**3GPP TSG-SA5 Meeting #148e *S5-233262***

**Online, ,17 April 2023 – 25 April 2023**

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **32.298** | **CR** |  **0932** | **rev** | **1** | **Current version:** | **18.1.0** |  |
|  |
| *For* [***HELP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
|  |

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

|  |
| --- |
|  |
| ***Title:***  | Rel-18 CR 32.298 Update EAS Infrastructure Usage Charging Information |
|  |  |
| ***Source to WG:*** | Amdocs |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | EDGE\_CH |  | ***Date:*** | 2023-04-06 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories 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:*** | The attributes in edge infrastructure usage charging information differ from their source definitions. The duration start and end times need to be optional, as defined in TS 32.291, and the data volumes defined in TS 32.257 are missing  |
|  |  |
| ***Summary of change:*** | Define duration start and end time as optional. Also, add incoming and outgoing data volumes in the edge infrastructure usage charging information |
|  |  |
| ***Consequences if not approved:*** | There can be confusion on the implementation of EAS Infrastructure Usage Charging CDRs |
|  |  |
| ***Clauses affected:*** | 5.2.5.2 |
|  |  |
|  | **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 32.291 CR 0469 |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

|  |
| --- |
| **First change** |

#### 5.2.5.2 CHF CDRs

This subclause contains the abstract syntax definitions that are specific to the CHF CDR types defined in this document.

.$CHFChargingDataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) charging (5) chfChargingDataTypes (15) asn1Module (0) version1 (0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- EXPORTS everything

IMPORTS

CallDuration,

CauseForRecClosing,

ChargingID,

DataVolumeOctets,

Diagnostics,

Ecgi,

EnhancedDiagnostics,

DynamicAddressFlag,

InvolvedParty,

IPAddress,

LocalSequenceNumber,

ManagementExtensions,

MessageClass,

MessageReference,

MSCAddress,

MSISDN,

MSTimeZone,

Ncgi,

Nid,

NodeAddress,

PLMN-Id,

PriorityType,

PSCellInformation,

RANNASCause,

RecordType,

ServiceSpecificInfo,

Session-Id,

SubscriberEquipmentNumber,

SubscriptionID,

ThreeGPPPSDataOffStatus,

TimeStamp

FROM GenericChargingDataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) charging (5) genericChargingDataTypes (0) asn1Module (0) version2 (1)}

AddressString,

IMSI

FROM MAP-CommonDataTypes {itu-t identified-organization (4) etsi (0) mobileDomain (0) gsm-Network (1) modules (3) map-CommonDataTypes (18) version18 (18) }

ChargingCharacteristics,

ChargingRuleBaseName,

ChChSelectionMode,

EventBasedChargingInformation,

PresenceReportingAreaInfo,

RatingGroupId,

ServiceIdentifier

FROM GPRSChargingDataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) charging (5) gprsChargingDataTypes (2) asn1Module (0) version2 (1)}

OriginatorInfo,

RecipientInfo,

SMAddressInfo,

SMMessageType,

SMSResult,

SMSStatus

FROM SMSChargingDataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) charging (5) smsChargingDataTypes (10) asn1Module (0) version2 (1)}

APIDirection

FROM ExposureFunctionAPIChargingDataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) charging (5) exposureFunctionAPIChargingDataTypes (14) asn1Module (0) version2 (1)}

SupplService

FROM MMTelChargingDataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) charging (5) mMTelChargingDataTypes (9) asn1Module (0) version2 (1)}

AccessNetworkInfoChange,

AccessTransferInformation,

ApplicationServersInformation,

CalledIdentityChange,

CarrierSelectRouting,

Early-Media-Components-List,

FEIdentifierList,

IMS-Charging-Identifier,

IMSCommunicationServiceIdentifier,

IMSNodeFunctionality,

InterOperatorIdentifiers,

ISUPCause,

ListOfInvolvedParties,

ListOfReasonHeader,

MessageBody,

NNI-Information,

NumberPortabilityRouting,

Role-of-Node,

S-CSCF-Information,

SDP-Media-Component,

ServedPartyIPAddress,

Service-Id,

SessionPriority,

SIPEventType,

TADIdentifier,

TransitIOILists,

TransmissionMedium,

TrunkGroupID

FROM IMSChargingDataTypes {itu-t (0) identified-organization (4) etsi(0) mobileDomain (0) charging (5) imsChargingDataTypes (4) asn1Module (0) version2 (1)}

AppSpecificData,

ProseFunctionality,

ProSeEventType,

ProSeUERole,

RangeClass,

ProximityAlertIndication,

ChangeOfProSeCondition,

CoverageInfo,

RadioParameterSetInfo,

TransmitterInfo

FROM ProSeChargingDataTypes {itu-t (0) identified-organization (4) etsi (0) mobileDomain (0) charging (5) proseChargingDataType (14) asn1Module (0) version2 (1)}

;

--

-- CHF RECORDS

--

CHFRecord ::= CHOICE

--

-- Record values 200..201 are specific

--

{

 chargingFunctionRecord [200] ChargingRecord

}

ChargingRecord ::= SET

{

 recordType [0] RecordType,

 recordingNetworkFunctionID [1] NetworkFunctionName,

 subscriberIdentifier [2] SubscriptionID OPTIONAL,

 nFunctionConsumerInformation [3] NetworkFunctionInformation,

 triggers [4] SEQUENCE OF Trigger OPTIONAL,

 listOfMultipleUnitUsage [5] SEQUENCE OF MultipleUnitUsage OPTIONAL,

 recordOpeningTime [6] TimeStamp,

 duration [7] CallDuration,

 recordSequenceNumber [8] INTEGER OPTIONAL,

 causeForRecClosing [9] CauseForRecClosing,

 diagnostics [10] Diagnostics OPTIONAL,

 localRecordSequenceNumber [11] LocalSequenceNumber OPTIONAL,

 recordExtensions [12] ManagementExtensions OPTIONAL,

 pDUSessionChargingInformation [13] PDUSessionChargingInformation OPTIONAL,

 roamingQBCInformation [14] RoamingQBCInformation OPTIONAL,

 sMSChargingInformation [15] SMSChargingInformation OPTIONAL,

 chargingSessionIdentifier [16] ChargingSessionIdentifier OPTIONAL,

 serviceSpecificationInformation [17] OCTET STRING OPTIONAL,

 exposureFunctionAPIInformation [18] ExposureFunctionAPIInformation OPTIONAL,

 registrationChargingInformation [19] RegistrationChargingInformation OPTIONAL,

 n2ConnectionChargingInformation [20] N2ConnectionChargingInformation OPTIONAL,

 locationReportingChargingInformation [21] LocationReportingChargingInformation OPTIONAL,

 incompleteCDRIndication [22] IncompleteCDRIndication OPTIONAL,

 tenantIdentifier [23] TenantIdentifier OPTIONAL,

 mnSConsumerIdentifier [24] MnSConsumerIdentifier OPTIONAL,

 nSMChargingInformation [25] NSMChargingInformation OPTIONAL,

 nSPAChargingInformation [26] NSPAChargingInformation OPTIONAL,

 chargingID [27] ChargingID OPTIONAL,

 iMSChargingInformation [28] IMSChargingInformation OPTIONAL,

 mMTelChargingInformation [29] MMTelChargingInformation OPTIONAL,

 edgeInfrastructureUsageChargingInformation [30] EdgeInfrastructureUsageChargingInformation OPTIONAL,

 eASDeploymentChargingInformation [31] EASDeploymentChargingInformation OPTIONAL,

 directEdgeEnablingServiceChargingInformation [32] ExposureFunctionAPIInformation OPTIONAL,

 exposedEdgeEnablingServiceChargingInformation [33] ExposureFunctionAPIInformation OPTIONAL,

 proseChargingInformation [34] ProseChargingInformation OPTIONAL,

 eASID [35] UTF8String OPTIONAL,

 eDNID [36] UTF8String OPTIONAL,

 eASProviderIdentifier [37] UTF8String OPTIONAL,

 mMSChargingInformation [38] MMSChargingInformation OPTIONAL,

}

--

-- PDU Session Charging Information

--

PDUSessionChargingInformation ::= SET

{

 pDUSessionChargingID [0] ChargingID,

 userIdentifier [1] InvolvedParty OPTIONAL,

 userEquipmentInfo [2] SubscriberEquipmentNumber OPTIONAL,

 userLocationInformation [3] UserLocationInformation OPTIONAL,

 userRoamerInOut [4] RoamerInOut OPTIONAL,

 presenceReportingAreaInfo [5] PresenceReportingAreaInfo OPTIONAL,

 pDUSessionId [6] PDUSessionId,

 networkSliceInstanceID [7] SingleNSSAI OPTIONAL,

 pDUType [8] PDUSessionType OPTIONAL,

 sSCMode [9] SSCMode OPTIONAL,

 sUPIPLMNIdentifier [10] PLMN-Id OPTIONAL,

 servingNetworkFunctionID [11] SEQUENCE OF ServingNetworkFunctionID OPTIONAL,

 rATType [12] RATType OPTIONAL,

 dataNetworkNameIdentifier [13] DataNetworkNameIdentifier OPTIONAL,

 pDUAddress [14] PDUAddress OPTIONAL,

 authorizedQoSInformation [15] AuthorizedQoSInformation OPTIONAL,

 uETimeZone [16] MSTimeZone OPTIONAL,

 pDUSessionstartTime [17] TimeStamp OPTIONAL,

 pDUSessionstopTime [18] TimeStamp OPTIONAL,

 diagnostics [19] Diagnostics OPTIONAL,

 chargingCharacteristics [20] ChargingCharacteristics OPTIONAL,

 chChSelectionMode [21] ChChSelectionMode OPTIONAL,

 threeGPPPSDataOffStatus  [22] ThreeGPPPSDataOffStatus OPTIONAL,

 rANSecondaryRATUsageReport [23] SEQUENCE OF NGRANSecondaryRATUsageReport OPTIONAL,

 subscribedQoSInformation [24] SubscribedQoSInformation OPTIONAL,

 authorizedSessionAMBR [25] SessionAMBR OPTIONAL,

 subscribedSessionAMBR [26] SessionAMBR OPTIONAL,

 servingCNPLMNID [27] PLMN-Id OPTIONAL,

 sUPIunauthenticatedFlag [28] NULL OPTIONAL,

 dnnSelectionMode [29] DNNSelectionMode OPTIONAL,

 homeProvidedChargingID [30] ChargingID OPTIONAL,

 mAPDUNonThreeGPPUserLocationInfo [31] UserLocationInformation OPTIONAL,

 mAPDUNonThreeGPPRATType [32] RATType OPTIONAL,

 mAPDUSessionInformation [33] MAPDUSessionInformation OPTIONAL,

 enhancedDiagnostics [34] EnhancedDiagnostics5G OPTIONAL,

 userLocationInformationASN1  [35] UserLocationInformationStructured OPTIONAL,

 mAPDUNonThreeGPPUserLocationInfoASN1 [36] UserLocationInformationStructured OPTIONAL,

 userLocationTime [37] TimeStamp OPTIONAL, -- not to be used

-- user location info time is included under UserLocationInformation

 mAPDUNonThreeGPPUserLocationTime [38] TimeStamp OPTIONAL,

 listOfPresenceReportingAreaInformation [39] SEQUENCE OF PresenceReportingAreaInfo OPTIONAL,

 redundantTransmissionType [40] RedundantTransmissionType OPTIONAL,

 pDUSessionPairID [41] PDUSessionPairID OPTIONAL,

 fiveGLANTypeService [42] FiveGLANTypeService OPTIONAL,

 cpCIoTOptimisationIndicator [43] TimeStamp OPTIONAL,

 fiveGSControlPlaneOnlyIndicator [44] QosMonitoringReport OPTIONAL,

 smfChargingID [45] UTF8String OPTIONAL,

 smfHomeProvidedChargingID [46] UTF8String OPTIONAL

}

--

-- Roaming QBC Information

--

RoamingQBCInformation ::= SET

{

 multipleQFIcontainer [0] SEQUENCE OF MultipleQFIContainer OPTIONAL,

 uPFID [1] NetworkFunctionName OPTIONAL,

 -- included for backwards compatibility and

 -- can be included based on operators requirement

 roamingChargingProfile [2] RoamingChargingProfile OPTIONAL

}

--

-- SMS Charging Information

--

SMSChargingInformation ::= SET

{

 originatorInfo [1] OriginatorInfo OPTIONAL,

 recipientInfos [2] SEQUENCE OF RecipientInfo OPTIONAL,

 userEquipmentInfo [3] SubscriberEquipmentNumber OPTIONAL,

 userLocationInformation [4] UserLocationInformation OPTIONAL,

 uETimeZone [5] MSTimeZone OPTIONAL,

 rATType [6] RATType OPTIONAL,

 sMSCAddress [7] AddressString OPTIONAL,

 eventtimestamp [8] TimeStamp,

-- 9 to 19 is for future use

 sMDataCodingScheme [20] INTEGER OPTIONAL,

 sMMessageType [21] SMMessageType OPTIONAL,

 sMReplyPathRequested [22] SMReplyPathRequested OPTIONAL,

 sMUserDataHeader [23] OCTET STRING OPTIONAL,

 sMSStatus [24] SMSStatus OPTIONAL,

 sMDischargeTime [25] TimeStamp OPTIONAL,

 sMTotalNumber [26] INTEGER OPTIONAL,

 sMServiceType [27] SMServiceType OPTIONAL,

 sMSequenceNumber [28] INTEGER OPTIONAL,

 sMSResult [29] SMSResult OPTIONAL,

 submissionTime [30] TimeStamp OPTIONAL,

 sMPriority [31] PriorityType OPTIONAL,

 messageReference [32] MessageReference OPTIONAL,

 messageSize [33] INTEGER OPTIONAL,

 messageClass [34] MessageClass OPTIONAL,

 sMdeliveryReportRequested [35] SMdeliveryReportRequested OPTIONAL,

 messageClassTokenText [36] UTF8String OPTIONAL,

 userRoamerInOut [37] RoamerInOut OPTIONAL,

 userLocationInformationASN1 [38] UserLocationInformationStructured OPTIONAL

}

--

-- Exposure Function API Information corresponds to NEF API Charging information

--

ExposureFunctionAPIInformation ::= SET

{

 groupIdentifier [0] UTF8String OPTIONAL,

-- This UTF8Stringis based on the string specified in TS 29.571 [249]

-- The string may also be based on AddressString.

 aPIDirection [1] APIDirection OPTIONAL,

 aPITargetNetworkFunction [2] NetworkFunctionInformation OPTIONAL,

 aPIResultCode [3] APIResultCode OPTIONAL,

 aPIName [4] IA5String,

 aPIReference [5] IA5String OPTIONAL,

 aPIContent [6] OCTET STRING OPTIONAL,

 externalIndividualIdentifier [7] InvolvedParty OPTIONAL,

 externalGroupIdentifier [8] ExternalGroupIdentifier OPTIONAL,

 internalGroupIdentifier [9] InternalGroupIdentifier OPTIONAL,

 internalIndividualIdentifier [10] SubscriptionID OPTIONAL,

 aPIOperation [11] APIOperation OPTIONAL

}

--

-- Registration Charging Information

--

RegistrationChargingInformation ::= SET

{

 registrationMessagetype [0] RegistrationMessageType,

 userIdentifier [1] InvolvedParty OPTIONAL,

 userEquipmentInfo [2] SubscriberEquipmentNumber OPTIONAL,

 sUPIunauthenticatedFlag [3] NULL OPTIONAL,

 userRoamerInOut [4] RoamerInOut OPTIONAL,

 userLocationInformation [5] UserLocationInformation OPTIONAL,

 userLocationInfoTime [6] TimeStamp OPTIONAL, -- This field is not used

-- user location info time is included under UserLocationInformation

 uETimeZone [7] MSTimeZone OPTIONAL,

 rATType [8] RATType OPTIONAL,

 mICOModeIndication [9] MICOModeIndication OPTIONAL,

 smsIndication [10] SmsIndication OPTIONAL,

 taiList [11] SEQUENCE OF TAI OPTIONAL,

 serviceAreaRestriction [12] ServiceAreaRestriction OPTIONAL,

 requestedNSSAI [13] SEQUENCE OF SingleNSSAI OPTIONAL,

 allowedNSSAI [14] SEQUENCE OF SingleNSSAI OPTIONAL,

 rejectedNSSAI [15] SEQUENCE OF SingleNSSAI OPTIONAL,

 pSCellInformation [16] PSCellInformation OPTIONAL,

 fiveGMMCapability [17] FiveGMMCapability OPTIONAL,

 nSSAIMapList [18] SEQUENCE OF NSSAIMap OPTIONAL,

 amfUeNgapId [19] AmfUeNgapId OPTIONAL,

 ranUeNgapId [20] RanUeNgapId OPTIONAL,

 ranNodeId [21] GlobalRanNodeId OPTIONAL,

 userLocationInformationASN1 [22] UserLocationInformationStructured OPTIONAL

}

--

-- N2 connection charging Information

--

N2ConnectionChargingInformation ::= SET

{

 n2ConnectionMessageType [0] N2ConnectionMessageType,

 userIdentifier [1] InvolvedParty OPTIONAL,

 userEquipmentInfo [2] SubscriberEquipmentNumber OPTIONAL,

 sUPIunauthenticatedFlag [3] NULL OPTIONAL,

 userRoamerInOut [4] RoamerInOut OPTIONAL,

 userLocationInformation [5] UserLocationInformation OPTIONAL,

 userLocationInfoTime [6] TimeStamp OPTIONAL, -- This field is not used

-- user location info time is included under UserLocationInformation

 uETimeZone [7] MSTimeZone OPTIONAL,

 rATType [8] RATType OPTIONAL,

 ranUeNgapId [9] RanUeNgapId OPTIONAL,

 ranNodeId [10] GlobalRanNodeId OPTIONAL,

 restrictedRatList [11] SEQUENCE OF RATType OPTIONAL,

 forbiddenAreaList [12] SEQUENCE OF Area OPTIONAL,

 serviceAreaRestriction [13] ServiceAreaRestriction OPTIONAL,

 restrictedCnList [14] SEQUENCE OF CoreNetworkType OPTIONAL,

 allowedNSSAI [15] SEQUENCE OF SingleNSSAI OPTIONAL,

 rrcEstablishmentCause [16] RrcEstablishmentCause OPTIONAL,

 pSCellInformation [17] PSCellInformation OPTIONAL,

 amfUeNgapId [18] AmfUeNgapId OPTIONAL,

 userLocationInformationASN1 [19] UserLocationInformationStructured OPTIONAL

}

--

-- Location reporting charging Information

--

LocationReportingChargingInformation ::= SET

{

 locationReportingMessagetype [0] LocationReportingMessageType,

 userIdentifier [1] InvolvedParty OPTIONAL,

 userEquipmentInfo [2] SubscriberEquipmentNumber OPTIONAL,

 sUPIunauthenticatedFlag [3] NULL OPTIONAL,

 userRoamerInOut [4] RoamerInOut OPTIONAL,

 userLocationInformation [5] UserLocationInformation OPTIONAL,

 userLocationInfoTime [6] TimeStamp OPTIONAL, -- This field is not used

-- user location info time is included under UserLocationInformation

 uETimeZone [7] MSTimeZone OPTIONAL,

 presenceReportingAreaInfo [8] PresenceReportingAreaInfo OPTIONAL,

 rATType [9] RATType OPTIONAL,

 pSCellInformation [10] PSCellInformation OPTIONAL,

 userLocationInformationASN1 [11] UserLocationInformationStructured OPTIONAL,

 listOfPresenceReportingAreaInformation [12] SEQUENCE OF PresenceReportingAreaInfo OPTIONAL

}

--

-- Network Slice Performance and Analytics charging Information

--

NSPAChargingInformation ::= SET

{

 singelNSSAI [0] SingleNSSAI

}

--

-- NSM charging Information

--

--

-- See TS 28.541 [254] for more information

--

NSMChargingInformation ::= SET

{

 managementOperation [0] ManagementOperation OPTIONAL,

 iDnetworkSliceInstance [1] OCTET STRING OPTIONAL,

 listOfserviceProfileChargingInformation [2] SEQUENCE OF ServiceProfileChargingInformation OPTIONAL,

 managementOperationStatus [3] ManagementOperationStatus OPTIONAL,

 operationalState [4] OperationalState OPTIONAL,

 administrativeState [5] AdministrativeState OPTIONAL

}

--

-- MMTel charging Information

--

--

-- See TS 32.275 [35] for more information

--

MMTelChargingInformation ::= SET

{

 supplementaryServices [0] SEQUENCE OF SupplService OPTIONAL

}

--

-- IMS charging Information

--

--

-- See TS 32.260 [20] for more information

--

IMSChargingInformation ::= SET

{

 eventType [0] SIPEventType OPTIONAL,

 iMSNodeFunctionality [1] IMSNodeFunctionality OPTIONAL,

 roleOfNode [2] Role-of-Node OPTIONAL,

 userIdentifier [3] InvolvedParty OPTIONAL,

 userEquipmentInfo [4] SubscriberEquipmentNumber OPTIONAL,

 userLocationInfo [5] UserLocationInformation OPTIONAL,

 ueTimeZone [6] MSTimeZone OPTIONAL,

 threeGPPPSDataOffStatus [7] ThreeGPPPSDataOffStatus OPTIONAL,

 iSUPCause [8] ISUPCause OPTIONAL,

 controlPlaneAddress [9] NodeAddress OPTIONAL,

 vlrNumber [10] MSCAddress OPTIONAL,

 mscAddress [11] MSCAddress OPTIONAL,

 userSessionID [12] Session-Id OPTIONAL,

 outgoingSessionID [13] Session-Id OPTIONAL,

 sessionPriority [14] SessionPriority OPTIONAL,

 callingPartyAddresses [15] ListOfInvolvedParties OPTIONAL,

 calledPartyAddress [16] InvolvedParty OPTIONAL,

 numberPortabilityRouting [17] NumberPortabilityRouting OPTIONAL,

 carrierSelectRoutingInformation [18] CarrierSelectRouting OPTIONAL,

 alternateChargedPartyAddress [19] UTF8String OPTIONAL,

 requestedPartyAddresses [20] ListOfInvolvedParties OPTIONAL,

 calledAssertedIdentities [21] ListOfInvolvedParties OPTIONAL,

 calledIdentityChanges [22] SEQUENCE OF CalledIdentityChange OPTIONAL,

 associatedURIs [23] ListOfInvolvedParties OPTIONAL,

 timeStamps [24] TimeStamp OPTIONAL,

 applicationServerInformation [25] SEQUENCE OF ApplicationServersInformation OPTIONAL,

 interOperatorIdentifiers [26] SEQUENCE OF InterOperatorIdentifiers OPTIONAL,

 imsChargingIdentifier [27] IMS-Charging-Identifier OPTIONAL,

 relatedICID [28] IMS-Charging-Identifier OPTIONAL,

 relatedICIDGenerationNode [29] NodeAddress OPTIONAL,

 transitIOIList [30] TransitIOILists OPTIONAL,

 earlyMediaDescription [31] SEQUENCE OF Early-Media-Components-List OPTIONAL,

 sdpSessionDescription [32] SEQUENCE OF UTF8String OPTIONAL,

 sdpMediaComponent [33] SEQUENCE OF SDP-Media-Component OPTIONAL,

 servedPartyIPAddress [34] ServedPartyIPAddress OPTIONAL,

 serverCapabilities [35] S-CSCF-Information OPTIONAL,

 trunkGroupID [36] TrunkGroupID OPTIONAL,

 bearerService [37] TransmissionMedium OPTIONAL,

 imsServiceId [38] Service-Id OPTIONAL,

 messageBodies [39] SEQUENCE OF MessageBody OPTIONAL,

 accessNetworkInformation [40] SEQUENCE OF UTF8String OPTIONAL,

 additionalAccessNetworkInformation [41] UTF8String OPTIONAL,

 cellularNetworkInformation [42] UTF8String OPTIONAL,

 accessTransferInformation [43] SEQUENCE OF AccessTransferInformation OPTIONAL,

 accessNetworkInfoChange [44] SEQUENCE OF AccessNetworkInfoChange OPTIONAL,

 imsCommunicationServiceID [45] IMSCommunicationServiceIdentifier OPTIONAL,

 imsApplicationReferenceID [46] UTF8String OPTIONAL,

 causeCode [47] INTEGER OPTIONAL,

 reasonHeaders [48] ListOfReasonHeader OPTIONAL,

 initialIMSChargingIdentifier [49] IMS-Charging-Identifier OPTIONAL,

 nniInformation [50] SEQUENCE OF NNI-Information OPTIONAL,

 fromAddress [51] UTF8String OPTIONAL,

 imsEmergencyIndicator [52] NULL OPTIONAL,

 imsVisitedNetworkIdentifier [53] UTF8String OPTIONAL,

 sipRouteHeaderReceived [54] UTF8String OPTIONAL,

 sipRouteHeaderTransmitted [55] UTF8String OPTIONAL,

 tadIdentifier [56] TADIdentifier OPTIONAL,

 feIdentifierList [57] FEIdentifierList OPTIONAL

}

--

-- Edge Enabling Infrastructure Resource Usage Charging Information

--

EdgeInfrastructureUsageChargingInformation ::= SET

{

 meanVirtualCPUUsage [0] REAL OPTIONAL,

 meanVirtualMemoryUsage [1] REAL OPTIONAL,

 meanVirtualDiskUsage [2] REAL OPTIONAL,

 durationStartTime [3] TimeStamp OPTIONAL,

 durationEndTime [4] TimeStamp OPTIONAL,

 incomingDataVolume [5] INTEGER OPTIONAL,

 outgoingDataVolume [6] INTEGER OPTIONAL

}

--

-- EAS Deployment Charging Information

--

EASDeploymentChargingInformation ::= SET

{

 eASDeploymentRequirements [0] EASDeploymentRequirements,

 lCMStartTime [1] TimeStamp,

 lCMEndTime [2] TimeStamp

}

--

-- Prose Charging Information--

--

-- See TS 32.277 [34] for more information

-- See clause 5.2.4.7 for ProSe CDR types definition

ProseChargingInformation ::= SET

{

 announcingPlmnID [0] PLMN-Id OPTIONAL,

 announcingUeHplmnIdentifier [1] PLMN-Id OPTIONAL,

 announcingUeVplmnIdentifier [2] PLMN-Id OPTIONAL,

 monitoringUeHplmnIdentifier [3] PLMN-Id OPTIONAL,

 monitoringUeVplmnIdentifier [4] PLMN-Id OPTIONAL,

 discovererUeHplmnIdentifier [5] PLMN-Id OPTIONAL,

 discovererUeVplmnIdentifier [6] PLMN-Id OPTIONAL,

 discovereeUeHplmnIdentifier [8] PLMN-Id OPTIONAL,

 discovereeUeVplmnIdentifier [9] PLMN-Id OPTIONAL,

 monitoredPlmnIdentifier [10] PLMN-Id OPTIONAL,

 proseApplicationID [11] UTF8String OPTIONAL,

 applicationID [12] UTF8String OPTIONAL,

 applicationSpecificDataList [13] SEQUENCE OF AppSpecificData,

 proseFunctionality [14] ProseFunctionality OPTIONAL,

 proseEventType [15] ProSeEventType OPTIONAL,

 directDiscoveryModel [16] UTF8String OPTIONAL,

 validityPeriod [17] INTEGER OPTIONAL,

 roleOfUE [18] ProSeUERole OPTIONAL,

 proseRequestTimestamp [19] TimeStamp OPTIONAL,

 pC3ProtocolCause [20] INTEGER OPTIONAL,

 monitoringUEIdentifier [21] SubscriptionID OPTIONAL,

 requestedPLMNIdentifier [22] PLMN-Id OPTIONAL,

 timeWindow [23] INTEGER OPTIONAL,

 rangeClass [24] RangeClass OPTIONAL,

 proximityAlertIndication [25] ProximityAlertIndication OPTIONAL,

 proximityAlertTimestamp [26] TimeStamp OPTIONAL,

 proximityCancellationTimestamp [27] TimeStamp OPTIONAL,

 relayIPAddress [28] IPAddress OPTIONAL,

 proseUEToNetworkRelayUEID [29] OCTET STRING OPTIONAL,

 proseDestinationLayer2ID [30] OCTET STRING OPTIONAL,

 pFIContainerInformation [31] SEQUENCE OF PFIContainerInformation OPTIONAL,

 transmissionDataContainer [32] SEQUENCE OF ChangeOfProSeCondition OPTIONAL,

 receptionDataContainer [33] SEQUENCE OF ChangeOfProSeCondition OPTIONAL

}

--

-- MMS Charging Information

--

MMSChargingInformation ::= SET

{

 mMOriginatorInfo [1] MMOriginatorInfo OPTIONAL,

 mMRecipientInfoList [2] SEQUENCE OF MMRecipientInfo OPTIONAL,

 userLocationInformation [3] UserLocationInformation OPTIONAL,

 uETimeZone [4] MSTimeZone OPTIONAL,

 rATType [5] RATType OPTIONAL,

 correlationInformation [6] UTF8String OPTIONAL,

 submissionTime [7] TimeStamp OPTIONAL,

 mMContentType [8] MMContentType OPTIONAL,

 mMPriority [9] PriorityType OPTIONAL,

 messageID [10] UTF8String OPTIONAL,

 messageType [11] UTF8String OPTIONAL,

 messageSize [12] INTEGER OPTIONAL,

 messageClass [13] UTF8String OPTIONAL,

 deliveryReportRequested [14] BOOLEAN OPTIONAL,

 readReplyReportRequested [15] BOOLEAN OPTIONAL,

 applicID [16] UTF8String OPTIONAL,

 replyApplicID [17] UTF8String OPTIONAL,

 auxApplicInfo [18] UTF8String OPTIONAL,

 contentClass [19] UTF8String OPTIONAL,

 dRMContent [20] BOOLEAN OPTIONAL,

 adaptations [21] BOOLEAN OPTIONAL,

 vasID [22] UTF8String OPTIONAL,

 vaspID [23] UTF8String OPTIONAL

}

--

-- CHF CHARGING TYPES

--

--

-- A

--

AFChargingID ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details.

--

AffinityAntiAffinity ::= SEQUENCE

{

 affinityEAS [0] SEQUENCE OF UTF8String OPTIONAL,

 antiAffinityEAS [1] SEQUENCE OF UTF8String OPTIONAL

}

AgeOfLocationInformation ::= INTEGER

AdministrativeState ::= ENUMERATED

{

 lOCKED (0),

 uNLOCKED (1),

 sHUTTINGDOWN (2)

}

AccessType ::= ENUMERATED

{

 threeGPPAccess (0),

 nonThreeGPPAccess (1)

}

AllocationRetentionPriority ::= SEQUENCE

{

 priorityLevel [1] INTEGER,

 preemptionCapability [2] PreemptionCapability,

 preemptionVulnerability [3] PreemptionVulnerability

}

AMFID ::= OCTET STRING (SIZE(3..6))

-- See subclause 2.10.1 of 3GPP TS 23.003 [7] for encoding.

-- Any byte following the 3 first shall be set to ”F”

AmfUeNgapId ::= INTEGER

APIOperation ::= SEQUENCE

{

 name [1] UTF8String,

 description [2] UTF8String

}

APIResultCode ::= INTEGER

--

-- See specific API for more information

--

Area ::= SEQUENCE

{

 tacs [0] SEQUENCE OF TAC OPTIONAL,

 areaCode [1] OCTET STRING OPTIONAL

}

ATSSSCapability ::= ENUMERATED

{

 aTSSS-LL (0),

 mPTCP-ATSS-LL (1),

 mPTCP-ATSS-LL-ASModeUL (2),

 mPTCP-ATSS-LL-ExSDModeUL (3),

 mPTCP-ATSS-LL-ASModeDLUL (4)

}

AuthorizedQoSInformation ::= SEQUENCE

--

-- See TS 32.291 [58] for more information

--

{

 fiveQi [1] INTEGER OPTIONAL,

 aRP [2] AllocationRetentionPriority OPTIONAL,

 priorityLevel [3] INTEGER OPTIONAL,

 averWindow [4] INTEGER OPTIONAL,

 maxDataBurstVol [5] INTEGER OPTIONAL

}

--

-- B

--

Bitrate ::= OCTET STRING

--

-- See 3GPP TS 29.571 [249] Bitrate data type.

--

--

-- C

--

CellGlobalId ::= SEQUENCE

{

 plmnId [0] PLMN-Id,

 lac [1] Lac,

 cellId [2] CellId

}

CellId ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

ChargingSessionIdentifier ::= OCTET STRING

-- See 3GPP TS 32.290 [57] for details.

CoreNetworkType ::= ENUMERATED

{

 fiveGC (0),

 ePC (1)

}

--

-- D

--

DataNetworkNameIdentifier ::= IA5String (SIZE(1..63))

--

-- Network Identifier part of DNN in dot representation.

-- For example, if the complete DNN is 'apn1a.apn1b.apn1c.mnc022.mcc111.gprs'

-- The Identifier is 'apn1a.apn1b.apn1c' and is presented in this form in the CDR.

--

DelayToleranceIndicator ::= ENUMERATED

{

 dTSupported (0),

 dTNotSupported (1)

}

DNNSelectionMode ::= ENUMERATED

--

-- See Information Elements TS 29.502 [250] for more information

--

{

 uEorNetworkProvidedSubscriptionVerified (0),

 uEProvidedSubscriptionNotVerified (1),

 networkProvidedSubscriptionNotVerified (2)

}

--

-- E

--

--

-- See 3GPP TS 28.538 [256] for details

--

EASDeploymentRequirements ::= SEQUENCE

{

 requiredEASservingLocation [0] ServingLocation OPTIONAL,

 softwareImageInfo [1] SoftwareImageInfo OPTIONAL,

 affinityAntiAffinity [2] AffinityAntiAffinity OPTIONAL,

 serviceContinuity [3] BOOLEAN OPTIONAL,

 virtualResource [4] VirtualResource OPTIONAL

}

--

-- See 3GPP TS 29.571 [249] for details

--

ENbId ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

ExternalGroupIdentifier ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

EutraLocation ::= SEQUENCE

{

 tai [0] TAI OPTIONAL,

 ecgi [1] Ecgi OPTIONAL,

 ageOfLocationInformation [3] AgeOfLocationInformation OPTIONAL,

 ueLocationTimestamp [4] TimeStamp OPTIONAL,

 geographicalInformation [5] GeographicalInformation OPTIONAL,

 geodeticInformation [6] GeodeticInformation OPTIONAL,

 globalNgenbId [7] GlobalRanNodeId OPTIONAL,

 globalENbId [8] GlobalRanNodeId OPTIONAL

}

EnhancedDiagnostics5G ::= SEQUENCE

{

 rANNASRelCause [0] SEQUENCE OF RANNASRelCause

}

--

-- F

--

FiveGLANTypeService ::= SEQUENCE

{

 internalGroupIdentifier [1] UTF8String

}

FiveGMMCapability ::= OCTET STRING

--

-- See 3GPP TS 29.571 [249] for details

--

FiveGMmCause ::= INTEGER

--

-- See 3GPP TS 29.571 [249] for details

--

FiveGQoSInformation ::= SEQUENCE

--

-- See TS 32.291 [58] for more information

--

{

 fiveQi [1] INTEGER OPTIONAL,

 aRP [2] AllocationRetentionPriority OPTIONAL,

 qoSNotificationControl [3] BOOLEAN OPTIONAL,

 reflectiveQos [4] BOOLEAN OPTIONAL,

 maxbitrateUL [5] Bitrate OPTIONAL,

 maxbitrateDL [6] Bitrate OPTIONAL,

 guaranteedbitrateUL [7] Bitrate OPTIONAL,

 guaranteedbitrateDL [8] Bitrate OPTIONAL,

 priorityLevel [9] INTEGER OPTIONAL,

 averWindow [10] INTEGER OPTIONAL,

 maxDataBurstVol [11] INTEGER OPTIONAL,

 maxPacketLossRateDL [12] INTEGER OPTIONAL,

 maxPacketLossRateUL [13] INTEGER OPTIONAL

}

FiveGSmCause ::= INTEGER

--

-- See 3GPP TS 29.571 [249] for details

--

--

-- G

--

GCI ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

GeodeticInformation ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

GeographicalInformation ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

GeographicalLocation ::= SEQUENCE

{

 geographicalCoordinates [0] GeographicalCoordinates OPTIONAL,

 civicLocation [1] OCTET UTF8String OPTIONAL

}

GeographicalCoordinates::= SEQUENCE

{

 latitude [0] INTEGER OPTIONAL,

 longitude [1] INTEGER OPTIONAL

}

GeraLocation ::= SEQUENCE

{

 locationNumber [0] LocationNumber OPTIONAL,

 cgi [1] CellGlobalId OPTIONAL,

 sai [2] ServiceAreaId OPTIONAL,

 lai [3] LocationAreaId OPTIONAL,

 rai [4] RoutingAreaId OPTIONAL,

 vlrNumber [5] VlrNumber OPTIONAL,

 mscNumber [6] MscNumber OPTIONAL,

 ageOfLocationInformation [7] AgeOfLocationInformation OPTIONAL,

 ueLocationTimestamp [8] TimeStamp OPTIONAL,

 geographicalInformation [9] GeographicalInformation OPTIONAL,

 geodeticInformation [10] GeodeticInformation OPTIONAL

}

GLI ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

GlobalRanNodeId ::= SEQUENCE

{

 pLMNId [0] PLMN-Id OPTIONAL,

 n3IwfId [1] N3IwFId OPTIONAL,

 gNbId [2] GNbId OPTIONAL,

 ngeNbId [3] NgeNbId OPTIONAL,

 wagfId [4] WAgfId OPTIONAL,

 tngfId [5] TngfId OPTIONAL,

 nid [6] Nid OPTIONAL,

 eNbId [7] ENbId OPTIONAL

}

GNbId ::= SEQUENCE

{

 bitLength [0] INTEGER,

 gNbValue [1] IA5String (SIZE(6..8))

}

--

-- H

--

HFCNodeId ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

--

-- I

--

IncompleteCDRIndication ::= SEQUENCE

-- The values are TRUE if the corresponding message was lost, FALSE if it is not lost

-- and not included if the status is unknown

{

 initialLost [0] BOOLEAN OPTIONAL, -- Initial was lost

 updateLost [1] BOOLEAN OPTIONAL, -- An Update was lost,

 terminationLost [2] BOOLEAN OPTIONAL -- Termination was lost

}

InternalGroupIdentifier ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

--

-- L

--

Lac ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

LineType ::= ENUMERATED

{

 dSL (0),

 pON (1)

}

LocationAreaId ::= SEQUENCE

{

 plmnId [0] PLMN-Id,

 lac [1] Lac

}

LocationNumber ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

LocationReportingMessageType ::= INTEGER

--

-- M

--

ManagementOperation ::= ENUMERATED

{

 createMOI (0),

 modifyMOIAttributes (1),

 deleteMOI (2)

}

ManagementOperationStatus ::= ENUMERATED

{

 oPERATION-SUCCEEDED (0),

 oPERATION-FAILED (1)

}

MnSConsumerIdentifier ::= OCTET STRING

MAPDUSessionIndicator ::= ENUMERATED

{

 mAPDURequest (0),

 mAPDUNetworkUpgradeAllowed (1)

}

MAPDUSessionInformation ::= SEQUENCE

{

 mAPDUSessionIndicator [0] MAPDUSessionIndicator OPTIONAL,

 aTSSSCapability [1] ATSSSCapability OPTIONAL

}

MAPDUSteeringFunctionality ::= ENUMERATED

{

 mPTCP (0),

 aTSSSLL (1)

}

MAPDUSteeringMode ::= SEQUENCE

{

 steerModeValue [0] SteerModeValue OPTIONAL,

 active [1] AccessType OPTIONAL,

 standby [2] AccessType OPTIONAL,

 threegLoad [3] INTEGER OPTIONAL,

 prioAcc [4] AccessType OPTIONAL

}

MICOModeIndication ::= ENUMERATED

{

 mICOMode (0),

 noMICOMode (1)

}

MMAddContentInfo ::= SEQUENCE

{

 typeNumber [0] UTF8String OPTIONAL,

 addtypeInfo [1] UTF8String OPTIONAL,

 contentSize [2] INTEGER OPTIONAL

}

MMContentType ::= SEQUENCE

{

 typeNumber [0] UTF8String OPTIONAL,

 addtypeInfo [1] UTF8String OPTIONAL,

 contentSize [2] INTEGER OPTIONAL,

 mmAddContentInfo [3] SEQUENCE OF MMAddContentInfo OPTIONAL

}

MMOriginatorInfo ::= SEQUENCE

{

 originatorIMSI [0] IMSI OPTIONAL,

 originatorMSISDN [1] MSISDN OPTIONAL,

 originatorOtherAddresses [2] SEQUENCE OF SMAddressInfo OPTIONAL

}

MMRecipientInfo ::= SEQUENCE

{

 recipientIMSI [0] IMSI OPTIONAL,

 recipientMSISDN [1] MSISDN OPTIONAL,

 recipientOtherAddresses [2] SEQUENCE OF SMAddressInfo OPTIONAL

}

MobilityLevel ::= ENUMERATED

{

 stationary (0),

 nomadic (1),

 restrictedMobility (2),

 fullyMobility (3)

}

MscNumber ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

MultipleUnitUsage ::= SEQUENCE

{

 ratingGroup [0] RatingGroupId,

 usedUnitContainers [1] SEQUENCE OF UsedUnitContainer OPTIONAL,

 uPFID [2] NetworkFunctionName OPTIONAL,

 multihomedPDUAddress [3] PDUAddress OPTIONAL

}

MultipleQFIContainer ::= SEQUENCE

{

 qosFlowId [0] QoSFlowId OPTIONAL,

 triggers [1] SEQUENCE OF Trigger OPTIONAL,

 triggerTimeStamp [2] TimeStamp OPTIONAL,

 dataTotalVolume [3] DataVolumeOctets OPTIONAL,

 dataVolumeUplink [4] DataVolumeOctets OPTIONAL,

 dataVolumeDownlink [5] DataVolumeOctets OPTIONAL,

 localSequenceNumber [6] LocalSequenceNumber OPTIONAL,

 timeOfFirstUsage [8] TimeStamp OPTIONAL,

 timeOfLastUsage [9] TimeStamp OPTIONAL,

 qoSInformation [10] FiveGQoSInformation OPTIONAL,

 userLocationInformation [11] UserLocationInformation OPTIONAL,

 uETimeZone [12] MSTimeZone OPTIONAL,

 presenceReportingAreaInfo [13] PresenceReportingAreaInfo OPTIONAL,

 rATType [14] RATType OPTIONAL,

 reportTime [15] TimeStamp,

 servingNetworkFunctionID [16] SEQUENCE OF ServingNetworkFunctionID OPTIONAL,

 threeGPPPSDataOffStatus [17] ThreeGPPPSDataOffStatus OPTIONAL,

 threeGPPChargingID [18] ChargingID OPTIONAL,

 diagnostics [19] Diagnostics OPTIONAL,

 extensionDiagnostics [20] EnhancedDiagnostics OPTIONAL,

 qoSCharacteristics [21] QoSCharacteristics OPTIONAL,

 time [22] CallDuration OPTIONAL,

 userLocationInformationASN1 [23] UserLocationInformationStructured OPTIONAL,

 listOfPresenceReportingAreaInformation [39] SEQUENCE OF PresenceReportingAreaInfo OPTIONAL

}

--

-- N

--

N2ConnectionMessageType ::= INTEGER

N3IwFId ::= IA5String (SIZE(1..16))

--

-- See 3GPP TS 29.571 [249] for details.

--

N3gaLocation ::= SEQUENCE

{

 n3gppTai [0] TAI OPTIONAL,

 n3IwfId [1] N3IwFId OPTIONAL,

 ueIpv4Addr [2] IPAddress OPTIONAL,

 ueIpv6Addr [3] IPAddress OPTIONAL,

 portNumber [4] INTEGER OPTIONAL,

 tnapId [5] TNAPId OPTIONAL,

 twapId [6] TWAPId OPTIONAL,

 hfcNodeId [7] HFCNodeId OPTIONAL,

 w5gbanLineType [8] LineType OPTIONAL,

 gli [9] GLI OPTIONAL,

 gci [10] GCI OPTIONAL

}

NrLocation ::= SEQUENCE

{

 tai [0] TAI OPTIONAL,

 ncgi [1] Ncgi OPTIONAL,

 ageOfLocationInformation [2] AgeOfLocationInformation OPTIONAL,

 ueLocationTimestamp [3] TimeStamp OPTIONAL,

 geographicalInformation [4] GeographicalInformation OPTIONAL,

 geodeticInformation [5] GeodeticInformation OPTIONAL,

 globalGnbId [6] GlobalRanNodeId OPTIONAL

}

--

-- See 3GPP TS 29.571 [249] for details

--

NetworkAreaInfo ::= SEQUENCE

{

 ecgis [0] SEQUENCE OF Ecgi OPTIONAL,

 ncgis [1] SEQUENCE OF Ncgi OPTIONAL,

 gRanNodeIds [2] SEQUENCE OF GlobalRanNodeId OPTIONAL,

 tais [3] SEQUENCE OF TAI OPTIONAL

}

NetworkFunctionInformation ::= SEQUENCE

{

 networkFunctionality [0] NetworkFunctionality,

 networkFunctionName [1] NetworkFunctionName OPTIONAL,

 networkFunctionIPv4Address [2] IPAddress OPTIONAL,

 networkFunctionPLMNIdentifier [3] PLMN-Id OPTIONAL,

 networkFunctionIPv6Address [4] IPAddress OPTIONAL,

 networkFunctionFQDN [5] NodeAddress OPTIONAL

}

NetworkFunctionName ::= IA5String (SIZE(1..36))

-- Shall be a Universally Unique Identifier (UUID) version 4, as described in IETF RFC 4122 [410]

NetworkFunctionality ::= ENUMERATED

{

 cHF (0),

 -- CHF may only to be used in failure cases

 sMF (1),

 aMF (2),

 sMSF (3),

 sGW (4),

 -- SGW is only applicable for interworking with EPC scenario

 -- when UE is connected to P-GW+SMF via EPC

 iSMF (5),

 ePDG (6),

 -- ePDG is only applicable for interworking with EPC scenario

 -- when UE is connected to P-GW+SMF via EPC/ePDG

 cEF (7),

 nEF (8),

 pGWCSMF (9),

 mnS-Producer (10),

 sGSN (11),

 -- SGSN is only applicable when UE is connected to SMF+PGW-C via GERAN/UTRAN

 fiveGDDNMF (12),

 vSMF (13),

 -- vSMF may be used instead of sMF in roaming scenarios}

 iMS-Node (14)

 eES (15)

 mMS-Node (16)

}

NgApCause ::= SEQUENCE

-- See 3GPP TS 29.571 [249] for details.

{

 group [0] INTEGER,

 value [1] INTEGER

}

NgeNbId ::= IA5String (SIZE(1..21))

--

-- See 3GPP TS 29.571 [249] for details.

--

NGRANSecondaryRATType ::= OCTET STRING

--

-- "NR" or "EUTRA"

--

NGRANSecondaryRATUsageReport ::= SEQUENCE

{

 nGRANSecondaryRATType [0] NGRANSecondaryRATType OPTIONAL,

 qosFlowsUsageReports [1] SEQUENCE OF QosFlowsUsageReport OPTIONAL

}

NsiLoadLevelInfo ::= SEQUENCE

--

-- See 3GPP TS 29.520 [233] for details

--

{

 loadLevelInformation [0] INTEGER OPTIONAL,

 snssai [1] SingleNSSAI OPTIONAL,

 nsiId [2] OCTET STRING OPTIONAL

}

NSPAContainerInformation ::= SEQUENCE

{

 latency [0] INTEGER OPTIONAL,

 throughput [1] Throughput OPTIONAL,

 maximumPacketLossRate [3] UTF8String OPTIONAL,

 serviceExperienceStatisticsData [4] ServiceExperienceInfo OPTIONAL,

 numberOfPDUSessions [5] INTEGER OPTIONAL,

 numberOfRegisteredSubscribers [6] INTEGER OPTIONAL,

 loadLevel [7] NsiLoadLevelInfo OPTIONAL

}

NSSAIMap ::= SEQUENCE

{

 servingSnssai [0] SingleNSSAI,

 homeSnssai [1] SingleNSSAI

}

--

-- O

--

OperationalState ::= ENUMERATED

{

 eNABLED (0),

 dISABLED(1)

}

--

-- P

--

PartialRecordMethod ::= ENUMERATED

{

 default (0),

 individual (1)

}

PDUAddress ::= SEQUENCE

{

 pDUIPv4Address [0] IPAddress OPTIONAL,

 pDUIPv6AddresswithPrefix [1] IPAddress OPTIONAL,

 iPV4dynamicAddressFlag [2] DynamicAddressFlag OPTIONAL,

 iPV6dynamicPrefixFlag [3] DynamicAddressFlag OPTIONAL,

 additionalPDUIPv6Prefixes [4] SEQUENCE OF IPAddress OPTIONAL

}

PDUContainerInformation ::= SEQUENCE

{

 chargingRuleBaseName [0] ChargingRuleBaseName OPTIONAL,

 -- aFCorrelationInformation [1] is replaced by afChargingIdentifier [14]

 timeOfFirstUsage [2] TimeStamp OPTIONAL,

 timeOfLastUsage [3] TimeStamp OPTIONAL,

 qoSInformation [4] FiveGQoSInformation OPTIONAL,

 userLocationInformation [5] UserLocationInformation OPTIONAL,

 presenceReportingAreaInfo [6] PresenceReportingAreaInfo OPTIONAL,

 rATType [7] RATType OPTIONAL,

 sponsorIdentity [8] OCTET STRING OPTIONAL,

 applicationServiceProviderIdentity [9] OCTET STRING OPTIONAL,

 servingNetworkFunctionID [10] SEQUENCE OF ServingNetworkFunctionID OPTIONAL,

 uETimeZone [11] MSTimeZone OPTIONAL,

 threeGPPPSDataOffStatus [12] ThreeGPPPSDataOffStatus OPTIONAL,

 qoSCharacteristics [13] QoSCharacteristics OPTIONAL,

 afChargingIdentifier [14] ChargingID OPTIONAL,

 afChargingIdString [15] AFChargingID OPTIONAL,

 mAPDUSteeringFunctionality [16] MAPDUSteeringFunctionality OPTIONAL,

 mAPDUSteeringMode [17] MAPDUSteeringMode OPTIONAL,

 userLocationInformationASN1 [18] UserLocationInformationStructured OPTIONAL,

 listOfPresenceReportingAreaInformation [19] SEQUENCE OF PresenceReportingAreaInfo OPTIONAL,

 trafficForwardingWay [20] TrafficForwardingWay OPTIONAL,

 qosMonitoringReport [21] QosMonitoringReport OPTIONAL

}

PDUSessionPairID ::= INTEGER

PDUSessionId ::= INTEGER (0..255)

--

-- See 3GPP TS 29.571 [249] for details

--

PDUSessionType ::= ENUMERATED

{

 iPv4v6 (0),

 iPv4 (1),

 iPv6 (2),

 unstructured (3),

 ethernet (4)

}

-- See 3GPP TS 29.571 [249] for details.

PFIContainerInformation ::= SEQUENCE

{

 pC5qosFlowId [0] QoSFlowId OPTIONAL,

 timeOfFirstUsage [1] TimeStamp OPTIONAL,

 timeOfLastUsage [2] TimeStamp OPTIONAL,

 qoSInformation [3] FiveGQoSInformation OPTIONAL,

 userLocationInformation [4] UserLocationInformation OPTIONAL,

 uETimeZone [5] MSTimeZone OPTIONAL,

 presenceReportingAreaInfo [6] PresenceReportingAreaInfo OPTIONAL,

 reportTime [7] TimeStamp,

 qoSCharacteristics [8] QoSCharacteristics OPTIONAL

}

PreemptionCapability ::= ENUMERATED

{

 nOT-PREEMPT (0),

 mAY-PREEMPT (1)

}

PreemptionVulnerability ::= ENUMERATED

{

 nOT-PREEMPTABLE (0),

 pREEMPTABLE (1)

}

ProseFunctionality ::= ENUMERATED

{

 dIRECT-DISCOVERY (0),

 dIRECT-COMMUNICATION (1)

}

PC5ContainerInformation ::= SET

{

 coverageInfoList [0] SEQUENCE OF CoverageInfo OPTIONAL,

 radioParameterSetInfoList [1] SEQUENCE OF RadioParameterSetInfo OPTIONAL,

 transmitterInfoList [2] SEQUENCE OF TransmitterInfo OPTIONAL,

 timeOfFirstTransmission [3] TimeStamp OPTIONAL,

 timeOfFirstReception [4] TimeStamp OPTIONAL

}

--

-- Q

--

QoSCharacteristics ::= OCTET STRING

--

-- This data is converted from JSON format of the QoSCharacteristics as described in TS 29.512

-- [251].

--

QoSFlowId ::= INTEGER

QosFlowsUsageReport ::= SEQUENCE

{

 qosFlowId [0] QoSFlowId OPTIONAL,

 startTime [1] TimeStamp,

 endTime [2] TimeStamp,

 dataVolumeDownlink [3] DataVolumeOctets,

 dataVolumeUplink [4] DataVolumeOctets

}

QuotaManagementIndicator ::= ENUMERATED

{

 onlineCharging (0),

 offlineCharging (1),

 quotaManagementSuspended (2)

}

QosMonitoringReport ::= SEQUENCE-- The maximum number of elements in the SEQUENCE of ulDelays,dlDelays and rtDelays is 2.

{

 ulDelays [0] SEQUENCE OF INTEGER OPTIONAL,

 dlDelays [1] SEQUENCE OF INTEGER OPTIONAL,

 rtDelays [2] SEQUENCE OF INTEGER OPTIONAL

}

--

-- R

--

Rac ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

RanUeNgapId ::= INTEGER

RANNASRelCause ::= SEQUENCE

-- Mode details are described in TS 29.512[251].

{

 ngApCause [0] NgApCause OPTIONAL,

 fivegMmCause [1] FiveGMmCause OPTIONAL,

 fivegSmCause [2] FiveGSmCause OPTIONAL,

 epsCause [3] RANNASCause OPTIONAL

}

RatingIndicator ::= BOOLEAN

-- Included if the units have been rated.

RATType ::= INTEGER

--

-- This integer is based on the RatType specified in TS 29.571 [249]

-- with 3GPP RAT Type specified in TS 29.061 [216] added for backwards compatibility.

--

{

-- 0 reserved

 uTRAN (1),

 gERAN (2),

 wLAN (3),

-- 4 reserved for GAN

-- 5 reserved for HSPA Evolution

 eUTRAN (6),

 virtual (7),

-- 8 reserved for nBIoT

-- 9 reserved for lTEM

 nR (51),

 nR-U (52),

 eUTRAN-U (53),

 lte-m (54),

 wIRELINE (55),

 wIRELINE-CABLE (56),

 wIRELINE-BBF (57),

 nR-REDCAP (58),

 tRUSTED-N3GA (65),

 tRUSTED-WLAN (66),

-- 101 reserved for IEEE 802.16e

-- 102 reserved for 3GPP2 eHRPD

-- 103 reserved for 3GPP2 HRPD

-- 104 reserved for 3GPP2 1xRTT

-- 105 reserved for 3GPP2 UMB

}

RegistrationMessageType ::= ENUMERATED

{

 initial (0),

 mobility (1),

 periodic (2),

 emergency (3),

 deregistration (4)

}

RestrictionType ::= ENUMERATED

{

 allowedAreas (0),

 notAllowedAreas (1)

}

RoamingChargingProfile ::= SEQUENCE

{

 roamingTriggers [0] SEQUENCE OF RoamingTrigger OPTIONAL,

 partialRecordMethod [1] PartialRecordMethod OPTIONAL

}

RoamerInOut ::= ENUMERATED

{

 roamerInBound (0),

 roamerOutBound (1)

}

RoamingTrigger ::= SEQUENCE

{

 trigger [0] SMFTrigger OPTIONAL,

 triggerCategory [1] TriggerCategory OPTIONAL,

 timeLimit [2] CallDuration OPTIONAL,

 volumeLimit [3] DataVolumeOctets OPTIONAL,

 maxNbChargingConditions [4] INTEGER OPTIONAL

}

RoutingAreaId ::= SEQUENCE

{

 plmnId [0] PLMN-Id,

 lac [1] Lac,

 rac [2] Rac

}

RrcEstablishmentCause ::= OCTET STRING

RedundantTransmissionType ::= ENUMERATED

{

 nonTransmission (0),

 endToEndUserPlanePaths (1),

 n3N9 (2),

 transportLayer (3)

}

--

-- S

--

Sac ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

ServiceAreaId ::= SEQUENCE

{

 plmnId [0] PLMN-Id,

 lac [1] Lac,

 sac [2] Sac

}

ServiceAreaRestriction ::= SEQUENCE

{

 restrictionType [0] RestrictionType OPTIONAL,

 areas [1] SEQUENCE OF Area OPTIONAL,

 maxNumOfTAs [2] INTEGER OPTIONAL,

 maxNumOfTAsForNotAllowedAreas [3] INTEGER OPTIONAL

}

-- See 3GPP TS 29.571 [249] for details.

ServiceExperienceInfo ::= SEQUENCE

--

-- See 3GPP TS 29.520 [233] for details

--

{

 svcExprc [0] SvcExperience OPTIONAL,

 svcExprcVariance [1] INTEGER OPTIONAL,

 snssai [2] SingleNSSAI OPTIONAL,

 appId [3] OCTET STRING OPTIONAL,

 confidence [4] INTEGER OPTIONAL,

 dnn [5] DataNetworkNameIdentifier OPTIONAL,

 networkArea [6] NetworkAreaInfo OPTIONAL,

 nsiId [7] OCTET STRING OPTIONAL,

 ratio [8] INTEGER OPTIONAL

}

ServiceProfileChargingInformation ::= SET

{

--

-- attributes of the service profile: see TS 28.541 [254]

--

 serviceProfileIdentifier [0] OCTET STRING OPTIONAL,

 sNSSAIList [1] SEQUENCE OF SingleNSSAI OPTIONAL,

 sST [2] SliceServiceType OPTIONAL,

 latency [3] INTEGER OPTIONAL,

 availability [4] INTEGER OPTIONAL,

 resourceSharingLevel [5] SharingLevel OPTIONAL,

 jitter [6] INTEGER OPTIONAL,

 reliability [7] OCTET STRING OPTIONAL,

 maxNumberofUEs [8] INTEGER OPTIONAL,

 coverageArea [9] OCTET STRING OPTIONAL,

 uEMobilityLevel [10] MobilityLevel OPTIONAL,

 delayToleranceIndicator [11] DelayToleranceIndicator OPTIONAL,

 dLThroughtputPerSlice [12] Throughput OPTIONAL,

 dLThroughtputPerUE [13] Throughput OPTIONAL,

 uLThroughtputPerSlice [14] Throughput OPTIONAL,

 uLThroughtputPerUE [15] Throughput OPTIONAL,

 maxNumberofPDUsessions [16] INTEGER OPTIONAL,

 kPIsMonitoringList [17] OCTET STRING OPTIONAL,

 supportedAccessTechnology [18] INTEGER OPTIONAL,

 v2XCommunicationMode [19] V2XCommunicationModeIndicator OPTIONAL,

 addServiceProfileChargingInfo [100] OCTET STRING OPTIONAL

}

ServingLocation ::= SEQUENCE

{

 geographicalLocation [0] SEQUENCE OF GeographicalLocation OPTIONAL,

 topologicalLocation [1] TopologicalLocation OPTIONAL

}

ServingNetworkFunctionID ::= SEQUENCE

{

 servingNetworkFunctionInformation [0] NetworkFunctionInformation,

 aMFIdentifier [1] AMFID OPTIONAL

}

SessionAMBR ::= SEQUENCE

{

 ambrUL [1] Bitrate,

 ambrDL [2] Bitrate

}

SharingLevel ::= ENUMERATED

{

 sHARED (0),

 nON-SHARED (1)

}

SingleNSSAI ::= SEQUENCE

-- See S-NSSAI subclause 28.4.2 of TS 23.003 [200] for encoding.

{

 sST [0] SliceServiceType,

 sD [1] SliceDifferentiator OPTIONAL

}

SliceServiceType ::= INTEGER (0..255)

--

-- See subclause 28.4.2 TS 23.003 [200]

--

SliceDifferentiator ::= OCTET STRING (SIZE(3))

--

-- See subclause 28.4.2 TS 23.003 [200]

--

SMdeliveryReportRequested ::= ENUMERATED

{

 yes (0),

 no (1)

}

SMFTrigger ::= INTEGER

{

 startOfPDUSession (1),

 startOfServiceDataFlowNoSession (2),

-- Change of Charging conditions

 qoSChange (100),

 userLocationChange (101),

 servingNodeChange (102),

 presenceReportingAreaChange (103),

 threeGPPPSDataOffStatusChange (104),

 tariffTimeChange (105),

 uETimeZoneChange (106),

 pLMNChange (107),

 rATTypeChange (108),

 sessionAMBRChange (109),

 additionOfUPF (110),

 removalOfUPF (111),

 insertionOfISMF (112),

 removalOfISMF (113),

 changeOfISMF (114),

 gFBRGuaranteedStatusChange (115),

 additionOfAccess (116),

 removalOfAccess (117),

 redundantTransmissionChange (118),

-- Limit per PDU session

 pDUSessionExpiryDataTimeLimit (200),

 pDUSessionExpiryDataVolumeLimit (201),

 pDUSessionExpiryDataEventLimit (202),

 pDUSessionExpiryChargingConditionChanges (203),

-- Limit per Rating group

 ratingGroupDataTimeLimit (300),

 ratingGroupDataVolumeLimit (301),

 ratingGroupDataEventLimit (302),

-- Quota management

 timeThresholdReached (400),

 volumeThresholdReached (401),

 unitThresholdReached (402),

 timeQuotaExhausted (403),

 volumeQuotaExhausted (404),

 unitQuotaExhausted (405),

 expiryOfQuotaValidityTime (406),

 reAuthorizationRequest (407),

 startOfServiceDataFlowNoValidQuota (408),

 otherQuotaType (409),

 expiryOfQuotaHoldingTime (410),

 startOfSDFAdditionalAccessNoValidQuota (411),

-- Others

 terminationOfServiceDataFlow (500),

 managementIntervention (501),

 unitCountInactivityTime (502),

 endOfPDUSession (503),

 cHFResponseWithSessionTermination (504),

 cHFAbortRequest (505),

 abnormalRelease (506),

 notProvidedBySMF (507), -- used if not provided by SMF

-- Limit per QoS Flow

 qoSFlowExpiryDataTimeLimit (600),

 qoSFlowExpiryDataVolumeLimit (601),

-- interworking with EPC

 eCGIChange (700),

 tAIChange (701),

 handoverCancel (702),

 handoverStart (703),

 handoverComplete (704),

-- GERAN/UTRAN access

 cGI-SAIChange (705),

 rAIChange (706)

}

-- See TS 32.255 [15] for details.

SMReplyPathRequested ::= ENUMERATED

{

 noReplyPathSet (0),

 replyPathSet (1)

}

SMServiceType ::= INTEGER

{

-- 0 to 10 VAS4SMS Short Message, see TS TS 22.142 [x] for details

 contentProcessing (0),

 forwarding (1),

 forwardingMultipleSubscriptions (2),

 filtering (3),

 receipt (4),

 networkStorage (5),

 toMultipleDestinations (6),

 virtualPrivateNetwork (7),

 autoreply (8),

 personalSignature (9),

 deferredDelivery (10)

-- 11 to 99 Reserved for 3GPP defined SM services

-- 100 to 199 Vendor specific SM services

}

SmsIndication ::= ENUMERATED

{

 sMSSupported (0),

 sMSNotSupported (1)

}

SoftwareImageInfo ::= SEQUENCE

{

 minimumDisk [0] INTEGER OPTIONAL,

 minimumRAM [1] INTEGER OPTIONAL,

 swImageRef [2] UTF8String OPTIONAL,

 diskFormat [3] UTF8String OPTIONAL,

 operatingSystem [4] UTF8String OPTIONAL

}

SSCMode ::= INTEGER

{

 sSCMode1 (1),

 sSCMode2 (2),

 sSCMode3 (3)

}

-- See 3GPP TS 23.501 [247] for details.

SteerModeValue ::= ENUMERATED

{

 activeStandby (0),

 loadBalancing (1),

 smallestDelay (2),

 priorityBased (3)

}

SubscribedQoSInformation ::= SEQUENCE

--

-- See TS 32.291 [58] for more information

--

{

 fiveQi [1] INTEGER OPTIONAL,

 aRP [2] AllocationRetentionPriority OPTIONAL,

 priorityLevel [3] INTEGER OPTIONAL

}

SvcExperience ::= SEQUENCE

{

 mos [0] INTEGER OPTIONAL,

 upperRange [1] INTEGER OPTIONAL,

 lowerRange [2] INTEGER OPTIONAL

}

--

-- T

--

TAC ::= OCTET STRING (SIZE(3))

TAI ::= SEQUENCE

{

 pLMNId [0] PLMN-Id,

 tac [1] TAC

}

TenantIdentifier ::= OCTET STRING

Throughput ::= SEQUENCE

{

 guaranteedThpt [0] Bitrate,

 maximumThpt [1] Bitrate

}

TNAPId ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

TngfId ::= UTF8String

TopologicalLocation ::= SEQUENCE

{

 cellIdList [0] SEQUENCE OF Ncgi OPTIONAL,

 trackingAreaIdList [1] SEQUENCE OF TAI OPTIONAL,

 servingPLMN [2] SEQUENCE OF PLMN-Id

}

--

-- See 3GPP TS 29.571 [249] for details

--

TrafficForwardingWay ::= ENUMERATED

{

 n6 (0),

 n19 (1),

 localSwitch (2)

}

Trigger ::= CHOICE

{

 sMFTrigger [0] SMFTrigger

}

TriggerCategory ::= ENUMERATED

{

 immediateReport (0),

 deferredReport (1)

}

TWAPId ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

--

-- U

--

UsedUnitContainer ::= SEQUENCE

{

 serviceIdentifier [0] ServiceIdentifier OPTIONAL,

 time [1] CallDuration OPTIONAL,

 triggers [2] SEQUENCE OF Trigger OPTIONAL,

 triggerTimeStamp [3] TimeStamp OPTIONAL,

 dataTotalVolume [4] DataVolumeOctets OPTIONAL,

 dataVolumeUplink [5] DataVolumeOctets OPTIONAL,

 dataVolumeDownlink [6] DataVolumeOctets OPTIONAL,

 serviceSpecificUnits [7] INTEGER OPTIONAL,

 eventTimeStamp [8] TimeStamp OPTIONAL,

 localSequenceNumber [9] LocalSequenceNumber OPTIONAL,

 ratingIndicator [10] RatingIndicator OPTIONAL,

 pDUContainerInformation [11] PDUContainerInformation OPTIONAL,

 quotaManagementIndicator [12] BOOLEAN OPTIONAL,

 quotaManagementIndicatorExt [13] QuotaManagementIndicator OPTIONAL,

 nSPAContainerInformation [14] NSPAContainerInformation OPTIONAL,

 eventTimeStampExt [15] SEQUENCE OF TimeStamp OPTIONAL,

 pC5ContainerInformation [16] PC5ContainerInformation OPTIONAL

}

--

-- UserLocationInformationStructured is an alternative ASN.1 format to UserLocationInformation

--

UserLocationInformation ::= OCTET STRING

UserLocationInformationStructured ::= SEQUENCE

{

 eutraLocation [0] EutraLocation OPTIONAL,

 nrLocation [1] NrLocation OPTIONAL,

 n3gaLocation [2] N3gaLocation OPTIONAL,

 utraLocation [3] UtraLocation OPTIONAL,

 geraLocation [4] GeraLocation OPTIONAL

}

UtraLocation ::= SEQUENCE

{

 cgi [0] CellGlobalId OPTIONAL,

 sai [1] ServiceAreaId OPTIONAL,

 lai [2] LocationAreaId OPTIONAL,

 rai [3] RoutingAreaId OPTIONAL,

 ageOfLocationInformation [4] AgeOfLocationInformation OPTIONAL,

 ueLocationTimestamp [5] TimeStamp OPTIONAL,

 geographicalInformation [6] GeographicalInformation OPTIONAL,

 geodeticInformation [7] GeodeticInformation OPTIONAL

}

--

-- This data is converted from JSON format of the User Location as described in TS 29.571 [249].

--

--

-- V

--

VirtualResource ::= SEQUENCE

{

 virtualMemory [0] INTEGER OPTIONAL,

 virtualDisk [1] INTEGER OPTIONAL,

 virtualResource [2] OCTET STRING OPTIONAL

}

VlrNumber ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

V2XCommunicationModeIndicator ::= ENUMERATED

{

 v2XComSupported (0),

 v2XComNotSupported (1)

}

--

-- W

-- WAgfId ::= UTF8String

--

-- See 3GPP TS 29.571 [249] for details

--

.#END

|  |
| --- |
| **End of changes** |