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Digital cellular telecommunications system (Phase 2+);
Network Management (NM)
procedures and messages on the A-bis interface
(3GPP TS 52.021 version 13.0.0 Release 13)

3GPP A GLOBAL INITIATIVE
GSM® GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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Contents

Foreword

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Introduction

(Background)

The use and general aspects of the A-bis interface are given in specification 3GPP TS 48.051. The split of telecommunications functions and management procedures between BSC and BTS are defined in specification 3GPP TS 48.052. Specification 3GPP TS 48.056 defines Layer 2 of the signalling messages.

The general aspects of NM are defined in specification GSM 12.00. Qx interface and protocol stack are defined in specification GSM 12.01. GSM 12.06 provides the functional requirements supported by the present document. The NM procedures and messages to support these operations over the A-bis interface are specified here. Specification GSM 12.20 provides the information model as seen on the OMC-BSC interface. Interworking between this model and the NM messages and procedures provided here is specified in GSM 12.22.

1 Scope

The present document addresses the network management messages and procedures across the A-bis interface, which is defined as Qx in GSM. The information model included here defines the objects and how they are addressed for purposes of operations and maintenance activities.

There is a requirement for the A-bis interface to be open to allow interoperation between BTSs of different manufacturers working to the same BSC. The present document addresses this requirement from O&M point of view, which allows this interworking to take place. It shows the split of NM functions between BSC and BTS. The procedures and coding of the messages are specified in detail. In practice, in addition to the present document it is necessary that the content of manufacturer-dependent information fields be specified to fulfill the functionality.

It is essential for operation that a BSC can handle the functions used by all its BTSs. Therefore, all items in the present document are considered mandatory unless otherwise indicated in the present document.

2 References

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

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

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 44.006: "Mobile Station - Base Stations System (MS - BSS) Interface Data Link (DL) Layer Specification".

[3] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[4] 3GPP TS 45.002: "Multiplexing and Multiple Access on the Radio Path".

[5] 3GPP TS 45.005: "Radio transmission and reception".

[6] 3GPP TS 45.008: "Radio subsystem link control".

[7] 3GPP TS 48.051: "Base Station Controller - Base Tranceiver Station (BSC-BTS) Interface General Aspects".

[8] 3GPP TS 48.052: "Base Station Controller - Base Tranceiver Station (BSC-BTS) Interface - Interface Principles".

[9] 3GPP TS 48.056: "BSC-BTS Layer 2 Specification".

[10] 3GPP TS 48.058: "Base Station Controler - Base Transceiver Station (BCS-BTS) Interface Layer 3 Specification".

[11] GSM 12.00 (GSM Phase 2): "Objectives and structure of Network Management (NM)".

[12] GSM 12.01 (GSM Phase 2): "Common aspects of GSM Network Management (NM)".

[13] GSM 12.06 (GSM Phase 2): "GSM Network Configuration Management and Administration".

[14] GSM 12.20 (GSM Phase 2): "Base Station System (BSS) Management Information".

[15] GSM 12.22 (GSM Phase 2): "Interworking of GSM Network Management (NM) procedures and messages at the Base Station Controller (BSC)".

[16] ITU-T Recommendation X.731: "Information technology - Open Systems Interconnection - Systems Management: State management function".

3 Definitions and abbreviations

3.1 Definitions

Definitions of terms used within the present document may be found mostly in clause5 in text context.

3.2 Abbreviations

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

ASN.1	(CCITT) Abstract Syntax Notation One
BSC	Base Station Controller
BSS	Base Station System
BTS	Base Transceiver Station
cont.	continued
HW	Hardware
LSB	Least Significant Byte
man. dep.	manufacturer dependent (with upper and lower case adjusted as appropriate)
MMI	Man-machine Interface
MSB	Most Significant Byte
MSC	Mobile-services Switching Centre
NE	Network Element
NM	Network Management
O&M	Operations and Maintenance
OMC	Operations and Maintenance Centre
RF	Radio Frequency
SAPI	Service Access Point Indicator
SW	Software
TEI	Terminal End-point Identifier
TMN	Telecommunications Management Network
TSC	Training Sequence Code

Further GSM related abbreviations may be found in 3GPP TS 21.905 [1].

4 Functional Split between BSC and BTS

Functional split of management functions between BSC and BTS is shown in table 1.

Table 1/GSM 12.2: Split of management functions between BSC and BTS

	BSC	BTS
Fault Management		
BTS		
test request	X	-
test execution	-	X
test analysis	NS	-
fault detection	-	X
fault localization	X (note)	X
fault reporting	X	X
Link		
testing (req,ex,rpt)	NS	-
fault detection	X	X
fault localization	X	X
fault reporting	X	X
Configuration Management		
Hardware	control/monitor	control
Software	control/monitor	monitor
State	control/monitor	control/monitor
Parameters	control/monitor	monitor
Performance Management		
Collection	X	X (radio path only)
Reporting	X	X (radio path only)
Administration	X	-
Security Management (Access Control to BTS)		
BTS)		
Control	-	X
Monitoring	-	X

NOTE: When fault localisation is not possible at the BTS it must be deduced at the BSC.

Legend: Abbreviations:
NS = Not Specified;
req = request;
X = Function exists;
ex = execution
- = Function non-exists;
rpt = report

5 Information Model

5.1 Managed Objects

The BCF mentioned in 3GPP TS 48.052 and 3GPP TS 48.056 is the agent at the BTS end of the A-bis O&M interface. It has four different descriptions depending on the object that is managed: Site Manager, BTS, Radio Carrier and Baseband Transceiver.

This model describes how objects are managed across A-bis interface, but it doesn't specify how information is transferred inside the site. That is, the manner of communication between an object and objects under it is not specified in the present document.

As shown in Figure 1, the Object Classes used on the A-bis interface are a subset of those found under Site Manager on the OMC-BSC interface. The Object Classes are listed below and the functionalities that describe them are found in table 2.

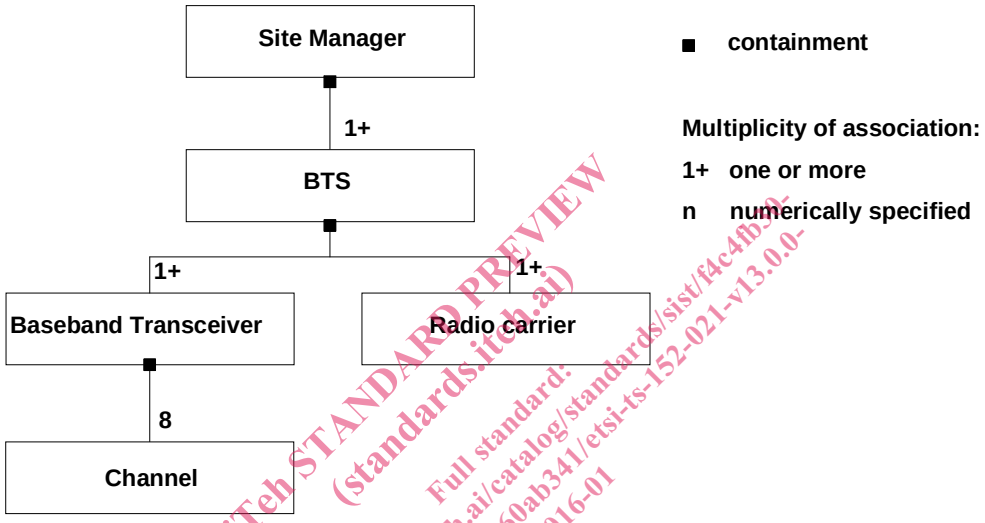
Site Manager: manages common control functions of several BTSs and transceivers on one site. These can include managing external alarms, front-end switch, etc. This model describes logical sites. There can be multiple logical sites in one physical site. Communication between entities within a logical site is manufacturer dependent.

BTS: is associated with one cell. BTSs are typically created at installation phase by connecting transceivers to antennas thus forming cells from the air interface point of view. The BTS can also contain control functions common to various transceivers. The way BTSs are formed from transceivers and how corresponding BTS numbers are determined is configuration dependent information, which is stored during installation.

Radio Carrier: represents manageable properties pertaining to radio transmission and reception of one carrier.

Baseband Transceiver: represents functions common to eight radio time slots.

Channel: is a physical channel in air interface, which can contain several logical channels depending on channel combination. A Channel is described with radio time slot and frequency hopping attributes (see 3GPP TS 45.002).



NOTE: Site Manager and BTS don't necessarily require separate equipment. For example, the Site Manager and a Baseband Transceiver can be associated with the same physical equipment.

Figure 1/GSM 12.21: Object model seen across A-bis interface

Table 2/GSM 12.21: Objects, attributes and procedures seen across A-bis interface

Object class	Attributes	Procedures
Site Manager	Abis Channel Availability Status HW Configuration Manufacturer Dependent State Manufacturer Id Operational State Site Inputs Site Outputs SW Configuration	Equipment Management Establish TEI Get Attributes Measurement Management Set Site Outputs State Management and Event Report SW Download Management Test Management
BTS	Administrative State Availability Status BCCH ARFCN BSIC BTS Air Timer CCCH Load Ind. Period CCCH Load Threshold Connection Failure Criterion GSM Time HW Configuration Intave Parameter Interterference Level Boundaries Manufacturer Dependent State Max Timing Advance Ny1 Operational State Overload Period RACH Busy Threshold RACH Load Averaging Slots SW Configuration T200	Equipment Management Get Attributes Measurement Management Report Procedures Set BTS Attributes State Management and Event Report SW Download Management Test Management
Radio Carrier	Administrative State ARFCN List Availability Status HW Configuration Manufacturer Dependent State Manufacturer Id Operational State Power Class RF Max Power Reduction SW Configuration	Equipment Management Get Attributes Measurement Management Set RadioCarrier Attributes State Management and Event Report SW Download Management Test Management
Baseband Transceiver	Abis Channel* Administrative State Availability Status HW Configuration Manufacturer Dependent State Manufacturer Id Operational State SW Configuration	Connect Terrestrial Signalling Disconnect Terrestrial Signalling Equipment Management Get Attributes Measurement Management State Management and Event Report SW Download Management Test Management
Channel	Abis Channel* Administrative State ARFCN List* Availability Status Channel Combination HW Configuration HSN* MAIO* Operational State SW Configuration TSC	Connect Terrestrial Traffic Disconnect Terrestrial Traffic Equipment Management Get Attributes Measurement Management Set Channel Attributes State Management and Event Report SW Download Management Test Management