



**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 16.1.0 Release 16)**



ReferenceRTS/TSGS-0528662vg10

KeywordsLTE,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 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from the
[ETSI Search & Browse Standards application](#).

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 prevailing version of an ETSI deliverable is the one made publicly available in PDF format on [ETSI deliver repository](#).

Users should be aware that the present document may be revised or have its status changed,
this information is available in the [Milestones listing](#).

If you find errors in the present document, please send your comments to
the relevant service listed under [Committee Support Staff](#).

If you find a security vulnerability in the present document, please report it through our
[Coordinated Vulnerability Disclosure \(CVD\)](#) program.

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.

No recommendation as to products and services or vendors is made or should be implied.

No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.

In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

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 2025.
All rights reserved.

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are 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 IPR online database](#).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, 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.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™**, **LTE™** and **5G™** logo are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Legal Notice

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. These shall be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between 3GPP and ETSI identities can be found at [3GPP to ETSI numbering cross-referencing](#).

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
Legal Notice	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	10
4.3.2.1 Definition	10
4.3.2.2 Attributes.....	10
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.....	11
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.....	12
4.3.4.3 Attribute constraints	12
4.3.4.4 Notifications.....	12
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.....	13
4.3.6.3 Attribute constraints	13
4.3.6.4 Notifications.....	13
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
4.3.8 ProxyCell <<ProxyClass>>	14

4.3.8.1	Definition	14
4.3.8.3	Attribute constraints	14
4.3.8.4	Notifications	14
4.3.9	ProxyBsFunction <<ProxyClass>>	14
4.3.8.1	Definition	14
4.3.8.3	Attribute constraints	14
4.3.8.4	Notifications	15
4.4	Attribute definitions	15
4.4.1	Attribute properties	15
4.4.2	Constraints	22
4.5	Common Notifications	22
4.5.1	Alarm notifications	22
4.5.2	Configuration notifications	22
Annex A (informative): Change history		23
History		24

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 used 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 in the NRM in a protocol and technology neutral way. It does not define their syntax and encoding.

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] Void.
- [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)".

[23]3GPP TS 38.104: "NR; Base Station (BS) radio transmission and reception".

[24]3GPP TS 28.541: "NR and NG-RAN Network Resource Model (NRM) stage 2 and stage 3".

[25]3GPP TS 28.652: "UTRAN Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)".

[26]3GPP TS 37.466: "Iuant Interface: Application Part".

3Definitions and abbreviations

3.1Definitions

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.

Network Resource Model (NRM): See definition in TS 28.622 [15].

3.2Abbreviations

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].

CM	Configuration Management
DN	Distinguished Name
IOC	Information Object Class
RDN	Relative Distinguished Name
SS	Solution Set

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
3GPP TS 28.541 [24], IOC, NRSectorCarrier	NRSectorCarrier
3GPP TS 28.541 [24], IOC, NRCellDU	NRCellDU
3GPP TS 28.658 [13], IOC, ENBFunction	ENBFunction
3GPP TS 28.652 [25], IOC, NodeBFunction	NodeBFunction
3GPP TS 28.655 [14], IOC, BssFunction	BssFunction

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.

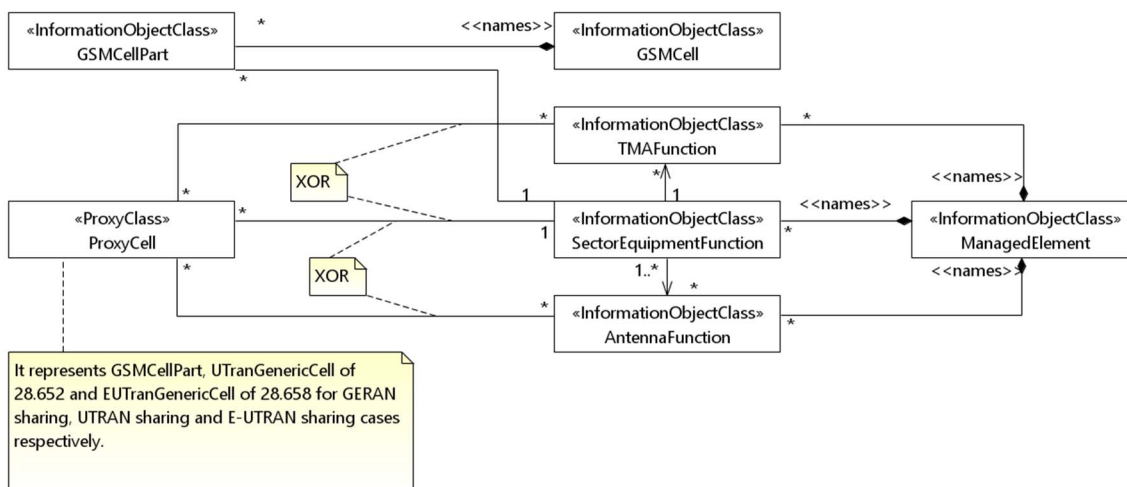


Figure 4.2.1.1: UTRAN/E-UTRAN/NR/GERAN sharing (1/2)

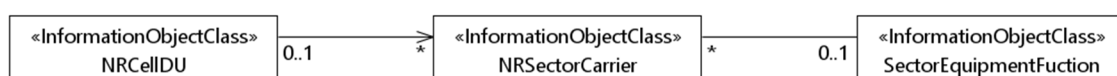


Figure 4.2.1.2: UTRAN/E-UTRAN/NR/GERAN sharing (2/2)

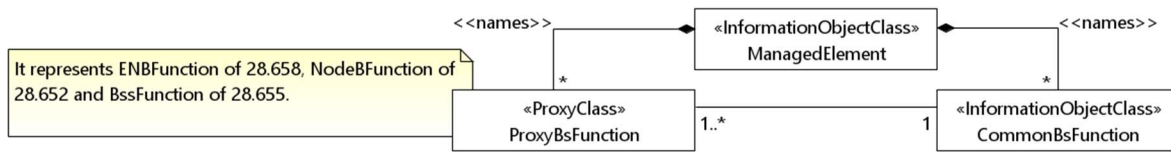


Figure 4.2.1.3: CommonBsFunction NRM fragment

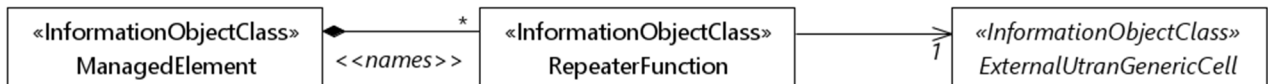


Figure 4.2.1.4: RepeaterFunction NRM fragment



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

4.2.2 Inheritance

This subclause depicts the inheritance relationships.

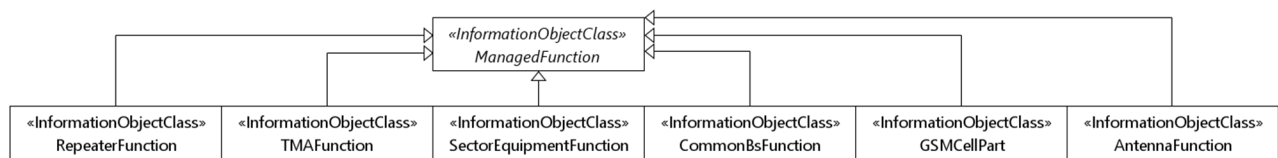


Figure 4.2.2.1: Inheritance diagram (1/2)

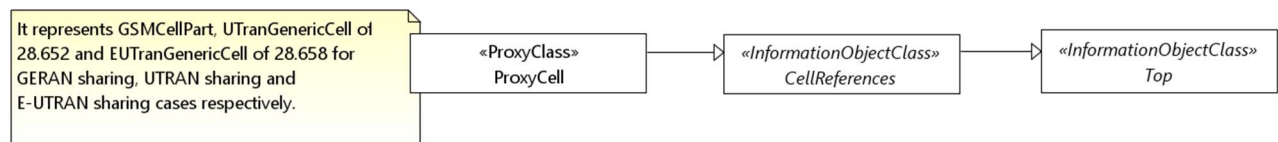


Figure 4.2.21.2: Inheritance diagram (2/2)

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.

4.3.1.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	isNotifiable
fqBandList	M	T	F	F	T
confOutputPower	O	T	T	F	T
Attribute related to role					
referencedBy	M	T	F	F	T

4.3.1.3 Attribute constraints

None.

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).

4.3.2.2 Attributes

Attribute name	Support Qualifier	isReadable	isWritable	isInvariant	IsNotifyable
beamTilt	O	T	T	F	T
elevation	O	T	T	F	T
retTiltValue	O	T	T	F	T
Bearing	O	T	T	F	T
retGroupName	O	T	T	F	T
maxAzimuthValue	O	T	T	F	T
minAzimuthValue	O	T	T	F	T
horizBeamwidth	O	T	T	F	T
vertBeamwidth	O	T	T	F	T
latitude	O	T	F	F	T
longitude	O	T	F	F	T
Attribute related to role					
referencedBy	M	T	F	F	T

4.3.2.3 Attribute constraints

None.

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	T	T	F	T
tmaStateFlag	M	T	O	F	T
tmaFunctionFlag	M	T	T	F	T
tmaMinGain	M	T	F	F	T
tmaMaxGain	M	T	F	F	T
tmaResolution	M	T	F	F	T
tmaGainFigure	M	T	O	F	T
tmaNumberOfSubunits	M	T	F	F	T
tmaBaseStationId	CO	T	CO	F	T
tmaSectorId	CO	T	CO	F	T
tmaAntennaBearing	CO	T	CO	F	T
tmaInstalledMechanicalTilt	CO	T	CO	F	T
tmaSubunitType	CO	T	CO	F	T
tmaSubunitRxFrequencyBand	CO	T	CO	F	T
tmaSubunitTxFrequencyBand	CO	T	CO	F	T
tmaGainResolution	CO	T	CO	F	T
Attribute related to role					
theCellList	CM	T	F	F	T

4.3.3.3 Attribute Constraints

Name	Definition
theCellList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and ProxyCellList is absent ; and association between SectorEquipmentFunction and NRSectorCarrier 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 37.466 [26]
The CO write qualifier of the attributes tmaBaseStationId through tmaGainResolution	Condition: The TMA subunit supports the write operation in 3GPP TS 37.466 [26]

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	IsNotifiable
aRFCN	M	T	T	F	T
tsc	M	T	T	F	T
aTA	M	T	T	F	T
Attribute related to role					
theSectorEquipment	M	T	F	F	T

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	isNotifiable
sharedTechnologies	M	T	O	F	T
Attribute related to role					
theProxyBsList	M	T	F	F	T

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	T	F	F	T
relatedTMAList	CM	T	F	F	T
relatedAntennaList	CM	T	F	F	T

4.3.6.3 Attribute constraints

Name	Definition
relatedSectorEquipment CM Support Qualifier	Condition: 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 ProxyCell is absent.
relatedTMAList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and ProxyCell 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	isNotifyable
priority	M	T	T	F	T
latitude	M	T	F	F	F
longitude	M	T	F	F	F
ctrlConnMode	M	T	T	F	T
environmentInfo	M	T	-	F	-
powerSwitch	M	T	T	F	T
ulAttenuation	M	T	T	F	T
dlAttenuation	M	T	T	F	T
firmwareVer	M	T	F	F	F
repeaterType	M	T	F	F	F
Attribute related to role					
externalUTRANCell	M	T	F	F	T

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.

4.3.8 ProxyCell <<ProxyClass>>

4.3.8.1 Definition

This IOC represents GSMCellPart, UTranGenericCell and EUTranGenericCell.

4.3.8.3 Attribute constraints

See respective IOCs

4.3.8.4 Notifications

See respective IOCs.

4.3.9 ProxyBsFunction <<ProxyClass>>

4.3.8.1 Definition

This IOC represents ENBFunction, NodeBFunction and BssFunction.

4.3.8.3 Attribute constraints

See respective IOCs.

4.3.8.4 Notifications

See respective IOCs.

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 [19] clause 2 for the ARFCN for GSM. ARFCN are based on a 200 kHz channel raster. allowedValues: See 3GPP TS 45.005 [19] clause 2	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
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 [20]	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
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 3GPP TS 25.463 [8].	type: Integer multiplicity: 0..1 isOrdered: False isUnique: True defaultValue: None isNullable: False
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 set to a value 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: False
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: False
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: False
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: False
firmwareVer	Version of the device firmware. allowedValues: N/A	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False

Attribute Name	Documentation and Allowed Values	Properties
fqBandList	The list of frequency bands/ranges supported by the hardware associated with the SectorEquipmentFunction. Valid frequency bands/ranges may be found in TS 25.104 (UTRA), TS 36.104 (E-UTRA) and TS 38.104 (NR). AllowedValues: Operating band id or frequencies tuple <UL,DL,mode> expressed as a string. Examples for NR: Bands: {"n1", "n12"} Frequencies: {"1920–1980, 2110–2170, FDD", "699–716, 729–746, FDD"}	type: String multiplicity: 1..* isOrdered: False isUnique: True defaultValue: None isNullable: False
elevation	The elevation of the antenna function should have, based on World Geodetic System (1984 version) global reference frame (WGS 84). allowedValues: Positive values correspond to meters above sea level. Negative values correspond to meters below sea level. If empty, value is not defined.	type: Real multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
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 luant interface according to Ref. 3GPP TS37.466 [26]. 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: False
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: Real multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
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: Real multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
maxAzimuthValue	The maximum amount of change of azimuth the RET system can support. This is the change in degrees clockwise from bearing. 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 37.466 [26]. A single integral value corresponding to an angle in degrees between 0 and 360 with a resolution of 0.1 degrees. allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False

Attribute Name	Documentation and Allowed Values	Properties
minAzimuthValue	The minimum amount of change of azimuth the RET system can support. This is the change in degrees counter-clockwise from bearing. 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]. A single integral value corresponding to an angle in degrees between 0 and 360 with a resolution of 0.1 degrees. allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
priority	The priority of a repeater decided by an operator. allowedValues: N/A	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
powerSwitch	Power switch of device which has two status: ON/OFF. allowedValues: ON, OFF	type: Boolean multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
relatedAntennaList	This attribute contains the DNs of one or more AntennaFunction. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: False isUnique: True defaultValue: None isNullable: False
relatedSectorEquipment	This attribute contains the DN of one SectorEquipmentFunction. allowedValues: N/A	type: DN multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
relatedTMAList	This attribute contains the DNs of one or more TmaFunction. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: False isUnique: True defaultValue: None isNullable: False
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: False

Attribute Name	Documentation and Allowed Values	Properties
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 Itf-N. allowedValues: N/A (String size is bounded to 80 characters.)	type: String multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
retTiltValue	The electrical tilt setting of the antenna, "Tilt value" in Ref. 3GPP TS 37.466 [26]. allowedValues: See "Tilt value" in Ref. 3GPP TS 37.466 [26].	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
beamTilt	The beam tilt of the wanted antenna beam in the vertical plane. A positive value on the beamtilt indicates an antenna beam direction below the vertical plane."	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
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: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaAntennaBearing	A data field defined in Table B.3 of 3GPP TS 37.466 [26]. See definition in 3GPP TS 37.466 [26]. allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaBaseStationId	A data field defined in Table B.3 of 3GPP TS 37.466 [26] allowedValues: N/A	type: String multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaFunctionFlag	Defined in 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaGainFigure	Defined in 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False

Attribute Name	Documentation and Allowed Values	Properties
tmaGainResolution	A data field defined in Table B.3 of 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaInstalledMechanicalTilt	A data field defined in Table B.3 of 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaMaxGain	Defined in 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaMinGain	Defined in 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaNumberOfSubunits	Defined in 3GPP TS 37.466 [26] allowedValues: --	Defined in 3GPP TS 37.466 [26] type: -- multiplicity: -- isOrdered: -- isUnique: -- defaultValue: -- isNullable: --
tmaResolution	Defined in 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaSectorId	A data field defined in Table B.3 of 3GPP TS 37.466 [26] allowedValues: N/A	type: String multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaStateFlag	Defined in 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaSubunitNumber	Defined in 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False

Attribute Name	Documentation and Allowed Values	Properties
tmaSubunitRxFrequencyBand	A data field defined in Table B.3 of 3GPP TS 37.466 [26] allowedValues: See 3GPP TS 37.466 [26].	type: Integer multiplicity: 2 isOrdered: True isUnique: True defaultValue: None isNullable: False
tmaSubunitType	A data field defined in Table B.3 of 3GPP TS 37.466 [26] allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
tmaSubunitTxFrequencyBand	A data field defined in Table B.3 of 3GPP TS 37.466 [26] allowedValues: See 3GPP TS 37.466 [26].	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: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
ulAttenuation	Uplink signal attenuation of the device to change uplink gain. allowedValues: N/A	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
vertBeamwidth	The 3 dB power beamwidth of the antenna pattern in the vertical plane. 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. This attribute is not supported over the luant interface according to Ref. 3GPP TS 37.466 [26]. allowedValues: A single integral value corresponding to an angle in degrees between 0 and 180.	type: Integer multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
Attribute related to role		
externalUTRANCEll	This role (when present) represents RepeaterFunction capability to identify one ExternalUtranCell. When present, it shall contain one ExternalUtranCell DN. allowedValues: N/A	type: DN multiplicity: 0..1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False
theProxyBsList	A CommonBsFunction instance serves a number of ProxyBsFunction instances. This CommonBsFunction role-attribute contains a list of DNS of ENBFunction (3GPP TS 28.658 [13]), NodeBFunction (3GPP TS 28.652 [12]) and BssFunction (3GPP TS 28.655 [14]) that it serves. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: False isUnique: True defaultValue: None isNullable: False

Attribute Name	Documentation and Allowed Values	Properties
referencedBy	This attribute contains the DNs of one or more objects (e.g. antenna, tma, cells, sector carrier) if associations between them exist. allowedValues: N/A	type: DN multiplicity: * isOrdered: N/A isUnique: N/A defaultValue: None isNullable: False

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
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyChangedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyClearedAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyNewAlarm	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyComments	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAlarmListRebuilt	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyPotentialFaultyAlarmList	See Alarm IRP (3GPP TS 32.111-2 [11])	

4.5.2 Configuration notifications

This subclause presents a list of notifications, defined in 3GPP TS 32.662 [17], 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
notifyAttributeValueChange	O	
notifyObjectCreation	O	
notifyObjectDeletion	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
2018-12	SA#82	SP-181156	0007	1	F	Correct SectorEquipmentFunction property to support NR.	15.1.0
2018-12	SA#82	SP-181156	0008	2	F	Align NR frequency bands supported by the hardware associated with the SectorEquipmentFunction	15.1.0
2019-09	SA#85	SP-190751	0009	-	F	Correct references and add reference to TR21.905	15.2.0
2019-12	SA#86	SP-191173	0010	1	F	Correct use of ProxyCellList	15.3.0
2020-07	-	-	-	-	-	Update to Rel-16 version (MCC)	16.0.0
2025-06	SA#108	SP-250554	0017	1	F	Rel-16 CR 28.662 Update sector equipment and antenna function definitions	16.1.0

History

Document history		
V16.0.0	August 2020	Publication
V16.1.0	July 2025	Publication