**3GPP TSG-RAN3 Meeting # 115R3-222789**

**E-Meeting, 21st February – 3rd March 2022**

**Title:** (TP for POS BL CR for TS 38.473) Remaining Open Issues on Positioning Latency Improvement

**Source:** Huawei, Ericsson, Nokia, Nokia Shanghai Bell, CATT

**Agenda item:** 19.3

**Document for:** Other

# 1. Introduction

This TP contains the mirror changes to F1AP BL CR for positioning latency improvement as agreed in R3-222788.

# 2. Annex: TP to F1AP BL CR

<<<<<<<<<<<<<<<<<<<< Changes Begin >>>>>>>>>>>>>>>>>>>>

List of F1AP Elementary procedures

In the following tables, all EPs are divided into Class 1 and Class 2 EPs (see subclause 3.1 for explanation of the different classes):

**Table 1: Class 1 procedures**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Elementary Procedure** | | **Initiating Message** | | **Successful Outcome** | | **Unsuccessful Outcome** | |
| **Response message** | | **Response message** | |
| Reset | | RESET | | RESET ACKNOWLEDGE | |  | |
| F1 Setup | | F1 SETUP REQUEST | | F1 SETUP RESPONSE | | F1 SETUP FAILURE | |
| gNB-DU Configuration Update | | GNB-DU CONFIGURATION UPDATE | | GNB-DU CONFIGURATION UPDATE ACKNOWLEDGE | | GNB-DU CONFIGURATION UPDATE FAILURE | |
| gNB-CU Configuration Update | | GNB-CU CONFIGURATION UPDATE | | GNB-CU CONFIGURATION UPDATE ACKNOWLEDGE | | GNB-CU CONFIGURATION UPDATE FAILURE | |
| UE Context Setup | | UE CONTEXT SETUP REQUEST | | UE CONTEXT SETUP RESPONSE | | UE CONTEXT SETUP FAILURE | |
| UE Context Release (gNB-CU initiated) | | UE CONTEXT RELEASE COMMAND | | UE CONTEXT RELEASE COMPLETE | |  | |
| UE Context Modification (gNB-CU initiated) | | UE CONTEXT MODIFICATION REQUEST | | UE CONTEXT MODIFICATION RESPONSE | | UE CONTEXT MODIFICATION FAILURE | |
| UE Context Modification Required (gNB-DU initiated) | | UE CONTEXT MODIFICATION REQUIRED | | UE CONTEXT MODIFICATION CONFIRM | | UE CONTEXT MODIFICATION REFUSE | |
| Write-Replace Warning | | WRITE-REPLACE WARNING REQUEST | | WRITE-REPLACE WARNING RESPONSE | |  | |
| PWS Cancel | | PWS CANCEL REQUEST | | PWS CANCEL RESPONSE | |  | |
| gNB-DU Resource Coordination | | GNB-DU RESOURCE COORDINATION REQUEST | | GNB-DU RESOURCE COORDINATION RESPONSE | |  | |
| F1 Removal | | F1 REMOVAL REQUEST | | F1 REMOVAL RESPONSE | | F1 REMOVAL FAILURE | |
| BAP Mapping Configuration | | BAP MAPPING CONFIGURATION | | BAP MAPPING CONFIGURATION ACKNOWLEDGE | | BAP MAPPING CONFIGURATION FAILURE | |
| GNB-DU Resource Configuration | | GNB-DU RESOURCE CONFIGURATION | | GNB-DU RESOURCE CONFIGURATION ACKNOWLEDGE | | GNB-DU RESOURCE CONFIGURATION FAILURE | |
| IAB TNL Address Allocation | | IAB TNL ADDRESS REQUEST | | IAB TNL ADDRESS RESPONSE | | IAB TNL ADDRESS FAILURE | |
| IAB UP Configuration Update | | IAB UP CONFIGURATION UPDATE REQUEST | | IAB UP CONFIGURATION UPDATE RESPONSE | | IAB UP CONFIGURATION UPDATE FAILURE | |
| Resource Status Reporting Initiation | | RESOURCE STATUS REQUEST | | RESOURCE STATUS RESPONSE | | RESOURCE STATUS FAILURE | |
| Positioning Measurement | | POSITIONING MEASUREMENT REQUEST | | POSITIONING MEASUREMENT RESPONSE | | POSITIONING MEASUREMENT FAILURE | |
| Positioning Information Exchange | | POSITIONING INFORMATION REQUEST | | POSITIONING INFORMATION RESPONSE | | POSITIONING INFORMATION FAILURE | |
| TRP Information Exchange | | TRP INFORMATION REQUEST | | TRP INFORMATION RESPONSE | | TRP INFORMATION FAILURE | |
| Positioning Activation | | POSITIONING ACTIVATION REQUEST | | POSITIONING ACTIVATION RESPONSE | | POSITIONING ACTIVATION FAILURE | |
| E-CID Measurement Initiation | | E-CID MEASUREMENT INITIATION REQUEST | | E-CID MEASUREMENT INITIATION RESPONSE | | E-CID MEASUREMENT INITIATION FAILURE | |
| PRS Configuration Exchange | | PRS CONFIGURATION REQUEST | | PRS CONFIGURATION RESPONSE | | PRS CONFIGURATION FAILURE | |
| Measurement Preconfiguration | | MEASUREMENT PRECONFIGURATION REQUIRED | | MEASUREMENT PRECONFIGURATION CONFIRM | | MEASUREMENT PRECONFIGURATION REFUSE | |

**Table 2: Class 2 procedures**

|  |  |  |  |
| --- | --- | --- | --- |
| **Elementary Procedure** | | **Message** | |
| Error Indication | | ERROR INDICATION | |
| UE Context Release Request (gNB-DU initiated) | | UE CONTEXT RELEASE REQUEST | |
| Initial UL RRC Message Transfer | | INITIAL UL RRC MESSAGE TRANSFER | |
| DL RRC Message Transfer | | DL RRC MESSAGE TRANSFER | |
| UL RRC Message Transfer | | UL RRC MESSAGE TRANSFER | |
| UE Inactivity Notification | | UE INACTIVITY NOTIFICATION | |
| System Information Delivery | | SYSTEM INFORMATION DELIVERY COMMAND | |
| Paging | | PAGING | |
| Notify | | NOTIFY | |
| PWS Restart Indication | | PWS RESTART INDICATION | |
| PWS Failure Indication | | PWS FAILURE INDICATION | |
| gNB-DU Status Indication | | GNB-DU STATUS INDICATION | |
| RRC Delivery Report | | RRC DELIVERY REPORT | |
| Network Access Rate Reduction | | NETWORK ACCESS RATE REDUCTION | |
| Trace Start | | TRACE START | |
| Deactivate Trace | | DEACTIVATE TRACE | |
| DU-CU Radio Information Transfer | | DU-CU RADIO INFORMATION TRANSFER | |
| CU-DU Radio Information Transfer | | CU-DU RADIO INFORMATION TRANSFER | |
| Resource Status Reporting | | RESOURCE STATUS UPDATE | |
| Access And Mobility Indication | | ACCESS AND MOBILITY INDICATION | |
| Reference Time Information Reporting Control | | REFERENCE TIME INFORMATION REPORTING CONTROL | |
| Reference Time Information Report | | REFERENCE TIME INFORMATION REPORT | |
| Access Success | | ACCESS SUCCESS | |
| Cell Traffic Trace | | CELL TRAFFIC TRACE | |
| Positioning Assistance Information Control | | POSITIONING ASSISTANCE INFORMATION CONTROL | |
| Positioning Assistance Information Feedback | | POSITIONING ASSISTANCE INFORMATION FEEDBACK | |
| Positioning Measurement Report | | POSITIONING MEASUREMENT REPORT | |
| Positioning Measurement Abort | | POSITIONING MEASUREMENT ABORT | |
| Positioning Measurement Failure Indication | | POSITIONING MEASUREMENT FAILURE INDICATION | |
| Positioning Measurement Update | | POSITIONING MEASUREMENT UPDATE | |
| Positioning Deactivation | | POSITIONING DEACTIVATION | |
| E-CID Measurement Failure Indication | | E-CID MEASUREMENT FAILURE INDICATION | |
| E-CID Measurement Report | | E-CID MEASUREMENT REPORT | |
| E-CID Measurement Termination | | E-CID MEASUREMENT TERMINATION COMMAND | |
| Positioning Information Update | | POSITIONING INFORMATION UPDATE | |
| Measurement Activation | | MEASUREMENT ACTIVATION | |

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>>

8.13.y Measurement Preconfiguration

8.13.y.1 General

The Measurement Preconfiguration procedure allows the gNB-CU to provide necessary information to the serving gNB-DU and request the gNB-DU to configure measurement gap or PRS processing window of the UE.

8.13.y.2 Successful Operation



**Figure 8.13.y.2-1: Measurement Preconfiguration procedure, successful operation**

The gNB-CU initiates the procedure by sending a MEASUREMENT PRECONFIGURATION REQUIRED message.

If the gNB-DU is able to configure measurement gap or PRS processing window, it shall reply with the MEASUREMENT PRECONFIGURATION CONFIRM message.

8.13.y.3 Unsuccessful Operation



**Figure 8.13.Y.3-1: Measurement Preconfiguration procedure, unsuccessful operation**

If the gNB-DU cannot configure any of the measurement gap or PRS processing window, the gNB-DU shall respond with a MEASUREMENT PRECONFIGURATION REFUSE message.

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>>

8.13.z Measurement Activation

8.13.z.1 General

The Measurement Activation procedure is initiated by the gNB-CU to indicate the gNB-DU to activate the preconfigured measurement gap for the UE.

8.13.z.2 Successful Operation

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**Figure 8.13.z.2-1: Measurement Activation procedure, successful operation**

The gNB-CU initiates the procedure by sending a MEASUREMENT ACTIVATION message.

8.13.z.3 Unsuccessful Operation

Not Applicable.

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>>

9.2.12.y1 MEASUREMENT PRECONFIGURATION REQUIRED

This message is sent by a gNB-CU to provide the PRS configuration information of multiple TRPs to a gNB-DU and request to configure measurement gap or PRS processing window of the UE.

Direction: gNB-CU → gNB-DU.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.3.1.1 |  | YES | reject |
| gNB-CU UE F1AP ID | M |  | 9.3.1.4 |  | YES | reject |
| gNB-DU UE F1AP ID | M |  | 9.3.1.5 |  | YES | reject |
| **TRP PRS Information List** |  | *1* |  |  | YES | ignore |
| **>TRP PRS Information Item** |  | *1 .. <maxnoofPRSTRPs>* |  |  | EACH | ignore |
| >>TRP ID | M |  | 9.3.1.197 |  | - |  |
| >>NR PCI | M |  | INTEGER (0..1007) |  |  |  |
| >>NR CGI | O |  | 9.3.1.12 |  |  |  |
| >>PRS Configuration | M |  | 9.3.1.177 |  |  |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofPRSTRPs | Maximum no. of TRPs for on-demand PRS in a gNB-DU Value is 256. |

9.2.12.y2 MEASUREMENT PRECONFIGURATION CONFIRM

This message is sent by an gNB-DU to gNB-CU to confirm successful configuration of measurement gap or PRS processing window of the UE.

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 |
| gNB-CU UE F1AP ID | M |  | 9.3.1.4 |  | YES | reject |
| gNB-DU UE F1AP ID | M |  | 9.3.1.5 |  | YES | reject |
| Criticality Diagnostics | O |  | 9.3.1.3 |  | YES | ignore |

9.2.12.y3 MEASUREMENT PRECONFIGURATION REFUSE

This message is sent by gNB-DU to indicate configuration of measurement gap or PRS processing window of the UE was unsuccessful.

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 |
| gNB-CU UE F1AP ID | M |  | 9.3.1.4 |  | YES | reject |
| gNB-DU UE F1AP ID | M |  | 9.3.1.5 |  | YES | reject |
| Cause | M |  | 9.3.1.2 |  | YES | ignore |
| Criticality Diagnostics | O |  | 9.3.1.3 |  | YES | ignore |

9.1.1.a MEASUREMENT ACTIVATION

This message is sent by the gNB-CU to indicate the gNB-DU to activate the preconfigured measurement gap for the UE.

Direction: gNB-CU → gNB-DU.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.3.1.1 |  | YES | Ignore |
| gNB-CU UE F1AP ID | M |  | 9.3.1.4 |  | YES | reject |
| gNB-DU UE F1AP ID | M |  | 9.3.1.5 |  | YES | reject |
| **PRS Measurement Info List** |  | *1* |  |  | YES | Ignore |
| **> PRS Measurement Info Item** |  | *1 .. <* *maxFreqLayers>* |  |  |  |  |
| >>Point A | M |  | INTEGER (0..3279165) |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| >>MeasPRS Periodicity | M |  | ENUMERATED (ms20, ms40, ms80, ms160, …) | Measurement gap periodicity in units of ms |  |  |
| >>MeasPRS Offset | M |  | INTEGER (0..159, …) | Measurement gap offset in units of subframes |  |  |
| >>Measurement PRS Length | M |  | ENUMERATED {ms1dot5, ms3, ms3dot5, ms4, ms5dot5, ms6, ms10, ms20} |  |  |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxFreqLayers | Maximum no. of frequency layers. Value is 4 |

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>>

9.3.1.2 Cause

The purpose of the *Cause* IE is to indicate the reason for a particular event for the F1AP protocol.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE Type and Reference** | **Semantics Description** |
| CHOICE *Cause Group* | M |  |  |  |
| >*Radio Network Layer* |  |  |  |  |
| >>Radio Network Layer Cause | M |  | ENUMERATED (Unspecified, RL failure-RLC, Unknown or already allocated gNB-CU UE F1AP ID,  Unknown or already allocated gNB-DU UE F1AP ID,  Unknown or inconsistent pair of UE F1AP ID,  Interaction with other procedure,  Not supported QCI Value,  Action Desirable for Radio Reasons,  No Radio Resources Available,  Procedure cancelled, Normal Release, ..., Cell not available, RL failure-others, UE rejection, Resources not available for the slice(s), AMF initiated abnormal release, Release due to Pre-Emption, PLMN not served by the gNB-CU, Multiple DRB ID Instances, Unknown DRB ID, Multiple BH RLC CH ID Instances, Unknown BH RLC CH ID, CHO-CPC resources to be changed, NPN not supported, NPN access denied, gNB-CU Cell Capacity Exceeded, Report Characteristics Empty, Existing Measurement ID, Measurement Temporarily not Available, Measurement not Supported For The Object, Unknown BAP address, Unknown BAP routing ID, Insufficient UE Capabilities, Requested Item not Supported on Time) |  |
| *>Transport Layer* |  |  |  |  |
| >>Transport Layer Cause | M |  | ENUMERATED (Unspecified, Transport Resource Unavailable, ... , Unknown TNL address for IAB, Unknown UP TNL information for IAB) |  |
| *>Protocol* |  |  |  |  |
| >>Protocol Cause | M |  | ENUMERATED (Transfer Syntax Error, Abstract Syntax Error (Reject), Abstract Syntax Error (Ignore and Notify), Message not Compatible with Receiver State,  Semantic Error,  Abstract Syntax Error (Falsely Constructed Message), Unspecified, ...) |  |
| *>Misc* |  |  |  |  |
| >>Miscellaneous Cause | M |  | ENUMERATED (Control Processing Overload, Not enough User Plane Processing Resources, Hardware Failure, O&M Intervention, Unspecified, ...) |  |

The meaning of the different cause values is described in the following table. In general, "not supported" cause values indicate that the related capability is missing. On the other hand, "not available" cause values indicate that the related capability is present, but insufficient resources were available to perform the requested action.

|  |  |
| --- | --- |
| **Radio Network Layer cause** | **Meaning** |
| Unspecified | Sent for radio network layer cause when none of the specified cause values applies. |
| RL Failure-RLC | The action is due to an RL failure caused by exceeding the maximum number of ARQ retransmissions. |
| Unknown or already allocated gNB-CU UE F1AP ID | The action failed because the gNB-CU UE F1AP ID is either unknown, or (for a first message received at the gNB-CU) is known and already allocated to an existing context. |
| Unknown or already allocated gNB-DU UE F1AP ID | The action failed because the gNB-DU UE F1AP ID is either unknown, or (for a first message received at the gNB-DU) is known and already allocated to an existing context. |
| Unknown or inconsistent pair of UE F1AP ID | The action failed because both UE F1AP IDs are unknown, or are known but do not define a single UE context. |
| Interaction with other procedure | The action is due to an ongoing interaction with another procedure. |
| Not supported QCI Value | The action failed because the requested QCI is not supported. |
| Action Desirable for Radio Reasons | The reason for requesting the action is radio related. |
| No Radio Resources Available | The cell(s) in the requested node don’t have sufficient radio resources available. |
| Procedure cancelled | The sending node cancelled the procedure due to other urgent actions to be performed. |
| Normal Release | The action is due to a normal release of the UE (e.g. because of mobility) and does not indicate an error. |
| Cell Not Available | The action failed due to no cell available in the requested node. |
| RL Failure-others | The action is due to an RL failure caused by other radio link failures than exceeding the maximum number of ARQ retransmissions. |
| UE rejection | The action is due to gNB-CU’s rejection of a UE access request. |
| Resources not available for the slice(s) | The requested resources are not available for the slice(s). |
| AMF initiated abnormal release | The release is triggered by an error in the AMF or in the NAS layer. |
| Release due to Pre-Emption | Release is initiated due to pre-emption. |
| PLMN not served by the gNB-CU | The PLMN indicated by the UE is not served by the gNB-CU. |
| Multiple DRB ID Instances | The action failed because multiple instances of the same DRB had been provided. |
| Unknown DRB ID | The action failed because the DRB ID is unknow. |
| Multiple BH RLC CH ID Instances | The action failed because multiple instances of the same BH RLC CH ID had been provided. This cause value is only applicable to IAB. |
| Unknown BH RLC CH ID | The action failed because the BH RLC CH ID is unknown. This cause value is only applicable to IAB. |
| CHO-CPC resources to be changed | The gNB-DU requires gNB-CU to replace, i.e. overwrite the configuration of indicated candidate target cell. |
| NPN not supported | The action fails because the indicated SNPN is not supported in the node. |
| NPN access denied | The action is due to rejection of a UE access request for NPN. |
| gNB-CU Cell Capacity Exceeded | The number of cells requested to be added was exceeding maximum cell capacity in the gNB-CU. |
| Report Characteristics Empty | The action failed because there is no measurement object in the report characteristics. |
| Existing Measurement ID | The action failed because the measurement ID is already used. |
| Measurement Temporarily not Available | The gNB-DU can temporarily not provide the requested measurement object. |
| Measurement not Supported For The Object | At least one of the concerned object(s) does not support the requested measurement. |
| Unknown BAP address | The action failed because the BAP address is unknown. This cause value is only applicable to IAB. |
| Unknown BAP routing ID | The action failed because the BAP routing ID is unknown. This cause value is only applicable to IAB. |
| Insufficient UE Capabilities | The setup can’t proceed due to insufficient UE capabilities. |
| Requested Item not Supported on Time | The gNB-DU is unable to provide the measurement results on time. |

|  |  |
| --- | --- |
| **Transport Layer cause** | **Meaning** |
| Unspecified | Sent when none of the above cause values applies but still the cause is Transport Network Layer related. |
| Transport Resource Unavailable | The required transport resources are not available. |
| Unknown TNL address for IAB | The action failed because the TNL address is unknown. This cause value is only applicable to IAB. |
| Unknown UP TNL information for IAB | The action failed because the UP TNL information is unknown. This cause value is only applicable to IAB. |

|  |  |
| --- | --- |
| **Protocol cause** | **Meaning** |
| Transfer Syntax Error | The received message included a transfer syntax error. |
| Abstract Syntax Error (Reject) | The received message included an abstract syntax error and the concerning criticality indicated "reject". |
| Abstract Syntax Error (Ignore And Notify) | The received message included an abstract syntax error and the concerning criticality indicated "ignore and notify". |
| Message Not Compatible With Receiver State | The received message was not compatible with the receiver state. |
| Semantic Error | The received message included a semantic error. |
| Abstract Syntax Error (Falsely Constructed Message) | The received message contained IEs or IE groups in wrong order or with too many occurrences. |
| Unspecified | Sent when none of the above cause values applies but still the cause is Protocol related. |

| **Miscellaneous cause** | **Meaning** |
| --- | --- |
| Control Processing Overload | Control processing overload. |
| Not EnoughUser Plane Processing Resources Available | No enough resources are available related to user plane processing. |
| Hardware Failure | Action related to hardware failure. |
| O&M Intervention | The action is due to O&M intervention. |
| Unspecified Failure | Sent when none of the above cause values applies and the cause is not related to any of the categories Radio Network Layer, Transport Network Layer or Protocol. |

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>>

9.3.1.x Response Time

This information element contains the response time of the measurement results reporting.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE Type and Reference** | **Semantics Description** |
| Time | M |  | INTEGER(1..128, …) |  |
| Time Unit | M |  | ENUMERATED(second, ten-seconds, ten-milliseconds, …) |  |

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>

9.4.5 Information Element Definitions

-- ASN1START

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-- 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

IMPORTS

id-gNB-CUSystemInformation,

id-HandoverPreparationInformation,

id-TAISliceSupportList,

id-RANAC,

id-BearerTypeChange,

id-Cell-Direction,

id-Cell-Type,

id-CellGroupConfig,

id-AvailablePLMNList,

id-PDUSessionID,

id-ULPDUSessionAggregateMaximumBitRate,

id-DC-Based-Duplication-Configured,

id-DC-Based-Duplication-Activation,

id-Duplication-Activation,

id-DLPDCPSNLength,

id-ULPDCPSNLength,

id-RLC-Status,

id-MeasurementTimingConfiguration,

id-DRB-Information,

id-QoSFlowMappingIndication,

id-ServingCellMO,

id-RLCMode,

id-ExtendedServedPLMNs-List,

id-ExtendedAvailablePLMN-List,

id-DRX-LongCycleStartOffset,

id-SelectedBandCombinationIndex,

id-SelectedFeatureSetEntryIndex,

id-Ph-InfoSCG,

id-latest-RRC-Version-Enhanced,

id-RequestedBandCombinationIndex,

id-RequestedFeatureSetEntryIndex,

id-DRX-Config,

id-UEAssistanceInformation,

id-PDCCH-BlindDetectionSCG,

id-Requested-PDCCH-BlindDetectionSCG,

id-BPLMN-ID-Info-List,

id-NotificationInformation,

id-TNLAssociationTransportLayerAddressgNBDU,

id-portNumber,

id-AdditionalSIBMessageList,

id-IgnorePRACHConfiguration,

id-CG-Config,

id-Ph-InfoMCG,

id-AggressorgNBSetID,

id-VictimgNBSetID,

id-MeasGapSharingConfig,

id-systemInformationAreaID,

id-areaScope,

id-IntendedTDD-DL-ULConfig,

id-QosMonitoringRequest,

id-BHInfo,

id-IAB-Info-IAB-DU,

id-IAB-Info-IAB-donor-CU,

id-IAB-Barred,

id-SIB12-message,

id-SIB13-message,

id-SIB14-message,

id-UEAssistanceInformationEUTRA,

id-SL-PHY-MAC-RLC-Config,

id-SL-ConfigDedicatedEUTRA-Info,

id-AlternativeQoSParaSetList,

id-CurrentQoSParaSetIndex,

id-CarrierList,

id-ULCarrierList,

id-FrequencyShift7p5khz,

id-SSB-PositionsInBurst,

id-NRPRACHConfig,

id-TDD-UL-DLConfigCommonNR,

id-CNPacketDelayBudgetDownlink,

id-CNPacketDelayBudgetUplink,

id-ExtendedPacketDelayBudget,

id-TSCTrafficCharacteristics,

id-AdditionalPDCPDuplicationTNL-List,

id-RLCDuplicationInformation,

id-AdditionalDuplicationIndication,

id-mdtConfiguration,

id-TraceCollectionEntityURI,

id-NID,

id-NPNSupportInfo,

id-NPNBroadcastInformation,

id-AvailableSNPN-ID-List,

id-SIB10-message,

id-RequestedP-MaxFR2,

id-DLCarrierList,

id-ExtendedTAISliceSupportList,

id-E-CID-MeasurementQuantities-Item,

id-ConfiguredTACIndication,

id-NRCGI,

id-SFN-Offset,

id-TransmissionStopIndicator,

id-SrsFrequency,

id-EstimatedArrivalProbability,

id-TRPType,

id-SRSSpatialRelationPerSRSResource,

id-OnDemandTRPPRS,

id-AoA-SearchWindow,

id-ZoA,

id-ARPLocationInfo,

id-ARP-ID,

id-MultipleULAoA,

id-UL-SRS-RSRPP,

id-SRSResourcetype,

id-ExtendedAdditionalPathList,

id-MultipleULAoAofAdditionalPathRequest,

id-LoS-NLoSInformation,

id-NumberOfTRPRxTEG,

id-NumberOfTRPRxTxTEG,

id-TRPTxTEGAssociation,

id-TEGIDInformation,

id-TRPRXTEGID,

maxNRARFCN,

maxnoofErrors,

maxnoofBPLMNs,

maxnoofBPLMNsNR,

maxnoofDLUPTNLInformation,

maxnoofNrCellBands,

maxnoofULUPTNLInformation,

maxnoofQoSFlows,

maxnoofSliceItems,

maxnoofSIBTypes,

maxnoofSITypes,

maxCellineNB,

maxnoofExtendedBPLMNs,

maxnoofAdditionalSIBs,

maxnoofUACPLMNs,

maxnoofUACperPLMN,

maxCellingNBDU,

maxnoofTLAs,

maxnoofGTPTLAs,

maxnoofslots,

maxnoofNonUPTrafficMappings,

maxnoofServingCells,

maxnoofServedCellsIAB,

maxnoofChildIABNodes,

maxnoofIABSTCInfo,

maxnoofSymbols,

maxnoofDUFSlots,

maxnoofHSNASlots,

maxnoofEgressLinks,

maxnoofMappingEntries,

maxnoofDSInfo,

maxnoofQoSParaSets,

maxnoofPC5QoSFlows,

maxnoofSSBAreas,

maxnoofNRSCSs,

maxnoofPhysicalResourceBlocks,

maxnoofPhysicalResourceBlocks-1,

maxnoofPRACHconfigs,

maxnoofRACHReports,

maxnoofRLFReports,

maxnoofAdditionalPDCPDuplicationTNL,

maxnoofRLCDuplicationState,

maxnoofCHOcells,

maxnoofMDTPLMNs,

maxnoofCAGsupported,

maxnoofNIDsupported,

maxnoofExtSliceItems,

maxnoofPosMeas,

maxnoofTRPInfoTypes,

maxnoofSRSTriggerStates,

maxnoofSpatialRelations,

maxnoBcastCell,

maxnoofTRPs,

maxnoofAngleInfo,

maxnooflcs-gcs-translation,

maxnoofPath,

maxnoofMeasE-CID,

maxnoofSSBs,

maxnoSRS-ResourceSets,

maxnoSRS-ResourcePerSet,

maxnoSRS-Carriers,

maxnoSCSs,

maxnoSRS-Resources,

maxnoSRS-PosResources,

maxnoSRS-PosResourceSets,

maxnoSRS-PosResourcePerSet,

maxnoofPRS-ResourceSets,

maxnoofPRS-ResourcesPerSet,

maxNoOfMeasTRPs,

maxnoofPRSresourceSets,

maxnoofPRSresources,

maxnoARPs,

maxnoofULAoAs,

maxNoPathExtended,

maxnoUETEGs,

maxnoTRPTEGs,

maxFreqLayers,

maxnoofPRSTRPs

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>

Cause ::= CHOICE {

radioNetwork CauseRadioNetwork,

transport CauseTransport,

protocol CauseProtocol,

misc CauseMisc,

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

}

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

...

}

CauseMisc ::= ENUMERATED {

control-processing-overload,

not-enough-user-plane-processing-resources,

hardware-failure,

om-intervention,

unspecified,

...

}

CauseProtocol ::= ENUMERATED {

transfer-syntax-error,

abstract-syntax-error-reject,

abstract-syntax-error-ignore-and-notify,

message-not-compatible-with-receiver-state,

semantic-error,

abstract-syntax-error-falsely-constructed-message,

unspecified,

...

}

CauseRadioNetwork ::= ENUMERATED {

unspecified,

rl-failure-rlc,

unknown-or-already-allocated-gnb-cu-ue-f1ap-id,

unknown-or-already-allocated-gnb-du-ue-f1ap-id,

unknown-or-inconsistent-pair-of-ue-f1ap-id,

interaction-with-other-procedure,

not-supported-qci-Value,

action-desirable-for-radio-reasons,

no-radio-resources-available,

procedure-cancelled,

normal-release,

...,

cell-not-available,

rl-failure-others,

ue-rejection,

resources-not-available-for-the-slice,

amf-initiated-abnormal-release,

release-due-to-pre-emption,

plmn-not-served-by-the-gNB-CU,

multiple-drb-id-instances,

unknown-drb-id,

multiple-bh-rlc-ch-id-instances,

unknown-bh-rlc-ch-id,

cho-cpc-resources-tobechanged,

nPN-not-supported,

nPN-access-denied,

gNB-CU-Cell-Capacity-Exceeded,

report-characteristics-empty,

existing-measurement-ID,

measurement-temporarily-not-available,

measurement-not-supported-for-the-object,

unknown-bh-address,

unknown-bap-routing-id,

insufficient-ue-capabilities,

requested-item-not-supported-on-time,

}

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>>

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 ::= {

...

}

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>

TRP-PRS-Info-List ::= SEQUENCE (SIZE(1.. maxnoofPRSTRPs)) OF TRP-PRS-Info-List-Item

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

tRP-ID TRPID,

nR-PCI NRPCI,

cGI-NR NRCGI OPTIONAL,

pRSConfiguration PRSConfiguration,

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

...

}

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

...

}

<<<<<<<<<<<<<<<<<<<< Next change >>>>>>>>>>>>>>>>>>>

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

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

--

-- IE parameter types from other modules.

--

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

IMPORTS

ProcedureCode,

ProtocolIE-ID

FROM F1AP-CommonDataTypes;

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

--

-- Elementary Procedures

--

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

id-Reset ProcedureCode ::= 0

id-F1Setup ProcedureCode ::= 1

id-ErrorIndication ProcedureCode ::= 2

id-gNBDUConfigurationUpdate ProcedureCode ::= 3

id-gNBCUConfigurationUpdate ProcedureCode ::= 4

id-UEContextSetup ProcedureCode ::= 5

id-UEContextRelease ProcedureCode ::= 6

id-UEContextModification ProcedureCode ::= 7

id-UEContextModificationRequired ProcedureCode ::= 8

id-UEMobilityCommand ProcedureCode ::= 9

id-UEContextReleaseRequest ProcedureCode ::= 10

id-InitialULRRCMessageTransfer ProcedureCode ::= 11

id-DLRRCMessageTransfer ProcedureCode ::= 12

id-ULRRCMessageTransfer ProcedureCode ::= 13

id-privateMessage ProcedureCode ::= 14

id-UEInactivityNotification ProcedureCode ::= 15

id-GNBDUResourceCoordination ProcedureCode ::= 16

id-SystemInformationDeliveryCommand ProcedureCode ::= 17

id-Paging ProcedureCode ::= 18

id-Notify ProcedureCode ::= 19

id-WriteReplaceWarning ProcedureCode ::= 20

id-PWSCancel ProcedureCode ::= 21

id-PWSRestartIndication ProcedureCode ::= 22

id-PWSFailureIndication ProcedureCode ::= 23

id-GNBDUStatusIndication ProcedureCode ::= 24

id-RRCDeliveryReport ProcedureCode ::= 25

id-F1Removal ProcedureCode ::= 26

id-NetworkAccessRateReduction ProcedureCode ::= 27

id-TraceStart ProcedureCode ::= 28

id-DeactivateTrace ProcedureCode ::= 29

id-DUCURadioInformationTransfer ProcedureCode ::= 30

id-CUDURadioInformationTransfer ProcedureCode ::= 31

id-BAPMappingConfiguration ProcedureCode ::= 32

id-GNBDUResourceConfiguration ProcedureCode ::= 33

id-IABTNLAddressAllocation ProcedureCode ::= 34

id-IABUPConfigurationUpdate ProcedureCode ::= 35

id-resourceStatusReportingInitiation ProcedureCode ::= 36

id-resourceStatusReporting ProcedureCode ::= 37

id-accessAndMobilityIndication ProcedureCode ::= 38

id-accessSuccess ProcedureCode ::= 39

id-cellTrafficTrace ProcedureCode ::= 40

id-PositioningMeasurementExchange ProcedureCode ::= 41

id-PositioningAssistanceInformationControl ProcedureCode ::= 42

id-PositioningAssistanceInformationFeedback ProcedureCode ::= 43

id-PositioningMeasurementReport ProcedureCode ::= 44

id-PositioningMeasurementAbort ProcedureCode ::= 45

id-PositioningMeasurementFailureIndication ProcedureCode ::= 46

id-PositioningMeasurementUpdate ProcedureCode ::= 47

id-TRPInformationExchange ProcedureCode ::= 48

id-PositioningInformationExchange ProcedureCode ::= 49

id-PositioningActivation ProcedureCode ::= 50

id-PositioningDeactivation ProcedureCode ::= 51

id-E-CIDMeasurementInitiation ProcedureCode ::= 52

id-E-CIDMeasurementFailureIndication ProcedureCode ::= 53

id-E-CIDMeasurementReport ProcedureCode ::= 54

id-E-CIDMeasurementTermination ProcedureCode ::= 55

id-PositioningInformationUpdate ProcedureCode ::= 56

id-ReferenceTimeInformationReport ProcedureCode ::= 57

id-ReferenceTimeInformationReportingControl ProcedureCode ::= 58

id-pRSConfigurationExchange ProcedureCode ::= 59

id-measurementPreconfiguration ProcedureCode ::= 60

id-measurementActivation ProcedureCode ::= 61

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

--

-- Extension constants

--

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

maxPrivateIEs INTEGER ::= 65535

maxProtocolExtensions INTEGER ::= 65535

maxProtocolIEs INTEGER ::= 65535

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

--

-- Lists

--

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

maxNRARFCN INTEGER ::= 3279165

maxnoofErrors INTEGER ::= 256

maxnoofIndividualF1ConnectionsToReset INTEGER ::= 65536

maxCellingNBDU INTEGER ::= 512

maxnoofSCells INTEGER ::= 32

maxnoofSRBs INTEGER ::= 8

maxnoofDRBs INTEGER ::= 64

maxnoofULUPTNLInformation INTEGER ::= 2

maxnoofDLUPTNLInformation INTEGER ::= 2

maxnoofBPLMNs INTEGER ::= 6

maxnoofCandidateSpCells INTEGER ::= 64

maxnoofPotentialSpCells INTEGER ::= 64

maxnoofNrCellBands INTEGER ::= 32

maxnoofSIBTypes INTEGER ::= 32

maxnoofSITypes INTEGER ::= 32

maxnoofPagingCells INTEGER ::= 512

maxnoofTNLAssociations INTEGER ::= 32

maxnoofQoSFlows INTEGER ::= 64

maxnoofSliceItems INTEGER ::= 1024

maxCellineNB INTEGER ::= 256

maxnoofExtendedBPLMNs INTEGER ::= 6

maxnoofUEIDs INTEGER ::= 65536

maxnoofBPLMNsNR INTEGER ::= 12

maxnoofUACPLMNs INTEGER ::= 12

maxnoofUACperPLMN INTEGER ::= 64

maxnoofAdditionalSIBs INTEGER ::= 63

maxnoofslots INTEGER ::= 5120

maxnoofTLAs INTEGER ::= 16

maxnoofGTPTLAs INTEGER ::= 16

maxnoofBHRLCChannels INTEGER ::= 65536

maxnoofRoutingEntries INTEGER ::= 1024

maxnoofIABSTCInfo INTEGER ::= 45

maxnoofSymbols INTEGER ::= 14

maxnoofServingCells INTEGER ::= 32

maxnoofDUFSlots INTEGER ::= 320

maxnoofHSNASlots INTEGER ::= 5120

maxnoofServedCellsIAB INTEGER ::= 512

maxnoofChildIABNodes INTEGER ::= 1024

maxnoofNonUPTrafficMappings INTEGER ::= 32

maxnoofTLAsIAB INTEGER ::= 1024

maxnoofMappingEntries INTEGER ::= 67108864

maxnoofDSInfo INTEGER ::= 64

maxnoofEgressLinks INTEGER ::= 2

maxnoofULUPTNLInformationforIAB INTEGER ::= 32678

maxnoofUPTNLAddresses INTEGER ::= 8

maxnoofSLDRBs INTEGER ::= 512

maxnoofQoSParaSets INTEGER ::= 8

maxnoofPC5QoSFlows INTEGER ::= 2048

maxnoofSSBAreas INTEGER ::= 64

maxnoofPhysicalResourceBlocks INTEGER ::= 275

maxnoofPhysicalResourceBlocks-1 INTEGER ::= 274

maxnoofPRACHconfigs INTEGER ::= 16

maxnoofRACHReports INTEGER ::= 64

maxnoofRLFReports INTEGER ::= 64

maxnoofAdditionalPDCPDuplicationTNL INTEGER ::= 2

maxnoofRLCDuplicationState INTEGER ::= 3

maxnoofCHOcells INTEGER ::= 8

maxnoofMDTPLMNs INTEGER ::= 16

maxnoofCAGsupported INTEGER ::= 12

maxnoofNIDsupported INTEGER ::= 12

maxnoofNRSCSs INTEGER ::= 5

maxnoofExtSliceItems INTEGER ::= 65535

maxnoofPosMeas INTEGER ::= 16384

maxnoofTRPInfoTypes INTEGER ::= 64

maxnoofTRPs INTEGER ::= 65535

maxnoofSRSTriggerStates INTEGER ::= 3

maxnoofSpatialRelations INTEGER ::= 64

maxnoBcastCell INTEGER ::= 16384

maxnoofAngleInfo INTEGER ::= 65535

maxnooflcs-gcs-translation INTEGER ::= 3

maxnoofPath INTEGER ::= 2

maxnoofMeasE-CID INTEGER ::= 64

maxnoofSSBs INTEGER ::= 255

maxnoSRS-ResourceSets INTEGER ::= 16

maxnoSRS-ResourcePerSet INTEGER ::= 16

maxnoSRS-Carriers INTEGER ::= 32

maxnoSCSs INTEGER ::= 5

maxnoSRS-Resources INTEGER ::= 64

maxnoSRS-PosResources INTEGER ::= 64

maxnoSRS-PosResourceSets INTEGER ::= 16

maxnoSRS-PosResourcePerSet INTEGER ::= 16

maxnoofPRS-ResourceSets INTEGER ::= 2

maxnoofPRS-ResourcesPerSet INTEGER ::= 64

maxNoOfMeasTRPs INTEGER ::= 64

maxnoofPRSresourceSets INTEGER ::= 8

maxnoofPRSresources INTEGER ::= 64

maxnoARPs INTEGER ::= 101

-- 101 are FFS for compilation

maxnoofULAoAs INTEGER ::= 8

maxNoPathExtended INTEGER ::= 8

maxnoUETEGs INTEGER ::= 101

maxnoTRPTEGs INTEGER ::= 101

maxFreqLayers INTEGER ::= 4

maxnoofPRSTRPs INTEGER ::= 256

<<<<<<<<<<<<<<<<<<<< Changes End >>>>>>>>>>>>>>>>>>>>