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Network Resource Model (NRM)
Integration Reference Point (IRP);
Information Service (IS)
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Contents

Foreword

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

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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:

28.661	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) definition

1 Scope

The present document specifies the Generic Radio Access Network (RAN) network resource model (NRM) that can be communicated between an IRPAgent and an IRPManager 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: " Technical Specification Group Services and System Aspects; 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] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[7] 3GPP TS 36.104: “Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E_UTRA); Base Station (BS) radio transmission and reception”

[8] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[9] GPP 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".

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 32.622 [15], IOC, ManagedFunction	ManagedFunction
3GPP TS 32.642 [12], IOC, UtranGenericCell	UtranGenericCell
3GPP TS 32.762 [13], IOC, EUtranGenericCell	EUtranGenericCell
3GPP TS 32.652 [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.

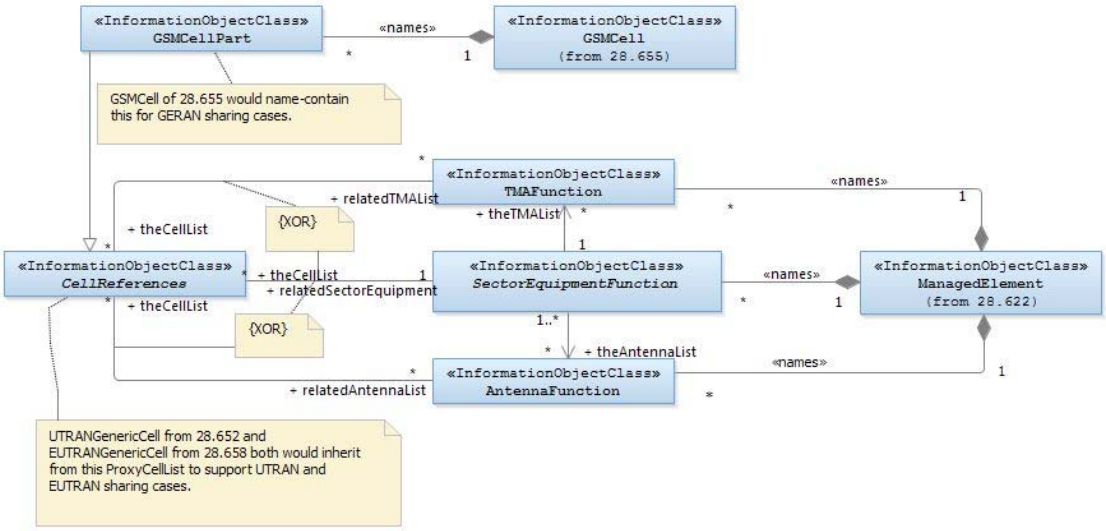

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Figure 4.2.1.1: UTRAN/E-UTRAN/GERAN sharing (1/2)

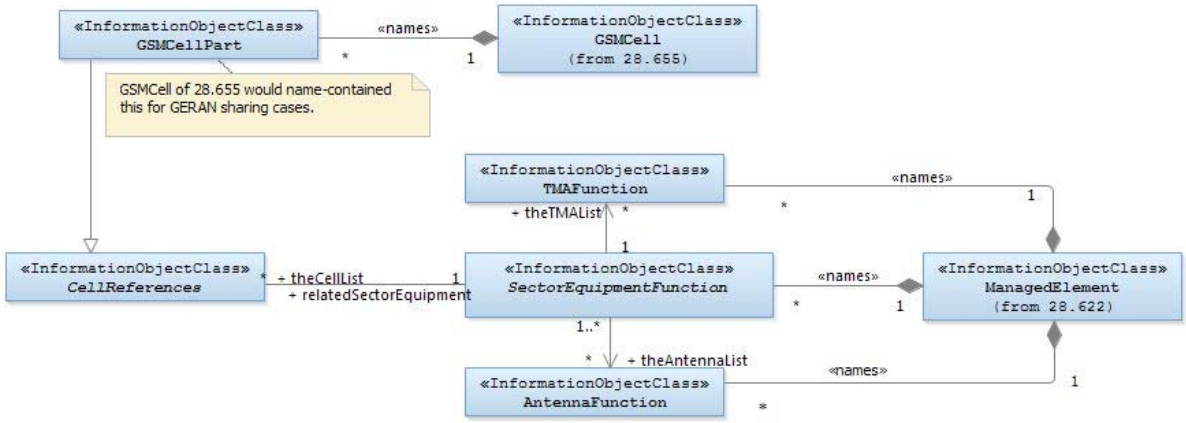

Figure 4.2.1.2: UTRAN/E-UTRAN/GERAN sharing (2/2)

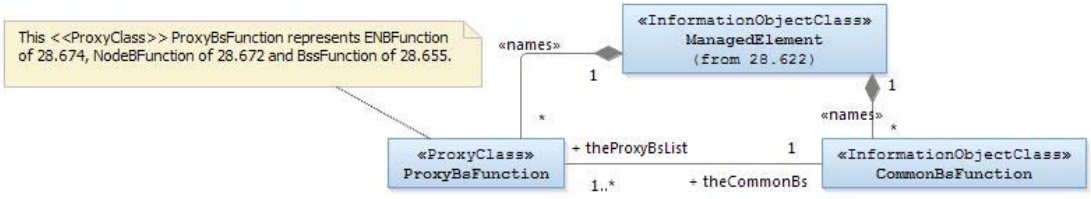

Figure 4.2.1.3: CommonBsFunction

Editor's Note: Correct Role Names are to be discussed further.

Figure 4.2.1.4: Repeater object Containment/Naming and Association diagram

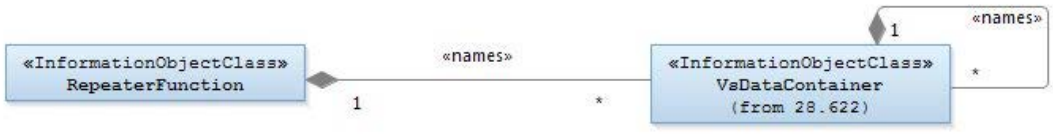

Figure 4.2.1.5: Repeater related VsDataContainer Containment/Naming and Association diagram

4.2.2 Inheritance

This subclause depicts the inheritance relationships.

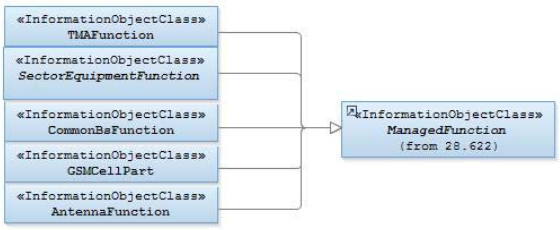

Figure 4.2.2.1: Inheritance diagram (1/2)

Figure 4.2.21.2: 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.

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

Referenced TS	Requirement label	Comment
3GPP TS 2866.1 [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	isNotifyable
fqBand	M	M	-	-	M
confOutputPower	M	M	M	-	-
Attribute related to role					
theTMAList	CM	M	-	-	M
theAntennaList	CM	M	-	-	M
theCellList	CM	M	-	-	M

4.3.1.3 Attribute constraints

Name	Definition
theTMAList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and AntennaFunction 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 TMAFunction is present.
theAntennaList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and TMAFunction is absent AND is supporting the UTRAN/E-UTRAN sharing/non-sharing OR is supporting GERAN sharing case. In such case, at least one AntennaFunction is present.

theCellList CM Support Qualifier	Condition: Association between SectorEquipmentFunction and ProxyCellList is present AND is supporting UTRAN/E-UTRAN sharing (and non-sharing) cases. In such case, at least one instance represented by the associated ProxyCell is present. Condition: Association between SectorEquipmentFunction and ProxyCellList is present AND is supporting the GERAN sharing case. In such case, at least one GSMCellPart 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	IsNotifyable
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

Editor's note:

We need to examine the need of retGroupName.

The attributes horizBeamwidth and vertBeamwidth are to be checked if they should be moved to inventory.

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

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

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-01	
3GPP TS 28.661 [10]	REQ-GRAN_NRM-CON-02	

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	isNotifyable
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	isNotifyable
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 Section 2 for the ARFCN for GSM. ARFCN are based on a 200 kHz channel raster. allowedValues: N/A	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. See 3GPP TS 45.010 allowedValues: N/A	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]. See "Antenna bearing" in TS 25.463 [8]. allowedValues: N/A	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
fqBand	This is the frequency band supported by the hardware associated with the SectorEquipmentFunction. The earfcnDl and earfcnUl of cells associated with the SectorEquipmentFunction must be assigned with value within this fqBand value. allowedValues: See section 5 Table 5.2-1 “E-UTRA frequency band” of TS 36.104 [7]. Other legal values would be applicable for other technologies such as for UTRA.	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 Iuant 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 omni-directional 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	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True

Attribute Name	Documentation and Allowed Values	Properties
	that this attribute is not supported over the Iuant 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	
relatedAntennaList	This attribute contains the DNs of one or more AntennaFunction. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: T defaultValue: None isNullable: True
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: True
relatedTMAList	This attribute contains the DNs of one or more TmaFunction. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: N/A isUnique: T defaultValue: None isNullable: True
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 Iuant 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: True
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 Iuant 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: 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 Itf-N.	type: String multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True

Attribute Name	Documentation and Allowed Values	Properties
	allowedValues: N/A (String size is bounded to 80 characters.)	
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: 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
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

Attribute Name	Documentation and Allowed Values	Properties
		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
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
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
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

Attribute Name	Documentation and Allowed Values	Properties
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
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 Iuant interface according to Ref. 3GPP TS 25.466 [9]. allowedValues: A single integral value corresponding to an angle in degrees between 0 and 180.	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True
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: True
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: True
ulAttenuation	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
dlAttenuation	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
firmwareVer	Version of the device firmware. allowedValues: N/A	type: String 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.	type: Integer multiplicity: 1 isOrdered: N/A isUnique: N/A defaultValue: None

Attribute Name	Documentation and Allowed Values	Properties
	allowedValues: -180.0000 to +180.0000	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
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
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
Attribute related to role		
theAntennaList	This attribute contains the DNs of one or more AntennaFunction. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: False isUnique: True defaultValue: None isNullable: TruepassedById: True
theCellList	This attribute contains the DNs of EUtranGenericCell or UtranGenericCell if association between SectorEquipmentFunction and ProxyCellList, parent of EUtranGenericCell or UtranGenericCell is used. This attribute contains the DNs of GSMCellPart if association between SectorEquipmentFunction and ProxyCellList, parent of GSMCellPartis used. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: False isUnique: True defaultValue: None isNullable: TruepassedById: True
theTMAList	This attribute contains the DNs of one or more TMAFunction. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: False isUnique: True defaultValue: None isNullable: TruepassedById: True
theProxyBsList	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. allowedValues: N/A	type: DN multiplicity: 1..* isOrdered: False isUnique: True defaultValue: None isNullable: TruepassedById: True
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: 1 isOrdered: N/A isUnique: N/A defaultValue: None isNullable: True passedById: True

4.4.2 Constraints

None

4.5 Common Notifications

4.5.1 Alarm notifications

This subclause presents a list of notifications, defined in [11], 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
`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 [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
`notifyAttributeValueChange`	O	
`notifyObjectCreation`	O	
`notifyObjectDeletion`	O	

Annex A (informative): Change history

Change history								
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Cat**	**Old**	**New**
2013-09	SA#61	SP-130433	001	F	Add missing Repeater Object IS definitions	F	11.0.0	11.1.0
2014-06	SA#64	SP-140359	002	-	remove the feature support statements	F	11.1.0	11.2.0

History

Document history		
V11.0.0	January 2013	Publication
V11.1.0	October 2013	Publication
V11.2.0	July 2014	Publication