DL-PRS.- ***rs-Type*** indicates the QCL type.- ***dl-PRS*** indicates the PRS information for QCL source and comprises the followings sub-fields:- ***qcl-DL-PRS-ResourceID*** specifies DL-PRS Resource ID as the source reference signal for the DL-PRS.- ***qcl-DL-PRS-ResourceSetID*** indicates the DL-PRS Resource Set configured under the same TRP whose DL-PRS resource serve as the source reference signal for the DL-PRS. |
| ***nr-DL-PRS-ResourceSetID***This field specifies the DL-PRS resource set ID, which is used to identify the DL-PRS source set under the same TRP across all the frequency layers. |

==================================NEXT CHANGE======================================

#### – *NR-SelectedDL-PRS-IndexList*

The IE *NR-SelectedDL-PRS-IndexList* is used by the location server to provide the selected DL-PRS resource of *nr-DL-PRS-AssistanceDataList* to the target device.

In the case of assistance data for multiple NR positioning methods are provided, the IE *NR-DL-PRS-ProvideAssistanceData* shall be present in only one of *NR-Multi-RTT-ProvideAssistanceData*, *NR-DL-AoD-ProvideAssistanceData*, or *NR-DL-TDOA-ProvideAssistanceData*.

-- ASN1START

NR-SelectedDL-PRS-IndexList-r16 ::= SEQUENCE (SIZE (1..nrMaxFreqLayers-r16)) OF

 NR-SelectedDL-PRS-PerFreq-r16

NR-SelectedDL-PRS-PerFreq-r16 ::= SEQUENCE {

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

 nr-SelectedDL-PRS-IndexListPerFreq-r16 SEQUENCE (SIZE (1..nrMaxTRPsPerFreq-r16)) OF

 NR-SelectedDL-PRS-IndexPerTRP-r16

 OPTIONAL, --Need ON

 ...

}

NR-SelectedDL-PRS-IndexPerTRP-r16 ::= SEQUENCE {

 nr-SelectedTRP-Index-r16 INTEGER (0..nrMaxTRPsPerFreq-1-r16),

 dl-SelectedPRS-ResourceSetIndexList-r16 SEQUENCE (SIZE (1..nrMaxSetsPerTrpPerFreqLayer-r16)) OF

 DL-SelectedPRS-ResourceSetIndex-r16

 OPTIONAL, --Need ON

 ...

}

DL-SelectedPRS-ResourceSetIndex-r16 ::= SEQUENCE {

 nr-DL-SelectedPRS-ResourceSetIndex-r16 INTEGER (0..nrMaxSetsPerTrpPerFreqLayer-1-r16),

 dl-SelectedPRS-ResourceIndexList-r16 SEQUENCE (SIZE (1..nrMaxResourcesPerSet-r16)) OF

 DL-SelectedPRS-ResourceIndex-r16

 OPTIONAL --Need ON

}

DL-SelectedPRS-ResourceIndex-r16 ::= SEQUENCE {

 nr-DL-SelectedPRS-ResourceIdIndex-r16 INTEGER (0..nrMaxNumDL-PRS-ResourcesPerSet-1-r16),

 ...

}

-- ASN1STOP

| *NR-SelectedDL-PRS-IndexList* field descriptions |
| --- |
| ***nr-SelectedDL-PRS-FrequencyLayerIndex***This field indicates the frequency layer provided in IE *NR-DL-PRS-AssistanceData*. Value 0 corresponds to the first frequency layer provided in *nr-DL-PRS-AssistanceDataList* in IE *NR-DL-PRS-AssistanceData*, value 1 to the second frequency layer in *nr-DL-PRS-AssistanceDataList*, and so on. |
| ***nr-SelectedDL-PRS-IndexListPerFreq***This field provides the list of addressed TRPs of the selected frequency layer. If this field is absent, all DL-PRS Resources of all TRPs of the indicated frequency layer are addressed. |
| ***nr-SelectedTRP-Index***This field indicates the addressed TRP of the selected frequency layer. Value 0 corresponds to the first entry in *nr-DL-PRS-AssistanceDataPerFreq* provided in IE *NR-DL-PRS-AssistanceData*, value 1 corresponds to the second entry in *nr-DL-PRS-AssistanceDataPerFreq*, and so on. |
| ***dl-SelectedPRS-ResourceSetIndexList***This field provides the list of addressed DL-PRS Resource Sets of the selected TRPs of the selected frequency layer. If this field is absent, all DL-PRS Resource Sets and Resources of the indicated TRP are addressed. |
| ***nr-DL-SelectedPRS-ResourceSetIndex***This field indicates the addressed DL-PRS Resource Set of the selected TRP of the selected frequency layer. Value 0 corresponds to the first entry in *nr-DL-PRS-ResourceSetList* in IE *NR-DL-PRS-Info* provided in IE *NR-DL-PRS-AssistanceData*. Value 1 corresponds to the second entry in the *nr-DL-PRS-ResourceSetList* in IE *NR-DL-PRS-Info*. |
| ***dl-SelectedPRS-ResourceIndexList***This field provides the list of addressed DL-PRS Resources of the selected DL-PRS Resource Set of the selected TRP of the selected frequency layer. If this field is absent, all DL-PRS Resources of the indicated DL-PRS Resource Set are addressed. |
| ***nr-dl-SelectedPRS-ResourceIdIndex***This field indicates the addressed DL-PRS Resource of the selected DL-PRS Resource Set of the TRP of the selected frequency layer. Value 0 corresponds to the first entry in *dl-PRS-ResourceList* in IE *NR-DL-PRS-Info* provided in IE *NR-DL-PRS-AssistanceData*. Value 1 corresponds to the second entry in the *dl-PRS-ResourceList* in IE *NR-DL-PRS-Info*, and so on. |

=====================================NEXT CHANGE===================================

#### *–* *NR-TRP-LocationInfo*

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

 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

 ...

}

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

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

 ...

}

-- ASN1STOP

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

| *NR-TRP-LocationInfo* field descriptions |
| --- |
| ***referencePoint***This field specifies the reference point used to define the TRP location 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* list. |
| ***trp-LocationInfoList***This field provides the antenna reference point locations of the DL-PRS Resources for the TRPs 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 Resources 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.- ***associated-DL-PRS-ID***: This field, if present, specifies the *dl-PRS-ID* of the associated TRP from which the *trp-location* information is adopted. If the field is present, the field *trp-Location* shall be absent- ***trp-Location***: This field provides the location of the TRP relative to the *referencePoint* location. If this field is absent the TRP location coincides with the *referencePoint* location, unless the field *associated-dl-PRS-ID*is present, in which case the *trp-Location* is adopted from the associated TRP indicated by *associated-dl-PRS-ID*.- ***trp-DL-PRS-ResourceSets***: This field provides the antenna reference point location(s) of the DL-PRS Resource Set(s) associated with this TRP. If this field is absent, the antenna reference point location(s) of the DL-PRS Resource Set(s) coincides with the *trp-Location* location. This field comprises the following sub-fields:- ***dl-PRS-ResourceSetARP***: This field provides the antenna reference point location of the DL-PRS Resource Set relative to the *trp-Location* location. If this field is absent, the antenna reference point location of this DL-PRS Resource Set coincides with the *trp-Location* location.- ***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. If this field is absent, the antenna reference point location(s) of the DL-PRS Resources coincides with the *dl-PRS-ResourceSetARP* location. This field comprises the following sub-fields:- ***dl-PRS-Resource-ARP-location***: 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* location. If this field is absent, the antenna reference point location of this DL-PRS Resource coincides with the *dl-PRS-ResourceSetARP* location. |

=====================================NEXT CHANGE===================================

#### *– Multiplicity and type constraint definitions*

-- ASN1START

maxEARFCN INTEGER ::= 65535 -- Maximum value of EUTRA carrier frequency

maxEARFCN-Plus1 INTEGER ::= 65536 -- Lowest value extended EARFCN range

maxEARFCN2 INTEGER ::= 262143 -- Highest value extended EARFCN range

maxMBS-r14 INTEGER ::= 64

maxWLAN-AP-r13 INTEGER ::= 64

maxKnownAPs-r14 INTEGER ::= 2048

maxVisibleAPs-r14 INTEGER ::= 32

maxWLAN-AP-r14 INTEGER ::= 128

maxWLAN-DataSets-r14 INTEGER ::= 8

maxBT-Beacon-r13 INTEGER ::= 32

nrMaxBands-r16 INTEGER ::= 1024 -- Maximum number of supported bands in

 -- UE capability.

nrMaxFreqLayers-r16 INTEGER ::= 4 -- Max freq layers

nrMaxFreqLayers-1-r16 INTEGER ::= 3

nrMaxNumDL-PRS-ResourcesPerSet-1-r16 INTEGER ::= 63

nrMaxNumDL-PRS-ResourceSetsPerTRP-1-r16 INTEGER ::= 7

nrMaxResourceIDs-r16 INTEGER ::= 64 -- Max Resource IDs

nrMaxResourceOffsetValue-1-r16 INTEGER ::= 511

nrMaxResourcesPerSet-r16 INTEGER ::= 64 -- Maximum resources for one set

nrMaxSetsPerTrpPerFreqLayer-r16 INTEGER ::= 2 -- Maximum resource sets for one TRP

nrMaxSetsPerTrpPerFreqLayer-1-r16 INTEGER ::= 1

nrMaxTRPs-r16 INTEGER ::= 256 -- Max TRPs per UE

nrMaxTRPsPerFreq-r16 INTEGER ::= 64 -- Max TRPs per freq layers

nrMaxTRPsPerFreq-1-r16 INTEGER ::= 63

maxSimultaneousBands-r16 INTEGER ::= 4 -- Maximum number of simultaneously

 -- measured bands

maxBandComb-r16 INTEGER ::= 1024

nrMaxConfiguredBands-r16 INTEGER ::= 16

-- ASN1STOP

=================================END OF CHANGES=====================================