**3GPP TSG-RAN WG3 Meeting #116-e *R3-223867***

**, 9th – 19th May 2022**

|  |
| --- |
| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
|  |
| *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 |  | Radio Access Network | **X** | Core Network | **X** |

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|  |
| ***Title:***  | NRPPa ASN.1 review for NR Positioning Enhancements |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, CATT, Ericssion, Huawei, ZTE |
| ***Source to TSG:*** | R3 |
|  |  |
| ***Work item code:*** |  NR\_pos\_enh-Core |  | ***Date:*** | 2022-04-25 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | 17 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | Errors in the NRPPa ASN.1. |
|  |  |
| ***Summary of change:*** | 1. OnDemandTRPPRS changed to OnDemandPRS, also in one instance in tabular (editorial error for On-demand PRS)
2. ExtendedAdditionalPathListRequest deleted (unused)
3. LoS-NLoSInfoRequest deleted (unused)
4. MultipleULAoAofAdditionalPathRequest deleted (unused)
5. Criticality of id-ARPLocationInfo changed to “ignore” (alignment with tabular).
6. Encoding of MultipleULAOA-Item is corrected (wrong extension container)
7. “multiple-UL-AoA” and “uL-SRS-RSRPP” codepoints added to TRPMeasurementQuantities-Item (alignment with tabular)
8. In UETEGItem, the sRSResourceSetID-List is changed to sRSResourceID-List (alignment with tabular)
9. Rename “LCS-to-GCS-TranslationAoA” as “LCS-to-GCS-Translation” in ASN.1
10. Correct the “MeasPRSOffset” related ASN.1 part to align with IE in the tabular
11. Change the presence of *PRS Transmission TRP List* IE in PRS CONFIGURATION RESPONSE message from mandatory to optional, the *PRS Configuration* IE is kept mandatory.
12. Add the *Criticality Diagnostics* IE to PRS CONFIGURATION RESPONSE message.
13. Remove the (pos) *SRS Resource Set ID* IE in *SRS Resource Type* IE and *UE Tx TEG Association* IE
14. In 9.2.74, “maxnoExtPath” should be changed to “maxNoPathExtended” to align with the ASN.1.
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|  |  |
| ***Consequences if not approved:*** | Errors remain in the specification.  |
|  |  |
| ***Clauses affected:*** | 9.1.1.14, 9.1.1.22, 9.2.73, 9.2.74, 9.2.78, 9.3.4, 9.3.5, 9.3.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.473 CR 0896 |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev1: added changes #9-14. |

*First Modification*

#### 9.1.1.14 TRP INFORMATION REQUEST

This message is sent by an LMF to request information for TRPs hosted by an NG-RAN node.

Direction: LMF → NG-RAN node.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| **TRP List** |  | *0 ..1* |  |  | YES | ignore |
| **>TRP Item** |  | *1 .. <maxnoTRPs>* |  |  | EACH | ignore |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| **TRP Information Type List** |  | *1* |  |  |  |  |
| **>TRP Information Type Item** |  | *1 .. <maxnoTRPInfoTypes>* |  |  | EACH | reject |
| >>TRP Information Type Item | M |  | ENUMERATED (nr pci, ng-ran cgi, nr arfcn, prs config, ssb config, sfn init time, spatial direction info, geo-coordinates, …, trp type, on-demand prs, trp tx teg, beam antenna info)  |  |  |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoTRPs | Maximum no. of TRPs in a NG-RAN node. Value is 65535 |
| maxnoTRPInfoTypes | Maximum no of TRP information types that can be requested and reported with one message. Value is 64. |

*Next Modification*

#### 9.1.1.22 PRS CONFIGURATION RESPONSE

This message is sent by the NG-RAN node to acknowledge configuring or updating the PRS transmission.

Direction: NG-RAN node → LMF.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.3 |  | YES | reject |
| NRPPa Transaction ID | M |  | 9.2.4 |  | - |  |
| **PRS Transmission TRP List** |  | *0..1* |  |  | YES | ignore |
| **>PRS Transmission TRP Item** |  | *1 .. <maxnoTRPs>* |  |  | EACH | ignore |
| >>TRP ID | M |  | 9.2.24 |  | - |  |
| >>PRS Configuration | M |  | 9.2.44 |  | - |  |
| Criticality Diagnostics | O |  | 9.2.2 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoTRPs | Maximum no. of TRPs in a NG-RAN node. Value is 65535 |

*Next Modification*

### 9.2.73 SRS Resource type

This IE contains the SRS resource type.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| CHOICE *Reference Signal* | M |  |  |  |
| >SRS |  |  |  |  |
| >>SRS Resource ID | M |  | INTEGER(0..63) |  |
|  |  |  |  |  |
| >*Positioning SRS* |  |  |  |  |
| >>Positioning SRS Resource ID | M |  | INTEGER(0..63) |  |
|  |  |  |  |  |

### 9.2.74 Extended Additional Path List

This IE contains the extended additional path results of time measurement.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description |
| **Additional Path Item** |  | *1..<maxNoPathExtended>* |  |  |
| >CHOICE *Relative Path Delay* | M |  |  |  |
| >>k0 | M |  | INTEGER(0..16351) |  |
| >>k1 | M |  | INTEGER(0..8176) |  |
| >>k2 | M |  | INTEGER(0..4088) |  |
| >>k3 | M |  | INTEGER(0..2044) |  |
| >>k4 | M |  | INTEGER(0..1022) |  |
| >>k5 | M |  | INTEGER(0..511) |  |
| >Path Quality | O |  | Measurement Quality9.2.43 |  |
| >Multiple UL-AoA | O |  | 9.2.71 |  |
| >Path Power | O |  | UL SRS-RSRPP9.2.72 |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxNoPathExtended | Maximum no. of additional path measurement. Value is 8. |

*Next Modification*

### 9.2.78 UE Tx TEG Association

This information element contains the UE Tx TEG association.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| **UE Tx TEG Association item** | 1 .. <maxnoUETEGs> |  |  |  |
| >UE Tx TEG ID | M |  | INTEGER (0..7) |  |
|  |  |  |  |  |
| **>SRS Resource ID List** |  | 0..<maxnoSRS-ResourcePerSet> |  |  |
| >>SRS Resource ID | M |  | INTEGER(0..63) |  |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoUETEGs | Maximum no of reported UE Tx TEG association. Value is 8. |
| maxnoSRS-ResourcePerSet | Maximum no of SRS Resources per set. Value is 16. |

*Next Modification*

### 9.3.4 PDU Definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- PDU definitions for NRPPa

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\* Unchanged text skipped \*\*

PRSConfigurationResponse ::= SEQUENCE {

 protocolIEs ProtocolIE-Container {{ PRSConfigurationResponse-IEs}},

 ...

}

PRSConfigurationResponse-IEs NRPPA-PROTOCOL-IES ::= {

 { ID id-PRSTransmissionTRPList CRITICALITY ignore TYPE PRSTransmissionTRPList PRESENCE optional}|

 { ID id-CriticalityDiagnostics CRITICALITY ignore TYPE CriticalityDiagnostics PRESENCE optional},

 ...

}

*Next Modification*

### 9.3.5 Information Element definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

--

-- Information Element Definitions

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\* Unchanged text skipped \*\*

 id-PRS-Resource-ID,

 id-OnDemandPRS,

 id-AoA-SearchWindow,

\*\* Unchanged text skipped \*\*

AoA-AssistanceInfo ::= SEQUENCE {

 angleMeasurement AngleMeasurementType,

 lCS-to-GCS-Translation LCS-to-GCS-Translation OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { AoA-AssistanceInfo-ExtIEs } } OPTIONAL,

 ...

}

AoA-AssistanceInfo-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

EARFCN ::= INTEGER (0..262143, ...)

\*\* Unchanged text skipped \*\*

GeographicalCoordinates ::= SEQUENCE {

 tRPPositionDefinitionType TRPPositionDefinitionType,

 dLPRSResourceCoordinates DLPRSResourceCoordinates OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { GeographicalCoordinates-ExtIEs } } OPTIONAL,

 ...

}

GeographicalCoordinates-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 { ID id-ARPLocationInfo CRITICALITY ignore EXTENSION ARPLocationInformation PRESENCE optional},

 ...

}

\*\* Unchanged text skipped \*\*

LCS-to-GCS-Translation::= SEQUENCE {

 alpha INTEGER (0..3599),

 beta INTEGER (0..3599),

 gamma INTEGER (0..3599),

 iE-Extensions ProtocolExtensionContainer { { LCS-to-GCS-Translation-ExtIEs} } OPTIONAL,

 ...

}

LCS-to-GCS-Translation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

LoS-NLoSIndicatorSoft ::= INTEGER (0..10)

\*\* Unchanged text skipped \*\*

MultipleULAoA-List ::= SEQUENCE (SIZE(1.. maxnoofULAoAs)) OF MultipleULAoA-Item

MultipleULAoA-Item ::= CHOICE {

 uL-AoA UL-AoA,

 ul-ZoA ZoA,

 choice-extension ProtocolIE-Single-Container { { MultipleULAoA-Item-ExtIEs } }

}

MultipleULAoA-Item-ExtIEs NRPPA-PROTOCOL-IES ::= {

 ...

}

\*\* Unchanged text skipped \*\*

OnDemandPRS-Info ::= SEQUENCE {

 onDemandPRSRequestAllowed BIT STRING (SIZE (16)),

 allowedResourceSetPeriodicityValues BIT STRING (SIZE (24)) OPTIONAL,

 allowedPRSBandwidthValues BIT STRING (SIZE (64)) OPTIONAL,

 allowedResourceRepetitionFactorValues BIT STRING (SIZE (8)) OPTIONAL,

 allowedResourceNumberOfSymbolsValues BIT STRING (SIZE (8)) OPTIONAL,

 allowedCombSizeValues BIT STRING (SIZE (8)) OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { OnDemandPRS-Info-ExtIEs} } OPTIONAL,

 ...

}

OnDemandPRS-Info-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

PRS-Measurements-Info-List ::= SEQUENCE (SIZE(1..maxFreqLayers)) OF PRS-Measurements-Info-List-Item

PRS-Measurements-Info-List-Item ::= SEQUENCE {

 pointA INTEGER (0..3279165),

 measPRSPeriodicity ENUMERATED {ms20, ms40, ms80, ms160, ...},

 measPRSOffset INTEGER (0..159, ...),

 measurementPRSLength ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6, ms10, ms20},

 iE-Extensions ProtocolExtensionContainer { { PRS-Measurements-Info-List-Item-ExtIEs} } OPTIONAL,

 ...

}

PRS-Measurements-Info-List-Item-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

SRSResourcetype ::= SEQUENCE {

 sRSResourceTypeChoice SRSResourceTypeChoice,

 iE-Extensions ProtocolExtensionContainer { { SRSResourcetype-ExtIEs} } OPTIONAL,

 ...

}

SRSResourcetype-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

SRSResourceTypeChoice ::= CHOICE {

 sRSResourceInfo SRSInfo,

 posSRSResourceInfo PosSRSInfo,

 ...

}

SRSInfo ::= SEQUENCE {

 sRSResource SRSResourceID,

 ...

}

PosSRSInfo ::= SEQUENCE {

 posSRSResourceID SRSPosResourceID,

 ...

}

\*\* Unchanged text skipped \*\*

TRP-BeamAntennaExplicitInformation ::= SEQUENCE {

 trp-BeamAntennaAngles TRP-BeamAntennaAngles,

 lcs-to-gcs-translation LCS-to-GCS-Translation OPTIONAL,

 iE-Extensions ProtocolExtensionContainer {{ TRP-BeamAntennaExplicitInformation-ExtIEs}} OPTIONAL,

 ...

}

TRP-BeamAntennaExplicitInformation-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

TRPMeasurementQuantities-Item ::= ENUMERATED {

 gNB-RxTxTimeDiff,

 uL-SRS-RSRP,

 uL-AoA,

 uL-RTOA,

 ...,

 multiple-UL-AoA,

 uL-SRS-RSRPP

}

\*\* Unchanged text skipped \*\*

TRPInformationTypeResponseItem-ExtIEs NRPPA-PROTOCOL-IES ::= {

 { ID id-TRPType CRITICALITY reject TYPE TRPType PRESENCE mandatory }|

 { ID id-OnDemandPRS CRITICALITY reject TYPE OnDemandPRS-Info PRESENCE mandatory}|

 { ID id-TRPTxTEGAssociation CRITICALITY reject TYPE TRPTxTEGAssociation PRESENCE mandatory}|

 { ID id-TRPBeamAntennaInformation CRITICALITY reject TYPE TRPBeamAntennaInformation PRESENCE mandatory },

 ...

}

\*\* Unchanged text skipped \*\*

TRPInformationTypeItem ::= ENUMERATED {

 nrPCI,

 nG-RAN-CGI,

 arfcn,

 pRSConfig,

 sSBInfo,

 sFNInitTime,

 spatialDirectInfo,

 geoCoord,

 ...,

 trp-type,

 ondemandPRSInfo,

 trpTxTeg,

 beam-antenna-info

}

\*\* Unchanged text skipped \*\*

UETEGItem ::= SEQUENCE {

 uE-Tx-TEG-ID INTEGER (0..7),

 sRSResourceID-List SEQUENCE (SIZE(1.. maxnoSRS-ResourcePerSet)) OF SRSResourceID-Item OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { UETEGItem-ExtIEs } } OPTIONAL,

 ...

}

\*\* Unchanged text skipped \*\*

UL-AoA ::= SEQUENCE {

 azimuthAoA INTEGER (0..3599),

 zenithAoA INTEGER (0..1799) OPTIONAL,

 lCS-to-GCS-Translation LCS-to-GCS-Translation OPTIONAL,

 iE-extensions ProtocolExtensionContainer { { UL-AoA-ExtIEs } } OPTIONAL,

 ...

}

UL-AoA-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

ZoA ::= SEQUENCE {

 zenithAoA INTEGER (0..1799),

 lCS-to-GCS-Translation LCS-to-GCS-Translation OPTIONAL,

 iE-extensions ProtocolExtensionContainer { { ZoA-ExtIEs } } OPTIONAL,

 ...

}

ZoA-ExtIEs NRPPA-PROTOCOL-EXTENSION ::= {

 ...

}

*Next Modification*

### 9.3.7 Constant definitions

-- ASN1START

-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

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-- Constant definitions

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-- \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\* Unchanged text skipped \*\*

id-PRSTransmissionTRPList ProtocolIE-ID ::= 67

id-OnDemandPRS ProtocolIE-ID ::= 68

id-AoA-SearchWindow ProtocolIE-ID ::= 69