ETSI TS 128 656 V11.1.0 (2014-07)

TECHNICAL SPECIFICATION

Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
GSM/EDGE Radio Access Network (GERAN)
Network Resource Model (NRM)
Integration Reference Point (IRP);
Solution Set (SS) definitions
(3GPP TS 28.656 version 11.1.0 Release 11)

Reference
RTS/TSGS-0528656vb10

Keywords
LTE,UMTS

ETSI

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3GPP TS 28.656 version 11.1.0 Release 11 **2** **ETSI TS 128 656 V11.1.0 (2014-07)**

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Contents

Foreword

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

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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.

This Solution Set specification is related to 3GPP TS 28.655 V11.1.X.

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 of [6].

XML document: See definition of [6].

XML declaration: See definition of [6].

XML element: See definition of [6].

empty XML See definition of [6].

XML content (of an XML element): See definition of [6].

XML start-tag: See definition of [6].

XML end-tag: See definition of [6].

XML empty-element tag: See definition of [6].

XML attribute specification: See definition of [6].

DTD: See definition of [6].

XML schema: See definition of [6].

XML namespace: See definition of [6].

XML complex type: See definition of [6].

XML element type: See definition of [6].

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

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

See clause A.1.1 of [5].

A.1.2 Rules for NRM extensions

See clause A.1.2 of [5].

A.2 Mapping

A.2.1 General mapping

See clause A.2.1 of [5].

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
hoppingSequenceNumber	hoppingSequenceNumber	Long
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

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

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
<?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
  targetNamespace=
"http://www.3gpp.org/ftp/specs/archive/28_series/28.656#geranNrm"
  elementFormDefault="qualified"
  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/32_series/28.629#sonPolicyNrm"
>

<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/32_series/28.629#sonPolicyNrm"/>
  />

  <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"/>
               </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="latitude" minOccurs="0"/>
                 <element name="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="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="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"/>
                 </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		

History

Document history		
V11.0.0	April 2013	Publication
V11.1.0	July 2014	Publication