

# 3GPP TS 32.796 V11.0.0 (2012-09)

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*Technical Specification*

**3rd Generation Partnership Project;  
Technical Specification Group Services and System Aspects;  
Telecommunication management;  
Generic Radio Access Network (RAN)  
Network Resource Model (NRM) Integration Reference Point  
(IRP);  
Solution Set (SS) definitions  
(Release 11)**

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Keywords

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IRP, NRM, RAN

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## Foreword

This Technical Specification has been produced by the 3<sup>rd</sup> 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.

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## Introduction

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

32.791	Generic Radio Access Network (RAN) Network Resource Model (NRM) Integration Reference Point (IRP): Requirements
32.792	Generic Radio Access Network (RAN) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)
<b>32.796</b>	<b>Generic Radio Access Network (RAN) Network Resource Model (NRM) Integration Reference Point (IRP): Solution Set (SS) definitions</b>

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# 1 Scope

The present document is part of an Integration Reference Point (IRP) named Generic Radio Access Network (RAN) Network Resource Model (NRM) IRP, through which an IRPAgent can communicate configuration management information to one or several IRPManagers concerning Generic RAN resources. The Generic RAN 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 Generic RAN NRM IRP.

This Solution Set specification is related to 3GPP TS 32.792 V11.0.X [4].

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# 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 32.792: "Telecommunications management; Generic Radio Access Network (RAN) 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] W3C REC-xml-20001006: "Extensible Markup Language (XML) 1.0 (Second Edition)".
- [9] W3C REC-xmlschema-0-20010502: "XML Schema Part 0: Primer".
- [10] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".
- [11] W3C REC-xmlschema-2-20010502: "XML Schema Part 2: Datatypes".
- [12] W3C REC-xml-names-19990114: "Namespaces in XML".

---

## 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:** file containing an XML document

**XML document:** composed of the succession of an optional XML declaration followed by a root XML element

NOTE: See [8]; in the scope of the present document.

**XML declaration:** it specifies the version of XML being used

NOTE: See [8].

**XML element:** has a type, is identified by a name, may have a set of XML attribute specifications and is either composed of the succession of an XML start-tag followed by the XML content of the XML element followed by an XML end-tag, or composed simply of an XML empty-element tag; each XML element may contain other XML elements

NOTE: See [8].

**empty XML element:** having an empty XML content; an empty XML element still possibly has a set of XML attribute specifications; an empty XML element is either composed of the succession of an XML start-tag directly followed by an XML end-tag, or composed simply of an XML empty-element tag

NOTE: See [8].

**XML content (of an XML element):** empty if the XML element is simply composed of an XML empty-element tag; otherwise the part, possibly empty, of the XML element between its XML start-tag and its XML end-tag

**XML start-tag:** the beginning of a non-empty XML element is marked by an XML start-tag containing the name and the set of XML attribute specifications of the XML element

NOTE: See [8].

**XML end-tag:** the end of a non-empty XML element is marked by an XML end-tag containing the name of the XML element

NOTE: See [8].

**XML empty-element tag:** composed simply of an empty-element tag containing the name and the set of XML attribute specifications of the XML element.

NOTE: See [8].

**XML attribute specification:** has a name and a value

NOTE: See [8].

**DTD:** defines structure and content constraints to be respected by an XML document to be valid with regard to this DTD

NOTE: See [8].

**XML schema:** more powerful than a DTD, an XML schema defines structure and content constraints to be respected by an XML document to conform with this XML schema; through the use of XML namespaces several XML schemas can be used together by a single XML document; an XML schema is itself also an XML document that shall conform with the XML schema for XML schemas

NOTE: See [9], [10] and [11].

**XML namespace:** enables qualifying element and attribute names used in XML documents by associating them with namespaces identified by different XML schemas

NOTE: See [12], in the scope of the present document.

**XML complex type:** defined in an XML schema; cannot be directly used in an XML document; can be the concrete type or the derivation base type for an XML element type or for another XML complex type; ultimately defines constraints for an XML element on its XML attribute specifications and/or its XML content

NOTE: See [9], [10] and [11].

**XML element type:** declared by an XML schema; can be directly used in an XML document; as the concrete type of an XML element, directly or indirectly defines constraints on its XML attribute specifications and/or its XML content; can also be the concrete type or the derivation base type for another XML element type

NOTE: See [9], [10] and [11].

## 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].

BS	Base Station
CM	Configuration Management
CORBA	Common Object Request Broker Architecture
DTD	Document Type Definition
GSM	Global System for Mobile communication
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
RAN	Radio Access Network
SS	Solution Set
UMTS	Universal Mobile Telecommunications System
XML	eXtensible Markup Language

---

## 4 Solution Set Definitions

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

- 3GPP Generic RAN NRM IRP CORBA SS (Annex A)
- 3GPP Generic RAN NRM IRP XML Definitions (Annex B)

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## Annex A (normative): CORBA Solution Set

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in Generic RAN NRM IRP: Information Service (TS 32.792 [4]).

---

### A.1 Architectural features

The overall architectural feature of Generic RAN Network Resources IRP is specified in 3GPP TS 32.792 [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

This clause discusses how the models and IDL definitions provided in the present document can be extended for a particular implementation and still remain compliant with 3GPP SA5's specifications (see also Annex B of TS 32.153 [2]).

##### A.1.2.1 Allowed extensions

Vendor-specific MOCs may be supported. The vendor-specific MOCs may support new types of attributes. The 3GPP SA5-specified notifications may be issued referring to the vendor-specific MOCs and vendor-specific attributes. New MOCs shall be distinguishable from 3GPP SA5 MOCs by name. 3GPP SA5-specified and vendor-specific attributes may be used in vendor-specific MOCs. Vendor-specific attribute names shall be distinguishable from existing attribute names.

NRM MOCs may be subclassed. Subclassed MOCs shall maintain the specified behaviour of the 3GPP SA5's superior classes. They may add vendor-specific behaviour with vendor-specific attributes. When subclassing, naming attributes cannot be changed. The subclassed MOC shall support all attributes of its superior class. Vendor-specific attributes cannot be added to 3GPP SA5 NRM MOCs without subclassing.

When subclassing, the 3GPP SA5-specified containment rules and their specified cardinality shall still be followed. As an example, ManagementNode (or its subclasses) shall be contained under SubNetwork (or its subclasses).

Managed Object Instances may be instantiated as CORBA objects. This requires that the MOCs be represented in IDL. 3GPP SA5's NRM MOCs are not currently specified in IDL, but may be specified in IDL for instantiation or subclassing purposes. However, management information models should not require that IRPManagers access the instantiated managed objects other than through supported methods in the present document.

Extension rules related to notifications (Notification categories, Event Types, Extended Event Types etc.) are for further study.

##### A.1.2.2 Extensions not allowed

The IDL specifications in the present document cannot be edited or altered. Any additional IDL specifications shall be specified in separate IDL files.

IDL interfaces (note: not MOCs) specified in the present document may not be subclassed or extended. New interfaces may be defined with vendor-specific methods.



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## A.2 Mapping

### A.2.1 General mapping

Attributes modelling associations as defined in the NRM (here also called "reference attributes") are in this SS mapped to attributes. The names of the reference attributes in the NRM are mapped to the corresponding attribute names in the MOC. When the cardinality for an association is 0..1 or 1..1 the datatype for the reference attribute is defined as an MOReference. The value of an MO reference contains the distinguished name of the associated MO. When the cardinality for an association allows more than one referred MO, the reference attribute will be of type MOReferenceSet, which contains a sequence of MO references.

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

This Solution Set supports reference attributes for relations other than containment relations between objects. Reference attributes are therefore introduced in each MOC where needed.

### A.2.2.1 IOC SectorEquipmentFunction

#### Mapping from NRM IOC SectorEquipmentFunction attributes and associations to SS equivalent MOC SectorEquipmentFunction attributes

Attribute of IOC SectorEquipmentFunction in 3GPP TS 32.792 [4]	SS Attribute	SS Type	Support Qualifier	Read Qualifier	Write Qualifier
id	id	string	M	M	-
fqBand	fqBand	short	CM	M	-
eUTRANFqBands	eUTRANFqBands	GenericRanNRMAAttributeTypes::eUTRANFqBandsListType	M	M	-
uTRANFDDFqBands	uTRANFDDFqBands	GenericRanNRMAAttributeTypes::uTRANFDDFqBandsListType	M	M	-
uTRANTDDFqBands	uTRANTDDFqBands	GenericRanNRMAAttributeTypes::uTRANTDDFqBandsListType	M	M	-
confOutputPower	confOutputPower	short	M	M	M
relatedTmaList	relatedTmaList	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet	M	M	-
relatedAntennaList	relatedAntennaList	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet	M	M	-
relatedCellList	relatedCellList	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet	M	M	-

### A.2.2.2 IOC AntennaFunction

#### Mapping from NRM IOC AntennaFunction attributes and associations to SS equivalent MOC AntennaFunction attributes

NRM Attributes of IOC antennaFunction in TS 32.692 [4]	SS Attributes	SS Type	Support Qualifier	Read	Write
id	id	string	O	M	-
retTiltValue	retTiltValue	short	O	M	M
bearing	bearing	short	O	M	M
retGroupName	retGroupName	string	O	M	M
height	height	short	O	M	M
maxAzimuthValue	maxAzimuthValue	short	O	M	M
minAzimuthValue	minAzimuthValue	short	O	M	M
horizBeamwidth	horizBeamwidth	short	O	M	M
vertBeamwidth	vertBeamwidth	short	O	M	M
relatedCellList	relatedCellList	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet	M	M	-

NOTE: For all support qualifiers with the value "O", see attribute constraints in TS 32.692 [4].

## A.2.2.3 IOC TmaFunction

## Mapping from NRM IOC TmaFunction attributes and associations to SS equivalent MOC TmaFunction attributes

NRM Attributes of IOC tmaFunction in TS 32.692 [4]	SS Attributes	SS Type	Support Qualifier	Read	Write
id	id	string	M	M	-
tmaSubunitNumber	tmaSubunitNumber	unsigned short	M	M	M
tmaStateFlag	tmaStateFlag	unsigned short	M	M	O
tmaFunctionFlag	tmaFunctionFlag	unsigned short	M	M	M
tmaMinGain	tmaMinGain	unsigned short	M	M	-
tmaMaxGain	tmaMaxGain	unsigned short	M	M	-
tmaResolution	tmaResolution	unsigned short	M	M	-
tmaGainFigure	tmaGainFigure	unsigned short	M	M	O
tmaNumberOfSubunits	tmaNumber OfSubunits	unsigned short	M	M	-
tmaBaseStationId	tmaBaseStationId	string	CO	M	CO
tmaSectorId	tmaSectorId	string	CO	M	CO
tmaAntennaBearing	tmaAntennaBearing	unsigned short	CO	M	CO
tmaInstalledMechanicalTilt	tmaInstalledMechanicalTilt	short	CO	M	CO
tmaSubunitType	tmaSubunitType	unsigned short	CO	M	CO
tmaSubunitRxFrequencyBand	tmaSubunitRxFrequencyBand	sequence of unsigned short	CO	M	CO
tmaSubunitTxFrequencyBand	tmaSubunitTxFrequencyBand	sequence of unsigned short	CO	M	CO
tmaGainResolution	tmaGainResolution	unsigned short	CO	M	CO
relatedCellList	relatedCellList	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReferenceSet	M	M	-

Editor's note: The attributes tmaSubunitType, tmaSubunitRxFrequencyBand, tmaSubunitTxFrequencyBand, tmaGainResolution, tmaBaseStationId and tmaSectorId are to be checked if they should be moved to inventory.

## A.2.2.4 IOC CommonBSFunction

## Mapping from NRM IOC CommonBSFunction attributes and associations to SS equivalent MOC CommonBSFunction attributes

Attribute of IOC SectorEquipmentFunction in 3GPP TS 32.792 [4]	SS Attribute	SS Type	Support Qualifier	Read Qualifier	Write Qualifier
id	id	string	M	M	-
sharedTechnologies	sharedTechnologies	short	M	M	O

## A.2.2.5 IOC GSMCellPart

## Mapping from NRM IOC GSMCellPart attributes and associations to SS equivalent MOC GSMCellPart attributes

Attribute of IOC SectorEquipmentFunction in 3GPP TS 32.792 [4]	SS Attribute	SS Type	Support Qualifier	Read Qualifier	Write Qualifier
id	id	string	M	M	-
aRFCN	aRFCN	string	M	M	M
tsc	tsc	long	M	M	M
aTA	aTA	short	M	M	M
relatedSectorEquipment	relatedSectorEquipment	GenericNetworkResourcesIRPSystem::AttributeTypes::MOReference	M	M	-

## A.3 Solution Set definitions

### A.3.1 IDL definition structure

Clause A.3.2 defines the MO classes for the Generic RAN NRM IRP.

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

```
//File:GenericRanNRMDefs.idl
#ifndef _GENERICRANNRMDEFS_IDL_
#define _GENERICRANNRMDEFS_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 GenericRanNRMDefs
{
    /**
    * Definitions for MO class AntennaFunction
    */
    interface AntennaFunction: GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS= "AntennaFunction";
        // Attribute Names
        //
        const string id = "id";
        const string retTiltValue = "retTiltValue";
        const string bearing = "bearing";
        const string retGroupName = "retGroupName";
        const string height = "height";
        const string maxAzimuthValue = "maxAzimuthValue";
        const string minAzimuthValue = "minAzimuthValue";
        const string horizBeamwidth = "horizBeamwidth";
        const string vertBeamwidth = "vertBeamwidth";
        const string relatedCellList= "relatedCellList";
    };

    /**
    * Definitions for MO class TmaFunction
    */
    interface TmaFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
    {
        const string CLASS = "TmaFunction";
        // Attribute Names
        //
        const string id = "id";
        const string tmaSubunitNumber = "tmaSubunitNumber";
        const string tmaStateFlag = "tmaStateFlag";
        const string tmaFunctionFlag = "tmaFunctionFlag";
        const string tmaMinGain = "tmaMinGain";
        const string tmaMaxGain = "tmaMaxGain";
        const string tmaResolution = "tmaResolution";
        const string tmaGainFigure = "tmaGainFigure";
        const string tmaNumberOfSubunits = "tmaNumberOfSubunits";
        const string tmaBaseStationId = "tmaBaseStationId";
        const string tmaSectorId = "tmaSectorId";
        const string tmaAntennaBearing = "tmaAntennaBearing";
        const string tmaInstalledMechanicalTilt = "tmaInstalledMechanicalTilt";
        const string tmaSubunitType = "tmaSubunitType";
        const string tmaSubunitRxFrequencyBand = "tmaSubunitRxFrequencyBand";
        const string tmaSubunitTxFrequencyBand = "tmaSubunitTxFrequencyBand";
        const string tmaGainResolution = "tmaGainResolution";
        const string relatedCellList= "relatedCellList";
    };

    /**
    * Definitions for MO class SectorEquipmentFunction

```

```
*/
interface SectorEquipmentFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "SectorEquipmentFunction";
    // Attribute Names
    //
    const string id = "id";
    const string fqBand = "fqBand";
    const string eUTRANFqBands = "eUTRANFqBands";
    const string uTRANFDDFqBands = "uTRANFDDFqBands";
    const string uTRANTDDFqBands = "uTRANTDDFqBands";
    const string confOutputPower = "confOutputPower";
    const string relatedTmaList = "relatedTmaList";
    const string relatedAntennaList = "relatedAntennaList";
    const string relatedCellList = "relatedCellList";
};

/*
 * Definitions for MO class CommonBSFunction
 */
interface CommonBSFunction : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "CommonBSFunction";
    // Attribute Names
    //
    const string id = "id";
    const string sharedTechnologies = "sharedTechnologies";
};

/*
 * Definitions for MO class GSMCellPart
 */
interface GSMCellPart : GenericNetworkResourcesNRMDefs::ManagedFunction
{
    const string CLASS = "GSMCellPart";
    // Attribute Names
    //
    const string id = "id";
    const string aRFCN = "aRFCN";
    const string tsc = "tsc";
    const string aTA = "aTA";
    const string relatedSectorEquipment = "relatedSectorEquipment";
};

};

module GenericRanNRMAAttributeTypes
{
    typedef sequence<string> eUTRANFqBandsListType;
    typedef sequence<string> uTRANFDDFqBandsListType;
    typedef sequence<string> uTRANTDDFqBandsListType;
};
#endif // _GENERICRANNRMDEFS_IDL_
```

---

## Annex B (normative): XML Definitions

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

---

### B.1 Architectural features

The overall architectural feature of Generic RAN Network Resources IRP is specified in 3GPP TS 32.792 [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

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 `genericRanNrm.xsd` for the Generic RAN Network Resources IRP NRM defined in 3GPP TS 32.792 [4].

XML schema `genericRanNrm.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

Not present in the current version of this specification.



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

```

❑ <?xml version="1.0" encoding="UTF-8"?>
❑ <!--
❑ 3GPP TS 32.796 Generic RAN Network Resources IRP
❑ Bulk CM Configuration data file NRM-specific XML schema
genericRanNrm.xsd
-->
<schema xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:xn="http://www.3gpp.org/ftp/specs/archive/32_series/32.626#genericNrm"
xmlns:gn="http://www.3gpp.org/ftp/specs/archive/32_series/32.656#geranNrm"
xmlns:gr="http://www.3gpp.org/ftp/specs/archive/32_series/32.796#genericRanNrm"
targetNamespace="http://www.3gpp.org/ftp/specs/archive/32_series/32.796#genericRanNrm"
elementFormDefault="qualified">

  <import namespace="http://www.3gpp.org/ftp/specs/archive/32_series/32.626#genericNrm"/>
  <import namespace="http://www.3gpp.org/ftp/specs/archive/32_series/32.656#geranNrm"/>

  <!-- Generic RAN Network Resources IRP NRM attribute related XML types -->

  <simpleType name="angleValue">
    <restriction base="short">
      <minInclusive value="0"/>
      <maxInclusive value="3600"/>
    </restriction>
  </simpleType>

  <simpleType name="retGroupName">
    <restriction base="string">
      <maxLength value="80"/>
    </restriction>
  </simpleType>

  <simpleType name="bearing">
    <restriction base="short">
      <minInclusive value="0"/>
      <maxInclusive value="360"/>
    </restriction>
  </simpleType>

  <simpleType name="tmaFunctionFlag">
    <restriction base="unsignedShort">
      <minInclusive value="0"/>
      <maxInclusive value="1"/>
    </restriction>
  </simpleType>

  <simpleType name="tmaStateFlag">
    <restriction base="unsignedShort">
      <minInclusive value="0"/>
      <maxInclusive value="1"/>
    </restriction>
  </simpleType>

  <simpleType name="fourOctets">
    <restriction base="hexBinary">
      <length value="4"/>
    </restriction>
  </simpleType>

  <complexType name="FqBandsList">
    <sequence>
      <element name="fqBand" type="string" minOccurs="0" maxOccurs="unbounded"/>
    </sequence>
  </complexType>

  <!-- Generic RAN Network Resources IRP NRM class associated XML elements -->

  <element name="SectorEquipmentFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">

```

```

        <complexType>
          <all>
            <element name="userLabel" type="string"/>
            <element name="fqBand" type="short" minOccurs="0" />
            <element name="eUTRANFqBands" type="gr:FqBandsList" />
            <element name="uTRANFDDFqBands" type="gr:FqBandsList" />
            <element name="uTRANTDDFqBands" type="gr:FqBandsList" />
            <element name="confOutputPower" type="short" />
            <element name="relatedTmaList" type="xn:dnList" />
            <element name="relatedAntennaList" type="xn:dnList" />
            <element name="relatedCellList" type="xn:dnList" />
          </all>
        </complexType>
      </element>
      <choice minOccurs="0" maxOccurs="unbounded">
        <element ref="gr:SectorEquipmentFunctionOptionallyContainedNrmClass"/>
        <element ref="xn:VsDataContainer"/>
      </choice>
    </sequence>
  </extension>
</complexContent>
</complexType>
</element>

  <element name="AntennaFunction"
    substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="retTiltValue" type="gr:angleValue"
minOccurs="0"/>
                  <element name="bearing" type="gr:bearing" minOccurs="0"/>
                  <element name="retGroupName" type="gr:retGroupName"
minOccurs="0"/>
                  <element name="height" type="short" minOccurs="0"/>
                  <element name="maxAzimuthValue" type="gr:angleValue"
minOccurs="0"/>
                  <element name="minAzimuthValue" type="gr:angleValue"
minOccurs="0"/>
                  <element name="horizBeamwidth" type="gr:angleValue"
minOccurs="0"/>
                  <element name="vertBeamwidth" type="gr:angleValue"
minOccurs="0"/>
                  <element name="relatedCellList" type="xn:dnList" />
                </all>
              </complexType>
            </element>
            <choice minOccurs="0" maxOccurs="unbounded">
              <element ref="gr:AntennaFunctionOptionallyContainedNrmClass"/>
              <element ref="xn:VsDataContainer"/>
            </choice>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>
  <element name="TmaFunction" substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
    <complexType>
      <complexContent>
        <extension base="xn:NrmClass">
          <sequence>
            <element name="attributes" minOccurs="0">
              <complexType>
                <all>
                  <element name="userLabel" type="string"/>
                  <element name="tmaSubunitNumber" type="unsignedShort" />
                  <element name="tmaStateFlag" type="gr:tmaStateFlag" />
                  <element name="tmaFunctionFlag" type="gr:tmaFunctionFlag" />
                  <element name="tmaMinGain" type="unsignedShort" />
                  <element name="tmaMaxGain" type="unsignedShort" />
                </all>
              </complexType>
            </element>
          </sequence>
        </extension>
      </complexContent>
    </complexType>
  </element>

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        <element name="tmaResolution" type="unsignedShort" />
        <element name="tmaGainFigure" type="unsignedShort" />
        <element name="tmaNumberOfSubunits" type="unsignedShort" />
        <element name="tmaBaseStationId" type="string" minOccurs="0"/>
        <element name="tmaSectorId" type="string" minOccurs="0"/>
        <element name="tmaAntennaBearing" type="unsignedShort"
minOccurs="0"/>
        <element name="tmaInstalledMechanicalTilt" type="short"
minOccurs="0"/>
        <element name="tmaSubunitType" type="unsignedShort"
minOccurs="0"/>
        <element name="tmaSubunitRxFrequencyBand" type="gr:fourOctets"
minOccurs="0"/>
        <element name="tmaSubunitTxFrequencyBand" type="gr:fourOctets"
minOccurs="0"/>
        <element name="tmaGainResolution" type="unsignedShort"
minOccurs="0"/>
        <element name="relatedCellList" type="xn:dnList"/>
    </all>
</complexType>
</element>
<choice minOccurs="0" maxOccurs="unbounded">
    <element ref="gr:TmaFunctionOptionallyContainedNrmClass"/>
    <element ref="xn:VsDataContainer"/>
</choice>
</sequence>
</extension>
</complexContent>
</complexType>
</element>
<element name="GSMCellPart" substitutionGroup="gn:GsmCellOptionallyContainedNrmClass">
    <complexType>
        <complexContent>
            <extension base="xn:NrmClass">
                <sequence>
                    <element name="attributes" minOccurs="0">
                        <complexType>
                            <all>
                                <element name="userLabel" type="string"/>
                                <element name="aRFCN" type="string"/>
                                <element name="tsc" type="long"/>
                                <element name="aTA" type="short"/>
                                <element name="relatedSectorEquipment" type="xn:dn"/>
                            </all>
                        </complexType>
                    </element>
                    <choice minOccurs="0" maxOccurs="unbounded">
                        <element ref="gr:GSMCellPartOptionallyContainedNrmClass"/>
                        <element ref="xn:VsDataContainer"/>
                    </choice>
                </sequence>
            </extension>
        </complexContent>
    </complexType>
</element>
<element name="CommonBSFunction"
substitutionGroup="xn:ManagedElementOptionallyContainedNrmClass">
    <complexType>
        <complexContent>
            <extension base="xn:NrmClass">
                <sequence>
                    <element name="attributes" minOccurs="0">
                        <complexType>
                            <all>
                                <element name="userLabel" type="string"/>
                                <element name="sharedTechnologies" type="short"/>
                            </all>
                        </complexType>
                    </element>
                    <choice minOccurs="0" maxOccurs="unbounded">
                        <element ref="gr:CommonBSFunctionOptionallyContainedNrmClass"/>
                        <element ref="xn:VsDataContainer"/>
                    </choice>
                </sequence>
            </extension>
        </complexContent>
    </complexType>

```

```
        </complexType>
    </element>

    <element name="SectorEquipmentFunctionOptionallyContainedNrmClass" type="xn:NrmClass"
abstract="true"/>
    <element name="AntennaFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
    <element name="TmaFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
    <element name="GSMCellPartOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
    <element name="CommonBSFunctionOptionallyContainedNrmClass" type="xn:NrmClass" abstract="true"/>
</schema>
```

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## Annex C (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2011-03	SP-51	SP-110119	--	--	Presentation to SA for Information	---	1.0.0
2011-05	SP-52	SP-110274	--	--	Presentation to SA for Approval	1.0.0	2.0.0
2011-06	--	--	--	--	Publication	2.0.0	10.0.0
2012-09	SP-57	SP-120563	001	2	Add/Correct support for multi frequency HW	10.0.0	10.1.0
2012-09	SA-57	-	-	-	Automatic upgrade from previous Release version 10.1.0	10.1.0	11.0.0