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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
Telecommunication management;
Configuration Management (CM);
Repeater network resources Integration Reference Point (IRP);
information Service (IS)
(3GPP TS 32.722 version 10.0.0 Release 10)**

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Foreword

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Contents

Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

    x   the first digit:

        1   presented to TSG for information;

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    y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

    z   the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

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

    32.721:   Configuration Management (CM); Repeater network resources Integration Reference Point (IRP); Requirements

    32.722:   **Configuration Management (CM); Repeater network resources Integration Reference Point (IRP); Information Service (IS)**

    32.726:   Configuration Management (CM); Repeater network resources Integration Reference Point (IRP); Solution Set (SS) definitions

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 is part of an Integration Reference Point (IRP) named "Repeater 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 Repeater resources. The "Repeater 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 Repeater Network Resources IRP: Network Resource Model. It reuses relevant parts of the generic NRM in TS 32.622 [10] and 32.642 [5], either by direct reuse or sub-classing, and in addition to that defines Repeater 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 Repeater specific NRM, based on the generic NRM in 3GPP TS 32.622 [10].

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[11]) or the Bulk CM IRP IS (3GPP TS 32.612 [12]). However, which IS that 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 TS 32.101: "Telecommunication management; Principles and high level requirements".

[2]   3GPP TS 32.102: "Telecommunication management; Architecture".

[3]   3GPP TS 25.401: "UTRAN Overall Description".

[4]   3GPP TS 25.433: "UTRAN Iub Interface NBAP Signalling".

[5]   3GPP TS 32.642: "Telecommunication management; Configuration Management (CM); UTRAN network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[6]   3GPP TS 32.111-2: "Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".

[7]   3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[8]   3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[9]   3GPP TS 23.002: "Network Architecture".

[10]   3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

[11]   3GPP TS 32.602: "Telecommunication management; Configuration Management (CM); Basic CM Integration Reference Point (IRP) Information Service (IS)".

[12]   3GPP TS 32.612: "Telecommunication management; Configuration Management (CM); Bulk CM Integration Reference Point (IRP): Information Service (IS)".

[13]   3GPP TS 25.106: "Technical Specification Group Radio Access Network; UTRA repeater radio transmission and reception".

3   Definition and Abbreviation

3.1   Definition

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 [8].

Repeater: A device that receives, amplifies and transmits the radiated or conducted RF carrier both in the down-link direction (from the base station to the mobile area) and in the up-link direction (from the mobile to the base station).

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 TS 32.622 [10].

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.

3.2   Abbreviations

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

CMIP	Common Management Information Protocol
CORBA	Common Object Request Broker Architecture
DN	Distinguished Name (see 3GPP TS 32.300 [7])
IOC	Information Object Class
IRP	Integration Reference Point

ITU	International Telecommunication Union
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 [7])
SS	Solution Set
TMN	Telecommunications Management Network
UML	Unified Modelling Language
UMTS	Universal Mobile Telecommunications System
XML	eXtensible Mark-up Language

4 Modelling approach

The present document is part of an Integration Reference Point (IRP) named "Repeater 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 modelling approach used in this IRP is described in 32.622 [10] Generic Network Resources IRP; NRM.

This model allows for combined managed element functionality, where more than one "function IOC" (inherited from ManagedFunction) modelling more specific managed element functionality may be contained in the ManagedElement IOC.

5 Information Object Classes

5.1 Imported information entities and local labels

Label reference	Local label
3GPP TS 32.622 [10], IOC, `ManagedElement`	ManagedElement
3GPP TS 32.622 [10], IOC, `ManagedFunction`	ManagedFunction
3GPP TS 32.622 [10], IOC, `Top`	Top
3GPP TS 32.622 [10], IOC, `VsDataContainer`	VsDataContainer

5.2 Class diagram

5.2.1 Attributes and relationships

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

The following figures show the name-containment relation and other types of relations of the Repeater NRM.
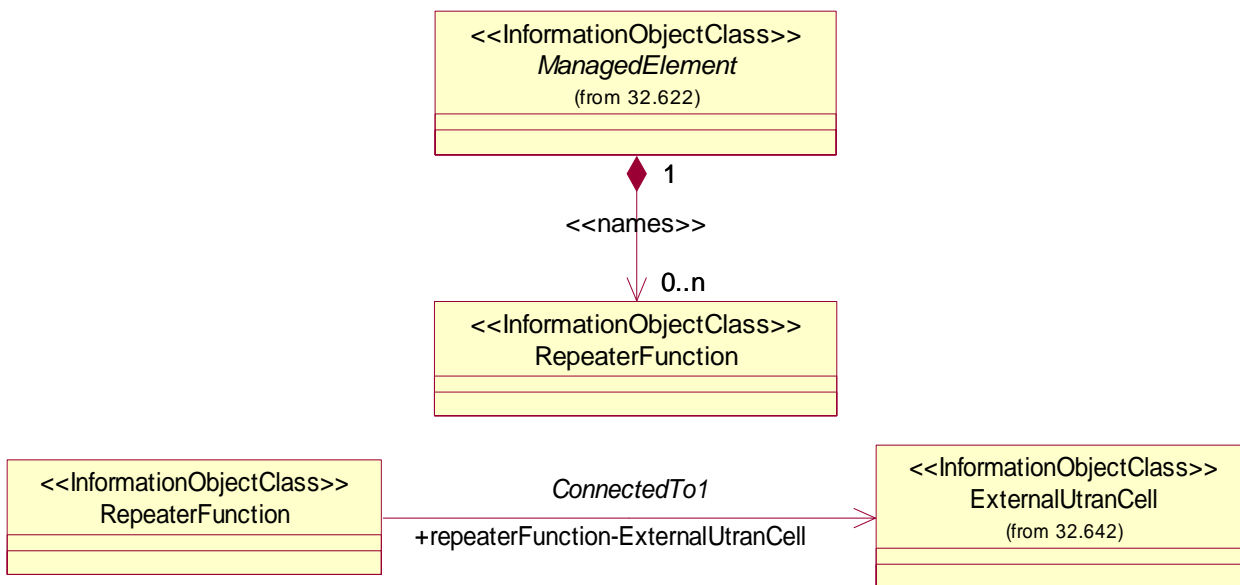
Figure 5.2.1.1: Repeater NRM Containment/Naming and Association diagram
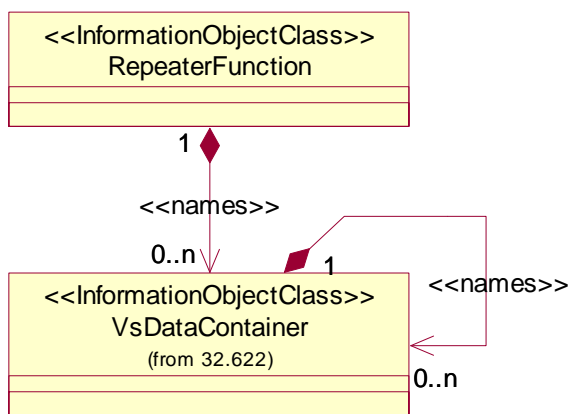
NOTE 1: The listed cardinality numbers represent transient as well as steady state numbers, and reflect all managed object creation and deletion scenarios.

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 5.2.1.2: `VsDataContainer` Containment/Naming and Association in Repeater NRM diagram

5.2.2   Inheritance

This clause depicts the inheritance relationships that exist between IOCs.

The following figure shows the inheritance hierarchy for the Repeater NRM.
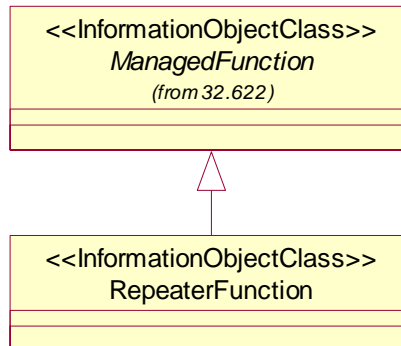

Figure 5.2.2.1: Repeater NRM Inheritance Hierarchy

5.3   Information object class definitions

5.3.1   RepeaterFunction

5.3.1.1   Definition

The current IOC represents the management aspect of repeater. For the information of repeater, see 3GPP TS 25.106 [4].

5.3.1.2   Attributes

Attribute of `RepeaterFunction`

Attribute name	Visibility	Support Qualifier	Read Qualifier	Write Qualifier
repeaterFunctionId	+	M	M	-
userLabel	+	M	M	M
Priority	+	M	M	M
latitude	+	M	M	-
longitude	+	M	M	-
ctrlConnMode	+	M	M	M
environmentInfo	+	M	M	-
powerSwitch	+	M	M	M
ulAttenuation	+	M	M	M
dlAttenuation	+	M	M	M
firmwareVer	+	M	M	-
repeaterType	+	M	M	-
repeaterFunction-ExternalUtranCell	+	M	M	-

Notifications of `RepeaterFunction`

Name	Qualifier	Notes
`notifyAttributeValueChange`	O	
`notifyChangedAlarm`	See Alarm IRP (3GPP TS 32.111-2 [6])	
`notifyClearedAlarm`	See Alarm IRP (3GPP TS 32.111-2 [6])	
`notifyNewAlarm`	See Alarm IRP (3GPP TS 32.111-2 [6])	
`notifyObjectCreation`	O	
`notifyObjectDeletion`	O	
`notifyComments`	See Alarm IRP (3GPP TS 32.111-2 [6])	
`notifyAlarmListRebuilt`	See Alarm IRP (3GPP TS 32.111-2 [6])	
`notifyPotentialFaultyAlarmList`	See Alarm IRP (3GPP TS 32.111-2 [6])	

5.4 Information relationship definitions

5.4.1 ConnectedTo1 (M)

5.4.1.1 Definition

This represents a uni-directional relationship between the `repeaterFunction` and `ExternalUtranCell`.
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.

5.4.1.2 Roles

Roles of the relation `ConnectedTo1`

Name	Definition
`repeaterFunction-ExternalUtranCell`	This role (when present) represents `repeaterFunction` capability to identify one `ExternalUtranCell`. When the role is absent, the `RepeaterFunction.repeaterFunction-ExternalUtranCell` shall contain no information. When present, it shall contain one `ExternalUtranCell` DN.

5.4.1.3 Constraints

When a particular `repeaterFunction` identifies a particular `UtranCell`.

5.5 Information attribute definitions

5.5.1 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
repeaterFunctionId	An attribute whose "name+value" can be used as an RDN (according to the rules in TS 32.300 [7]) when naming an instance of the object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance	
userLabel	A user-friendly (and user assigned) name of the associated object. Inherited from ManagedFunction.	
Priority	the priority of repeater decided by operator	Type: Integer
powerSwitch	Power switch of device which has two status: ON/OFF	Type: Bool
ulAttenuation	Downlink signal attenuation of the device to change downlink gain.	Type: Integer
dlAttenuation	Uplink signal attenuation of the device to change uplink gain	Type: Integer
firmwareVer	Version of device firmware	Type: String
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.	A single integral value in the range of -90.0000 to +90.0000.
longitude	The latitude 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.	A single integral value in the range of -180.0000 to +180.0000.
ctrlConnMode	Remote communication mode used by repeater to send and receive control message, such as GSM SMS, WCDMA SMS, Circle Switch Data-CSD, Package Switch Dat-IP, Serial port.	Type: String
environmentInfo	the repeater device is located either in the building or out of the building	Type: String
repeaterType	The repeater type defined by operator, such as wide band, frequency selective, indoor and fiber optic.	Type: String

5.5.2 Constraints

None.

Annex A (informative):
Change history

Change history								
Date	TSG #	TSG Doc.	CR	R	Subject/Comment	Cat	Old	New
Sep 2006	SA_33	SP-060559	--	--	Submitted to TSG SA #33 for Information		--	1.0.0
Dec 2006	SA_34	SP-060746	--	--	Submitted to TSG SA #34 for Approval.	--	2.0.0	7.0.0
Dec 2008	SA_42	--	--	--	Upgrade to Release 8	--	7.0.0	8.0.0
Dec 2009	-	-	-	-	Update to Rel-9 version	--	8.0.0	9.0.0
2011-03	-	-	-	-	Update to Rel-10 version (MCC)	--	9.0.0	10.0.0

History

Document history		
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