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3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;

Telecommunication management;

 Evolved Universal Terrestrial Radio Access Network
(E-UTRAN) Network Resource Model (NRM)

Integration Reference Point (IRP);

Solution Set (SS) definitions

(Release 19)

**

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Contents

Foreword 5

Introduction 5

1 Scope 6

2 References 6

3 Definitions and abbreviations 7

3.1 Definitions 7

3.2 Abbreviations 7

4 Solution Set Definitions 8

Annex A (normative): CORBA Solution Set 9

A.0 General 9

A.1 Architectural features 9

A.1.1 Syntax for Distinguished Names 9

A.1.2 Rules for NRM extensions 9

A.1.2.1 Allowed extensions 9

A.1.2.2 Extensions not allowed 9

A.2 Mapping 10

A.2.1 General mapping 10

A.2.2 Information Object Class (IOC) mapping 10

A.2.2.1 IOC ENBFunction 10

A.2.2.2 IOC EUtranGenericCell 11

A.2.2.3 IOC ExternalEUtranGenericCell 12

A.2.2.4 IOC EUtranCellFDD 12

A.2.2.5 IOC ExternalEUtranCellFDD 12

A.2.2.6 IOC EUtranRelation 13

A.2.2.7 IOC Link\_ENB\_ENB 14

A.2.2.8 IOC Cdma2000Relation 14

A.2.2.9 IOC ExternalENBFunction 14

A.2.2.10 IOC EUtranCellTDD 14

A.2.2.11 IOC ExternalEUtranCellTDD 14

A.2.2.12 IOC MCEFunction 14

A.2.2.13 IOC MBSFNArea 15

A.2.2.14 IOC RNFunction 15

A.2.2.15 IOC DeNBCapability 15

A.2.2.16 IOC ExternalRNFunction 15

A.2.2.17 IOC QciDscpMapping 15

A.2.2.18 IOC CellOutageCompensationInformation 16

A.2.2.19 IOC EUtranCellNMCentralizedSON 17

A.2.2.20 IOC WTFunction 19

A.2.2.21 IOC EP\_Xw 19

A.2.2.22 IOC WLANMobilitySet 19

A.2.2.23 IOC Link\_MCE\_ENB 19

A.2.2.23 IOC Link\_MCE\_MME 19

A.2.2.23 IOC EUtranFreqRelation 20

A.2.2.24 IOC EUtranFrequency 20

A.3 Solution Set definitions 21

A.3.1 IDL definition structure 21

A.3.2 IDL specification "EUtranNetworkResourcesNRMDefs.idl" 21

Annex B (normative): XML Definitions 32

B.0 General 32

B.1 Architectural features 32

B.1.1 Syntax for Distinguished Names 32

B.2 Mapping 32

B.2.1 General mapping 32

B.2.2 Information Object Class (IOC) mapping 32

B.3 Solution Set definitions 33

B.3.1 XML definition structure 33

B.3.2 Graphical Representation 33

B.3.3 XML schema "eutranNrm.xsd" 34

Annex C (informative): Change history 53

# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

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y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

# Introduction

The present document is part of a TS-family covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; as identified below:

TS 28.657 Evolved Universal Terrestrial Radio Access Network (E-UTRAN) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements.

TS 28.658 Evolved Universal Terrestrial Radio Access Network (E-UTRAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS).

**TS 28.659 Evolved Universal Terrestrial Radio Access Network (E-UTRAN) Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions.**

# 1 Scope

The present document is part of an Integration Reference Point (IRP) named E-UTRAN Network Resource Model (NRM) IRP, through which an IRPAgent can communicate configuration management information to one or several IRPManagers concerning E-UTRAN resources. The E-UTRAN NRM IRP comprises a set of specifications defining Requirements, a protocol neutral Information Service and one or more Solution Set(s).

The present document specifies the Solution Sets for the E-UTRAN NRM IRP, see 3GPP TS 28.658  [4].

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TS 21.905: “Vocabulary for 3GPP Specifications”.

[2] 3GPP TS 32.153: “Telecommunication management; Integration Reference Point (IRP) technology specific templates, rules and guidelines”.

[3] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[4] 3GPP TS 28.658: "Telecommunications management; Evolved Universal Terrestrial Radio Access Network (E-UTRAN) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)".

[5] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[6] 3GPP TS 32.606: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP); Solution Set (SS) definitions".

[7] 3GPP TS 32.616: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP); Solution Set (SS) definitions".

[8] 3GPP TS 28.623: “Generic network resources Integration Reference Point (IRP); Solution Set (SS) definition”.

[9] W3C REC-xml11-20060816: "Extensible Markup Language (XML) 1.1 (Second Edition)".

[10] W3C XML Schema Definition Language (XSD) 1.1 Part 1: Structures.

[11] W3C XML Schema Definition Language (XSD) 1.1 Part 2: Datatypes.

[12] W3C REC-xml-names-20060816: "Namespaces in XML 1.1 (Second Edition)".

[13] 3GPP TS 28.541: " Management and orchestration of 5G networks; Network Resource Model (NRM); Stage 2 and stage 3".

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1], TS 32.600 [3] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**XML file:** See definition in TS 32.616 [7].

**XML document:** See definition in TS 32.616 [7].

**XML declaration:** See definition in TS 32.616 [7].

**XML element:** See definition in TS 32.616 [7].

**empty XML element:** See definition in TS 32.616 [7].

**XML content (of an XML element):** See definition in TS 32.616 [7].

**XML start-tag:** See definition in TS 32.616 [7].

**XML end-tag:** See definition in TS 32.616 [7].

**XML empty-element tag:** See definition in TS 32.616 [7].

**XML attribute specification:** See definition in TS 32.616 [7].

**DTD:** See definition in TS 32.616 [7].

**XML schema:** See definition in TS 32.616 [7].

**XML namespace:** See definition in TS 32.616 [7].

**XML complex type:** See definition in TS 32.616 [7].

**XML element type:** See definition in TS 32.616 [7].

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1], TS 32.600 [3], and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

CM Configuration Management

CORBA Common Object Request Broker Architecture

DN Distinguished Name

DTD Document Type Definition

EDGE Enhanced Data for GSM Evolution

GERAN GSM/EDGE Radio Access Network

GSM Global System for Mobile communication

IS Information Service

IDL Interface Definition Language (OMG)

IOC Information Object Class

IRP Integration Reference Point

IS Information Service

MO Managed Object

MOC Managed Object Class

NRM Network Resource Model

OMG Object Management Group

SS Solution Set

UMTS Universal Mobile Telecommunications System

UTRAN Universal Terrestrial Radio Access Network

XML eXtensible Markup Language

XSD XML Schema Definition

# 4 Solution Set Definitions

This specification defines the following 3GPP E-UTRAN NRM IRP Solution Set Definitions:

- 3GPP E-UTRAN NRM IRP CORBA SS (Annex A).

- 3GPP E-UTRAN NRM IRP XML Definitions (Annex B).

Annex A (normative):
CORBA Solution Set

# A.0 General

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in E-UTRAN NRM IRP: Information Service (TS 28.658 [4]).

# A.1 Architectural features

The overall architectural feature of E-UTRAN Network Resources IRP is specified in 3GPP TS 28.658 [4].
This clause specifies features that are specific to the CORBA SS.

## A.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [5].

## A.1.2 Rules for NRM extensions

See clause A.1.2 of [8].

### A.1.2.1 Allowed extensions

See clause A.2.1 of [8].

### A.1.2.2 Extensions not allowed

See clause A.2.1 of [8].

# A.2 Mapping

## A.2.1 General mapping

See clause A.2.1 of [8].

## A.2.2 Information Object Class (IOC) mapping

### A.2.2.1 IOC ENBFunction

Mapping from NRM IOC ENBFunction attributes and associations to SS equivalent MOC ENBFunction attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| eNBId | eNBId | unsignedLong |
| intraANRSwitch | intraANRSwitch | boolean |
| iRATANRSwitch | iRATANRSwitch | boolean |
| x2BlockList | x2BlockList | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |
| x2AllowList | x2AllowList | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |
| x2HOBlockList | x2HOBlockList | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |
| x2IpAddressList | x2IpAddressList | genericEUTRANNRMAttributeTypes::ipAddressListType |
| tceIDMappingInfoList | tceIDMappingInfoList | genericEUTRANNRMAttributeTypes::TceIDMappingInfoListType |
| sharNetTceMappingInfoList | sharNetTceMappingInfoList | genericEUTRANNRMAttributeTypes::SharNetTceMappingInfo |
| netListeningRSForRIBS | netListeningRSForRIBS | genericEUTRANNRMAttributeTypes::NetListeningRSForRIBS |
| lWIPSeGWList | lWIPSeGWList | genericEUTRANNRMAttributeTypes::lWIPSeGWListType |
| isOnboardSatellite | isOnboardSatellite | boolean |
| onboardSatelliteId | onboardSatelliteId | string |
| storeAndForwardSupportInd | storeAndForwardSupportInd | boolean |
| ephemerisInfoSetRef | ephemerisInfoSetRef | string |
| NOTE: For all conditional qualifiers, see attribute constraints in 28.658 [4] |

### A.2.2.2 IOC EUtranGenericCell

Mapping from NRM IOC EUtranGenericCell attributes and associations to SS equivalent MOC EUtranGenericCell attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| cellLocalId | cellLocalId | unsignedShort |
| cellLocalIdList | cellLocalIdList | genericEUTRANNRMAttributeTypes::cellLocalIdListType |
| cellSize | cellSize | genericEUTRANNRMAttributeTypes::cellSizeEnumType |
| plmnIdList | plmnIdListNote: the first plmnId in the SS attribute plmnIdList is the primary PLMN id | genericEUTRANNRMAttributeTypes::plmnIdListType |
| cellAccessInfoList | cellAccessInfoList | genericEUTRANNRMAttributeTypes::cellAccessInfoListType |
| tac | tac | long |
| nTNTAClist | nTNTAClist | genericEUTRANNRMAttributeTypes::nTNTAClistType |
| pci | pci | short |
| pciList | pciList | genericEUTRANNRMAttributeTypes::pciListType |
| maximumTransmissionPower | maximumTransmissionPower | short |
| referenceSignalPower | referenceSignalPower | short |
| pb | pb | short |
| partOfSectorPower | partOfSectorPower | short |
| relatedTmaList | relatedTmaList | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |
| relatedAntennaList | relatedAntennaList | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |
| relatedSector | relatedSector | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |
| operationalState | operationalState | StateManagementIRPOptConstDefs::OperationalStateTypeOpt |
| administrativeState | administrativeState | StateManagementIRPOptConstDefs::AdministrativeStateTypeOpt |
| availabilityStatus | availabilityStatus | StateManagementIRPOptConstDefs::AvailabilityStatusTypeOpt |
| cellResvInfo | cellResvInfo | genericEUTRANNRMAttributeTypes::cellResvInfoType |
| nbIoTcellFlag | nbIoTcellFlag | genericEUTRANNRMAttributeTypes::yesNoType |
| allowedAccessClasses | allowedAccessClasses | genericEUTRANNRMAttributeTypes:: allowedAccessEnumClassesType |
| isChangeForEnergySavingAllowed | isChangeForEnergySavingAllowed | GenericNetworkResourcesIRPSystem::AttributeTypes::yesNoType |
| Note: For all conditional qualifiers, see attribute constraints in 28.658 [4] |

### A.2.2.3 IOC ExternalEUtranGenericCell

Mapping from NRM IOC ExternalEUtranGenericCell attributes and associations to SS equivalent MOC ExternalEUtranGenericCell attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| pci | pci | short |
| plmnIdList | plmnIdListNote: the first plmnId in the SS attribute plmnIdList is the primary PLMN id | genericEUTRANNRMAttributeTypes::plmnIdListType |
| cellLocalId | cellLocalId | unsignedShort |
| eNBId | eNBId | unsignedLong |

### A.2.2.4 IOC EUtranCellFDD

Mapping from NRM IOC EUtranCellFDD attributes and associations to SS equivalent MOC EUtranCellFDD attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| earfcnDl | earfcnDl | short |
| earfcnUl | earfcnUl | short |

### A.2.2.5 IOC ExternalEUtranCellFDD

Mapping from NRM IOC ExternalEUtranCellFDD attributes and associations to SS equivalent MOC ExternalEUtranCellFDD attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| earfcnDl | earfcnDl | short |
| earfcnUl | earfcnUl | short |

### A.2.2.6 IOC EUtranRelation

Mapping from NRM IOC EUtranRelation attributes and associations to SS equivalent MOC EUtranRelation attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| tCI | tCI | long |
| isRemoveAllowed | isRemoveAllowed | boolean |
| isHOAllowed | isHOAllowed | boolean |
| adjacentCell | adjacentCell | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |
| isICICInformationSendAllowed | isICICInformationSendAllowed | boolean |
| isLBAllowed | isLBAllowed | boolean |
| isESCoveredBy | isESCoveredBy | genericEUTRANNRMAttributeTypes::IsEsCoveredByEnumType |
| cellIndividualOffset | cellIndividualOffset | genericEUTRANNRMAttributeTypes::qOffsetEnumType |
| qOffset | qOffset | genericEUTRANNRMAttributeTypes::qOffsetEnumType |
| NOTE: For all conditional qualifiers, see attribute constraints in 28.658 [4] |

### A.2.2.7 IOC Link\_ENB\_ENB

None.

### A.2.2.8 IOC Cdma2000Relation

Mapping from NRM IOC Cdma2000Relation attributes and associations to SS equivalent MOC Cdma2000Relation attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| adjacentSector | adjacentSector | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |

### A.2.2.9 IOC ExternalENBFunction

Mapping from NRM IOC ExternalENBFunction attributes and associations to SS equivalent MOC ExternalENBFunction attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| eNBId | eNBId | unsignedLong |

### A.2.2.10 IOC EUtranCellTDD

Mapping from NRM IOC EUtranCellTDD attributes and associations to SS equivalent MOC EUtranCellTDD attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| earfcn | earfcn | short |
| sfAssignment | sfAssignment | short |
| specialSfPatterns | specialSfPatterns | short |

### A.2.2.11 IOC ExternalEUtranCellTDD

Mapping from NRM IOC ExternalEUtranCellTDD attributes and associations to SS equivalent MOC ExternalEUtranCellTDD attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| earfcn | earfcn | short |

### A.2.2.12 IOC MCEFunction

None.

### A.2.2.13 IOC MBSFNArea

Mapping from NRM IOC MBSFNAreaattributes and associations to SS equivalent MOC MBSFNAreaattributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string  |
| mbsfnAreaId | mbsfnAreaId | short |
| cellIdList | cellIdList | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |

### A.2.2.14 IOC RNFunction

Mapping from NRM IOC RNFunction attributes and associations to SS equivalent MOC RNFunction attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| servingCell | servingCell | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference |
| candidateDeNBCells | candidateDeNBCells | genericEUTRANNRMAttributeTypes::EcgiListType |

### A.2.2.15 IOC DeNBCapability

Mapping from NRM IOC DeNBCapabilityattributes and associations to SS equivalent MOC DeNBCapabilityattributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| servedRN | servedRN | GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet |
| maxNbrRNAllowed | maxNbrRNAllowed | unsignedShort |

### A.2.2.16 IOC ExternalRNFunction

None.

### A.2.2.17 IOC QciDscpMapping

Mapping from NRM IOC QciDscpMapping attributes and associations to SS equivalent MOC QciDscpMapping attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| qciDscpMappingList | qciDscpMappingList | genericEUTRANNRMAttributeTypes::qciDscpMappingListType |

### A.2.2.18 IOC CellOutageCompensationInformation

Mapping from NRM IOC CellOutageCompensationInformation attributes and associations to SS equivalent MOC CellOutageCompensationInformation attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| cOCStatus | cellOutageCompensationStatus | GenericSONPolicyNRMAttributeTypes:: cellOutageCompensationStatus |
| isCOCAllowed | isCOCAllowed | Boolean |

### A.2.2.19 IOC EUtranCellNMCentralizedSON

Mapping from NRM IOC EUtranCellNMCentralizedSON attributes and associations to SS equivalent MOC EUtranCellNMCentralizedSON attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | id | string |
| a1ThresholdRsrp | a1ThresholdRsrp | unsignedShort |
| a1ThresholdRsrq | a1ThresholdRsrq | unsignedShort |
| a2ThresholdRsrp | a2ThresholdRsrp | unsignedShort |
| a2ThresholdRsrq | a2ThresholdRsrq | unsignedShort |
| a3Offset | a3Offset | short |
| a4ThresholdRsrp | a4ThresholdRsrp | unsignedShort |
| a4ThresholdRsrq | a4ThresholdRsrq | unsignedShort |
| a5Threshold1Rsrp | a5Threshold1Rsrp | unsignedShort |
| a5Threshold1Rsrq | a5Threshold1Rsrq | unsignedShort |
| b1ThresholdUtraRscp | b1ThresholdUtraRscp | short |
| b1ThresholdUtraEcN0 | b1ThresholdUtraEcN0 | unsignedShort |
| b1ThresholdGeran | b1ThresholdGeran | unsignedShort |
| b1ThresholdCdma2000 | b1ThresholdCdma2000 | unsignedShort |
| b2Threshold1Rsrp | b2Threshold1Rsrp | unsignedShort |
| b2Threshold1Rsrq | b2Threshold1Rsrq | unsignedShort |
| b2Threshold2UtraRscp | b2Threshold2UtraRscp | short |
| b2Threshold2UtraEcN0 | b2Threshold2UtraEcN0 | unsignedShort |
| b2Threshold2Geran | b2Threshold2Geran | unsignedShort |
| b2Threshold2Cdma2000 | b2Threshold2Cdma2000 | unsignedShort |
| commonChannelPowerOffset | commonChannelPowerOffset | short |
| configurationIndex | configurationIndex | unsignedShort |
| contentionResolutionTimer | contentionResolutionTimer | genericEUTRANNRMAttributeTypes::contentionResolutionTimerEnumType |
| hysteresisEutraA1 | hysteresisEutraA1 | unsignedShort |
| hysteresisEutraA2 | hysteresisEutraA2 | unsignedShort |
| hysteresisEutraA3 | hysteresisEutraA3 | unsignedShort |
| hysteresisEutraA4 | hysteresisEutraA4 | unsignedShort |
| hysteresisEutraA5 | hysteresisEutraA5 | unsignedShort |
| hysteresisIratB1 | hysteresisIratB1 | unsignedShort |
| hysteresisIratB2 | hysteresisIratB2 | unsignedShort |
| numberOfRaPreambles | numberOfRaPreambles | genericEUTRANNRMAttributeTypes::numberOfRaPreamblesEnumType |
| preambleInitialReceivedTargetPower | preambleInitialReceivedTargetPower | genericEUTRANNRMAttributeTypes::preambleInitialReceivedTargetPowerEnumType |
| preambleTransMax | preambleTransMax | genericEUTRANNRMAttributeTypes::preambleTransMaxEnumType |
| pMax | pMax | short |
| powerRampingStep | powerRampingStep | genericEUTRANNRMAttributeTypes::powerRampingStepEnumType |
| qHyst | qHyst | genericEUTRANNRMAttributeTypes::qHystEnumType |
| qOffsetUtra | qOffsetUtra | unsignedShort |
| qOffsetGeran | qOffsetGeran | unsignedShort |
| qOffsetCdma2000 | qOffsetCdma2000 | unsignedShort |
| qQualMinUtra | qQualMinUtra | unsignedShort |
| qRxLevMinEUtraSib1 | qRxLevMinEUtraSib1 | short |
| qRxLevMinEUtraSib3 | qRxLevMinEUtraSib3 | short |
| qRxLevMinGeran | qRxLevMinGeran | unsignedShort |
| qRxLevMinUtra | qRxLevMinUtra | short |
| responseWindowSize | responseWindowSize | genericEUTRANNRMAttributeTypes::responseWindowSizeEnumType |
| rootSequenceIndex | rootSequenceIndex | unsignedShort |
| sIntraSearch | sIntraSearch | unsignedShort |
| sizeOfRAPreamblesGroupA | sizeOfRAPreamblesGroupA | genericEUTRANNRMAttributeTypes::sizeOfRAPreambleGroupAEnumType |
| timeToTriggerEutraA1 | timeToTriggerEutraA1 | genericEUTRANNRMAttributeTypes::timeToTriggerEUtraEnumType |
| timeToTriggerEutraA2 | timeToTriggerEutraA2 | genericEUTRANNRMAttributeTypes::timeToTriggerEUtraEnumType |
| timeToTriggerEutraA3 | timeToTriggerEutraA3 | genericEUTRANNRMAttributeTypes::timeToTriggerEUtraEnumType |
| timeToTriggerEutraA4 | timeToTriggerEutraA4 | genericEUTRANNRMAttributeTypes::timeToTriggerEUtraEnumType |
| timeToTriggerEutraA5 | timeToTriggerEutraA5 | genericEUTRANNRMAttributeTypes::timeToTriggerEUtraEnumType |
| timeToTriggerIratB1 | timeToTriggerIratB1 | genericEUTRANNRMAttributeTypes::timeToTriggerEUtraEnumType |
| timeToTriggerIratB2 | timeToTriggerIratB2 | genericEUTRANNRMAttributeTypes::timeToTriggerEUtraEnumType |
| tReselectionCdma2000 | tReselectionCdma2000 | unsignedShort |
| tReselectionEUtra | tReselectionEUtra | unsignedShort |
| tReselectionGeran | tReselectionGeran | unsignedShort |
| tReselectionUtra | tReselectionUtra | unsignedShort |
| tStoreUeContext | tStoreUeContext | unsignedShort |
| Note: For all conditional qualifiers, see attribute constraints in 28.658 [4] |

### A.2.2.20 IOC WTFunction

Mapping from NRM IOC WTFunction attributes and associations to SS equivalent MOC WTFunction attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| wLANInfoList | wLANInfoList | GenericNetworkResourcesIRPSystem::AttributeTypes::WLANInfoListType |

### A.2.2.21 IOC EP\_Xw

None.

### A.2.2.22 IOC WLANMobilitySet

Mapping from NRM IOC WLANMobility attributes and associations to SS equivalent MOC WLANMobilitySet attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
|  |  |  |

### A.2.2.23 IOC Link\_MCE\_ENB

None.

### A.2.2.23 IOC Link\_MCE\_MME

None.

### A.2.2.23 IOC EUtranFreqRelation

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| cellIndividualOffset | cellIndividualOffset | genericEUTRANNRMAttributeTypes::qOffsetEnumType |
| blockListEntry | blockListEntry | unsignedLong |
| blockListEntryIdleMode | blockListEntryIdleMode | unsignedLong |
| cellReselectionPriority | cellReselectionPriority | unsignedLong |
| cellReselectionSubPriority | cellReselectionSubPriority | unsignedShort |
| pMax | pMax | unsignedLong |
| qOffsetFreq | qOffsetFreq | unsignedLong |
| qQualMin | qQualMin | unsignedLong |
| qRxLevMin | qRxLevMin | unsignedLong |
| threshXHighP | threshXHighP | unsignedLong |
| threshXHighQ | threshXHighQ | unsignedLong |
| threshXLowP | threshXLowP | unsignedLong |
| threshXLowQ | threshXLowQ | unsignedLong |
| tReselectionEutra | tReselectionEutra | unsignedShort |
| tReselectionEutraSfHigh | tReselectionEutraSfHigh | unsignedShort |
| tReselectionEutraSfMedium | tReselectionEutraSfMedium | unsignedShort |
| eUtraFrequencyRef | eUtraFrequencyRef | string |

### A.2.2.24 IOC EUtranFrequency

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| earfcnDL | earfcnDL | unsignedLong  |
| multiBandInfoListEutra | multiBandInfoListEutra | unsignedLong  |

# A.3 Solution Set definitions

## A.3.1 IDL definition structure

Clause A.3.2 defines the MO classes for the E-UTRAN NRM IRP.

## A.3.2 IDL specification "EUtranNetworkResourcesNRMDefs.idl"

//File:EUtranNetworkResourcesNRMDefs.idl

#ifndef \_E*UTRANNETWORKRESOURCESNRMDEFS\_*IDL\_

#define \_E*UTRANNETWORKRESOURCESNRMDEFS\_*IDL\_

#include "GenericNetworkResourcesNRMDefs.idl"

#include "EPCResourcesNRMDefs.idl"

#pragma prefix "3gppsa5.org"

/\*\*

 \* This module defines constants for each MO class name and

 \* the attribute names for each defined MO class.

 \*/

module EUtranNetworkResourcesNRMDefs

{

 /\*

 \* Definitions for MO class ENBFunction

 \*/

 interface ENBFunction: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "ENBFunction";

 // Attribute Names

 //

 const string intraANRSwitch= "intraANRSwitch";

 const string iRATANRSwitch= "iRATANRSwitch";

 const string eNBId = "eNBId";

 const string x2BlackList= "x2BlackList";

 const string x2WhiteList= "x2WhiteList";

 const string x2HOBlackList= "x2HOBlackList";

 const string x2IpAddressList= "x2IpAddressList";

 const string tceIDMappingInfoList= "tceIDMappingInfoList";

 const string sharNetTceMappingInfoList= "sharNetTceMappingInfoList";

 const string netListeningRSForRIBS= "netListeningRSForRIBS";

 const string lWIPSeGWList = "lWIPSeGWList";

 const string isOnboardSatellite = "isOnboardSatellite";

 const string storeAndForwardSupportInd = "storeAndForwardSupportInd";

 const string onboardSatelliteId = "onboardSatelliteId";

 const string ephemerisInfoSetRef = "ephemerisInfoSetRef";

 };

 /\*

 \* Definitions for MO class RNFunction

 \*/

 interface RNFunction: ENBFunction

 {

 const string CLASS = "RNFunction";

 // Attribute Names

 //

 const string servingCell = "servingCell";

 const string candidateDeNBCells = "candidateDeNBCells";

 };

 /\*

 \* Definitions for MO class DeNBCapability

 \*/

 interface DeNBCapability: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "DeNBCapability";

 // Attribute Names

 //

 const string servedRN= "servedRN";

 const string maxNbrRNAllowed= "maxNbrRNAllowed";

 };

 /\*

 \* Definitions for MO class ExternalRNFunction

 \*/

 interface ExternalRNFunction: ExternalENBFunction

 {

 const string CLASS = "ExternalRNFunction";

 // Attribute Names

 //

 };

 /\*

 /\*

 \* Definitions for MO class EUtranGenericCell

 \*/

 interface EUtranGenericCell: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "EUtranGenericCell";

 // Attribute Names

 //

 const string cellLocalId = "cellLocalId";

 const string cellLocalIdList = "cellLocalIdList";

 const string cellSize = "cellSize";

 const string plmnIdList = "plmnIdList";

 const string cellAccessInfoList = "cellAccessInfoList";

 const string tac = "tac";

 const string nTNTAClist = "nTNTAClist";

 const string pci = "pci";

 const string pciList = "pciList";

 const string operationalState = "operationalState";

 const string administrativeState = "administrativeState";

 const string availabilityStatus = "availabilityStatus";

 const string maximumTransmissionPower = "maximumTransmissionPower";

 const string referenceSignalPower = "referenceSignalPower";

 const string pb = "pb";

 const string partOfSectorPower = "partOfSectorPower";

 const string relatedTmaList = "relatedTmaList";

 const string relatedAntennaList = "relatedAntennaList";

 const string relatedSector = "relatedSector";

 const string allowedAccessClasses = "allowedAccessClasses";

 const string isChangeForEnergySavingAllowed = "isChangeForEnergySavingAllowed";

 const string cellResvInfo = "cellResvInfo";

 const string nbIoTcellFlag = "nbIoTcellFlag";

 };

 /\*

 \* Definitions for MO class ExternalEUtranGenericCell

 \*/

 interface ExternalEUtranGenericCell: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "ExternalEUtranGenericCell";

 // Attribute Names

 //

 const string pci= "pci";

 const string plmnIdList = "plmnIdList";

 const string cellLocalId = "cellLocalId";

 const string eNBId = "eNBId";

 };

 /\*

 \* Definitions for MO class EUtranCellFDD

 \*/

 interface EUtranCellFDD: EUtranGenericCell

 {

 const string CLASS = "EUtranCellFDD";

 // Attribute Names

 //

 const string earfcnDl = "earfcnDl";

 const string earfcnUl = "earfcnUl";

 };

 /\*

 \* Definitions for MO class ExternalEUtranCellFDD

 \*/

 interface ExternalEUtranCellFDD: ExternalEUtranGenericCell

 {

 const string CLASS = "ExternalEUtranCellFDD";

 // Attribute Names

 //

 const string earfcnDl = "earfcnDl";

 const string earfcnUl = "earfcnUl";

 };

/\*

 \* Definitions for MO class EUtranCellTDD

 \*/

 interface EUtranCellTDD: EUtranGenericCell

 {

 const string CLASS = "EUtranCellTDD";

 // Attribute Names

 //

 const string earfcn = "earfcn";

 const string sfAssignment = "sfAssignment";

 const string specialSfPatterns = "specialSfPatterns";

 };

/\*

 \* Definitions for MO class ExternalEUtranCellTDD

 \*/

 interface ExternalEUtranCellTDD: ExternalEUtranGenericCell

 {

 const string CLASS = "ExternalEUtranCellTDD";

 // Attribute Names

 //

 const string earfcn = "earfcn";

 };

 /\*

 \* Definitions for MO class EUtranRelation

 \*/

 interface EUtranRelation: GenericNetworkResourcesNRMDefs::Top

 {

 const string CLASS = "EUtranRelation";

 // Attribute Names

 //

 const string id = "id";

 const string tCI = "tCI";

 const string isRemoveAllowed = "isRemoveAllowed";

 const string isHOAllowed = "isHOAllowed";

 const string adjacentCell = "adjacentCell";

 const string isICICInformationSendAllowed = "isICICInformationSendAllowed";

 const string isLBAllowed = "isLBAllowed";

 const string cellIndividualOffset = "cellIndividualOffset";

 const string qOffset = "qOffset";

 };

/\*

 \* Definitions for MO class Link\_ENB\_ENB

 \*/

 interface Link\_ENB\_ENB: GenericNetworkResourcesNRMDefs::Link

 {

 const string CLASS = "Link\_ENB\_ENB";

 // Attribute Names

 //

 };

/\*

 \* Definitions for MO class Cdma2000Relation

 \*/

 interface Cdma2000Relation:GenericNetworkResourcesNRMDefs::Top

 {

 const string CLASS = "Cdma2000Relation";

 // Attribute Names

 //

 const string id = "id";

 const string adjacentSector = "adjacentSector";

 };

/\*

 \* Definitions for MO class ExternalENBFunction

 \*/

 interface ExternalENBFunction: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "ExternalENBFunction";

 // Attribute Names

 //

 const string eNBId = "eNBId";

 };

/\*

 \* Definitions for MO class MCEFunction

 \*/

 interface MCEFunction: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "MCEFunction";

 // Attribute Names

 //

 };

/\*

 \* Definitions for MO class Link\_MCE\_ENB

 \*/

 interface Link\_MCE\_ENB: GenericNetworkResourcesNRMDefs::Link

 {

 const string CLASS = "Link\_MCE\_ENB";

 // Attribute Names

 //

 };

/\*

 \* Definitions for MO class Link\_MCE\_MME

 \*/

 interface Link\_MCE\_MME: GenericNetworkResourcesNRMDefs::Link

 {

 const string CLASS = "Link\_MCE\_MME";

 // Attribute Names

 //

 };

/\*

 \* Definitions for MO class MBSFNArea

 \*/

 interface MBSFNArea: GenericNetworkResourcesNRMDefs::Top

 {

 const string CLASS = "MBSFNArea";

 // Attribute Names

 //

 const string id = "id";

 const string mbsfnAreaId= "mbsfnAreaId";

 const string cellIdList= "cellIdList";

 };

/\*

 \* Definitions for MO class EnergySavingProperties

 \*/

 interface EnergySavingProperties: GenericNetworkResourcesNRMDefs::Top

 {

 const string CLASS = "EnergySavingProperties";

 // Attribute Names

 //

 const string id = "id";

 const string energySavingState= "energySavingState";

 const string energySavingControl= "energySavingControl";

 };

 /\*

 \* Definitions for MO class CellOutageCompensationInformation

 \*/

 interface CellOutageCompensationInformation: GenericNetworkResourcesNRMDefs::Top

 {

 const string CLASS = "CellOutageCompensationInformation";

 // Attribute Names

 //

 const string id = "id";

 const string cellOutageCompensationStatus = "cellOutageCompensationStatus";

 const string isCOCAllowed =

 "isCOCAllowed";

 };

 /\*

 \* Definitions for MO class EUtranCellNMCentralizedSON

 \*/

 interface EUtranCellNMCentralizedSON: GenericNetworkResourcesNRMDefs::Top

 {

 const string CLASS = "EUtranCellNMCentralizedSON";

 // Attribute Names

 //

 const string id = "id";

 const string a1ThresholdRsrp = "a1ThresholdRsrp";

 const string a1ThresholdRsrq = "a1ThresholdRsrq";

 const string a2ThresholdRsrp = "a2ThresholdRsrp";

 const string a2ThresholdRsrq = "a2ThresholdRsrq";

 const string a3Offset = "a3Offset";

 const string a4ThresholdRsrp = "a4ThresholdRsrp";

 const string a4ThresholdRsrq = "a4ThresholdRsrq";

 const string a5Threshold1Rsrp = "a5Threshold1Rsrp";

 const string a5Threshold1Rsrq = "a5Threshold1Rsrq";

 const string b1ThresholdUtraRscp = "b1ThresholdUtraRscp";

 const string b1ThresholdUtraEcN0 = "b1ThresholdUtraEcN0";

 const string b1ThresholdGeran = "b1ThresholdGeran";

 const string b1ThresholdCdma2000 = "b1ThresholdCdma2000";

 const string b2Threshold1Rsrp = "b2Threshold1Rsrp";

 const string b2Threshold1Rsrq = "b2Threshold1Rsrq";

 const string b2Threshold2UtraRscp = "b2Threshold2UtraRscp";

 const string b2Threshold2UtraEcN0 = "b2Threshold2UtraEcN0";

 const string b2Threshold2Geran = "b2Threshold2Geran";

 const string b2Threshold2Cdma2000 = "b2Threshold2Cdma2000";

 const string commonChannelPowerOffset = "commonChannelPowerOffset";

 const string configurationIndex = "configurationIndex";

 const string contentionResolutionTimer = "contentionResolutionTimer";

 const string hysteresisEutraA1 = "hysteresisEutraA1";

 const string hysteresisEutraA2 = "hysteresisEutraA2";

 const string hysteresisEutraA3 = "hysteresisEutraA3";

 const string hysteresisEutraA4 = "hysteresisEutraA4";

 const string hysteresisEutraA5 = "hysteresisEutraA5";

 const string hysteresisIratB1 = "hysteresisIratB1";

 const string hysteresisIratB2 = "hysteresisIratB2";

 const string numberOfRaPreambles = "numberOfRaPreambles";

 const string preambleInitialReceivedTargetPower = "preambleInitialReceivedTargetPower";

 const string preambleTransMax = "preambleTransMax";

 const string pMax = "pMax";

 const string powerRampingStep = "powerRampingStep";

 const string qHyst = "qHyst";

 const string qOffsetUtra = "qOffsetUtra";

 const string qOffsetGeran = " qOffsetGeran";

 const string qOffsetCdma2000 = "qOffsetCdma2000";

 const string qQualMinUtra = "qQualMinUtra";

 const string qRxLevMinEUtraSib1 = "qRxLevMinEUtraSib1";

 const string qRxLevMinEUtraSib3 = "qRxLevMinEUtraSib3";

 const string qRxLevMinGeran = "qRxLevMinGeran";

 const string qRxLevMinUtra = "qRxLevMinUtra";

 const string responseWindowSize = "responseWindowSize";

 const string rootSequenceIndex = "rootSequenceIndex";

 const string sIntraSearch = "sIntraSearch";

 const string sizeOfRAPreamblesGroupA = "sizeOfRAPreamblesGroupA";

 const string timeToTriggerEutraA1 = "timeToTriggerEutraA1";

 const string timeToTriggerEutraA2 = "timeToTriggerEutraA2";

 const string timeToTriggerEutraA3 = "timeToTriggerEutraA3";

 const string timeToTriggerEutraA4 = "timeToTriggerEutraA4";

 const string timeToTriggerEutraA5 = "timeToTriggerEutraA5";

 const string timeToTriggerIratB1 = "timeToTriggerIratB1";

 const string timeToTriggerIratB2 = "timeToTriggerIratB2";

 const string tReselectionCdma2000 = "tReselectionCdma2000";

 const string tReselectionEUtra = "tReselectionEUtra";

 const string tReselectionGeran = "tReselectionGeran";

 const string tReselectionUtra = "tReselectionUtra";

 const string tStoreUeContext = "tStoreUeContext";

};

/\*

 \* Definitions for MO class EUtranFreqRelation

 \*/

 interface EUtranFreqRelation: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "EUtranFreqRelation";

 // Attribute Names

 //

 const string cellIndividualOffset = "cellIndividualOffset";

 const string blackListEntry = "blackListEntry";

 const string blackListEntryIdleMode = "blackListEntryIdleMode";

 const string cellReselectionPriority = "cellReselectionPriority";

 const string cellReselectionSubPriority = "cellReselectionSubPriority";

 const string pMax = "pMax";

 const string qOffsetFreq = "qOffsetFreq";

 const string qQualMin = "qQualMin";

 const string qRxLevMin = "qRxLevMin";

 const string threshXHighP = "threshXHighP";

 const string threshXHighQ = "threshXHighQ";

 const string threshXLowP = "threshXLowP";

 const string threshXLowQ = "threshXLowQ";

 const string tReselectionEutra = "tReselectionEutra";

 const string tReselectionEutraSfHigh = "tReselectionEutraSfHigh";

 const string tReselectionEutraSfMedium = "tReselectionEutraSfMedium";

 const string eUtraFrequencyRef = "eUtraFrequencyRef";

 };

/\*

 \* Definitions for MO class EUtranFrequency

 \*/

 interface EUtranFrequency: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "EUtranFrequency";

 // Attribute Names

 //

 const string earfcnDL = "earfcnDL";

 const string multiBandInfoListEutra = "multiBandInfoListEutra";

 };

 /\*

 \* Definitions for MO class WTFunction

 \*/

 interface WTFunction: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "WTFunction";

 // Attribute Names

 //

 const string id = "id";

 const string wLANInfoList = "wLANInfoList";

 };

 /\*

 \* Definitions for MO class EP\_Xw

 \*/

 interface EP\_Xw: GenericNetworkResourcesNRMDefs::Top

 {

 const string CLASS = "EP\_Xw";

 };

 /\*

 \* Definitions for MO class WLANMobilitySet

 \*/

 interface WLANMobilitySet: GenericNetworkResourcesNRMDefs::ManagedFunction

 {

 const string CLASS = "WLANMobilitySet";

 // Attribute Names

 //

 };

 /\*

 \* Definitions for MO class MemberWLAN

 \*/

 interface MemberWLAN

 {

 const string CLASS = "MemberWLAN";

 // Attribute Names

 //

 const string wLANId = "memberWlanList";

 const string wLANGeoLocation = "wLANGeoLocation";

 const string isLWASupported = "isLWASupported";

 const string isLWIPSupported = "isLWIPSupported";

 };

module genericEUTRANNRMAttributeTypes

{

 typedef sequence<string> cellLocalIdListType;

 enum CellSizeEnumType

 {

 verysmall,

 small,

 medium,

 large

 };

 enum AllowedAccessClassesValues

 {

 EmergencyCall,

 ForPLMNUse,

 SecurityServices,

 PublicUtilities,

 EmergencyServices,

 PLMNStaff

 };

typedef sequence < AllowedAccessClassesValues,6> AllowedAccessClasses

 struct PlmnIdType

 {

 // A bounded string of 3 characters representing 3 digits.

 string mcc;

 // A bounded string of 2 or 3 characters representing 2 or 3 digits.

 string mnc;

 };

 const short PLMNID\_LIST\_LENGTH = 6;

 typedef sequence<PlmnIdType > plmnIdListType;

 struct CellAccessInfoType

 {

 PlmnIdType plmnId;

 long tac;

 unsigned short cellId;

 string managementServiceExposed;

 };

 typedef sequence <CellAcessInfoType, 5> cellAcessInfoListType;

 const short NO\_OF\_PCIS = 504;

 typedef sequence<short,NO\_OF\_PCIS> pciListType;

 const short MAX\_TAC = 12;

 typedef sequence<long, MAX\_TAC> nTNTAClistType;

 typedef sequence<string> ipAddressListType;

 enum CellResvInfoType

 {

 reservedCell,

 nonReservedCell

 };

 struct QciDscpMappingType

 {

 short qci;

 short dscp;

 };

 typedef sequence<QciDscpMappingType> QciDscpMappingListType;

 struct EcgiType

 {

 // A bounded string of 3 characters representing 3 digits.

 string mcc;

 // A bounded string of 2 or 3 characters representing 2 or 3 digits.

 string mnc;

 unsignedlong eci

 };

 typedef sequence <EcgiType> EcgiListType;

 enum isEsCoveredByEnumType

 {

 no,

 partial,

 yes

 };

 enum yesNoType

 {

 no,

 yes

 };

 struct TceIDMappingInfo

 {

 short tceID;

 string tceIPAddr;

 };

 typedef sequence<TceIDMappingInfo> TceIDMappingInfoListType;

 struct SharNetTceMappingInfo

 {

 PlmnIdType plmnId;

 short tceID;

 string tceIPAddr;

 };

 typedef sequence<SharNetTceMappingInfo> SharNetTceMappingInfoListType;

enum CellOutageCompensationState

{

 cOCActivating,

 cOCActive,

 cOCDeactivating,

 cOCDeactive

};

enum qOffsetEnumType

{

 dB-24,

 dB-22,

 dB-20,

 dB-18,

 dB-16,

 dB-14,

 dB-12,

 dB-10,

 dB-8,

 dB-6,

 dB-5,

 dB-4,

 dB-3,

 dB-2,

 dB-1,

 dB0,

 dB1,

 dB2,

 dB3,

 dB4,

 dB5,

 dB6,

 dB8,

 dB10,

 dB12,

 dB14,

 dB16,

 dB18,

 dB20,

 dB22,

 dB24

};

enum contentionResolutionTimerEnumType

{

 sf8,

 sf16,

 sf24,

 sf32,

 sf40,

 sf48,

 sf56,

 sf64

};

enum numberOfRaPreamblesEnumType

{

 n4,

 n8,

 n12,

 n16,

 n20,

 n24,

 n28,

 n32,

 n36,

 n40,

 n44,

 n48,

 n52,

 n56,

 n60,

 n64

};

enum preambleInitialReceivedTargetPowerEnumType

{

 dBm-120,

 dBm-118,

 dBm-116,

 dBm-114,

 dBm-112,

 dBm-110,

 dBm-108,

 dBm-106,

 dBm-104,

 dBm-102,

 dBm-100,

 dBm-98,

 dBm-96,

 dBm-94,

 dBm-92,

 dBm-90

};

enum preambleTransMaxEnumType

{

 n3,

 n4,

 n5,

 n6,

 n7,

 n8,

 n10,

 n20,

 n50,

 n100,

 n200

};

enum powerRampingStepEnumType

{

 dB0,

 dB2,

 dB4,

 dB6

};

enum qHystEnumType

{

 dB0,

 dB1,

 dB2,

 dB3,

 dB4,

 dB5,

 dB6,

 dB8,

 dB10,

 dB12,

 dB14,

 dB16,

 dB18,

 dB20,

 dB22,

 dB24

};

enum responseWindowSizeEnumType

{

 sf2,

 sf3,

 sf4,

 sf5,

 sf6,

 sf7,

 sf8,

 sf10

};

enum sizeOfRAPreambleGroupAEnumType

{

 n4,

 n8,

 n12,

 n16,

 n20,

 n24,

 n28,

 n32,

 n36,

 n40,

 n44,

 n48,

 n52,

 n56,

 n60,

};

enum timeToTriggerEUtraEnumType

{

 ms0,

 ms40,

 ms64,

 ms80,

 ms100,

 ms128,

 ms160,

 ms256,

 ms320,

 ms480,

 ms512,

 ms640,

 ms1024,

 ms1280,

 ms2560,

 ms5120

};

 typedef sequence<string> DnList;

struct CellOutageCompensationStatus

 {

 CellOutageCompensationState cellOutageCompensationState;

 DnList errorList;

 };

 struct ReferenceSignalPattern

 {

 yesNoType prs\_supported;

 };

 enum ReferenceSignalPeriodicity

 {

 ms1280,

 ms2560,

 ms5120,

 ms10240

 };

 const short MAX\_CONFIGURATION\_NO = 4;

 struct NetListeningRefSignalType

 {

 ReferenceSignalPattern referenceSignalPattern;

 short num\_of\_crs\_ports;

 ReferenceSignalPeriodicity referenceSignalPeriodicity;

 unsigned short referenceSignalOffset;

 };

 typedef sequence<NetListeningRefSignalType, MAX\_CONFIGURATION\_NO> NetListeningRSForRIBS;

 struct WLANInfoType

 {

 string WLANId;

 enum WLANOperationalState

 {

 Disabled, Enabled

 };

 string EnbWithLWARelation;

 };

 typedef sequence<WLANInfoType> WLANInfoListType;

 struct GeoLocationType

 {

 short latitude;

 short longitude

 };

 struct lWIPSeGWInfoType

 {

 string LWIPSeGWId;

 ipAddressListType LWIPSeGWIpAddressList;

 };

 typedef sequence<lWIPSeGWInfoType> lWIPSeGWListType;

};

#endif // \_E*UTRANNETWORKRESOURCESNRMDEFS\_*IDL\_

Annex B (normative):
XML Definitions

# B.0 General

This annex contains the XML Definitions for the E-UTRAN NRM IRP as it applies to Itf-N, in accordance with UTRAN NRM IRP IS definitions [4].

The XML file formats are based on XML [9], XML Schema [10] [11] and XML Namespace [12] standards.

# B.1 Architectural features

The overall architectural feature of E-UTRAN Network Resources IRP is specified in 3GPP TS 28.658 [4].
This clause specifies features that are specific to the Schema definitions.

The XML definitions of this document specify the schema for a configuration content.

When using the XML definitions for a configuration file transfer with the Bulk CM IRP, using either CORBA Solution Set of 3GPP TS 32.616 [7] or SOAP Solution Set of 3GPP TS 32.616 [7], the basic part of the XML file format definition is provided by 3GPP TS 32.616 [7]. The XML definitions of this document provide the schema for the configuration content to be included in such a configuration file.

When using the XML definitions with a SOAP Solution Set of any Interface IRP that perform operations on managed objects, for example the Basic CM IRP SOAP SS of 3GPP TS 32.606 [6], the XML definitions of this document provides the schema for the configuration content operated on by the interface IRP. Such configuration content can be name of managed object and, if applicable, IOC attributes.

## B.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [5].

# B.2 Mapping

### B.2.1 General mapping

An IOC maps to an XML element of the same name as the IOC's name in the IS. An IOC attribute maps to a sub-element of the corresponding IOC's XML element, and the name of this sub-element is the same as the attribute's name in the IS.

### B.2.2 Information Object Class (IOC) mapping

The mapping is not present in the current version of this specification.

# B.3 Solution Set definitions

## B.3.1 XML definition structure

The overall description of the file format of configuration data XML files is provided by 3GPP TS 32.616 [7].

Annex B.3.3 of the present document defines the NRM-specific XML schema eutranNrm.xsd for the E-UTRAN Network Resources IRP NRM defined in 3GPP TS 28.658 [4].

XML schema eutranNrm.xsd explicitly declares NRM-specific XML element types for the related NRM.

The definition of those NRM-specific XML element types complies with the generic mapping rules defined in 3GPP TS 32.616 [7].

## B.3.2 Graphical Representation

The graphical representation is not present in the current version of this specification.

## B.3.3 XML schema "eutranNrm.xsd"

<?xml version="1.1" encoding="UTF-8"?>

<!--

 3GPP TS 28.659 E-UTRAN Network Resource Model IRP

 XML schema definition

 eutranNrm.xsd

-->

<schema xmlns="http://www.w3.org/2001/XMLSchema" xmlns:xn="http://www.3gpp.org/ftp/specs/archive/28\_series/28.623#genericNrm"

xmlns:nr="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#nrNrm"

xmlns:en="http://www.3gpp.org/ftp/specs/archive/28\_series/28.659#eutranNrm" xmlns:ngc="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#ngcNrm" xmlns:epc="http://www.3gpp.org/ftp/specs/archive/28\_series/28.709#epcNrm" xmlns:un="http://www.3gpp.org/ftp/specs/archive/28\_series/28.653#utranNrm" xmlns:gn="http://www.3gpp.org/ftp/specs/archive/28\_series/28.656#geranNrm" xmlns:sm="http://www.3gpp.org/ftp/specs/archive/28\_series/28.626#stateManagementIRP" xmlns:sp="http://www.3gpp.org/ftp/specs/archive/28\_series/28.629#sonPolicyNrm"

targetNamespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.659#eutranNrm" elementFormDefault="qualified">

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.623#genericNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#nrNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#ngcNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.709#epcNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.653#utranNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.656#geranNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.626#stateManagementIRP"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.629#sonPolicyNrm"/>

 <complexType name="IpAddressList">

 <sequence>

 <element name="ipAddress" type="string" minOccurs="0" maxOccurs="unbounded"/>

 </sequence>

 </complexType>

 <simpleType name="EnbId">

 <restriction base="unsignedLong">

 <maxInclusive value="268435455"/>

 </restriction>

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 <simpleType name="Eci">

 <restriction base="unsignedLong">

 <maxInclusive value="268435455"/>

 </restriction>

 </simpleType>

<simpleType name="CellLocalId">

 <restriction base="unsignedShort">

 <maxInclusive value="255"/>

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 <complexType name="CellLocalIdList">

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 <element name="cellLocalId" type="en:CellLocalId" minOccurs="0"/>

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 <simpleType name="cellSize">

 <restriction base="string">

 <enumeration value="verysmall"/>

 <enumeration value="small"/>

 <enumeration value="medium"/>

 <enumeration value="large"/>

 </restriction>

 </simpleType>

 <simpleType name="allowedAccessClassesElementType">

 <restriction base="string">

 <enumeration value="EmergencyCall"/>

 <enumeration value="ForPLMNUse"/>

 <enumeration value="SecurityServices"/>

 <enumeration value="PublicUtilities"/>

 <enumeration value="EmergencyServices"/>

 <enumeration value="PLMNStaff"/>

 </restriction>

</simpleType>

 <complexType name="allowedAccessClassesType">

 <sequence minOccurs="0" maxOccurs="6">

 <element name="allowedAccessClassesElement" type="en:allowedAccessClassesElementType"/>

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 </complexType>

 <complexType name="PLMNId">

    <sequence>

      <element name="mcc" type="MCC"/>

      <element name="mnc" type="MNC"/>

    </sequence>

  </complexType>

  <simpleType name="MCC">

    <restriction base="string">

      <pattern value="[0-9]{3}"/>

    </restriction>

  </simpleType>

  <simpleType name="MNC">

    <restriction base="string">

      <pattern value="[0-9]{3}|[0-9]{2}"/>

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  </simpleType>

 <complexType name="PLMNIdList">

 <sequence>

 <element name="pLMNId" type="en:PLMNId" maxOccurs="6"/>

 <!-- The first pLMNId of the pLMNIdList is primary PLMN id -->

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 <complexType name="CellAccessInfo">

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 <element name="plmnId" type="en:PLMNId"/>

 <element name="tac" type="long"/>

 <element name="cellId" type="long"/>

 </sequence>

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 <complexType name="CellAccessInfoList">

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 <element name="cellAccessInfo" type="en:CellAccessInfo" maxOccurs="5"/>

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 </complexType>

 <complexType name="EcgiList">

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 <element name="plmnId" type="en:PLMNId" minOccurs="0"/>

 <element name="eci" type="en:Eci" minOccurs="0"/>

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 </complexType>

 <simpleType name="Pci">

 <restriction base="unsignedShort">

 <maxInclusive value="503"/>

 <!-- Minimum value is 0, maximum value is 3x167+2=503 -->

 </restriction>

 </simpleType>

 <complexType name="NTNTAClist">

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 <element name="tac" type="long" minOccurs="1" maxOccurs="12"/>

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 <complexType name="PciList">

 <sequence>

 <element name="pci" type="en:Pci" maxOccurs="504"/>

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 <simpleType name="cellResvInfoType">

 <restriction base="string">

 <enumeration value="reservedCell"/>

 <enumeration value="nonReservedCell"/>

 </restriction>

 </simpleType>

 <simpleType name="mbsfnAreaIdType">

 <restriction base="unsignedLong">

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 <complexType name="QciDscpMappingType">

 <sequence>

 <element name="qci" type="short"/>

 <element name="dscp" type="short"/>

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 <complexType name="QciDscpMappingListType">

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 <element name="QciDscpMappingPair" type="en:QciDscpMappingType"/>

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 </complexType>

 <simpleType name="isEsCoveredByEnumType">

 <restriction base="string">

 <enumeration value="no"/>

 <enumeration value="partial"/>

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 <simpleType name="ContentionResolutionTimerEnumType">

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 <simpleType name="NumberOfRaPreamblesEnumType">

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 <enumeration value="dBm-120"/>

 <enumeration value="dBm-118"/>

 <enumeration value="dBm-116"/>

 <enumeration value="dBm-114"/>

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 <enumeration value="n100"/>

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 <simpleType name="PowerRampingStepEnumType">

 <restriction base="string">

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 <enumeration value="dB2"/>

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 <simpleType name="QHystEnumType">

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 <simpleType name="SizeOfRAPreambleGroupAEnumType">

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 <simpleType name="ThresholdUtraEcN0RangeType">

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 <complexType name="SharNetTceMappingInfo">

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 </restriction>

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 <simpleType name="ReferenceSignalPeriodicity">

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 <element name="wLANInfo" type="en:WLANInfoType"/>

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 <complexType name="GeoLocationType">

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 <complexType name="lWIPSeGWListType">

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 <element name="LWIPSeGWIpAddressList" type="en:IpAddressList"/>

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 <element name="configurationIndex" type="en:ConfigurationIndexRangeType" minOccurs="0"/>

 <element name="contentionResolutionTimer" type="en:ContentionResolutionTimerEnumType" minOccurs="0"/>

 <element name="hysteresisEutraA1" type="en:HysteresisRangeType" minOccurs="0"/>

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 <element name="hysteresisEutraA5" type="en:HysteresisRangeType" minOccurs="0"/>

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 <element name="pMax" type="en:PMaxRangeType" minOccurs="0"/>

 <element name="powerRampingStep" type="en:PowerRampingStepEnumType" minOccurs="0"/>

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 <element name="qOffsetUtra" type="en:QOffsetRangeType" minOccurs="0"/>

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 <element name="qQualMinUtra" type="en:QQualMinUtraRangeType" minOccurs="0"/>

 <element name="qRxLevMinEUtraSib1" type="en:QRxLevMinEUtraRangeType" minOccurs="0"/>

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 <element name="qRxLevMinGeran" type="en:QRxLevMinGeranRangeType" minOccurs="0"/>

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 <element name="rootSequenceIndex" type="en:RootSequenceIndexRangeType" minOccurs="0"/>

 <element name="sIntraSearch" type="en:SIntraSearchRangeType" minOccurs="0"/>

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 <element name="timeToTriggerIratB1" type="en:TimeToTriggerEUtraEnumType" minOccurs="0"/>

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 <element name="iRATANRSwitch" type="boolean" minOccurs="0"/>

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 <element name="x2BlackList" type="xn:dnList" minOccurs="0"/>

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 <element name="x2HOBlackList" type="xn:dnList" minOccurs="0"/>

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 <element name="sharNetTceMappingInfoList" type="en:SharNetTceMappingInfoList" minOccurs="0"/>

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 <element name=" ephemerisInfoSetRef " type="xn:dn" minOccurs="0"/>

 <!-- linkList attribute is to be added when defined in the IS -->

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 <element ref="en:EUtranCellTDD"/>

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 <element ref="nn:EP\_X2C"/>

 <element ref="nn:EP\_X2U"/>

 <element ref="nn:EP\_NgC"/>

 <element ref="nn:EP\_NgU"/>

 <element ref="nn:EP\_XnC"/>

 <element ref="nn:EP\_XnU"/>

 <element ref="en:ENBFunctionOptionallyContainedNrmClass"/>

 <element ref="en:DeNBCapability"/>

 <element ref="xn:VsDataContainer"/>

 </choice>

 <choice minOccurs="0" maxOccurs="1">

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 <!-- The element definition for EP\_RP\_EPS is available through

 the epcNrm.xsd (3GPP TS 28.709), by using epc:EP\_RP\_EPS -->

 <element name="ENBFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="ExternalENBFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="EUtranCellFDDOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="ExternalEUtranCellFDDOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="EUtranCellTDDOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="ExternalEUtranCellTDDOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="EUtranRelationOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="Cdma2000RelationOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="Link\_ENB\_ENBOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="MCEFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="Link\_MCE\_ENBOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="Link\_MCE\_MMEOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="MBSFNAreaOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="RNFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="ExternalRNFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="WTFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="EP\_xwOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

 <element name="WLANMobilitySetOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>

</schema>

Annex C (informative):
Change history

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| **Change history** |
| **Date** | **TSG #** | **TSG Doc.** | **CR** | **Rev** | **Subject/Comment** | **Old** | **New** |
| 03-2013 | SA#59 | SP-130048 | 001 | 1 | Correction of attribute name relatedSector | 11.0.0 | 11.1.0 |
| SP-130057 | 002 | - | Alignment with 28.658: Addition of missing Network Sharing support for MDT |
| 06-2013 | SA#60 | SP-130304 | 003 | 1 | Energy saving synchronization with 32.766 | 11.1.0 | 11.2.0 |
| 12-2013 | SA#62 | SP-130614 | 005 | 1 | Add blacklist member | 11.2.0 | 11.3.0 |
| 06-2014 | SA#64 | SP-140332 | 006 | - | upgrade XSD | 11.3.0 | 11.4.0 |
| SP-140332 | 007 | 1 | Add the missing attribute cellResvInfo in IDL specification |
| SP-140359 | 008 | - | remove the feature support statements |
| 09-2014 | SA#65 | SP-140560 | 009 | - | Update the link from Solution Set to Information Service due to the end of Release 12 | 11.4.0 | 12.0.0 |
| 12-2014 | SA#66 | SP-140797 | 011 | - | Remove obsolete EUtranRelationSon - Align with 28.658 | 12.0.0 | 12.1.0 |
| SP-140798 | 012 | - | Add missing OAM support for radio interface based synchronization - Align with TS 36.300 |
| 12-2015 | SA#70 | SP-150691 | 014 | 1 | Align id attribute definitions  | 12.1.0 | 12.2.0 |
| 01-2016 | SA#70 |  |  |  | Upgrade to Rel-13 (MCC) | 12.2.0 | 13.0.0 |

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| **Change history** |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2016-06 | SA#72 | SP-160419 | 0016 | 1 | B | Adding NB-IoT cell type attribute in EUtranGenericCell IOC – Align with IS | 13.1.0 |
| 2016-06 | SA#72 | SP-160407 | 0017 | - | F | Update the link from IRP Solution Set to IRP Information Service | 13.1.0 |
| 2017-03 | SA#75 | - | - | - |  | Promotion to Release 14 without technical change | 14.0.0 |
| 2017-06 | SA#76 | SP-170514 | 0018 | - | F | Update link from IRP SS to IS | 14.1.0 |
| 2017-06 | SA#76 | SP-170510 | 0019 | 1 | B | Update the XML Schema definitions to align with IS to support Configuration Management for mobile networks that include virtualized network functions | 14.1.0 |
| 2017-09 | SA#77 | SP-170653 | 0020 | 2 | B | Support E-UTRAN sharing enhancement | 14.2.0 |
| 2018-01 | SA#78 | SP-170968 | 0021 | - | B | Adding attribute of IOC EUtranGenericCell to support SON for AAS deployment management | 15.0.0 |
| 2018-03 | SA#79 | SP-180060 | 0022 | - | B | Add attribute peeParametersList to solution set definitions | 15.1.0 |
| 2018-09 | SA#81 | SP-180828 | 0025 | - | B | Update E-UTRAN SS definitions to support ng-eNB management | 15.2.0 |
| 2018-12 | SA#82 | SP-181049 | 0026 | 1 | B | Add IOC for supporting management of non-collocated LWA | 16.0.0 |
| 2018-12 | SA#82 | SP-181049 | 0027 | 2 | B | Add WLANMobilitySet IOC | 16.0.0 |
| 2019-03 | SA#83 | SP-190124 | 0033 | 1 | B | Enhance ENBFunction for LWIP management | 16.1.0 |
| 2019-03 | SA#83 | SP-190126 | 0034 | - | A | Correct PLMN ID Type in Solution Set Stage 3 | 16.1.0 |
| 2019-12 | SA#86 | SP-191173 | 0037 | - | A | Update XML solution set to support EUTRAN frequency relation | 16.2.0 |
| 2019-12 | SA#86 | SP-191173 | 0038 | 1 | A | Add missing stage 3 CORBA/IDL solution | 16.2.0 |
| 2022-03 | - | - | - | - | - | Update to Rel-17 version (MCC) | 17.0.0 |
| 2022-06 | SA#96 | SP-220593 | 0040 | - | F | Non-inclusive language correction | 17.1.0 |
| 2023-12 | SA#102 | SP-231483 | 0041 | - | B | Add NRM solution set definitions for IOT-NTN management | 18.0.0 |
| 2024-09 | SA#105 | SP-241164 | 0043 | 1 | A | Rel-18 CR TS 28.659 Remove version number from TS | 18.1.0 |
| 2025-06 | SA#108 | SP-250546 | 0044 | - | B | Rel-19 CR TS 28.658 Add attributes to support Store and Forward Satellite operation for eNB stage3 | 19.0.0 |
| 2025-06 | SA#108 | SP-250546 | 0045 | - | B | Rel-19 CR TS 28.659 Add attributes to support Store and Forward Satellite operation for eNB stage3 | 19.0.0 |
| 2025-06 | SA#108 | SP-250546 | 0046 | - | B | Rel-19 CR TS 28.659 Add attributes to support Store and Forward Satellite operation for eNB stage3 | 19.0.0 |