



**Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
Generic Radio Access Network (RAN)
Network Resource Model (NRM)
Integration Reference Point (IRP);
Information Service (IS)
(3GPP TS 28.662 version 15.0.0 Release 15)**



Reference

RTS/TSGS-0528662vf00

Keywords

LTE,UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status.

Information on the current status of this and other ETSI documents is available at

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© ETSI 2018.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

3GPP™ and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

oneM2M logo is protected for the benefit of its Members.

GSM® and the GSM logo are trademarks registered and owned by the GSM Association.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

Foreword

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

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	5
Introduction	5
1 Scope	6
2 References	6
3 Definitions and abbreviations.....	7
3.1 Definitions	7
3.2 Abbreviations	7
4 Model	8
4.1 Imported information entities and local labels	8
4.2 Class diagrams.....	8
4.2.1 Relationships.....	8
4.2.2 Inheritance	9
4.3 Class definitions	10
4.3.1 SectorEquipmentFunction	10
4.3.1.1 Definition	10
4.3.1.2 Attributes.....	10
4.3.1.3 Attribute constraints	10
4.3.1.4 Notifications.....	10
4.3.2 AntennaFunction	11
4.3.2.1 Definition	11
4.3.2.2 Attributes.....	11
4.3.2.3 Attribute constraints	11
4.3.2.4 Notifications.....	11
4.3.3 TMAFunction.....	11
4.3.3.1 Definition	11
4.3.3.2 Attributes.....	12
4.3.3.3 Attribute Constraints	12
4.3.3.4 Notifications.....	12
4.3.4 GSMCellPart.....	12
4.3.4.1 Definition	12
4.3.4.2 Attributes.....	13
4.3.4.3 Attribute constraints	13
4.3.4.4 Notifications.....	13
4.3.5 CommonBsFunction	13
4.3.5.1 Definition	13
4.3.5.2 Attributes.....	13
4.3.5.3 Attribute constraints	13
4.3.5.4 Notifications.....	13
4.3.6 CellReferences	13
4.3.6.1 Definition	13
4.3.6.2 Attributes.....	14
4.3.6.3 Attribute constraints	14
4.3.6.4 Notifications.....	14
4.3.7 RepeaterFunction	14
4.3.7.1 Definition	14
4.3.7.2 Attributes.....	14
4.3.7.3 Attribute constraints	14
4.3.7.4 Notifications.....	14
4.4 Attribute definitions	15
4.4.1 Attribute properties	15

4.4.2 Constraints22

4.5 Common Notifications23

4.5.1 Alarm notifications23

4.5.2 Configuration notifications23

Annex A (informative): Change history24

History25

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:

28.661: Generic Radio Access Network (RAN) Network Resource Model (NRM); Integration Reference Point (IRP); Requirements;

28.662: Generic Radio Access Network (RAN) Network Resource Model (NRM); Integration Reference Point (IRP); Information Service (IS);

28.663: Generic Radio Access Network (RAN) Network Resource Model (NRM); Integration Reference Point (IRP); Solution Set (SS) definitions.

1 Scope

The present document specifies the Generic Radio Access Network (RAN) network resource model (NRM) that can be communicated between an IRP Agent and an IRP Manager for telecommunication network management purposes, including management of converged networks.

This document specifies the semantics and behaviour of information object class attributes and relations visible across the reference point in a protocol and technology neutral way. It does not define their syntax and encoding.

This document specifies equipment that may be shared between BSS in GSM, UTRAN and E-UTRAN.

In order to access the information defined by this NRM, an Interface IRP such as the "Basic CM IRP" is needed (3GPP TS 32.602 [5]). However, which Interface IRP is applicable is outside the scope of the present document.

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 TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".
- [3] 3GPP TS 32.102: "Telecommunication management; Architecture".
- [4] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".
- [5] 3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP) ; Information Service (IS)".
- [6] Void.
- [7] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception".
- [8] Void.
- [9] 3GPP TS 25.466: "UTRAN Iuant interface: Application Part".
- [10] 3GPP TS 28.661: "Telecommunication management; Generic Radio Access Network (RAN) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements".
- [11] 3GPP TS 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP); Information Service (IS)".
- [12] 3GPP TS 28.652: "Telecommunication management; Universal Terrestrial Radio Access Network (UTRAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS) ".
- [13] 3GPP TS 28.658: "Telecommunication management; Evolved Universal Terrestrial Radio Access Network (E-UTRAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

- [14] 3GPP TS 28.655: "Telecommunication management; GSM/EDGE Radio Access Network (GERAN) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".
- [15] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".
- [16] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Information Service (IS)".
- [17] 3GPP TS 32.662: "Telecommunication management; Configuration Management (CM); Kernel CM Information Service (IS)".
- [18] 3GPP TS 25.106: "Technical Specification Group Radio Access Network; UTRA repeater radio transmission and reception".
- [19] 3GPP TS 45.005: "Radio transmission and reception".
- [20] 3GPP TS 45.010: "Radio subsystem synchronization".
- [21] 3GPP TS 25.104: "Base Station (BS) radio transmission and reception (FDD)".
- [22] 3GPP TS 25.105: "Base Station (BS) radio transmission and reception (TDD)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions given in TR 21.905 [1], TS 32.150 [4], TS 32.101 [2], TS 32.102 [3] and the following apply. The definitions defined in the present document take precedence over those, if any, in TS 32.150 [4], TS 32.101 [2], TS 32.102 [3] and TR 21.905 [1], in that order.

No definition.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] 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
BSS	Base Station Subsystem
CM	Configuration Management
DN	Distinguished Name
E-UTRAN	Evolved UTRAN
GSM	Global System for Mobile communications
HW	Hardware
IRP	Integration Reference Point
IOC	Information Object Class
IS	Information Service
NE	Network Element
NRM	Network Resource Model
RAN	Radio Access Network
RDN	Relative Distinguished Name
RF	Radio Frequency
SS	Solution Set
TMA	Tower Mounted Amplifier
UTRA	Universal Terrestrial Radio Access
UTRAN	Universal Terrestrial Radio Access Network

4 Model

4.1 Imported information entities and local labels

Label reference	Local label
3GPP TS 28.622 [15], IOC, ManagedFunction	ManagedFunction
3GPP TS 28.652 [12], IOC, UtranGenericCell	UtranGenericCell
3GPP TS 28.658 [13], IOC, EUTranGenericCell	EUTranGenericCell
3GPP TS 28.655 [14], IOC, GSMCell	GSMCell

4.2 Class diagrams

4.2.1 Relationships

This subclause depicts the set of classes (e.g. IOCs) that encapsulates the information relevant for this IRP. This subclause provides the overview of the relationships of relevant classes in UML. Subsequent subclauses provide more detailed specification of various aspects of these classes.

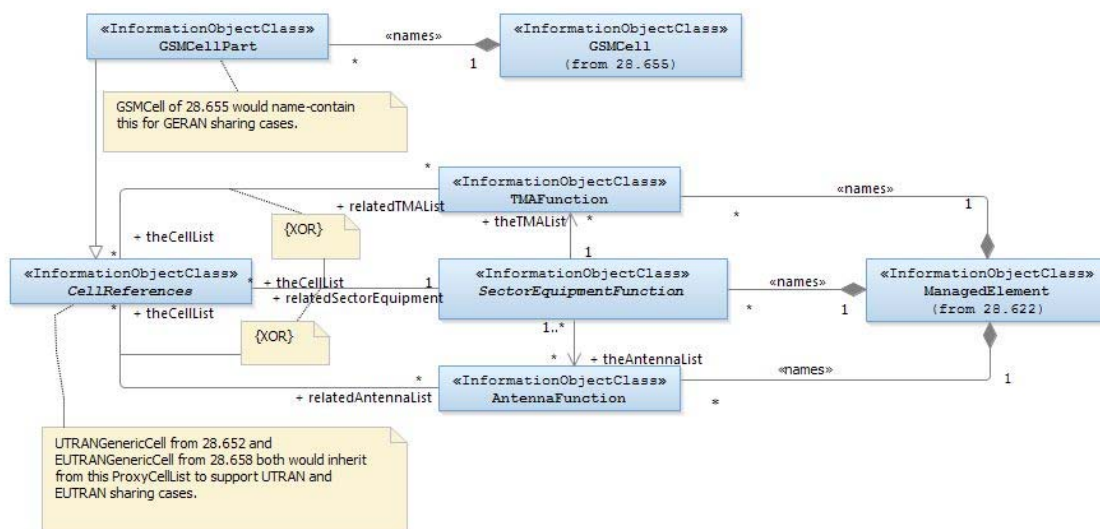


Figure 4.2.1.1: UTRAN/E-UTRAN/GERAN sharing (1/2)

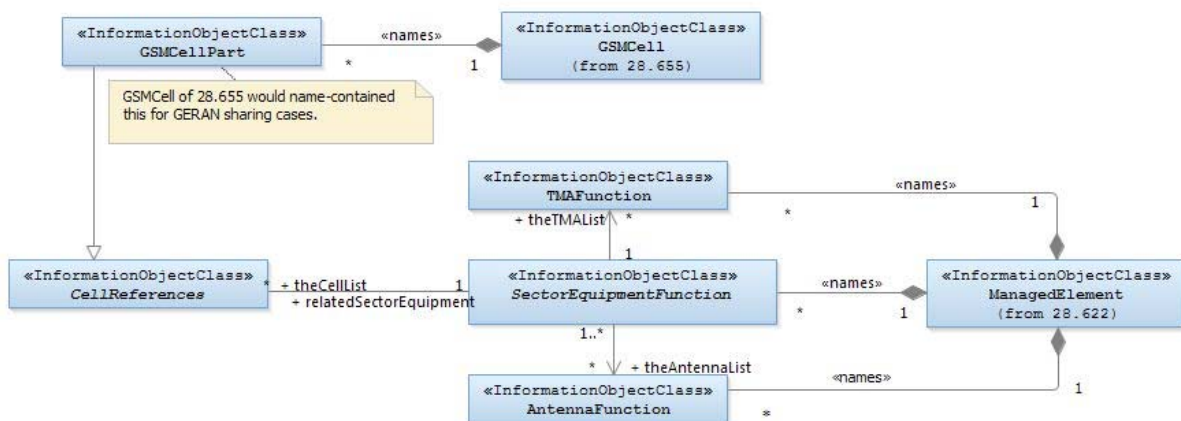


Figure 4.2.1.2: UTRAN/E-UTRAN/GERAN sharing (2/2)

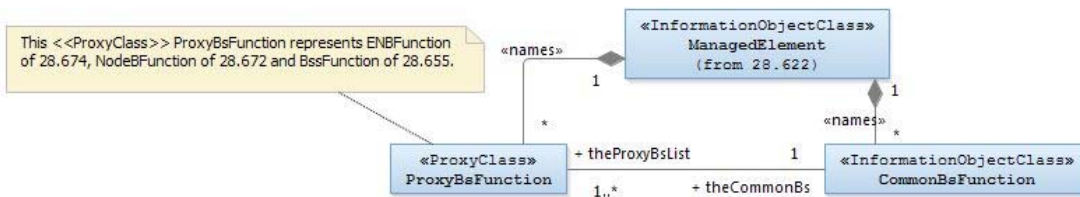


Figure 4.2.1.3: CommonBsFunction



Figure 4.2.1.4: Repeater object Containment/Naming and Association diagram

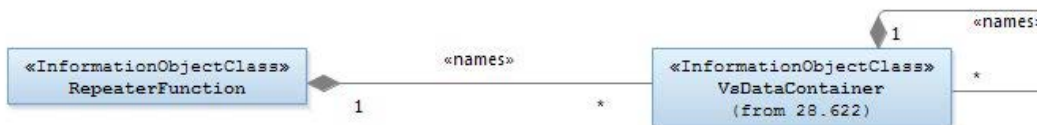


Figure 4.2.1.5: Repeater related VsDataContainer Containment/Naming and Association diagram

4.2.2 Inheritance

This subclause depicts the inheritance relationships.

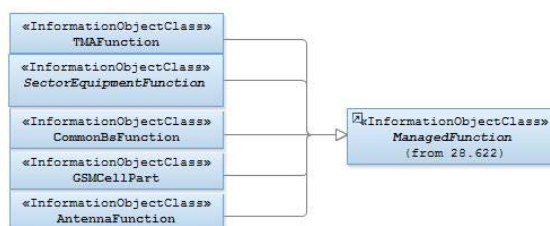


Figure 4.2.2.1: Inheritance diagram (1/2)



Figure 4.2.2.2: Inheritance diagram (2/2)

4.3 Class definitions

4.3.1 SectorEquipmentFunction

4.3.1.1 Definition

This IOC represents a set of cells within a geographical area that has common functions relating to `AntennaFunction`, `TMAFunction` and supporting equipment, such as power amplifier.

This IOC is required as part of the capability to satisfy the Requirements statement identified below.

Referenced TS	Requirement label	Comment
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-001	
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-002	

4.3.1.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifiable
<code>fqBand</code>	CM	M	-	-	M
<code>eUTRANFqBands</code>	CM	M	M	-	M
<code>uTRANFDDFqBands</code>	CM	M	M	-	M
<code>uTRANTDDFqBands</code>	CM	M	M	-	M
<code>confOutputPower</code>	M	M	M	-	-
Attribute related to role					
<code>theTMAList</code>	CM	M	-	-	M
<code>theAntennaList</code>	CM	M	-	-	M
<code>theCellList</code>	CM	M	-	-	M

4.3.1.3 Attribute constraints

Name	Definition
<code>fqBand</code> CM Support Qualifier	<code>fqBand</code> CM Support Qualifier
<code>eUTRANFqBands</code> CM Support Qualifier	<code>eUTRANFqBands</code> CM Support Qualifier
<code>uTRANFDDFqBands</code> CM Support Qualifier	<code>uTRANFDDFqBands</code> CM Support Qualifier
<code>uTRANTDDFqBands</code> CM Support Qualifier	<code>uTRANTDDFqBands</code> CM Support Qualifier
<code>theTMAList</code> CM Support Qualifier	Condition: Association between <code>SectorEquipmentFunction</code> and <code>AntennaFunction</code> is absent AND is supporting the UTRAN/E-UTRAN sharing/non-sharing case OR is supporting the GERAN sharing case. In such case, at least one <code>TMAFunction</code> is present.
<code>theAntennaList</code> CM Support Qualifier	Condition: Association between <code>SectorEquipmentFunction</code> and <code>TMAFunction</code> is absent AND is supporting the UTRAN/E-UTRAN sharing/non-sharing OR is supporting GERAN sharing case. In such case, at least one <code>AntennaFunction</code> is present.
<code>theCellList</code> CM Support Qualifier	Condition: Association between <code>SectorEquipmentFunction</code> and <code>ProxyCellList</code> is present AND is supporting UTRAN/E-UTRAN sharing (and non-sharing) cases. In such case, at least one instance represented by the associated <code>ProxyCell</code> is present. Condition: Association between <code>SectorEquipmentFunction</code> and <code>ProxyCellList</code> is present AND is supporting the GERAN sharing case. In such case, at least one <code>GSMCellPart</code> is present.

4.3.1.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.2 AntennaFunction

4.3.2.1 Definition

This IOC represents an array of radiating elements that may be tilted to adjust the RF coverage of a cell(s).

This IOC is required as part of the capability to satisfy the Requirements statement identified below.

Referenced TS	Requirement label	Comment
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-001	
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-002	

4.3.2.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	IsNotifiable
retTiltValue	O	M	M	-	M
bearing	O	M	M	-	M
retGroupName	O	M	M	-	M
height	O	M	M	-	M
maxAzimuthValue	O	M	M	-	M
minAzimuthValue	O	M	M	-	M
horizBeamwidth	O	M	M	-	M
vertBeamwidth	O	M	M	-	M
Attribute related to role					
theCellList	CM	M	-	-	M

4.3.2.3 Attribute constraints

Name	Definition
theCellList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and ProxyCell is absent.

4.3.2.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.3 TMAFunction

4.3.3.1 Definition

This IOC represents a Tower Mounted Amplifier or a number of TMA subunits within one TMA, each separately addressable by a specific index at the application layer.

This IOC is required as part of the capability to satisfy the Requirements statement identified below.

Referenced TS	Requirement label	Comment
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-001	
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-002	

4.3.3.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
tmaSubunitNumber	M	M	M	-	M
tmaStateFlag	M	M	O	-	M
tmaFunctionFlag	M	M	M	-	M
tmaMinGain	M	M	-	-	M
tmaMaxGain	M	M	-	-	M
tmaResolution	M	M	-	-	M
tmaGainFigure	M	M	O	-	M
tmaNumberOfSubunits	M	M	-	-	M
tmaBaseStationId	CO	M	CO	-	M
tmaSectorId	CO	M	CO	-	M
tmaAntennaBearing	CO	M	CO	-	M
tmaInstalledMechanicalTilt	CO	M	CO	-	M
tmaSubunitType	CO	M	CO	-	M
tmaSubunitRxFrequencyBand	CO	M	CO	-	M
tmaSubunitTxFrequencyBand	CO	M	CO	-	M
tmaGainResolution	CO	M	CO	-	M
Attribute related to role					
theCellList	CM	M	-	-	M

4.3.3.3 Attribute Constraints

Name	Definition
theCellList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and ProxyCellList is absent.

Name	Definition
The CO support qualifier of the attributes tmaBaseStationId through tmaGainResolution	Condition: The TMA subunit supports the read operation in 3GPP TS 25.466 [9]
The CO write qualifier of the attributes tmaBaseStationId through tmaGainResolution	Condition: The TMA subunit supports the write operation in 3GPP TS 25.466 [9]

4.3.3.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.4 GSMCellPart

4.3.4.1 Definition

A GSM cell can consist of a number of carriers. These carriers can be configured in a number of ways, for example, the carriers can have different propagation properties which are sent with different antenna tilt, with different RF power, different radio band and even possibly different antenna.

The various GSMCellPart instances capture different radio propagation properties allowing different frequency planning schemes, e.g. some GSMCellPart instances can use frequency groups planned for tighter frequency reuse.

Hence, a GSM cell can, and in some cases must, be distributed on more than one SectorEquipmentFunction.

This IOC is required as part of the capability to satisfy the Requirements statement identified below.

Referenced TS	Requirement label	Comment
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-001	
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-002	

4.3.4.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	IsNotifyable
aRFCN	M	M	M	-	M
tsc	M	M	M	-	M
aTA	M	M	M	-	M
theSectorEquipment	M	M	-	-	M

4.3.4.3 Attribute constraints

None

4.3.4.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.3.5 CommonBsFunction

4.3.5.1 Definition

This IOC represents common aspects of Base Station (BS) functionality shared by several radio access technologies.

Referenced TS	Requirement label	Comment
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-001	
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-002	

4.3.5.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifyable
sharedTechnologies	M	M	O	-	M
Attribute related to role					
theProxyBsList	M	M	-	-	M

4.3.5.3 Attribute constraints

None

4.3.5.4 Notifications

There is no notification defined.

4.3.6 CellReferences

4.3.6.1 Definition

This IOC represents the three references to TMAFunction, SectorEquipmentFunction and AntennaFunction. The references are used by various classes of cells, e.g. *UTRANGenericCell*.

This is an abstract class.

4.3.6.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifiable
Attribute related to role					
relatedSectorEquipment	CM	M	-	-	M
relatedTMAList	CM	M	-	-	M
relatedAntennaList	CM	M	-	-	M

4.3.6.3 Attribute constraints

Name	Definition
relatedSectorEquipment CM Support Qualifier	Condition: Association between SectorEquipmentFunction and ProxyCellList is present AND is supporting the GERAN sharing case. In such case, there shall be at least one GSMCellPart present at one end of this association.
relatedAntennaList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and ProxyCellList is absent.
relatedTMAList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and ProxyCellList is absent.

4.3.6.4 Notifications

There is no notification defined.

4.3.7 RepeaterFunction

4.3.7.1 Definition

This IOC represents the management aspect of a repeater. For the information on repeater see 3GPP TS 25.106 [18].

This IOC is required as part of the capability to satisfy the Requirements statement identified below.

Referenced TS	Requirement label	Comment
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-003	

4.3.7.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifiable
priority	M	M	M	-	M
latitude	M	M	-	-	-
longitude	M	M	-	-	-
ctrlConnMode	M	M	M	-	M
environmentInfo	M	M	-	-	-
powerSwitch	M	M	M	-	M
ulAttenuation	M	M	M	-	M
dlAttenuation	M	M	M	-	M
firmwareVer	M	M	-	-	-
repeaterType	M	M	-	-	-
Attribute related to role					
externalUTRANCell	M	M	-	-	M

4.3.7.3 Attribute constraints

None.

4.3.7.4 Notifications

The common notifications defined in subclause 4.5 are valid for this IOC, without exceptions or additions.

4.4 Attribute definitions

4.4.1 Attribute properties

Attribute Name	Documentation and Allowed Values	Properties
aRFCN	This attribute (Absolute Radio Frequency Channel Number) defines a pair of Radio Frequency (RF) channel frequencies for uplink and downlink use. See 3GPP TS 45.005 [18] clause 2 for the ARFCN for GSM. ARFCN are based on a 200 kHz channel raster. allowedValues: See 3GPP TS 45.005 [18] clause 2	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
aTA	This attribute (allowed Timing Advance) defines the signal sent by the BTS to the MS which the MS uses to advance its timings of transmissions to the BTS so as to compensate for propagation delay. allowedValues: See 3GPP TS 45.010 [19]	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
bearing	The bearing in degrees that the antenna is pointing in. Antenna bearing" in Ref. 3GPP TS 25.463 [8]. allowedValues: See "Antenna bearing" in TS 25.463 [8].	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
confOutputPower	It defines the allowed total power to use for all cells together in this sector. It may be set by the operator and/or limited by HW limitation or licensed power, e.g.: 20, 40, 60, 80,120 watts allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
ctrlConnMode	Remote communication mode used by a repeater to send and receive control message, such as GSM SMS, WCDMA SMS, Circle Switch Data-CSD, Package Switch Dat-IP, Serial port. allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
dlAttenuation	Downlink signal attenuation of the device to change downlink gain. allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
environmentInfo	The repeater device is located either in the building or out of the building. allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
eUTRANFqBands	This is the list of LTE frequency bands supported by the hardware associated with the SectorEquipmentFunction. The earfcnDl and earfcnUl or earfcn of LTE cells associated with the SectorEquipmentFunction must be assigned with value within one of the specified eUTRANFqBands values. allowedValues: A list of frequency bands expressed as strings. Valid frequency band values are specified in sub-clause 5.7.3 in 36.104 [7]. For HW not supporting LTE frequency bands, the list shall be empty.	type: String multiplicity: 1..* isOrdered: N/A isUnique: True defaultValue: None isNullable: True

Attribute Name	Documentation and Allowed Values	Properties
firmwareVer	Version of the device firmware. allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
fqBand	This is the LTE frequency band supported by the hardware associated with the <code>SectorEquipmentFunction</code> . The <code>earfcnDl</code> and <code>earfcnUl</code> of cells associated with the <code>SectorEquipmentFunction</code> must be assigned with value within this <code>fqBand</code> value. allowedValues: See section 5 Table 5.2-1 "E-UTRA frequency band" of TS 36.104 [7].	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
height	The height of an antenna above sea level. Note: The value of this attribute has no operational impact on the network, e.g. the NE behavior is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luan interface according to Ref. 3GPP TS 25.466 [9]. An integral value representing a number of meters in 0.1 meter increments. allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
horizBeamwidth	The 3 dB power beamwidth of the antenna pattern in the horizontal plane. A value of 360 indicates an omnidirectional antenna. Note: The value of this attribute has no operational impact on the network, e.g. the NE behaviour is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luan interface according to Ref. 3GPP TS 25.466 [9]. A single integral value corresponding to an angle in degrees between 0 and 360. allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
latitude	The latitude of the antenna location based on World Geodetic System (1984 version) global reference frame (WGS 84). Positive values correspond to the northern hemisphere. allowedValues: -90.0000 to +90.0000	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
longitude	The longitude of the antenna location based on World Geodetic System (1984 version) global reference frame (WGS 84). Positive values correspond to degrees east of 0 degrees longitude. allowedValues: -180.0000 to +180.0000	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True

Attribute Name	Documentation and Allowed Values	Properties
maxAzimuthValue	<p>The maximum amount of change of azimuth the RET system can support. This is the change in degrees clockwise from <i>bearing</i>.</p> <p>Note: The value of this attribute has no operational impact on the network, e.g. the NE behaviour is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luant interface according to Ref. 3GPP TS 25.466 [9].</p> <p>A single integral value corresponding to an angle in degrees between 0 and 360 with a resolution of 0.1 degrees.</p> <p>allowedValues: N/A</p>	<p>type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True</p>
minAzimuthValue	<p>The minimum amount of change of azimuth the RET system can support. This is the change in degrees counter-clockwise from <i>bearing</i>.</p> <p>Note: The value of this attribute has no operational impact on the network, e.g. the NE behaviour is not affected by the value setting of this attribute. Note as well that this attribute is not supported over the luant interface according to Ref. 3GPP TS 25.466 [9].</p> <p>A single integral value corresponding to an angle in degrees between 0 and 360 with a resolution of 0.1 degrees.</p> <p>allowedValues: N/A</p>	<p>type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True</p>
priority	<p>The priority of a repeater decided by an operator.</p> <p>allowedValues: N/A</p>	<p>type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True</p>
powerSwitch	<p>Power switch of device which has two status: ON/OFF.</p> <p>allowedValues: ON, OFF</p>	<p>type: Boolean multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True</p>
relatedAntennaList	<p>This attribute contains the DNs of one or more <i>AntennaFunction</i>.</p> <p>allowedValues: N/A</p>	<p>type: DN multiplicity: 1..* isOrdered: N/A isUnique: T defaultValue: None isNullable: True</p>
relatedSectorEquipment	<p>This attribute contains the DN of one <i>SectorEquipmentFunction</i>.</p> <p>allowedValues: N/A</p>	<p>type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True</p>
relatedTMAList	<p>This attribute contains the DNs of one or more <i>TmaFunction</i>.</p> <p>allowedValues: N/A</p>	<p>type: DN multiplicity: 1..* isOrdered: N/A isUnique: T defaultValue: None isNullable: True</p>

Attribute Name	Documentation and Allowed Values	Properties
repeaterType	The repeater type defined by operator, such as wide band, frequency selective, indoor and fiber optic. allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
retGroupName	The group name is a textual, alpha-numeric string to define a logical grouping of antennas which may be in different cells. This attribute permits the definition of a logical grouping of the antennas. This may be defined either at installation time, or by management activity to provisioning the group name via the ltf-N. allowedValues: N/A (String size is bounded to 80 characters.)	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
retTiltValue	The electrical tilt setting of the antenna, "Tilt value" in Ref. 3GPP TS 25.466 [9]. allowedValues: See "Tilt value" in Ref. 3GPP TS 25.466 [9].	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
sharedTechnologies	This attribute defines the radio access technologies sharing the common functionalities of a Base Station (BS). allowedValues: GSM, UMTS, LTE, or any combination thereof	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaAntennaBearing	A data field defined in Table B.3 of 3GPP TS 25.466 [9]. See definition in TS 25.466 [9]. allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaBaseStationId	A data field defined in Table B.3 of 3GPP TS 25.466 [9] allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaFunctionFlag	Defined in 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaGainFigure	Defined in 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True

Attribute Name	Documentation and Allowed Values	Properties
tmaGainResolution	A data field defined in Table B.3 of 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaInstalledMechanicalTilt	A data field defined in Table B.3 of 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaMaxGain	Defined in 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaMinGain	Defined in 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaNumberOfSubunits	Defined in 3GPP TS 25.466 [9] allowedValues: --	Defined in TS 25.466 [9] type: -- multiplicity: -- isOrdered: -- isUnique: -- defaultValue: -- isNullable: --
tmaResolution	Defined in 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaSectorId	A data field defined in Table B.3 of 3GPP TS 25.466 [9] allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaStateFlag	Defined in 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaSubunitNumber	Defined in 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True

Attribute Name	Documentation and Allowed Values	Properties
tmaSubunitRxFrequencyBand	A data field defined in Table B.3 of 3GPP TS 25.466 [9] allowedValues: See TS 25.466 [9].	type: Integer multiplicity: 2 isOrdered: True isUnique: True defaultValue: None isNullable: False
tmaSubunitType	A data field defined in Table B.3 of 3GPP TS 25.466 [9] allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
tmaSubunitTxFrequencyBand	A data field defined in Table B.3 of 3GPP TS 25.466 [9] allowedValues: See TS 25.466 [9].	type: Integer multiplicity: 2 isOrdered: True isUnique: True defaultValue: None isNullable: False
tsc	This attribute has the same definition as the one used in GsmCell IOC. The presence of GSMCellPart means the tsc attribute in GsmCell IOC instance is irrelevant (not applicable). allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
ulAttenuation	Uplink signal attenuation of the device to change uplink gain. allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
uTRANFDDFqBands	This is the list of UTRAN FDD frequency bands supported by the hardware associated with the SectorEquipmentFunction. The arfcnDl and arfcnUl of UTRAN FDD cells associated with the SectorEquipmentFunction must be assigned with value within one of the specified uTRANFDDFqBands values. allowedValues: A list of frequency bands expressed as strings. Valid frequency band values are specified in sub-clause 5.2 of TS 25.104 [20].	type: String multiplicity: 1..* isOrdered: N/A isUnique: True defaultValue: None isNullable: True
uTRANTDDFqBands	This is the list of UTRAN TDD frequency bands supported by the hardware associated with the SectorEquipmentFunction. The earfcn of UTRAN TDD cells associated with the SectorEquipmentFunction must be assigned with value within one of the specified uTRANTDDFqBands values. allowedValues: A list of frequency bands expressed as strings. Valid frequency band values are specified in sub-clause 5.2 of TS 25.105 [21].	type: String multiplicity: 1..* isOrdered: N/A isUnique: True defaultValue: None isNullable: True

Attribute Name	Documentation and Allowed Values	Properties
vertBeamwidth	<p>The 3 dB power beamwidth of the antenna pattern in the vertical plane.</p> <p>The value of this attribute has no operational impact on the network, e.g. the NE behaviour is not affected by the value setting of this attribute.</p> <p>This attribute is not supported over the luan interface according to Ref. 3GPP TS 25.466 [9].</p> <p>allowedValues: A single integral value corresponding to an angle in degrees between 0 and 180.</p>	<p>type: Integer</p> <p>multiplicity: 1</p> <p>isOrdered: N/A</p> <p>isUnique: N/A</p> <p>defaultValue: None</p> <p>isNullable: True</p>
Attribute related to role		
externalUTRANCell	<p>This role (when present) represents repeaterFunction capability to identify one ExternalUtranCell. When present, it shall contain one ExternalUtranCell DN.</p> <p>allowedValues: N/A</p>	<p>type: DN</p> <p>multiplicity: 1</p> <p>isOrdered: N/A</p> <p>isUnique: N/A</p> <p>defaultValue: None</p> <p>isNullable: True</p> <p>passedById: True</p>
theAntennaList	<p>This attribute contains the DNs of one or more AntennaFunction.</p> <p>allowedValues: N/A</p>	<p>type: DN</p> <p>multiplicity: 1..*</p> <p>isOrdered: False</p> <p>isUnique: True</p> <p>defaultValue: None</p> <p>isNullable: True</p> <p>passedById: True</p>
theCellList	<p>This attribute contains the DNs of EUTranGenericCell or UtranGenericCell if association between SectorEquipmentFunction and ProxyCellList, parent of EUTranGenericCell or UtranGenericCell is used.</p> <p>This attribute contains the DNs of GSMCellPart if association between SectorEquipmentFunction and ProxyCellList, parent of GSMCellPart is used.</p> <p>allowedValues: N/A</p>	<p>type: DN</p> <p>multiplicity: 1..*</p> <p>isOrdered: False</p> <p>isUnique: True</p> <p>defaultValue: None</p> <p>isNullable: True</p> <p>passedById: True</p>
theProxyBsList	<p>A CommonBsFunction instance serves a number of ProxyBsFunction instances. This CommonBsFunction role-attribute contains a list of DNs of ENBFunction (TS 28.658 [13]), NodeBFunction (TS 28.652 [12]) and BssFunction (TS 28.655 [14]) that it serves.</p> <p>allowedValues: N/A</p>	<p>type: DN</p> <p>multiplicity: 1..*</p> <p>isOrdered: False</p> <p>isUnique: True</p> <p>defaultValue: None</p> <p>isNullable: True</p> <p>passedById: True</p>
theTMAList	<p>This attribute contains the DNs of one or more TMAFunction.</p> <p>allowedValues: N/A</p>	<p>type: DN</p> <p>multiplicity: 1..*</p> <p>isOrdered: False</p> <p>isUnique: True</p> <p>defaultValue: None</p> <p>isNullable: True</p> <p>passedById: True</p>

4.4.2 Constraints

None

4.5 Common Notifications

4.5.1 Alarm notifications

This subclause presents a list of notifications, defined in 3GPP TS 32.111-2 [11], that IRPManager can receive. The notification header attribute `objectClass/objectInstance`, defined in 3GPP TS 32.302 [16], would capture the DN of an instance of an IOC defined in this IRP specification.

Name	Qualifier	Notes
<code>notifyAckStateChanged</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyChangedAlarm</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyClearedAlarm</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyNewAlarm</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyComments</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyAlarmListRebuilt</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	
<code>notifyPotentialFaultyAlarmList</code>	See Alarm IRP (3GPP TS 32.111-2 [11])	

4.5.2 Configuration notifications

This subclause presents a list of notifications, defined in [17], that IRPManager can receive. The notification header attribute `objectClass/objectInstance`, defined in [16], would capture the DN of an instance of an IOC defined in this IRP specification.

Name	Qualifier	Notes
<code>notifyAttributeValueChange</code>	O	
<code>notifyObjectCreation</code>	O	
<code>notifyObjectDeletion</code>	O	

Annex A (informative): Change history

Change history							
Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
2013-09	SA#61	SP-130433	0001		F	Add missing Repeater Object IS definitions	11.1.0
2014-06	SA#64	SP-140359	0002		F	remove the feature support statements	11.2.0
2014-10	-	-	-			Update to Rel-12 version (MCC)	12.0.0
2016-01	-	-	-			Update to Rel-13 version (MCC)	13.0.0
2016-06	SA#72	SP-160408	0005	1	A	Correcting references and reintroducing attributes.	13.1.0
2017-03	SA#75	-	-	-	-	Promotion to Release 14 without technical change	14.0.0
2018-06	-	-	-	-	-	Update to Rel-15 version (MCC)	15.0.0

History

Document history		
V15.0.0	July 2018	Publication