

# ETSI TS 132 642 V6.3.0 (2004-12)

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*Technical Specification*

**Universal Mobile Telecommunications System (UMTS);  
Telecommunication management;  
Configuration Management (CM);  
UTRAN network resources Integration Reference Point (IRP):  
Network Resource Model (NRM)  
(3GPP TS 32.642 version 6.3.0 Release 6)**

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Reference

RTS/TSGS-0532642v630

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Keywords

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## Introduction

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

- 32.641: "Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP): Requirements".
- 32.642: "Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP): Network Resource Model (NRM)".**
- 32.643: "Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)".
- 32.644: "Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP): Common Management Information Protocol (CMIP) Solution Set (SS)".
- 32.645: "Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP): Bulk CM eXtensible Markup Language (XML) file format definition

Configuration Management (CM), in general, provides the operator with the ability to assure correct and effective operation of the 3G network as it evolves. CM actions have the objective to control and monitor the actual configuration on the Network Elements (NEs) and Network Resources (NRs), and they may be initiated by the operator or by functions in the Operations Systems (OSs) or NEs.

CM actions may be requested as part of an implementation programme (e.g. additions and deletions), as part of an optimisation programme (e.g. modifications), and to maintain the overall Quality of Service (QoS). The CM actions are initiated either as single actions on single NEs of the 3G network, or as part of a complex procedure involving actions on many resources/objects in one or several NEs.

CM, in general, provides the operator with the ability to assure correct and effective operation of the 3G network as it evolves. CM actions have the objective to control and monitor the actual configuration on the NEs and NRs, and they may be initiated by the operator or by functions in the OSs or NEs.

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# 1 Scope

The present document is part of an Integration Reference Point (IRP) named "UTRAN Network Resources IRP", through which an "IRPAgent" (typically an Element Manager or Network Element) can communicate Configuration Management information to one or several "IRPManagers" (typically Network Managers) concerning UTRAN resources. The "UTRAN Network Resources IRP" comprises a set of specifications defining Requirements, a protocol neutral Network Resource Model (NRM) and corresponding Solution Set(s).

The present document specifies the protocol neutral UTRAN Network Resources IRP: Network Resource Model. It reuses relevant parts of the generic NRM in TS 32.622 [16], either by direct reuse or sub-classing, and in addition to that defines UTRAN specific Information Object Classes.

The Configuration Management (CM) area is very large. The intention is to split the specification of the related interfaces in several IRPs – as described in the Introduction clause above. An important aspect of such a split is that the Network Resource Models (NRMs) defined in different IRPs containing NRMs are consistent, and that NRMs supported by an IRPAgent implementation can be accessed as one coherent model through one IRP Information Service (IS).

To summarize, the present document has the following main purpose:

to define the applied UTRAN specific NRM, based on the generic NRM in 3GPP TS 32.622 [16].

In order to access the information defined by this NRM, an IRP IS is needed, such as the Basic CM IRP IS (3GPP TS 32.602 [17]) or the Bulk CM IRP IS (3GPP TS 32.612 [18]). However, which IS that is applicable is outside the scope of the present document.

The present document (NRM specification) is related to the IS in 3GPP TS 32.672 V6.0.X [8].

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".
- [2] 3GPP TS 32.102: "Telecommunication management; Architecture".
- [3] 3GPP TS 23.003: "Numbering, addressing and identification".
- [4] 3GPP TS 25.401: "UTRAN Overall Description".
- [5] 3GPP TS 25.433: "UTRAN Iub Interface NBAP Signalling".
- [6] 3GPP TS 32.652: "Telecommunication management; Configuration Management (CM); GERAN network resources Integration Reference Point (IRP): Network Resource Model (NRM)".
- [7] Void.
- [8] 3GPP TS 32.672: "Telecommunication management; Configuration Management (CM); State Management Integration Reference Point (IRP): Information Service (IS)".
- [9] 3GPP TS 25.331: "Radio Resource Control (RRC) protocol specification".

- [10] Void.
- [11] 3GPP TS 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".
- [12] Void.
- [13] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".
- [14] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".
- [15] 3GPP TS 23.002: "Network Architecture".
- [16] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".
- [17] 3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP) Information Service (IS)".
- [18] 3GPP TS 32.612: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP): Information Service (IS)".

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the following terms and definitions apply. For terms and definitions not found here, please refer to 3GPP TS 32.101 [1], 3GPP TS 32.102 [2] and 3GPP TS 32.600 [14].

**Antenna:** Within the present document an Antenna is the set of radiating elements involved in the transmission and reception of Radio Frequency energy to support the Uu interface of a UTRAN cell. See Annex B for more detail.

**Association:** In general it is used to model relationships between Managed Objects. Associations can be implemented in several ways, such as:

- (1) name bindings,
- (2) reference attributes, and
- (3) association objects.

This IRP stipulates that containment associations shall be expressed through name bindings, but it does not stipulate the implementation for other types of associations as a general rule. These are specified as separate entities in the object models (UML diagrams).

**Managed Element (ME):** An instance of the Information Object Class ManagedElement defined in [16].

**Managed Object (MO):** In the context of the present document, a Managed Object (MO) is a software object that encapsulates the manageable characteristics and behaviour of a particular Network Resource. The MO is instance of a MO class defined in a MIM/NRM. This class, called **Information Object Class (IOC)** has attributes that provide information used to characterize the objects that belong to the class (the term "attribute" is taken from TMN and corresponds to a "property" according to CIM). Furthermore, the IOC can have operations that represent the behaviour relevant for that class (the term "operation" is taken from TMN and corresponds to a "method" according to CIM). The IOC may support the emission of notifications that provide information about an event occurrence within a network resource.

**Management Information Model (MIM):** Also referred to as NRM – see the definition below.

**Network Resource Model (NRM):** A model representing the actual managed telecommunications network resources that a System is providing through the subject IRP. An NRM identifies and describes the IOCs, their associations, attributes and operations. The NRM is also referred to as "MIM" (see above), which originates from the ITU-T TMN.



**Node B:** A logical node responsible for radio transmission/reception in one or more cells to/from the User Equipment. It terminates the Iub interface towards the RNC.

## 3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CIM	Common Information Model
DN	Distinguished Name (see 3GPP TS 32.300 [13])
EM	Element Manager
FDD	Frequency Division Duplex
FM	Fault Management
IOC	Information Object Class
IRP	Integration Reference Point
Iub	Interface between RNC and Node B
Mcps	Mega-chips per second
ME	Managed Element
MIM	Management Information Model
MO	Managed Object
NE	Network Element
NM	Network Manager
NR	Network Resource
NRM	Network Resource Model
PM	Performance Management
RDN	Relative Distinguished Name (see 3GPP TS 32.300 [13])
RNC	Radio Network Controller
TDD	Time Division Duplex
TMN	Telecommunications Management Network
UML	Unified Modelling Language
UMTS	Universal Mobile Telecommunications System
UTRA	Universal Terrestrial Radio Access
UTRAN	Universal Terrestrial Radio Access Network

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## 4 System overview

### 4.1 Void

### 4.2 Compliance rules

The following defines the meaning of Mandatory and Optional IOC attributes and associations between IOCs, in Solution Sets to the IRP defined by the present document:

- The IRPManager shall support all mandatory attributes/associations. The IRPManager shall be prepared to receive information related to mandatory as well as optional attributes/associations without failure; however the IRPManager does not have to support handling of the optional attributes/associations.
- The IRPAgent shall support all mandatory attributes/associations. It may support optional attributes/associations.

An IRPAgent that incorporates vendor-specific extensions shall support normal communication with a 3GPP SAS-compliant IRPManager with respect to all Mandatory and Optional information object classes, attributes and associations without requiring the IRPManager to have any knowledge of the extensions.

Given that

- rules for vendor-specific extensions remain to be fully specified, and
- many scenarios under which IRPManager and IRPAgent interwork may exist,

it is recognised that the IRPManager, even though it is not required to have knowledge of vendor-specific extensions, may be required to be implemented with an awareness that extensions can exist and behave accordingly.

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## 5 Modelling approach

The modelling approach adopted and used in this IRP is described in the Generic Network Resources IRP NRM [16].

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## 6 Information Object Classes

### 6.1 Information entities imported and local labels

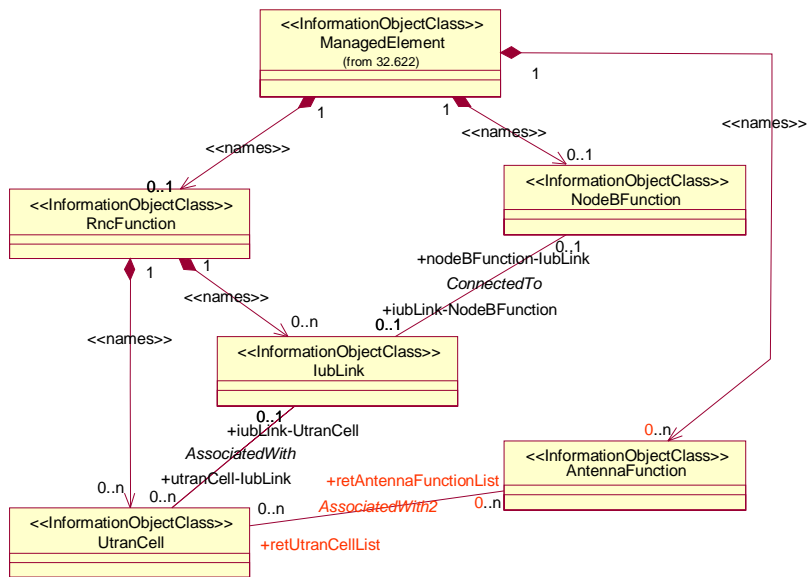
Label reference	Local label
3GPP TS 32.622 [16], IOC, ManagedElement	ManagedElement
3GPP TS 32.622 [16], IOC, ManagedFunction	ManagedFunction
3GPP TS 32.622 [16], IOC, MeContext	MeContext
3GPP TS 32.622 [16], IOC, SubNetwork	SubNetwork
3GPP TS 32.622 [16], IOC, Top	Top
3GPP TS 32.622 [16], IOC, VsDataContainer	VsDataContainer
3GPP TS 32.652 [6], IOC, ExternalGSMCell	ExternalGSMCell
3GPP TS32.652 [6], IOC, GsmCell	GsmCell
3GPP TS32.652 [6], IOC, GsmRelation	GsmRelation
3GPP TS32.652 [6], relation, ExternalGsmNeighbourCellRelation	ExternalGsmNeighbourCellRelation
3GPP TS32.652 [6], relation, GsmNeighbourCellRelation	GsmNeighbourCellRelation
3GPP TS32.672 [8], attribute, operationalState	operationalState

### 6.2 Class diagram

#### 6.2.1 Attributes and relationships

This clause depicts the set of IOCs that encapsulate information relevant for this service. This clause provides the overview of all information object classes in UML. Subsequent clauses provide more detailed specification of various aspects of these information object classes.

Figures 6.1, 6.2, 6.3 and 6.4 show the containment/naming hierarchy and the associations of the information object classes defined in the present document. They are split in several figures only for a readability purpose.

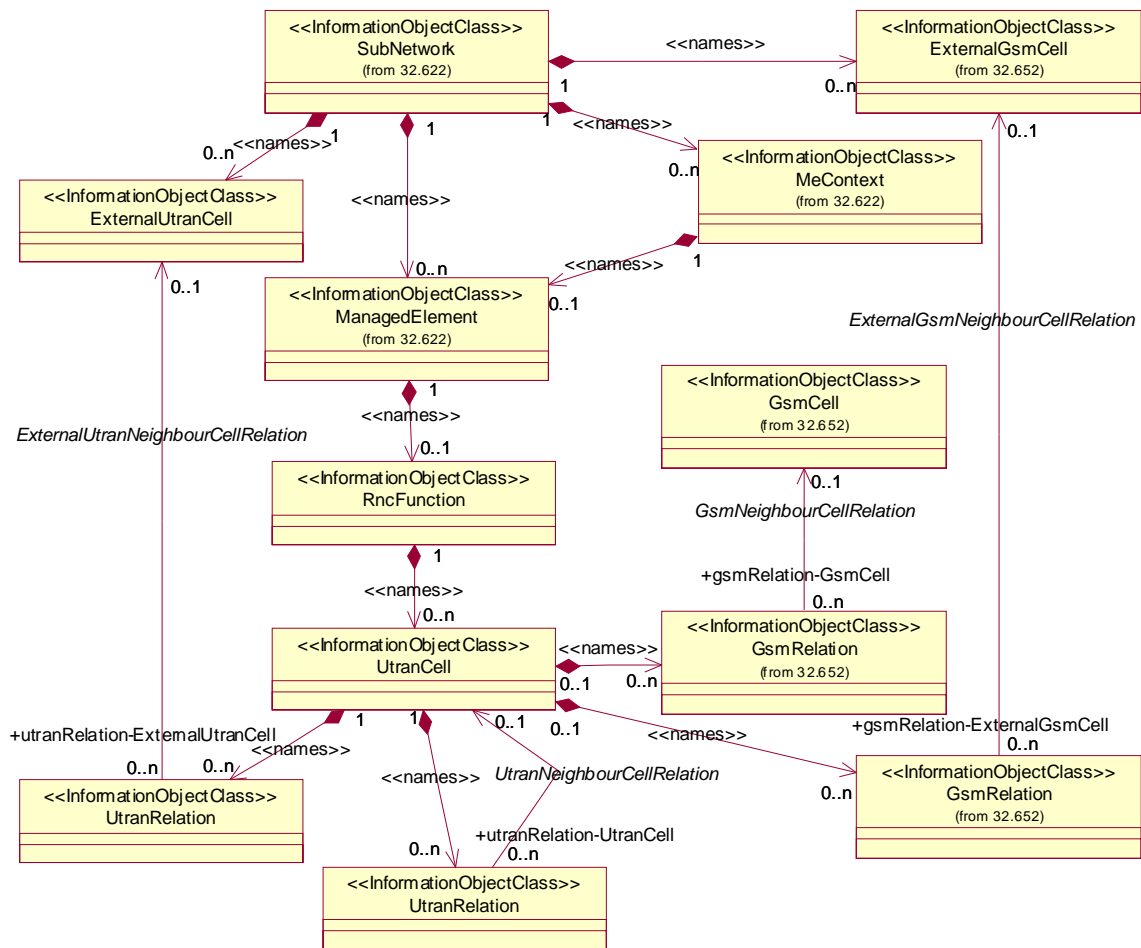


NOTE 1: The listed cardinality numbers represent transient as well as steady state numbers, and reflect all managed object creation and deletion scenarios.

NOTE 2: The IOC AntennaFunction is required when supporting RET, For a description and clarification of RET, please refer to Annex B.

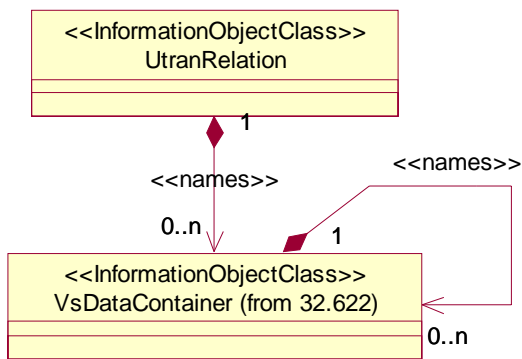
NOTE 3: The instances of the AntennaFunction associated with a particular instance of NodeBFunction shall be contained by the same ManagedFunction instance

Figure 6.1: Transport view UTRAN NRM Containment/Naming and Association diagram



- NOTE 1: The listed cardinality numbers represent transient as well as steady state numbers, and reflect all managed object creation and deletion scenarios.
- NOTE 2: The relation between GsmRelation and GsmCell is optional. It may be present if both the UtranCell and the GsmCell are managed by the same management node.
- NOTE 3: The UtranRelation and GsmRelation can be name-contained under IOCs defined in other NRMs.

**Figure 6.2: Cell view UTRAN NRM Containment/Naming and Association diagram**



NOTE 1: The listed cardinality numbers represent transient as well as steady state numbers, and reflect all managed object creation and deletion scenarios.  
 NOTE 2: Each instance of the VsDataContainer shall only be contained under one IOC. The VsDataContainer can be contained under IOCs defined in other NRMs.

Figure 6.3: VsDataContainer Containment/Naming and Association in UTRAN NRM diagram

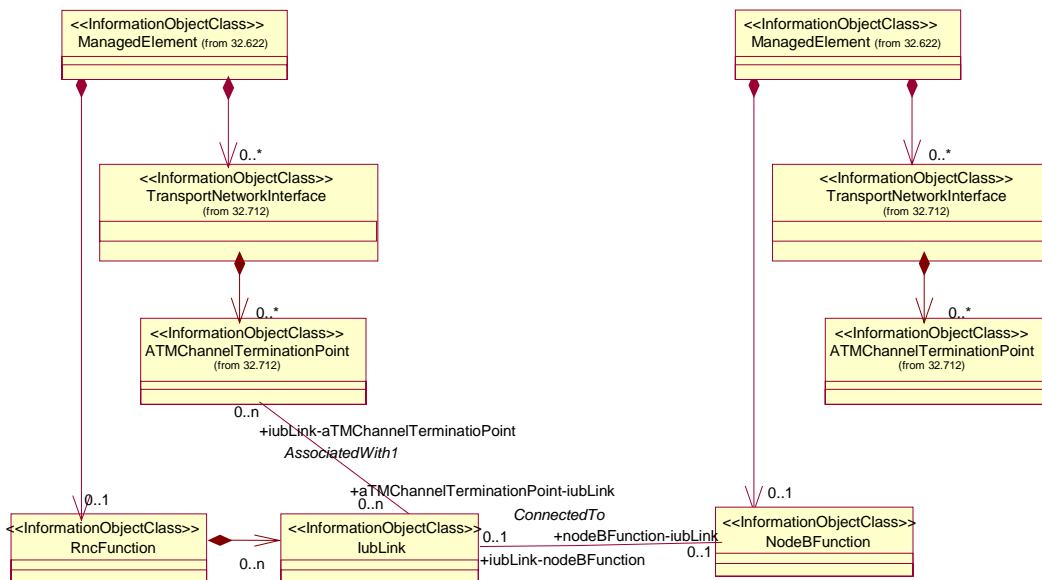


Figure 6.4: UTRAN Transport Network NRM Containment/Naming and Association diagram

NOTE 1: The ATMChannelTerminationPoint is name-contained under IOCs defined in the Transport Network NRM.  
 NOTE 2: The group of ATMChannelTerminationPoints associated with an IubLink (the relation AssociatedWith1) represent the RNC end of the ATM Virtual Channel Connections (transport connection) between an RNC and a NodeB.  
 NOTE 3: An ATMChannelTerminationPoint can be associated with more than one IubLink for the case of AAL2 multiplexing/switching, i.e. to allow an ATM Channel at the RNC to be connected to multiple NodeBs.

The VsDataContainer is only used for the Bulk CM IRP.

Each IOC is identified with a Distinguished Name (DN) according to 3GPP TS 32.300 [13] that expresses its containment hierarchy. As an example, the DN of an IOC representing a cell could have a format like:

SubNetwork=Sweden, MeContext=MEC-Gbg-1, ManagedElement=RNC-Gbg-1, RncFunction=RF-1, UtranCell=Gbg-1.

## 6.2.2 Inheritance

This clause depicts the inheritance relationships that exist between IOCs.

Figure 6.5 shows the inheritance hierarchy for the UTRAN NRM.

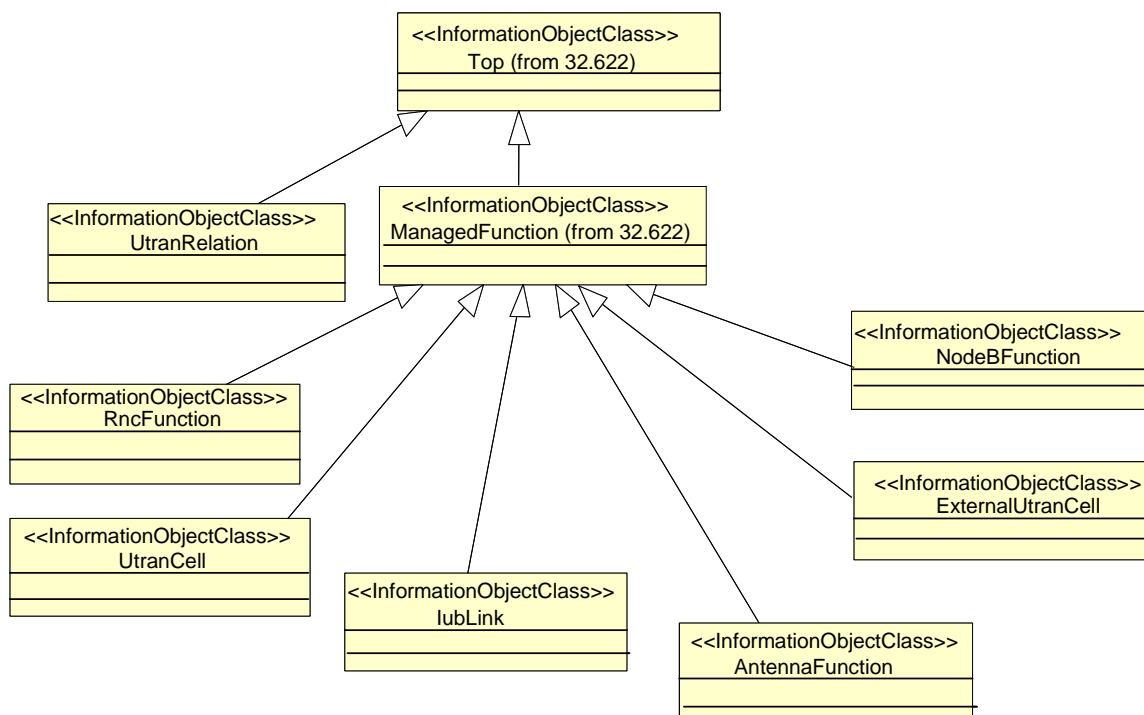


Figure 6.5: UTRAN NRM Inheritance Hierarchy

## 6.3 Information object class definitions

### 6.3.1 RncFunction

#### 6.3.1.1 Definition

This IOC represents RNC functionality. For more information about the RNC, see 3GPP TS 23.002 [15].

#### 6.3.1.2 Attributes

Attributes of RncFunction

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
rncFunctionId	+	M	M	-
userLabel	+	M	M	M
mcc	+	M	M	M
mnc	+	M	M	M
rncId	+	M	M	M

## 6.3.1.6 Notifications

### Notifications of RncFunction

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
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])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
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])	

## 6.3.2 NodeBFunction

### 6.3.2.1 Definition

This IOC represents Node B functionality. For more information about the Node B, see 3GPP TS 23.002 [15].

### 6.3.2.2 Attributes

#### Attributes of NodeBFunction

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
nodeBFunctionId	+	M	M	-
userLabel	+	M	M	M
nodeBFunction-IubLink	+	M	M	-

### 6.3.2.6 Notifications

#### Notifications of NodeBFunction

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
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])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
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])	

## 6.3.3 UtranCell

### 6.3.3.1 Definition

This IOC represents a radio cell controlled by the RNC. For more information about radio cells, see 3GPP TS 23.002 [15].

The cell may be an FDD mode cell, a 1.28 Mcps TDD mode cell or a 3.84 Mcps TDD mode cell.

## 6.3.3.2 Attributes

Attributes of UtranCell

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
utranCellId	+	M	M	-
userLabel	+	M	M	M
cId	+	M	M	M
localCellId	+	M	M	M
uarfcnUl	+	O	M	M
uarfcnDl	+	O	M	M
primaryScramblingCode	+	O	M	M
primaryCpichPower	+	O	M	M
retAntennaFunctionList	+	O	M	M
maximumTransmissionPower	+	M	M	M
primarySchPower	+	O	M	M
secondarySchPower	+	O	M	M
bchPower	+	O	M	M
cellMode	+	M	M	-
uarfcn	+	O	M	M
cellParameterId	+	O	M	M
primaryCcpchPower	+	O	M	M
dwPchPower	+	O	M	M
timeSlotList	+	O	M	M
schPower	+	O	M	M
lac	+	M	M	M
rac	+	M	M	M
rac	+	M	M	M
uraList	+	M	M	M
utranCell-IubLink	+	M	M	-

Table 6.6: Additional attributes of UtranCell for the support of the State Management IRP

Attribute Name	Support Qualifier	READ	WRITE
operationalState	O	M	-
NOTE: No state propagation shall be implied.			

## 6.3.3.3 Attribute constraints

The following optional attributes shall be supported for corresponding modes as described below:

- for FDD mode only: uarfcnUl, uarfcnDl, primaryScramblingCode, primaryCpichPower, primarySchPower, secondSchPower, bchPower;
- for 1.28 Mcps TDD mode only: uarfcn, cellParameterId, primaryCcpchPower, timeSlotList, dwPchPower;
- for 3.84 Mcps TDD mode only: uarfcn, cellParameterId, primaryCcpchPower, timeSlotList, schPower.



### 6.3.3.6 Notifications

#### Notifications of UtranCell

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
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])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
notifyStateChange	O	
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])	

### 6.3.4 IubLink

#### 6.3.4.1 Definition

This IOC represents the logical link to a Node B as seen from the RNC. For more information about the RNC, see 3GPP TS 23.002 [15].

#### 6.3.4.2 Attributes

##### Attributes of IubLink

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
iubLinkId	+	M	M	-
userLabel	+	M	M	M
iubLink-UtranCell	+	M	M	M
iubLink-NodeBFunction	+	M	M	-
iubLink-ATMChannelTerminationPoint	+	M	M	-

### 6.3.4.6 Notifications

#### Notifications of IubLink

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
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])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
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])	

## 6.3.5 UtranRelation

### 6.3.5.1 Definition

The UtranRelationIOC contains radio network related parameters for the relation to the UtranCell or ExternalUtranCell IOC. The UtranCell and the ExternalUtranCell may be an FDD mode cell, a 1.28 Mcps TDD mode cell or a 3.84 Mcps TDD mode cell.

NOTE: In handover relation terms, the cell containing the UTRAN Relation object is the source cell for the handover. The cell referred to in the UTRAN relation object is the target cell for the handover. This defines a one-way handover relation where the direction is *from* source cell *to* target cell.

### 6.3.5.2 Attributes

**Attributes of UtranRelation**

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
utranRelationId	+	M	M	-
adjacentCell	+	M	M	M
cellMode	+	M	M	-
uarfcnUl	+	O	M	-
uarfcnDl	+	O	M	-
primaryScramblingCode	+	O	M	-
primaryCpichPower	+	O	M	-
lac	+	O	M	-
uarfcn	+	O	M	-
cellParameterId	+	O	M	-
primaryCcpchPower	+	O	M	-

### 6.3.5.3 Attribute constraints

The optional attributes should be included as described below according to each mode, only when the EM can not guarantee consistency between the cell definition and what is broadcast on system information. Otherwise they shall not be included.

The attributes for FDD mode are:

uarfcnUl, uarfcnDl,  
primaryScramblingCode,  
primaryCpichPower, lac.

The attributes for 1.28 Mcps TDD mode and 3.84 Mcps TDD are: uarfcn, cellParameterId,  
primaryCcpchPower, lac.

### 6.3.5.6 Notifications

**Notifications of UtranRelation**

Name	Qualifier	Notes
notifyAttributeValueChange	O	
notifyObjectCreation	O	
notifyObjectDeletion	O	

## 6.3.6 ExternalUtranCell

### 6.3.6.1 Definition

This IOC represents a radio cell controlled by another IRPAgent. This IOC has necessary attributes for inter-system and intra-system handover. The external cell may be an FDD mode cell or a TDD mode cell. It contains a subset of the attributes of related IOCs controlled by another IRPAgent. The way to maintain consistency between the attribute values of these two IOCs is outside the scope of the present document.

## 6.3.6.2 Attributes

### Attributes of ExternalUtranCell

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
externalUtranCellId	+	M	M	-
userLabel	+	M	M	M
cId	+	M	M	M
mcc	+	M	M	M
mnc	+	M	M	M
rncId	+	M	M	M
cellMode	+	M	M	-
uarfcnUl	+	O	M	M
uarfcnDl	+	O	M	M
primaryScramblingCode	+	O	M	M
primaryCpichPower	+	O	M	M
uarfcn	+	O	M	M
cellParameterId	+	O	M	M
primaryCpchPower	+	O	M	M
lac	+	M	M	M
rac	+	M	M	M

## 6.3.6.3 Attribute constraints

The following optional attributes shall be supported for corresponding modes as described below:

for FDD mode only: uarfcnUl, uarfcnDl,  
primaryScramblingCode,  
primaryCpichPower;

for 1.28 Mcps TDD mode and 3.84 Mcps TDD mode: uarfcn, cellParameterId,  
primaryCpchPower.

## 6.3.6.6 Notifications

### Notifications of ExternalUtranCell

Name	Qualifier	Notes
notifyAttributeValueChange	O	
notifyObjectCreation	O	
notifyObjectDeletion	O	

## 6.3.7 AntennaFunction

### 6.3.7.1 Definition

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

## 6.3.7.2 Attributes

### Attributes of AntennaFunction

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
antennaFunctionId	+	O	M	-
userLabel	+	O	M	M
retUtranCellList	+	O	M	M
retTiltValue	+	O	M	M
compassDirection	+	O	M	M
maxTiltValue	+	O	M	M
minTiltValue	+	O	M	M
mechanicalOffset	+	O	M	M
retGroupName	+	O	M	M
height	+	O	M	M

## 6.3.7.4 Notifications

### Notifications of AntennaFunction

Name	Qualifier	Notes
notifyAckStateChanged	See Alarm IRP (3GPP TS 32.111-2 [11])	
notifyAttributeValueChange	O	
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])	
notifyObjectCreation	O	
notifyObjectDeletion	O	
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])	

## 6.4 Information relationship definitions

### 6.4.1 ConnectedTo (M)

#### 6.4.1.1 Definition

This represents a bi-directional relationship between the `IubLink` and Node B (through the `NodeBFunction`). The role of the relation shall be mapped to a reference attribute of the IOC. The names of the reference attribute and the role are the same.

#### 6.4.1.2 Roles

##### Roles of the relation ConnectedTo

Name	Definition
iubLink-NodeBFunction	This role (when present) represents <code>IubLink</code> capability to identify one <code>NodeBFunction</code> . When the role is absent, the <code>IubLink.iubLink-NodeBFunction</code> shall contain no information. When present, it shall contain one <code>NodeBFunctionDN</code> .
nodeBFunction-IubLink	This role (when present) represents <code>NodeBFunction</code> capability to identify one <code>IubLink</code> . When the role is absent, the <code>NodeBFunction.nodeBFunction-IubLink</code> shall contain no information. When present, it shall contain one <code>IubLink DN</code> .

### 6.4.1.3 Constraints

When a particular `IubLink` identifies a particular `NodeBFunction`, that particular `NodeBFunction` must identify the particular `IubLink`.

## 6.4.2 AssociatedWith (M)

### 6.4.2.1 Definition

This represents a bi-directional relation between the `IubLink` and `UtranCell`. The role of the relation shall be mapped to a reference attribute of the IOC. The name of the reference attribute shall be the role name.

### 6.4.2.2 Roles

**Roles of the relation AssociatedWith**

Name	Definition
<code>iubLink-UtranCell</code>	This role (when present) represents <code>IubLink</code> capability to identify the set of related <code>UtranCell</code> . <code>IubLink.iubLink-UtranCell</code> shall carry the set of <code>UtranCellDN(s)</code> .
<code>utranCell-IubLink</code>	This role (when present) represents <code>UtranCell</code> capability to identify one related <code>IubLink</code> . When the role is absent, the <code>UtranCell.utranCell-IubLink</code> shall contain no information. When it is present, it shall contain one <code>IubLink DN</code> .

### 6.4.2.3 Constraints

When a particular `IubLink` identifies a particular `UtranCell`, that particular `UtranCell` must have identified the particular `IubLink`.

## 6.4.3 ExternalUtranNeighbourCellRelation (M)

### 6.4.3.1 Definition

This represents a unidirectional relation from `UtranRelation` to the `ExternalUtranCell`. The role of the relation shall be mapped to a reference attribute, named `adjacentCell`, of the IOC.

### 6.4.3.2 Roles

**Roles of the relation ExternalUtranNeighbourCellRelation**

Name	Definition
<code>utranRelation-externalUtranNeighbourCell</code>	This role (when present) represents <code>UtranRelation</code> capability to identify one <code>ExternalUtranCell</code> . When this role is present, the <code>UtranRelation.adjacentCell</code> shall contain one <code>ExternalUtranNeighbourCell DN</code> .

### 6.4.3.3 Constraints

This role (for a particular `UtranRelation`) shall be present if the `UtranNeighbourCellRelation` of this particular `UtranRelation` is absent. This role shall be absent if the `UtranNeighbourCellRelation` of this particular `UtranRelation` is present.

## 6.4.4 UtranNeighbourCellRelation (M)

### 6.4.4.1 Definition

This represents the unidirectional relation from the UtranRelation to UtranCell. The role of the relation shall be mapped to a reference attribute, named adjacentCell, of the IOC.

### 6.4.4.2 Roles

**Roles of the relation UtranNeighbourCellRelation**

Name	Definition
utranRelation- utranNeighbourCell	This role (when present) represents UtranRelation capability to identify one UtranCell. When this role is present, the UtranRelation.adjacentCell shall contain one UtranCellDN.

### 6.4.4.3 Constraints

This role (for a particular UtranRelation) shall be present if the ExternalUtranNeighbourCellRelation of this particular UtranRelation is absent. This role shall be absent if the ExternalUtranNeighbourCellRelation of this particular UtranRelation is present.

## 6.4.5 AssociatedWith1 (M)

### 6.4.5.1 Definition

This represents a bi-directional relation between the IubLink and ATMChannelTerminationPoint. The roles of the relation shall be mapped to a reference attribute of the IOCs. The name of the reference attribute shall be the role name.

### 6.4.5.2 Roles

**Roles of the relation AssociatedWith1**

Name	Definition
iubLink- ATMChannelTerminationPoint	This role (when present) represents IubLink capability to identify the set of related ATMChannelTerminationPoint. It shall carry the set of ATMChannelTerminationPoint's DN(s).
atmChannelTerminationPoint- IubLink	This role (when present) represents ATMChannelTerminationPoint capability to identify one related IubLink. When the role is absent, the ATMChannelTerminationPoint -IubLink shall contain no information. When it is present, it shall contain one IubLink DN.

### 6.4.5.3 Constraints

When a particular IubLink identifies a particular ATMChannelTerminationPoint, that particular ATMChannelTerminationPoint must have identified the particular IubLink.

## 6.4.6 AssociatedWith2 (O)

### 6.4.6.1 Definition

This represents a bi-directional relation between a UtranCell and an AntennaFunction. The roles of the relation shall be mapped to a reference attribute of the IOCs. The name of the reference attribute shall be the role name

## 6.4.6.2 Roles

### Roles of the relation *AssociatedWith2*

Name	Definition
retAntennaFunctionList	This role (when present) allows navigation from a <i>UtranCell</i> to the <i>AntennaFunction(s)</i> which are supporting the <i>UtranCell</i> .
retUtranCellList	This role (when present) allows navigation from an <i>AntennaFunction</i> to the <i>UtranCell(s)</i> it is supporting.

## 6.4.6.3 Constraints

Name	Definition
inv_antennaInstance	The referential attributes <i>retAntennaFunctionList</i> , and <i>retUtranCellList</i> are to be populated when instances of the IOC <i>AntennaFunction</i> are instantiated.

## 6.5 Information attribute definitions

### 6.5.1 Definition and legal values

The following table defines the attributes that are present in several Information Object Classes (IOCs) of the present document.

**Attributes**

Attribute Name	Definition	Legal Values
adjacentCell	It carries the DN of the <code>UtranCell</code> or the <code>ExternalUtranCell</code> .	
antennaFunctionId	An attribute whose "name+value" can be used as an RDN (according to the rules in TS 32.300 [13]) when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance	
bchPower	The power of the broadcast channel in the FDD mode cell (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (-35..+15 dB) Steps of 0.1dB
cellMode	An attribute that identifies the cell mode.	Type: Enumerated value Range: ("FDD mode", "1.28McpsTDD mode", "3.84McpsTDD mode")
cellParameterId	For IOCs <code>UtranCell</code> and <code>ExternalUtranCell</code> , this attribute identifies unambiguously the TDD mode cell (see ref. TS 25.433 [5]): <ul style="list-style-type: none"> <li>3.84 Mcps TDD - Code Groups, Scrambling Codes, Midambles and Toffset</li> <li>1.28 Mcps TDD - SYNC-DL and SYNC-UL sequences, the scrambling codes and the midamble codes</li> </ul> For IOC <code>UtranRelation</code> , this parameter will be broadcast in the system information of associated cell. The associated cell can be: <ul style="list-style-type: none"> <li>another UTRAN TDD cell (1.28 Mcps TDD or 3.84 Mcps TDD)</li> <li>the external UTRAN TDD cell (1.28 Mcps TDD or 3.84 Mcps TDD).</li> </ul>	Type: Integral numeric value Range: (0..127)
cId	The attribute is the identifier of a cell in one RNC (Ref. 3GPP TS 25.401 [4]), 3GPP TS 25.433 [5]).	Type: Integral numeric value Range: (0..65535)
compassDirection	The compass direction in degrees (magnetic) that the antenna is pointing in. This attribute is used mainly for planning purposes. The value of this attribute, when combined with a few others, helps in plotting a coverage map on planning tools for the particular <code>UtranCell(s)</code> . When the coverage needs to be changed, the tilt value is adjusted. Also, when a cell site fails, it becomes much easier to determine the area where there is a loss of service.	A single integral value corresponding to an angle in degrees between 0 and 360.
dwPchPower	DwPCH Power is the power that shall be used for transmitting the DwPCH in a 1.28 Mcps TDD cell. (Ref. 3 GPP TS 25.433 [5]).	Type: Numeric value Range: (-15..+40 dBm) Steps of 0.1dB
externalUtranCellId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
height	The height of an antenna above sea level. Planning permission (for a cell site) is normally granted on the antenna height. This parameter also determines the site coverage and feeds into the planning tool.	An integral value representing a number of whole metres
iubLinkId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
lac	IOCs <code>UtranCell</code> and <code>ExternalUtranCell</code> : Location Area Code, LAC (Ref. 3GPP TS 23.003 [3]). IOC <code>UtranRelation</code> : Location Area Code, LAC (Ref. 3GPP TS 23.003 [3]), for another UTRAN cell or the external UTRAN Cell that is broadcast in the system information in the Cell.	Type: Integral numeric value Range: (1..65533, 65535)



localCellId	Local Cell id is used to uniquely identify the set of resources defined in a Node B to support a cell (as defined by a Cid Ref. 3GPP TS 25.401 [4]), 3GPP TS 25.433 [5]). It must be unique in Node B at a minimum, but may be unique in UTRAN. It can be used to tie the cell in the RNC to a specific set of resources in the Node B.	Type: Integral numeric value Range: (0..268435455)
maxTiltValue	The maximum amount of tilt the RET system can support. This helps in preventing the user from entering any unrealistic value for 'retTiltValue' and hence prevents the motors on the RET unit from getting jammed / burnt out.	A single integral value corresponding to an angle in degrees between 0 and 360 In 0.1 degree increments (see section 7.7.5.11 RET TR.25.802
maximumTransmissionPower	The maximum transmission power of a cell. It is the maximum power for all downlink channels added together, that is allowed to be used simultaneously in a cell. (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (0..50 dBm) Steps of 0.1 dB
mcc	Mobile Country Code, MCC (part of the PLMN Id, Ref. 3GPP TS 23.003 [3]).	
mechanicalOffset	This is a value representing a non-adjustable tilt value, which is imparted to the antenna due to the physical installation. The actual tilt at any point in time is the summation of "mechanicalOffset" and "retTiltValue"	A single integral value corresponding to an angle in degrees between 0 and 360 with a resolution of 0.1 degrees, see Note 1.
minTiltValue	The minimum amount of tilt the RET system can support. This helps in preventing the user from entering any unrealistic value for 'retTiltValue' and hence prevents the motors on the RET unit from getting jammed / burnt out.	A single integral value corresponding to an angle in degrees between 0 and 360 with a resolution of 0.1 degrees, see note 1. (also see section 7.7.5.11 RET TR.25.802 Note 1
mnc	Mobile Network Code, MNC (part of the PLMN Id, Ref. 3GPP TS 23.003 [3]).	
primaryCcpchPower	IOCs <b>UtranCell</b> and <b>ExternalUtranCell</b> : The power of the primary CCPCH channel in the TDD cell (Ref. 3GPP TS 25.433 [5]).  IOC <b>UtranRelation</b> : The power of the primary CCPCH channel in the TDD cell (Ref. 3GPP TS 25.433 [5]), for another UTRAN TDD cell or the external UTRAN TDD Cell that is broadcast in the system information in the Cell.	Type: Numeric value Range: (-15..+40 dBm) Steps of 0.1dB
nodeBFunctionId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
primaryCpichPower	IOCs <b>UtranCell</b> and <b>ExternalUtranCell</b> : The power of the primary CPICH channel in the FDD mode cell (Ref. 3GPP TS 25.433 [5]). IOC <b>UtranRelation</b> : The power of the primary CPICH channel in the FDD mode cell (Ref. 3GPP TS 25.433 [5]), for another UTRAN FDD mode cell or the external UTRAN FDD mode cell that is broadcast in the system information in the cell.	Type: Numeric value Range: (-10..50 dBm) Steps of 0.1 dB
primarySrchPower	The power of the primary synchronisation channel in the FDD mode cell, DL Power (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (-35..+15 dB) Steps of 0.1dB
primaryScramblingCode	IOCs <b>UtranCell</b> and <b>ExternalUtranCell</b> : The primary DL scrambling code used by the FDD mode cell (Ref. 3GPP TS 25.433 [5]). IOC <b>UtranRelation</b> : The primary DL scrambling code used by the FDD mode cell (Ref. 3GPP TS 25.433 [5]), for another UTRAN FDD mode cell or the external UTRAN FDD mode cell that is broadcast in the system information in the cell.	Type: Integral numeric value Range: (0..511)
rac	Routing Area Code, RAC (Ref. 3GPP TS 23.003 [3]).	Type: Integral numeric value Range: (0..255)
retAntennaFunctionList	This is a referential attribute to list the DNs of AntennaFunction(s) that support the UtranCell.	A list of DNs as defined in TS 32.300 [13]

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.	Type: string bounded to 80 characters.
retTiltValue	Gives you the tilt value of the antenna that has been made using electrical means (i.e. using RET). This attribute gives the operator an indication of the current setting of the antenna and is at the centre of the RET feature.	A single integral value corresponding to an angle in degrees between 0 and 360 In 0.1 degree increments (see Note 1)
retUtranCellList	This is a list of UtranCell DNs to record the relationship between the AntennaFunction instance and the UtranCell(s) which are supported by the antenna.	A list of DNs as defined in TS 32.300 [13]
rncFunctionId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
rncId	IOC ExternalUtranCell: Unique RNC ID for the associated RNC (Ref. 3GPP TS 23.003 [3]). IOC RncFunction: Unique RNC ID (Ref. 3GPP TS 23.003 [3]).	
sac	Service Area Code, SAC (Ref. 3GPP TS 23.003 [3]).	Type: Integral numeric value Range: (0.. 65535)
schPower	The power of the synchronisation channel in 3.84 Mcps TDD cell (Ref. 3GPP TS 25.433 [5]).	Type: Numeric Value Range: (-35..+15 dB) Steps of 0.1dB
secondarySchPower	The power of the secondary synchronisation channel in the cell, DL Power (Ref. 3GPP TS 25.433 [5]).	Type: Numeric value Range: (-35..+15 dB) Steps of 0.1dB
timeSlotList	This attribute defines the time slot configuration information in the TDD cell. It is a list which contains 7 (for 1.28 Mcps TDD cell) or 15 (for 3.84 Mcps TDD cell) items. Within each item there are three parts: timeSlotId, timeSlotDirection, timeSlotStatus (Ref. 3GPP TS 25.433 [5]).	timeSlotId: when applied to 1.28 Mcps TDD cell: Type: Integral numeric value Range: (0..6); when applied to 3.84 Mcps TDD cell: Type: Integral numeric value Range: (0..14);  timeSlotDirection: Type: Enumerated value Range: (UI, DI);  timeSlotStatus: Type: Enumerated value Range: (Active, Not active)
uarfcn	IOCs UtranCell and ExternalUtranCell: The UTRA absolute Radio Frequency Channel number for TDD mode cell, UARFCN (ref. 3 GPP TS 25.433 [5]).  IOC UtranRelation: The UTRA absolute Radio Frequency Channel number for TDD mode cell, UARFCN (ref. 3 GPP TS 25.433 [5]), for another UTRAN TDD mode cell or the external UTRAN TDD mode Cell that is broadcast in the system information in the Cell.	Type : Integral numeric Value (0..16383)
uarfcnDl	IOCs UtranCell and ExternalUtranCell: The DL UTRA absolute Radio Frequency Channel number for FDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]).  IOC UtranRelation: The DL UTRA absolute Radio Frequency Channel number for FDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]), for another UTRAN FDD mode cell or the external UTRAN FDD mode cell that is broadcast in the system information in the Cell.	Type: Integral numeric value Range: (0..16383)

uarfcnUl	<p>IOCs <b>UtranCell</b> and <b>ExternalUtranCell</b>: The UL UTRA absolute Radio Frequency Channel number for FDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]).</p> <p>IOC <b>UtranRelation</b>: The UL UTRA absolute Radio Frequency Channel number for FDD mode cell, UARFCN (Ref. 3GPP TS 25.433 [5]) for another UTRAN FDD mode cell or the external UTRAN FDD mode cell, that is broadcast in the system information in the Cell.</p>	Type: Integral numeric value Range: (0..16383)
uraList	A list of UTRAN Registration Area, URA (Ref. 3GPP TS 25.331 (subclause 10.3.10)[9]), that an UtranCell can belong to.	Type: A list of Integral numeric values Range: (0..65535) for each integral numeric value.
userLabel	A user-friendly (and user assigned) name of the associated object. Inherited from <i>ManagedFunction</i> .	
utranCellId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
utranRelationId	An attribute whose "name+value" can be used as an RDN when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.	
Note 1.	If an antenna vendor can only support a granularity of tilt value in 5 degree increments, it means that the value of tilt over the Itf-N would be 0, 50, 100, 150 etc, corresponding to an integral number of 0.1 degree values.	

## 6.5.2 Constraints

None.

## 6.6 Particular information configurations

Not applicable.

Annex A (informative):  
Void

## Annex B (informative): RET Control Architecture

The Itf-N provides an abstraction of resources to allow the monitor and control of physical resource from the network level management systems. For RET, the antenna tilt is controlled via a control unit which is located within the NodeB (from a management perspective). The control unit sends commands to actuators located at the tower top, in order to read, and to adjust antenna tilt values.

The AntennaFunction class will report failures and malfunctions of either the control unit, or the tilt.

There are several configurations of antennae. Some support the transmission of several frequencies from a single radome while others are deployed as an array in order to provide effective coverage.

Hence in the UTRAN model there is an N:M relationship between UtranCell's and the AntennaFunction class, permitting the model to support all possibilities. The figure B.1 below illustrates the RET architecture.

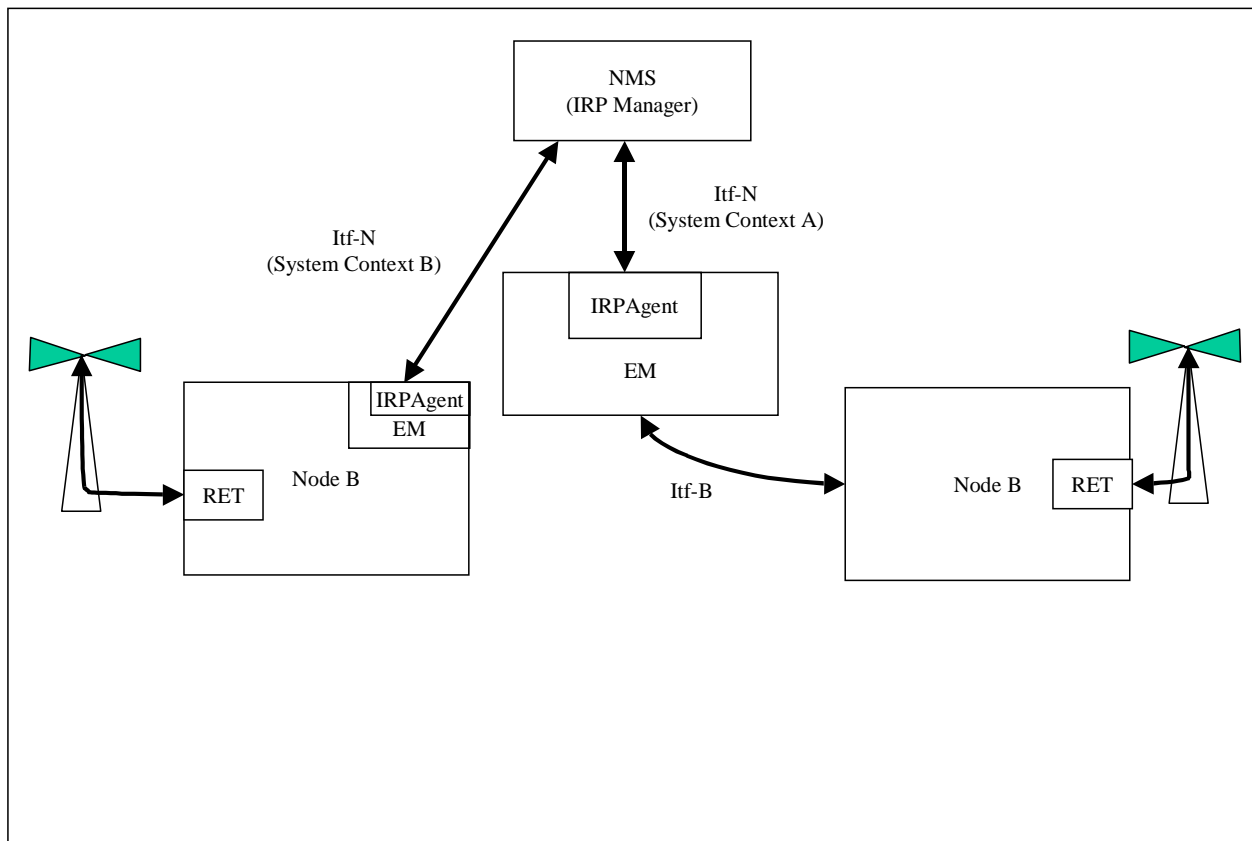


Figure B.1 Overall RET architecture

## Annex C (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Jun 2001	S_12	SP-010283	--	--	Approved at TSG SA #12 and placed under Change Control	2.0.0	4.0.0
Jun 2002	S_16	SP-020303	001	--	Corrections of reference in figure 6.2 and of attribute descriptions in UtranRelation in 32.642 (UTRAN network resources IRP: NRM)	4.0.0	4.1.0
Jun 2002	S_16	SP-020304	002	--	Correction of supported IRP in system context	4.0.0	4.1.0
Sep 2002	S_17	SP-020490	003	--	UML corrections	4.1.0	4.2.0
Sep 2002	S_17	SP-020492	004	--	Add the new IRP IS methodology defined in 32.102	4.2.0	5.0.0
Sep 2002	S_17	SP-020492	005	--	Add State Management	4.2.0	5.0.0
Dec 2002	S_18	SP-020748	006	--	Inclusion of valid values and ranges for UTRAN Cell parameters	5.0.0	5.1.0
Jan 2003	--	--	--	--	Accepted all revision marks	5.1.0	5.1.1
Jun 2003	S_20	SP-030282	008	--	Include notification tables	5.1.1	5.2.0
Jun 2003	S_20	SP-030282	010	--	Correction of UML diagram vsDataContainer Containment/Naming and Association in UTRAN NRM	5.1.1	5.2.0
Jun 2003	S_20	SP-030283	012	--	Deletion of UTRAN attribute relationType	5.1.1	5.2.0
Dec 2003	S_22	SP-030715	014	--	Correction in attribute description for "maximumTransmissionPower" to remove dual interpretation - Align with RAN3's 25.433	5.2.0	5.3.0
Dec 2003	S_22	SP-030646	016	--	Correction of the number of possible URAs from 1 to 8	5.2.0	5.3.0
Dec 2003	S_22	SP-030641	017	--	Add missing notification notifyPotentialFaultyAlarmlist	5.2.0	5.3.0
Dec 2003	S_22	SP-030643	018	--	Remove redundant VsDataContainer Containment UML - Now covered by 32.622	5.2.0	5.3.0
Mar 2004	S_23	SP-040129	019	--	Addition of new attributes for support of both FDD and TDD modes	5.3.0	6.0.0
Jun 2004	S_24	SP-040254	021	--	Correction of the supported UMTS frequencies	6.0.0	6.1.0
Sep 2004	S_25	SP-040584	022	--	Add support for the state change notification in UTRAN network resources IRP NRM	6.1.0	6.2.0
Sep 2004	S_25	SP-040595	023	--	Include ATM in CM UTRAN network resources IRP NRM	6.1.0	6.2.0
Sep 2004	S_25	SP-040585	026	--	Align with the IRP IS template (32.151) and IRP IS UML repertoire (32.152)	6.1.0	6.2.0
Sep 2004	S_25	SP-040587	027	--	Add support for Remote control of Electrical Tilting (RET) antenna CR not implementable (UML conflict) New CR028 SA#26 approved	6.1.0	6.2.0
Dec 2004	S_26	SP-040810	028	--	Add AntennaFunction class and attributes to support RET (Remote control of Electrical Tilting)	6.2.0	6.3.0
Dec 2004	S_26	SP-040810	029	--	Add support for the state change notification	6.2.0	6.3.0

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# History

<b>Document history</b>		
V6.3.0	December 2004	Publication