**3GPP TSG-RAN WG3 Meeting #116-e *R3-223868***

**, 9th – 19th May 2022**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.473** | **CR** | **0896** | **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:***  | F1AP ASN.1 review for NR Positioning Enhancements |
|  |  |
| ***Source to WG:*** | CATT |
| ***Source to TSG:*** | R3 |
|  |  |
| ***Work item code:*** |  NR\_pos\_enh-Core |  | ***Date:*** | 2022-04-20 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | Errors in the F1AP 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. Encoding of MultipleULAOA-Item is corrected (wrong extension container)
6. “multiple-UL-AoA” and “uL-SRS-RSRPP” codepoints added to TRPMeasurementQuantities-Item (alignment with tabular)
7. In UETEGItem, the sRSResourceSetID-List is changed to sRSResourceID-List (alignment with tabular)
8. Rename “LCS-to-GCS-TranslationAoA” as “LCS-to-GCS-Translation” in ASN.1
9. Correct the “MeasPRS Offset” related ASN.1 part to align with IE in the tabular
10. Change the presence of transmission TRP List IE in PRS CONFIGURATION MESSAGE from mandatory to optional, the PRS Configuration IE is kept mandatory.
11. Add the Criticality Diagnostics IE to PRS CONFIGURATION RESPONSE message.
12. Remove the (pos) SRS Resource Set ID IE in SRS Resource Type IE and Tx UE TEG Association IE
13. In the tabular of F1AP 9.3.1.248, “maxnoExtPath” should be changed to “maxNoPathExtended” to align with the ASN.1
14. Change the presence of “TRP Rx TEG ID” IE in 9.3.1.168 from Mandatory to Optional
 |
|  |  |
| ***Consequences if not approved:*** | Errors remain in the specification.  |
|  |  |
| ***Clauses affected:*** | 9.2.12.28, 9.3.1.168, 9.3.1.247, 9.3.1.248, 9.3.1.251, 9.4.4, 9.4.5, 9.4.7 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS 38.455 CR 0057 |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*First Modification*

#### 9.2.12.28 PRS CONFIGURATION RESPONSE

This message is sent by a gNB-DU to acknowledge configuring or updating the PRS transmissions.

Direction: gNB-DU → gNB-CU.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.3.1.1 |  | YES | reject |
| Transaction ID | M |  | 9.3.1.23 |  | YES | reject |
| **PRS Transmission TRP List** |  | *1* |  |  | YES | ignore |
| **>PRS Transmission TRP Item** |  | *1 .. <maxnoofTRPs>* |  |  | EACH | ignore |
| >>TRP ID | M |  | 9.3.1.197 |  | - |  |
| >>PRS Configuration | M |  | 9.3.1.117 |  | - |  |
| Criticality Diagnostics | O |  | 9.3.1.3 |  | YES | ignore |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofTRPs | Maximum no. of TRPs in a gNB-DU Value is 65535. |

*Next Modification*

#### 9.3.1.168 UL RTOA Measurement

This information element contains the uplink RTOA measurement.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE Type and Reference | Semantics Description | Criticality | Assigned Criticality |
| CHOICE *UL RTOA Measurement* | M |  |  |  | - |  |
| >k0 | M |  | INTEGER (0.. 1970049) | TS 38.133 [38] | - |  |
| >k1 | M |  | INTEGER (0.. 985025) | TS 38.133 [38] | - |  |
| >k2 | M |  | INTEGER (0.. 492513) | TS 38.133 [38] | - |  |
| >k3 | M |  | INTEGER (0.. 246257) | TS 38.133 [38] | - |  |
| >k4 | M |  | INTEGER (0.. 123129) | TS 38.133 [38] | - |  |
| >k5 | M |  | INTEGER (0.. 61565) | TS 38.133 [38] | - |  |
| Additional Path List | O |  | 9.3.1.169 | This IE is ignored if the *Extended Additional Path List* IE is included | - |  |
| Extended Additional Path List | O |  | 9.3.1.248 |  | YES | ignore |
| TRP Rx TEG ID | O |  | INTEGER (0..31) |  | YES | ignore |

*Next Modification*

#### 9.3.1.247 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) |  |
|  |  |  |  |  |

#### 9.3.1.248 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 |  | TRP Measurement Quality9.3.1.172 |  |
| >Path Power | O |  | UL SRS-RSRPP9.3.1.246 |  |
| >Multiple UL AoA | O |  | 9.3.1.245 |  |

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

*Next Modification*

#### 9.3.1.251 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*

### 9.4.4 PDU Definitions

-- ASN1START

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

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-- PDU definitions for F1AP.

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

F1AP-PDU-Contents {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-PDU-Contents (1) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

\*\* Unchanged text skipped \*\*

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

--

-- PRS CONFIGURATION RESPONSE

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

PRSConfigurationResponse ::= SEQUENCE {

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

 ...

}

PRSConfigurationResponse-IEs F1AP-PROTOCOL-IES ::= {

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

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

 ...

}

*Next Modification*

### 9.4.5 Information Element Definitions

-- ASN1START

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

--

-- Information Element Definitions

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

F1AP-IEs {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-IEs (2) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

\*\* Unchanged text skipped \*\*

 id-PDCMeasurementQuantities-Item,

 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 F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

ExplicitFormat ::= SEQUENCE {

 permutation Permutation,

 noofDownlinkSymbols NoofDownlinkSymbols OPTIONAL,

 noofUplinkSymbols NoofUplinkSymbols OPTIONAL,

 iE-Extensions ProtocolExtensionContainer { { ExplicitFormat-ExtIEs} } OPTIONAL

}

ExplicitFormat-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* 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 F1AP-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 ZoAInformation,

 choice-extension ProtocolIE-SingleContainer { { MultipleULAoA-Item-ExtIEs } }

}

MultipleULAoA-Item-ExtIEs F1AP-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 F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

PosMeasurementResultList ::= SEQUENCE (SIZE(1.. maxNoOfMeasTRPs)) OF PosMeasurementResultList-Item

PosMeasurementResultList-Item ::= SEQUENCE {

 posMeasurementResult PosMeasurementResult,

 tRPID TRPID,

 iE-Extensions ProtocolExtensionContainer { { PosMeasurementResultList-ItemExtIEs} } OPTIONAL

}

PosMeasurementResultList-ItemExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 { ID id-NRCGI CRITICALITY ignore EXTENSION NRCGI PRESENCE optional },

 ...

}

PosMeasurementType ::= ENUMERATED {

 gnb-rx-tx,

 ul-srs-rsrp,

 ul-aoa,

 ul-rtoa,

 ...,

 multiple-ul-aoa,

 ul-srs-rspp

}

\*\* Unchanged text skipped \*\*

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

PRS-Measurement-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-Measurement-Info-List-Item-ExtIEs} } OPTIONAL,

 ...

}

PRS-Measurement-Info-List-Item-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

SRSResourcetype ::= SEQUENCE {

 sRSResourceTypeChoice SRSResourceTypeChoice,

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

 ...

}

SRSResourcetype-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

SRSResourceTypeChoice ::= CHOICE {

 sRSResourceInfo SRSInfo,

 posSRSResourceInfo PosSRSInfo,

 choice-extension ProtocolIE-SingleContainer { { SRSResourceTypeChoice-ExtIEs} }

}

SRSResourceTypeChoice-ExtIEs F1AP-PROTOCOL-IES ::= {

 ...

}

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 ::= {

 ...

}

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 F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

TRPInformationTypeResponseItem-ExtIEs F1AP-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 optional }|

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

 ...

}

\*\* Unchanged text skipped \*\*

UETEG-Item ::= 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,

 ...

}

UETEGItem-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* 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 } }

}

UL-AoA-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

\*\* Unchanged text skipped \*\*

ZoAInformation ::= SEQUENCE {

 zenithAoA INTEGER (0..1799),

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

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

 ...

}

ZoAInformation-ExtIEs F1AP-PROTOCOL-EXTENSION ::= {

 ...

}

*Next Modification*

### 9.4.7 Constant Definitions

-- ASN1START

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

--

-- Constant definitions

--

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

F1AP-Constants {

itu-t (0) identified-organization (4) etsi (0) mobileDomain (0)

ngran-access (22) modules (3) f1ap (3) version1 (1) f1ap-Constants (4) }

DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

\*\* Unchanged text skipped \*\*

id-PRSTransmissionTRPList ProtocolIE-ID ::= 550

id-OnDemandPRS ProtocolIE-ID ::= 551

id-AoA-SearchWindow ProtocolIE-ID ::= 552

*End of Modification*