3GPP TS 28.656 V18.2.0 (2024-09)

Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;

Telecommunication management;

GSM/EDGE Radio Access Network (GERAN)

Network Resource Model (NRM)

Integration Reference Point (IRP);

Solution Set (SS) definitions

(Release 18)

**



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Keywords

GSM, EDGE, GERAN, NRM, IRP, Converged Management

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# 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:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

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:

28.654: GSM/EDGE Radio Access Network (GERAN) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements.

28.655: GSM/EDGE Radio Access Network (GERAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS).

**28.656: GSM/EDGE Radio Access Network (GERAN) 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 GERAN Network Resource Model (NRM) IRP, through which an IRPAgent can communicate configuration management information to one or several IRPManagers concerning GERAN resources. The GERAN NRM IRP comprises a set of specifications defining Requirements, a protocol neutral Information Service and one or more Solution Set definitions.

The present document specifies the Solution Set definitions for the GERAN NRM IRP.

# 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 32.101: "Telecommunication management; Principles and high level requirements".

[2] 3GPP TS 32.102: "Telecommunication management; Architecture".

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

[4] 3GPP TS 28.655: "Telecommunication management; GERAN 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 28.623: “Telecommunication management; Generic Network Resource Model (NRM) 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] W3C REC-xml11-20060816: "Extensible Markup Language (XML) 1.1 (Second Edition)".

[9] Void

[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)".

# 3 Definitions and abbreviations

## 3.1 Definitions

For terms and definitions please refer to 3GPP TS 32.101 [1], 3GPP TS 32.102 [2], 3GPP TS 32.600 [3] and 3GPP TS 28.655 [4].

**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** 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 following abbreviations apply:

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

# 4 Solution Set Definitions

This specification defines the following 3GPP GERAN NRM IRP Solution Set Definitions:

- 3GPP GERAN NRM IRP CORBA SS (Annex A)

- 3GPP GERAN 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 GERAN NRM IRP: Information Service (TS 28.655 [4]).

# A.1 Architectural features

The overall architectural feature of GERAN NRM IRP is specified in 3GPP TS 28.655 [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 3GPP TS 28.623 [6].

# A.2 Mapping

## A.2.1 General mapping

See clause A.2.1 of 3GPP TS 28.623 [6].

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

### A.2.2.1 IOC BSSFunction

Mapping from NRM IOC BSSFunction attributes to SS equivalent MOC BssFunction attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | bssFunctionId | string |
| userLabel | userLabel | string |

### A.2.2.2 IOC BTSSiteMgr

Mapping from NRM IOC BTSSiteMgr attributes to SS equivalent MOC BtsSiteMgr attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | btsSiteMgrId | string |
| userLabel | userLabel | string |
| latitude | latitude | long |
| longitude | longitude | long |
| operationalState | operationalState | StateManagementIRPOptConstDefs::OperationalStateTypeOpt |

### A.2.2.3 IOC GSMCell

Mapping from NRM IOC GSMCell attributes to SS equivalent MOC GsmCell attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | gsmCellId | string |
| userLabel | userLabel | string |
| cellIdentity | cellIdentity | long |
| cellAllocation | cellAllocation | GenericNetworkResourcesIRPSystem::AttributesTypes::LongSet |
| ncc | ncc | long |
| bcc | bcc | long |
| lac | lac | long |
| mcc | mcc | long |
| mnc | mnc | long |
| rac | rac | long |
| racc | racc | long |
| tsc | tsc | long |
| rxLevAccessMin | rxLevAccessMin | long |
| msTxPwrMaxCCH | msTxPwrMaxCCH | long |
| rfHoppingEnabled | rfHoppingEnabled | boolean |
| hoppingSequenceList | hoppingSequenceList | GeranNRMAttributeTypes:: HoppingSequenceListType |
| plmnPermitted | plmnPermitted | long |

### A.2.2.4 IOC GSMRelation

Mapping from NRM IOC GSMRelation attributes to SS equivalent MOC GsmRelation attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | gsmRelationId | string |
| adjacentCell | adjacentCell | string |
| bcchFrequency | bcchFrequency | long |
| ncc | ncc | long |
| bcc | bcc | long |
| lac | lac | long |
| isHOAllowed | isHOAllowed | boolean |
| isRemoveAllowed | isRemoveAllowed | boolean |
| isESCoveredBy | isESCoveredBy | GeranNRMAttributeTypes::IsEsCoveredByEnumType |

### A.2.2.5 IOC ExternalGSMCell

Mapping from NRM IOC ExternalGSMCell attributes to SS equivalent MOC ExternalGsmCell attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | externalGsmCellId | string |
| userLabel | userLabel | string |
| cellIdentity | cellIdentity | long |
| bcchFrequency | bcchFrequency | long |
| ncc | ncc | long |
| bcc | bcc | long |
| Lac | lac | long |
| mcc | mcc | long |
| mnc | mnc | long |
| rac | rac | long |
| racc | racc | long |

### A.2.2.6 IOC ExternalBSSFunction

Mapping from NRM IOC ExternalBSSFunction attributes to SS equivalent MOC ExternalBssFunction attributes

| IS Attributes | SS Attributes | SS Type |
| --- | --- | --- |
| id | externalBssFunctionId | string |
| userLabel | userLabel | string |

# A.3 Solution Set definitions

## A.3.1 IDL definition structure

Clause A.3.2 defines the MO classes for the GERAN NRM IRP.

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

//File: GeranNetworkResourcesNRMDefs.idl

#ifndef GeranNetworkResourcesNRMDefs\_idl

#define GeranNetworkResourcesNRMDefs\_idl

#include "GenericNetworkResourcesNRMDefs.idl"

#pragma prefix "3gppsa5.org"

/\*\*

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

\* the attribute names for each defined MO class.

\*/

module GeranNetworkResourcesNRMDefs

{

/\*\*

\* Definitions for MO class BssFunction

\*/

interface BssFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "BssFunction";

// Attribute Names

//

const string bssFunctionId = "bssFunctionId";

};

/\*\*

\* Definitions for MO class BtsSiteMgr

\*/

interface BtsSiteMgr : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "BtsSiteMgr";

// Attribute Names

//

const string btsSiteMgrId = "btsSiteMgrId";

const string latitude = "latitude";

const string longitude = "longitude";

const string operationalState = "operationalState";

};

/\*\*

\* Definitions for MO class GsmCell

\*/

interface GsmCell : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "GsmCell";

// Attribute Names

//

const string gsmCellId = "gsmCellId";

const string cellIdentity = "cellIdentity";

const string cellAllocation = "cellAllocation";  
 const string ncc = "ncc";

const string bcc = "bcc";

const string lac = "lac";

const string mcc = "mcc";

const string mnc = "mnc";

const string rac = "rac";

const string racc = "racc";

const string tsc = "tsc";

const string rxLevAccessMin = "rxLevAccessMin";

const string msTxPwrMaxCCH = "msTxPwrMaxCCH";

const boolean rfHoppingEnabled = “rfHoppingEnabled”;

const string hoppingSequenceList = "hoppingSequenceList";

const string plmnPermitted = "plmnPermitted";

};

/\*\*

\* Definitions for MO class GsmRelation

\*/

interface GsmRelation :GenericNetworkResourcesNRMDefs::Top

{

const string CLASS = "GsmRelation";

// Attribute Names

//

const string gsmRelationId = "gsmRelationId";

const string adjacentCell = "adjacentCell";

const string bcchFrequency = "bcchFrequency";  
 const string ncc = "ncc";

const string bcc = "bcc";

const string lac = "lac";

const string isHOAllowed = "isHOAllowed";

const string isRemoveAllowed = "isRemoveAllowed";

const string isESCoveredBy = "isESCoveredBy";

};

/\*\*

\* Definitions for MO class ExternalGsmCell

\*/

interface ExternalGsmCell : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ExternalGsmCell";

// Attribute Names

//

const string externalGsmCellId = "externalGsmCellId";

const string cellIdentity = "cellIdentity";

const string bcchFrequency = "bcchFrequency";  
 const string ncc = "ncc";

const string bcc = "bcc";

const string lac = "lac";

const string mcc = "mcc";

const string mnc = "mnc";

const string rac = "rac";

const string racc = "racc";

};

/\*\*

\* Definitions for MO class ExternalBssFunction

\*/

interface ExternalBssFunction : GenericNetworkResourcesNRMDefs::ManagedFunction

{

const string CLASS = "ExternalBssFunction";

// Attribute Names

//

const string externalBssFunctionId = "externalBssFunctionId";

};

};

module GeranNRMAttributeTypes

{

enum isEsCoveredByEnumType

{

no,

partial,

yes

};

typedef sequence<boolean> MAType;

struct HoppingSequenceType

{

MAType ma;

short hsn;

};

typedef sequence<HoppingSequenceType> HoppingSequenceListType;

};

#endif

Annex B (normative):  
XML Definitions

# B.0 General

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

The XML file formats are based on XML [8], XML Schema [10] [11] and XML Namespace [12] standards.

# B.1 Architectural features

## B.1.0 General

The overall architectural feature of GERAN NRM IRP is specified in 3GPP TS 28.655 [4].

This clause specifies features that are specific to the Schema definitions.

## 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 nNot 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 geranNrm.xsd for the GERAN Network Resources IRP NRM defined in 3GPP TS 32.652 [4].

XML schema geranNrm.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 "geranNrm.xsd"

<?xml version="1.1" encoding="UTF-8"?>  
  
<!--  
 3GPP TS 28.656 GERAN NRM IRP  
 Bulk CM Configuration data file NRM-specific XML schema  
 geranNrm.xsd  
-->

<schema

xmlns="http://www.w3.org/2001/XMLSchema"

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

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:en="http://www.3gpp.org/ftp/specs/archive/28\_series/28.659#eutranNrm"

xmlns:sp="http://www.3gpp.org/ftp/specs/archive/28\_series/28.629#sonPolicyNrm"

xmlns:gr="http://www.3gpp.org/ftp/specs/archive/28\_series/28.663#genericRanNrm"

targetNamespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.656#geranNrm"

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/28.653#utranNrm"  
 />  
<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/28.659#eutranNrm"  
 />

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

/>

<import

namespace=

"<http://www.3gpp.org/ftp/specs/archive/28_series/28.663#genericRanNrm>"

/>  
 <simpleType name="isESCoveredByEnumType">

<restriction base="string">

<enumeration value="no"/>

<enumeration value="partial"/>

<enumeration value="yes"/>

</restriction>

</simpleType>

<complexType name="MA">  
 <sequence>  
 <element name="rfSelected" type="boolean" minOccurs="0"/>  
 </sequence>  
 </complexType>  
 <complexType name="HoppingSequence">  
 <sequence>  
 <element name="ma" type="gn:MA" minOccurs="0"/>  
 <element name="hsn" type="short" minOccurs="0"/>  
 </sequence>  
 </complexType>  
 <complexType name="HoppingSequenceList">  
 <sequence>  
 <element name="hoppingSequence" type="gn:HoppingSequence" minOccurs="0"/>  
 </sequence>  
 </complexType>

<!-- GERAN Network Resources IRP NRM class associated XML elements -->  
  
 <element  
 name="BssFunction"  
 substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass"  
 >  
 <complexType>  
 <complexContent>  
 <extension base="xn:NrmClass">  
 <sequence>  
 <element name="attributes" minOccurs="0">  
 <complexType>  
 <all>  
 <element name="userLabel"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>  
 </all>  
 </complexType>  
 </element>  
 <choice minOccurs="0" maxOccurs="unbounded">  
 <element ref="gn:BtsSiteMgr"/>  
 <element ref="xn:VsDataContainer"/>  
 </choice>  
 </sequence>  
 </extension>  
 </complexContent>  
 </complexType>  
 </element>  
  
 <element name="BtsSiteMgr">  
 <complexType>  
 <complexContent>  
 <extension base="xn:NrmClass">  
 <sequence>  
 <element name="attributes" minOccurs="0">  
 <complexType>  
 <all>  
 <element name="userLabel"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>  
 <element ref="gr:latitude" minOccurs="0"/>  
 <element ref="gr:longitude" minOccurs="0"/>  
 <element  
 name="operationalState"  
 type="sm:operationalStateType"  
 minOccurs="0"  
 />  
 </all>  
 </complexType>  
 </element>  
 <choice minOccurs="0" maxOccurs="unbounded">  
 <element ref="gn:GsmCell"/>  
 <element ref="xn:VsDataContainer"/>  
 </choice>  
 <choice minOccurs="0" maxOccurs="1">

<element ref="sp:InterRatEsPolicies"/>

</choice>

</sequence>  
 </extension>  
 </complexContent>  
 </complexType>  
 </element>  
  
 <element name="GsmCell">  
 <complexType>  
 <complexContent>  
 <extension base="xn:NrmClass">  
 <sequence>  
 <element name="attributes" minOccurs="0">  
 <complexType>  
 <all>  
 <element name="userLabel"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>  
 <element name="cellIdentity"/>  
 <element name="cellAllocation"/>  
 <element name="ncc"/>  
 <element name="bcc"/>  
 <element name="lac"/>  
 <element name="mcc"/>  
 <element name="mnc"/>  
 <element name="rac" minOccurs="0"/>  
 <element name="racc" minOccurs="0"/>  
 <element name="tsc" minOccurs="0"/>  
 <element name="rxLevAccessMin"/>  
 <element name="msTxPwrMaxCCH"/>

<element name="rfHoppingEnabled"/>  
 <element name="hoppingSequenceList"/>  
 <element name="plmnPermitted"/>  
 </all>  
 </complexType>  
 </element>  
 <choice minOccurs="0" maxOccurs="unbounded">  
 <element ref="gn:GsmRelation"/>  
 <element ref="un:UtranRelation"/>  
 <element ref="en:EUtranRelation"/>  
 <element ref="xn:VsDataContainer"/>  
 <element ref="gn:GsmCellOptionallyContainedNrmClass"/>  
 </choice>  
 <choice minOccurs="0" maxOccurs="1">

<element ref="sp:InterRatEsPolicies"/>

</choice>

</sequence>  
 </extension>  
 </complexContent>  
 </complexType>  
 </element>  
  
 <element name="GsmRelation">  
 <complexType>  
 <complexContent>  
 <extension base="xn:NrmClass">  
 <sequence>  
 <element name="attributes" minOccurs="0">  
 <complexType>  
 <all>  
 <element name="adjacentCell"/>  
 <element name="bcchFrequency" minOccurs="0"/>  
 <element name="ncc" minOccurs="0"/>  
 <element name="bcc" minOccurs="0"/>  
 <element name="lac" minOccurs="0"/>  
 <element name="isRemoveAllowed" type="boolean" minOccurs="0"/>

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

<element name="isESCoveredBy" type="gn:isESCoveredByEnumType" minOccurs="0"/>

</all>  
 </complexType>  
 </element>  
 <choice minOccurs="0" maxOccurs="unbounded">  
 <element ref="xn:VsDataContainer"/>  
 </choice>  
 </sequence>  
 </extension>  
 </complexContent>  
 </complexType>  
 </element>  
  
 <element  
 name="ExternalGsmCell"  
 substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"  
 >  
 <complexType>  
 <complexContent>  
 <extension base="xn:NrmClass">  
 <sequence>  
 <element name="attributes" minOccurs="0">  
 <complexType>  
 <all>  
 <element name="userLabel"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>  
 <element name="cellIdentity"/>  
 <element name="bcchFrequency"/>  
 <element name="ncc"/>  
 <element name="bcc"/>  
 <element name="lac"/>  
 <element name="mcc"/>  
 <element name="mnc"/>  
 <element name="rac" minOccurs="0"/>  
 <element name="racc" minOccurs="0"/>  
 </all>  
 </complexType>  
 </element>  
 <choice minOccurs="0" maxOccurs="unbounded">  
 <element ref="xn:VsDataContainer"/>  
 </choice>  
 <choice minOccurs="0" maxOccurs="1">

<element ref="sp:InterRatEsPolicies"/>

</choice>

</sequence>  
 </extension>  
 </complexContent>  
 </complexType>  
 </element>  
  
 <element  
 name="ExternalBssFunction"  
 substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass"  
 >  
 <complexType>  
 <complexContent>  
 <extension base="xn:NrmClass">  
 <sequence>  
 <element name="attributes" minOccurs="0">  
 <complexType>  
 <all>  
 <element name="userLabel"/>

<element name="vnfParametersList" type="xn:vnfParametersListType" minOccurs="0"/>  
 </all>  
 </complexType>  
 </element>  
 <choice minOccurs="0" maxOccurs="unbounded">  
 <element ref="gn:ExternalGsmCell"/>  
 <element ref="xn:VsDataContainer"/>  
 </choice>  
 </sequence>  
 </extension>  
 </complexContent>  
 </complexType>  
 </element>  
<element name="GsmCellOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>  
</schema>

Annex C (informative):  
Change history

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Change history | | | | | | | | |
| Date | TSG # | TSG Doc. | CR | Rev | Subject/Comment | Cat | Old | New |
| 2014-06 | SA#64 | SP-140332 | 001 | - | upgrade XSD | F | 11.0.0 | 11.1.0 |
| SP-140332 | 002 | 1 | Use the latest version of 32.656 as base | F |
| SP-140359 | 003 | - | remove the feature support statements | F |
| 2014-09 | SA#65 | SP-140560 | 005 | - | Update the link from Solution Set to Information Service due to the end of Release 12 | C | 11.1.0 | 12.0.0 |
| 2016-01 | SA#70 |  |  |  | Upgrade to Rel-13(MCC) |  | 12.0.0 | 13.0.0 |
| 2016-03 | SA#71 | SP-160031 | 008 | - | Make the XML schema well formed | A | 13.0.0 | 13.1.0 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2016-06 | SA#72 | SP-160408 | 0011 | 1 | A | Correct the definition of hoppingSequenceList - Align with 28.655 | 13.2.0 |
| 2016-06 | SA#72 | SP-160407 | 0012 | - | F | Update the link from IRP Solution Set to IRP Information Service | 13.2.0 |
| 2016-06 | SA#72 | SP-160408 | 0015 | - | A | Namespace reference for the XML attributes "latitude" and "longitude" is missing | 13.2.0 |
| 2016-09 | SA#73 | SP-160620 | 0016 | - | F | Correct the link from IRP Solution Set to IRP Information Service | 13.3.0 |
| 2017-03 | SA#75 | - | - | - |  | Promotion to Release 14 without technical change | 14.0.0 |
| 2017-06 | SA#76 | SP-170514 | 0017 | - | F | Update link from IRP SS to IS | 14.1.0 |
| 2017-06 | SA#76 | SP-170510 | 0018 | 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 |
| 2018-06 | - | - | - | - | - | Update to Rel-15 version (MCC) | **15.0.0** |
| 2020-07 | - | - | - | - | - | Update to Rel-16 version (MCC) | **16.0.0** |
| 2022-03 | - | - | - | - | - | Update to Rel-17 version (MCC) | **17.0.0** |
| 2024-04 | - | - | - | - | - | Update to Rel-18 version (MCC) | **18.0.0** |
| 2024-04 | SA#104 | SP-240810 | 0019 | - | F | Rel-18 CR 28.656 Remove SS-IS version link | **18.1.0** |
| 2024-09 | SA#105 | SP-241164 | 0021 | 1 | A | Rel-18 CR TS 28.656 Correction of XML references | **18.2.0** |