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*Technical Specification*

**Digital cellular telecommunications system (Phase 2+);  
Telecommunication management;  
Configuration Management (CM);  
GERAN network resources Integration Reference Point (IRP);  
Network Resource Model (NRM)  
(3GPP TS 32.652 version 10.1.0 Release 10)**

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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:

- 32.651: Configuration Management (CM); GERAN network resources Integration Reference Point (IRP): Requirements
- 32.652: Configuration Management (CM); GERAN network resources Integration Reference Point (IRP): Network Resource Model (NRM)**
- 32.653: Configuration Management (CM); GERAN network resources Integration Reference Point (IRP): Common Object Request Broker Architecture (CORBA) Solution Set (SS)
- 32.655: Configuration Management (CM); GERAN 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.

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# 1 Scope

The present document specifies the GERAN network resource information that can be communicated between an IRPAgent and one or several IRPManagers for network management purposes.

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.

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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 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".
- [4] 3GPP TS 44.018: "Mobile radio interface layer 3 specification; Radio Resource Control (RRC) protocol".
- [5] 3GPP TS 45.008: "Radio subsystem link control".
- [6] 3GPP TS 45.002: "Multiplexing and multiple access on the radio path".
- [7] ITU-T Recommendation X.710 (1991): "Common Management Information Service Definition for CCITT Applications".
- [8] 3GPP TS 23.003: "Numbering, Addressing and Identification".
- [9] 3GPP TS 32.672: "Telecommunication management; Configuration Management (CM); State Management Integration Reference Point (IRP): Information Service (IS)".
- [10] Void.
- [11] 3GPP TS 32.111-2: "Telecommunication management; Fault Management (FM); 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] Void.
- [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)".
- [19] 3GPP TS 32.642: " Telecommunication management; Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP); Network Resource Model (NRM) ".
- [20] 3GPP TS 23.002: "Network architecture".
- [21] 3GPP TS 32.792: "Generic Radio Access Network (RAN) Network Resource Model (NRM) 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].

**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).

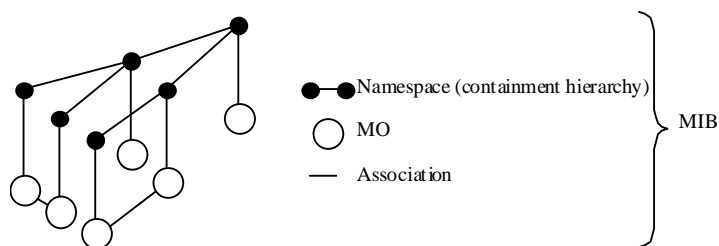
**Managed Element (ME):** An instance of the IOC ManagedElement, defined in 3GPP TS 32.622 [16].

**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 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 Base (MIB):** A MIB is an instance of an NRM and has some values on the defined attributes and associations specific for that instance. In the context of the present document, an MIB consists of:

- (1) a Name space (describing the MO containment hierarchy in the MIB through Distinguished Names),
- (2) a number of IOCs with their attributes and
- (3) a number of Associations between these IOCs. Also note that TMN (ITU-T Recommendation X.710 [7]) defines a concept of a Management Information Tree (also known as a Naming Tree) that corresponds to the name space (containment hierarchy) portion of this MIB definition. Figure 3.1 depicts the relationships between a Name space and a number of participating MOs (the shown association is of a non-containment type).





**Figure 3.1: Relationships between a Name space and a number of participating MOs**

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

**Name space:** A name space is a collection of names. The IRP name convention (see 3GPP TS 32.300 [13]) restricts the name space to a hierarchical containment structure, including its simplest form - the one-level, flat name space. All Managed Objects in a MIB shall be included in the corresponding name space and the MIB/name space shall only support a strict hierarchical containment structure (with one root object). A Managed Object that contains another is said to be the superior (parent); the contained Managed Object is referred to as the subordinate (child). The parent of all MOs in a single name space is called a Local Root. The ultimate parent of all MOs of all managed systems is called the Global Root.

**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.

## 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
FM	Fault Management
GERAN	GSM-EDGE Radio Access Network
GPRS	General Packet Radio System
IOC	Information Object Class
IRP	Integration Reference Point
ME	Managed Element
MIB	Management Information Base
MIM	Management Information Model
MO	Managed Object
NE	Network Element
NR	Network Resource
NRM	Network Resource Model
RDN	Relative Distinguished Name (see 3GPP TS 32.300 [13])
RNC	Radio Network Controller
SS	Solution Set
TMN	Telecommunications Management Network
UML	Unified Modelling Language
XML	eXtensible Mark-up Language

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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 SA5-compliant IRPManager with respect to all Mandatory and Optional information object classes, attributes, associations, operations, parameters and notifications 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 clause 5 of Generic Network Resources IRP: NRM 3GPP TS 32.622 [16].

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## 6 Information Object Classes

### 6.1 Imported information entities and local labels

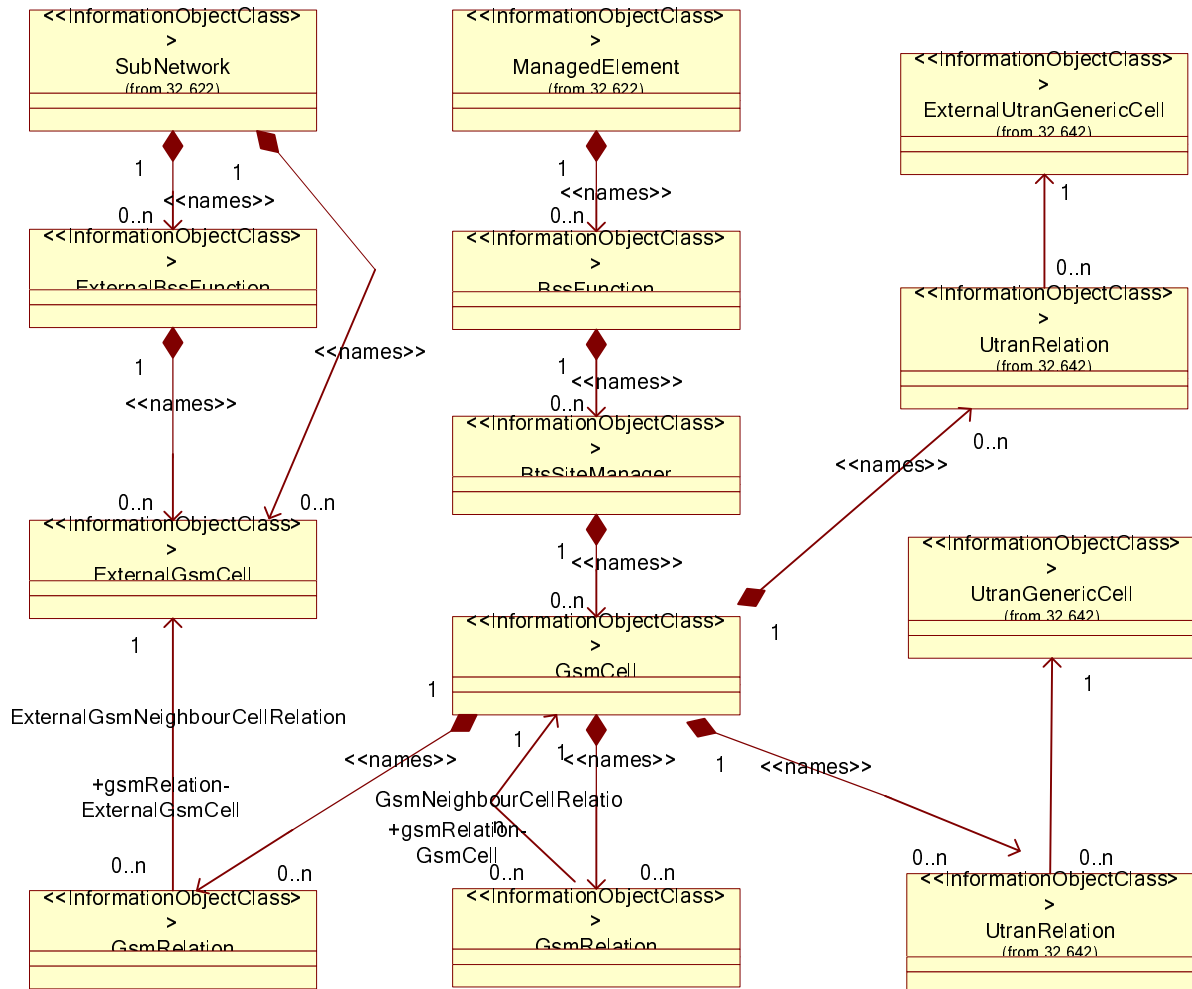
Label reference	Local label
3GPP TS 32.622 [16], information object class, ManagedElement	ManagedElement
3GPP TS 32.622 [16], information object class, ManagedFunction	ManagedFunction
3GPP TS 32.622 [16], information object class, SubNetwork	SubNetwork
3GPP TS 32.622 [16], information object class, Top	Top
3GPP TS 32.622 [16], information object class, VsDataContainer	VsDataContainer
3GPP TS 32.642 [19], information object class, ExternalUtranGenericCell	ExternalUtranGenericCell
3GPP TS 32.642 [19], information object class, UtranGenericCell	UtranGenericCell
3GPP TS 32.642 [19], information object class, UtranRelation	UtranRelation

## 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.

The figures below show the containment/naming hierarchy and the associations of the GERAN NRM.



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

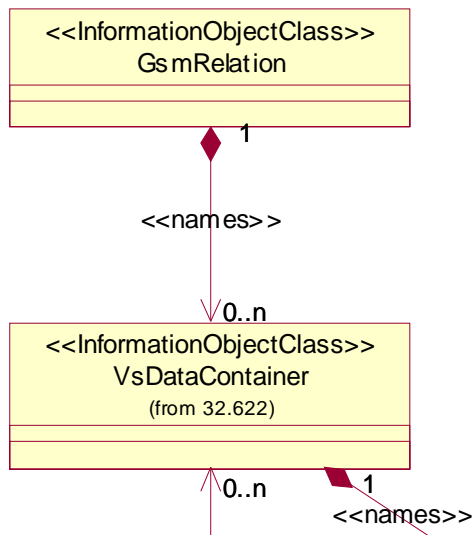
NOTE 2: TheUtranGenericCell, ExternalUtranGenericCell, GsmRelation and UtranRelation can be contained under IOCs defined in other NRMs.

NOTE 3: The ExternalBssFunction is used in the Core Network NRM.

**Figure 6.1: GERAN NRM Containment/Naming and Association diagram**

Each Managed Object 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, BssFunction=BSS1.



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 6.2: GERAN NRM Containment/Naming and Association diagram**

The VsDataContainer is only used for the Bulk CM IRP.

## 6.2.2 Inheritance

This clause depicts the inheritance relationships that exist between IOCs.

Figure 6.3 shows the inheritance hierarchy for the GERAN NRM.

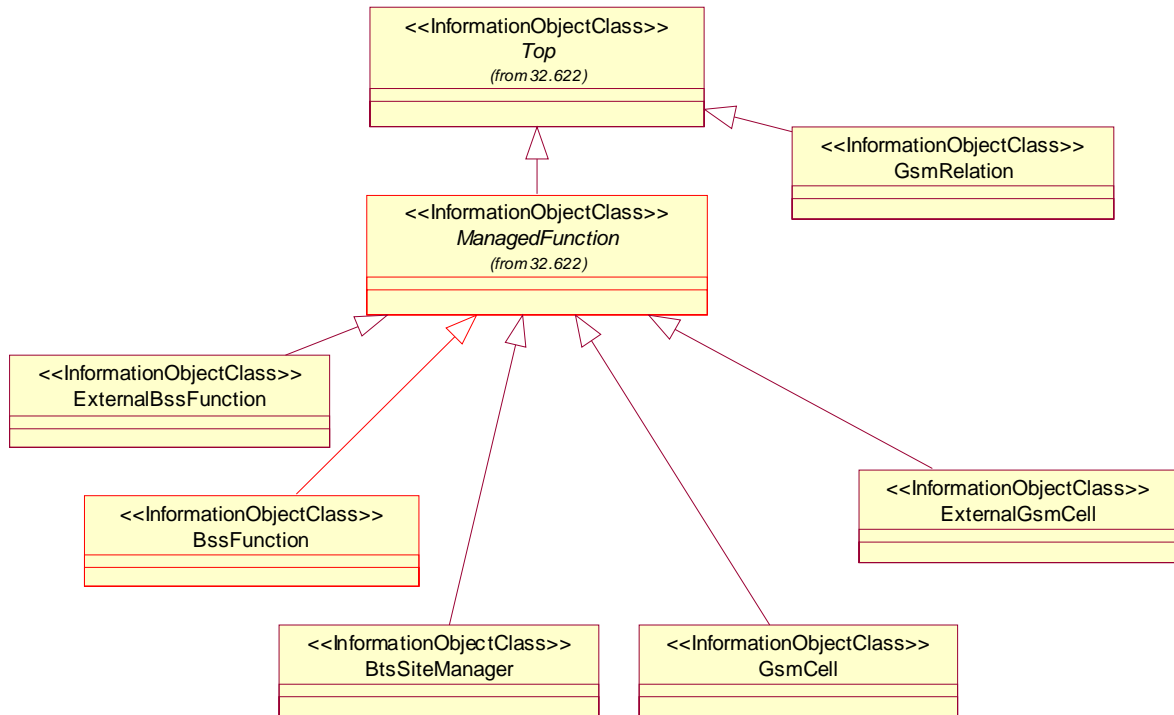


Figure 6.3: GERAN NRM Inheritance Hierarchy

## 6.3 Information object class definitions

### 6.3.1 BssFunction

#### 6.3.1.1 Definition

This IOC represents BSS functionality. For more information about the BSS, see Ref 3GPP TS 23.002 [20].

#### 6.3.1.2 Attributes

Table 6.1: Attributes of BssFunction

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-

### 6.3.2 BtsSiteMgr

#### 6.3.2.1 Definition

This IOC contains site specific information for a BTS site.

## 6.3.2.2 Attributes

**Table 6.3a: Attributes of BtsSiteMgr**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
latitude	O	M	M
longitude	O	M	M

**Table 6.3b: Additional attributes of BtsSiteMgr 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 GsmCell

### 6.3.3.1 Definition

This IOC represents the GSM radio cell. The applicability of instantiation of this class is depending on the ME type. It may only be instantiated under ME of type BSC.

### 6.3.3.2 Attributes

**Table 6.5: Attributes of GsmCell**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
cellIdentity	M	M	M
cellAllocation	M	M	M
ncc	M	M	M
bcc	M	M	M
lac	M	M	M
mcc	M	M	M
mnc	M	M	M
rac	CM	M	M
racc	CM	M	M
tsc	CM	M	M
rxLevAccessMin	M	M	M
msTxPwrMaxCCH	M	M	M
rfHoppingEnabled	M	M	M
hoppingSequenceList	M	M	M
plmnPermitted	M	M	M

### 6.3.3.3 Attribute constraints

Name	Definition
rac CM support qualifier	GPRS is supported in the cell.
racc CM support qualifier	GPRS is supported in the cell.

The attribute `tsc` shall be included if the BSS is only used in GSM and if the BSS is shared by several RATs, this attribute shall not be included in `GsmCell` and it can be available from the IOC `GsmCellPart` in TS 32.792[21].

## 6.3.4 GsmRelation

### 6.3.4.1 Definition

This IOC contains radio network related parameters for the relation to the `GsmCell` or `ExternalGsmCell` managed object. Note: In handover relation terms, the cell containing the `GsmRelation` object is the source cell for the handover. The cell referred to in the `GsmRelation` 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.

### 6.3.4.2 Attributes

**Table 6.7: Attributes of GsmRelation**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
<code>id</code>	M	M	-
<code>adjacentCell</code>	M	M	M
<code>bcchFrequency</code>	CM	M	-
<code>ncc</code>	CM	M	-
<code>bcc</code>	CM	M	-
<code>lac</code>	CM	M	-

### 6.3.4.3 Attribute constraints

Name	Definition
<code>bcchFrequency</code> CM support qualifier	The EM does not guarantee consistency between the cell definition and what is broadcasted on system information.
<code>ncc</code> CM support qualifier	The EM does not guarantee consistency between the cell definition and what is broadcasted on system information.
<code>bcc</code> CM support qualifier	The EM does not guarantee consistency between the cell definition and what is broadcasted on system information.
<code>lac</code> CM support qualifier	The EM does not guarantee consistency between the cell definition and what is broadcasted on system information.

The attribute `bcchFrequency` may be included if the BSS is only used in GSM and if the BSS is shared by several RATs, this attribute shall not be included in `GsmRelation` and it can be available from the attribute `aRFCN` of IOC `GSMCellPart` in TS 32.792[21].

## 6.3.5 ExternalGsmCell

### 6.3.5.1 Definition

This IOC represents a radio cell controlled by another `IRPAgent`. This IOC has necessary attributes for inter-system handover. It contains a subset of the attributes of related IOCs controlled by another `IRPAgent`. To maintain the consistency between the attribute values of these two IOCs is outside the scope of this document.

## 6.3.5.2 Attributes

**Table 6.9: Attributes of ExternalGsmCell**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-
cellIdentity	M	M	M
bcchFrequency	M	M	M
ncc	M	M	M
bcc	M	M	M
lac	M	M	M
mcc	M	M	M
mnc	M	M	M
rac	CM	M	M
racc	CM	M	M

## 6.3.5.3 Attribute constraints

Name	Definition
rac CM support qualifier	GPRS is supported in the cell.
racc CM support qualifier	GPRS is supported in the cell.

## 6.3.6 ExternalBssFunction

### 6.3.6.1 Definition

This IOC represents a `BssFunction` controlled by another `IRPAgent`. It contains a subset of the attributes of related IOCs controlled by another `IRPAgent`. To maintain the consistency between the attribute values of these two IOCs is outside the scope of the present document.

### 6.3.6.2 Attributes

**Table 6.11: Attributes of ExternalBssFunction**

Attribute name	Support Qualifier	Read Qualifier	Write Qualifier
id	M	M	-

### 6.3.6.3 Attribute constraints

None.

## 6.4 Information relationship definitions

### 6.4.1 ExternalGsmNeighbourCellRelation (M)

#### 6.4.1.1 Definition

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

#### 6.4.1.2 Roles

**Table 6.11: Roles of the relation ExternalGsmNeighbourCellRelation**

Name	Definition
gsmRelation-externalGsmNeighbourCell	This role (when present) represents <code>GsmRelation</code> capability to identify one <code>ExternalGsmCell</code> . When this role is present, the <code>GsmRelation.adjacentCell</code> shall contain one <code>ExternalGsmCell</code> DN.



### 6.4.1.3 Constraints

Name	Definition
external_neighbour_cell_relation	The role <code>gsmRelation-externalGsmNeighbourCell</code> is only present if the target cell is managed by another <code>IRPAgent</code> than the serving cell.

## 6.4.2 GsmNeighbourCellRelation (M)

### 6.4.2.1 Definition

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

### 6.4.2.2 Roles

**Table 6.12: Roles of the relation GsmNeighbourCellRelation**

Name	Definition
<code>gsmRelation-gsmNeighbourCell</code>	This role (when present) represents <code>GsmRelation</code> capability to identify one <code>GsmCell</code> . When this role is present, the <code>GsmRelation.adjacentCell</code> shall contain one <code>GsmRelation</code> DN.

### 6.4.2.3 Constraints

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

Name	Definition
<code>internal_neighbour_cell_relation</code>	The role <code>gsmRelation-gsmNeighbourCell</code> is only present if the target cell is managed by the same <code>IRPAgent</code> as the serving cell.

## 6.5 Information attribute definitions

### 6.5.1 Definition and legal values

Table 6.13 defines the attributes that are present in several information object classes of the present document.

**Table 6.13: Attributes**

Attribute Name	Definition	Legal Values
adjacentCell	Pointer to GSM cell or external GSM cell. Distinguished Name of the corresponding object.	
bcc	<u>IOCs <i>GsmCell</i> and <i>ExternalGsmCell</i>:</u> Base station colour code, BCC (part of BSIC). Ref 3GPP TS 44.018 [4]. <u>IOC <i>GsmRelation</i>:</u> Base station colour code, BCC (part of BSIC. Ref 3GPP TS 44.018 [4]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.	See Ref 3GPP TS 44.018 [4].
bcchFrequency	<u>IOC <i>ExternalGsmCell</i>:</u> This attribute contains the absolute radio frequency channel number of the BCCH channel of the GSM cell. <u>IOC <i>GsmRelation</i>:</u> This attribute contains the absolute radio frequency channel number of the BCCH channel of another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.	
cellAllocation	This attribute defines the set of radio frequencies allocated and available to a cell, the first element sets the BCCH frequency, Ref 3GPP TS 44.018 [4].	See Ref 3GPP TS 44.018 [4].
cellIdentity	Cell Identity (Ref 3GPP TS 24.008 [3]).	See Ref 3GPP TS 24.008 [3].
hoppingSequenceList	A list of hopping sequence, which is a structure including MA(see 44.018[4]) and HSN(see 45.002[6]).	See Ref 3GPP TS 44.018 [4].
lac	<u>IOCs <i>GsmCell</i> and <i>ExternalGsmCell</i>:</u> Location Area Code, LAC . Ref 3GPP TS 24.008 [3]. <u>IOC <i>GsmRelation</i>:</u> Location Area Code, LAC (Ref 3GPP TS 24.008 [3]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.	See Ref 3GPP TS 24.008 [3].
latitude	Used for geographical positioning of the sitemanager	
longitude	Used for geographical positioning of the sitemanager	
mcc	Mobile Country Code, MCC (part of the PLMN Id, Ref. 3GPP TS 23.003 [8]).	See Ref 3GPP TS 24.008 [3].
mnc	Mobile Network Code, MNC (part of the PLMN Id, Ref. 3GPP TS 23.003 [8]).	See Ref 3GPP TS 24.008 [3].
msTxPwrMaxCCH	Maximum Transmission Power for a Mobile Station on a CCH. Attribute description Ref 3GPP TS 45.008 [5] (MS_TXPWR_MAX_CCH)	See Ref 3GPP TS 45.008 [5].
ncc	<u>IOCs <i>GsmCell</i> and <i>ExternalGsmCell</i>:</u> Network Colour Code, NCC (part of BSIC). Ref 3GPP TS 44.018 [4]. <u>IOC <i>GsmRelation</i>:</u> Network Colour Code, NCC (part of BSIC. Ref 3GPP TS 44.018 [4]) for another GSM cell or the external GSM cell, that is broadcast in System Information in the Cell.	See Ref 3GPP TS 44.018 [4].
plmnPermitted	Network Colour Code Permitted. Attribute description reference 3GPP TS 45.008 [5] (NCC_PERMITTED)	See Ref 3GPP TS 45.008 [5].
rac	Routing Area Code, RAC. Ref 3GPP TS 44.018 [4].	See Ref 3GPP T

Attribute Name	Definition	Legal Values
		S 44.018 [4].
racc	Routing Area Colour Code, RACC. Ref 3GPP TS 44.018 [4].	See Ref 3GPP TS 44.018 [4].
rfHoppingEnabled	Indicates if frequency hopping is enabled.	Boolean values 0 represents 'disabled', 1 represents 'enabled'.
rxLevAccessMin	Minimum Access Level. Attribute description Ref 3GPP TS 45.008 [5] (RXLEV_ACCESS_MIN)	See Ref 3GPP TS 45.008 [5].
tsc	Training Sequence Code, an attribute of the class channel in Ref 3GPP TS 44.018 [4]	See Ref 3GPP TS 44.018 [4].

## 6.5.2 Constraints

Name	Definition
-	-

## 6.6 Common Notifications

The following notifications apply to the following IOCs:

- BssFunction;
- BtsSiteMgr;
- GsmCell.

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])	

The following notifications apply to the following IOCs:

- GsmRelation;
- ExternalGsmCell;

- ExternalBssFunction.

Name	Qualifier	Notes
notifyAttributeValueChange	O	
notifyObjectCreation	O	
notifyObjectDeletion	O	

## 6.7 Void

## Annex A (informative): Change history

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Cat	Old	New
Jun 2001	SA_12	SP-010283	--	--	Approved at TSG SA #12 and placed under Change Control		2.0.0	4.0.0
Sep 2001	SA_13	SP-010477	0001	--	Addition of mcc and mnc in the object model of GERAN	F	4.0.0	4.1.0
Dec 2001	SA_14	SP-010650	0002	--	Correction of references	F	4.1.0	4.2.0
Jun 2002	SA_16	SP-020305	0003	--	Addition of the attributes mcc and mnc in the object model of GERAN	F	4.2.0	4.3.0
Jun 2002	SA_16	SP-020305	0004	--	Correction of attribute descriptions in the Managed Object Class (MOC) GsmRelation of 32.652 (GERAN network resources IRP: NRM)	F	4.2.0	4.3.0
Jun 2002	SA_16	SP-020304	0005	--	Correction of supported IRP in system context	F	4.2.0	4.3.0
Sep 2002	SA_17	SP-020494	0006	--	UML corrections	F	4.3.0	4.4.0
Sep 2002	SA_17	SP-020496	0007	--	Add State Management	B	4.4.0	5.0.0
Dec 2002	--	--	--	--	Cosmetics	--	5.0.0	5.0.1
Jun 2003	SA_20	SP-030282	0010	--	Include notification tables	A	5.0.1	5.1.0
Jun 2003	SA_20	SP-030282	0012	--	Correction of UML diagram vsDataContainer Containment/Naming and Association in GERAN NRM	A	5.0.1	5.1.0
Jun 2003	SA_20	SP-030283	0014	--	Deletion of GERAN attribute relationType	A	5.0.1	5.1.0
Sep 2003	SA_21	SP-030418	0015	--	Inclusion of External BSS Function in GERAN NRM - Alignment with 32.632	F	5.1.0	5.2.0
Dec 2003	SA_22	SP-030641	0016	--	Add missing notification notifyPotentialFaultyAlarmlist	F	5.2.0	5.3.0
Dec 2003	SA_22	SP-030643	0017	--	VsDataContainer Containment UML - Now covered by 32.622	F	5.2.0	5.3.0
Sep 2004	SA_25	SP-040584	0018	--	Add support for the state change notification in GERAN network resources IRP NRM	B	5.3.0	6.0.0
Mar 2005	--	--	--	--	Title corrected (changed Release 5 to Release 6)	--	6.0.0	6.0.1
Jun 2005	SA_28	SP-050298	0019	--	Correction of System Context and Compliance rules	F	6.0.1	6.1.0
Dec 2005	SA_30	SP-050713	0020	--	Correct relationships for External IOCs	F	6.1.0	6.2.0
Dec 2005	SA_30	SP-050723	0021	--	Apply IS Template and the UML Repertoire - Align with 32.151 and 32.152	F	6.1.0	6.2.0
Jan 2006	--	--	--	--	Editorial correction to change history table.	--	6.2.0	6.2.1
Jun 2007	SA_36	--	--	--	Automatic upgrade to Rel-7 (no CR) at freeze of Rel-7. Deleted reference to CMIP SS, discontinued from R7 onwards.	--	6.2.1	7.0.0
Dec 2008	SA_42	--	--	--	Upgrade to Release 8	--	7.0.0	8.0.0
Dec 2009	SA_46	SP-090719	0022	--	Correction of imported IOC UtranCell and ExternalUtranCell from 32.642	F	8.0.0	9.0.0
Jan 2009	--	--	--	--	Removal of track changes	--	9.0.0	9.0.1
Sep 2010	SA_49	SP-100488	0024	--	Corrections of attribute hoppingSequenceNumber in GsmCell IOC	F	9.0.1	9.1.0
Sep 2010	SA_49	SP-100489	0023	--	Add attribute rfHoppingEnabled in GsmCell IOC	B	9.1.0	10.0.0
Mar 2011	SA-51	SP-110095	0025	--	Methodology clean-up of Configuration Management; GERAN network resources IRP; Network Resource Model	F	10.0.0	10.1.0
Mar 2011	SA-51	SP-110096	0026	--	Correcting the support qualifier of attributes tsc and bcchFrequency	F	10.0.0	10.1.0

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## History

<b>Document history</b>		
V10.1.0	April 2011	Publication