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Foreword

This final draft European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Voting phase of the ETSI standards approval procedure.

This final draft ETS provides the management information model for the Configuration and Fault Management aspects of the GSM BSS Network Element as seen on the Q3 interface between the OS (e.g. OMC) and the BSS within the Digital cellular telecommunications system. This ETS corresponds to GSM technical specification, GSM 12.20, version 4.2.0.

NOTE: TC-SMG has produced documents which give technical specifications for the implementation of the Digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TSs). These specifications may subsequently become I-ETSs (Phase 1), or European Telecommunication Standards (ETSs)(Phase 2), whilst others may become ETSI Technical Reports (ETRs). These ETSI-GSM Technical Specifications are, for editorial reasons, still referred to in this ETS.

Proposed transposition dates	
Date of latest announcement of this ETS (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Introduction

The management of a GSM PLMN follows the systems management model outlined in CCITT X.701 [7] which breaks systems management into various aspects. The GSM 12.20 Specification addresses the information and functional aspects of the CCITT model. The model presented in GSM 12.20 defines the management information and, together with the behaviours and notifications, specifies the functional aspects as well.

For the purposes of this document, the management information consists of managed object classes, packages, attributes, name bindings, actions, notifications, and behaviours as described in CCITT X.722 [9], the Guidelines for the Definition of Managed Objects (GDMO). A managed object is the abstract view of a resource that is subject to management. An essential part of this view is the relationship between the properties of the resource as represented by the attributes in the model, and the operational behaviour of the resource. This relationship must be specified for each property and is found in the behaviour descriptions associated with the model elements.

The model described in this document should be seen as the basic model for configuration and fault management of a GSM BSS Network Element. It is, however, expected that in order to support the management of enhanced functionality introduced in the BSS, additions will later on have to be made to this model. These additions can either be pure extensions to the model or alternatives to already existing parts of the model.

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1 Scope

This final draft European Telecommunication Standard (ETS) provides the management information model for the Configuration and Fault Management aspects of the GSM Base Station System (BSS) Network Element as seen on the Q3 interface between the OS (e.g. OMC) and the BSS.

The information defined in this model is that which is required to manage the BSS Network Element as set forth in the GSM core specifications for telecommunications operation, and as specified in the GSM 12-series Specifications for management requirements. The management information defined in this ETS is primarily related to what is termed configuration and fault management within the CCITT X.701 [7] definition of Management Functional Areas. Additional management information elements of the BSS model for other management areas are defined in other GSM 12-series Specifications. For example, the management information related to the performance Management Functional Area is to be found in GSM 12.04 [27]. See GSM 12.00 [24] for a complete overview of the GSM 12-series specifications.

In addition to the formal GDMO definitions, additional information is included to aid in understanding the model and its elements. Summary descriptions, containment and inheritance diagrams, and entity relationship diagrams are provided for this purpose.

The general management information contained in the models specified in CCITT M.3100 [3] and CCITT X.7xx Recommendations is referenced in this ETS but the formal definitions are contained in the referenced documents.

2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments to, or revisions of, any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] CCITT Recommendation M.3010: "Principles for a Telecommunications Management Network".

[2] CCITT Recommendation M.3020: "TMN Interface Specification Methodology".

[3] CCITT Recommendation M.3100: "Generic Network Information Model".

[4] CCITT Recommendation M.3200: "TMN Management Services: Overview".

[5] CCITT Recommendation M.3400: "TMN Management Functions".

[6] CCITT Recommendation X.208: "Specification of Abstract Syntax Notation One (ASN.1)".

[7] CCITT Recommendation X.701(ISO/IEC 10040): "Information technology - Open Systems Interconnection - Systems Management Overview ".

[8] CCITT Recommendation X.721 (ISO/IEC 10165-2): "Information technology - Open Systems Interconnection - Structure of management information: Definition of Management Information".

[9] CCITT Recommendation X.722 (ISO/IEC 10165-4): "Information technology - Open Systems Interconnection - Structure of management information: Guidelines for the Definition of Managed Objects".

[10] CCITT Recommendation X.730 (ISO/IEC 10164-1): "Information technology - Open Systems Interconnection - Systems Management: Object Management Function".

[11] CCITT Recommendation X.731 (ISO/IEC 10164-2): "Information technology - Open Systems Interconnection - Systems Management: State Management Function".

[12] CCITT Recommendation X.733 (ISO/IEC 10164-4): "Information technology - Open Systems Interconnection - Systems Management: Alarm Reporting Function".

[13] CCITT Recommendation X.734 (ISO/IEC 10164-5): "Information technology - Open Systems Interconnection - Systems Management: Event Report Management Function".

[14] CCITT Recommendation X.735 (ISO/IEC 10164-6): "Information technology - Open Systems Interconnection - Systems Management: Log Control Function".

[15] GSM 01.04 (ETR 100): "Digital cellular telecommunication system (Phase 2); Abbreviations and acronyms".

[16] GSM 03.03 (ETS 300 523): "Digital cellular telecommunication system (Phase 2); Numbering, addressing and identification".

[17] GSM 04.06 (ETS 300 555): "Digital cellular telecommunication system (Phase 2); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[18] GSM 04.08 (ETS 300 557): "Digital cellular telecommunication system (Phase 2); Mobile radio interface layer 3 specification".

[19] GSM 05.02 (ETS 300 574): "Digital cellular telecommunication system (Phase 2); Multiplexing and multiple access on the radio path".

[20] GSM 05.05 (ETS 300 577): "Digital cellular telecommunication system (Phase 2); Radio transmission and reception".

[21] GSM 05.08 (ETS 300 578): "Digital cellular telecommunication system (Phase 2); Radio subsystem link control".

[22] GSM 08.08 (ETS 300 590): "Digital cellular telecommunication system (Phase 2); Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[23] GSM 08.58 (ETS 300 596): "Digital cellular telecommunication system (Phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface Layer 3 specification".

[24] GSM 12.00 (ETS 300 612-1): "Digital cellular telecommunication system (Phase 2); Objectives and structure of Network Management (NM)".

[25] GSM 12.01 (ETS 300 612-2): "Digital cellular telecommunication system (Phase 2); Common aspects of GSM Network Management (NM)".

[26] GSM 12.02 (ETS 300 613): "Digital cellular telecommunication system (Phase 2); Subscriber, Mobile Equipment (ME) and services data administration".

[27] GSM 12.04 (ETS 300 615): "Digital cellular telecommunication system (Phase 2); Performance data measurements".

[28] GSM 12.05 (ETS 300 616): "Digital cellular telecommunication system (Phase 2); Subscriber related event and call data".

[29] GSM 12.06 (ETS 300 617): "Digital cellular telecommunication system (Phase 2); GSM Network Configuration Management and Administration".

[30] GSM 12.21 (ETS 300 623): "Digital cellular telecommunication system (Phase 2); Network Management (NM) procedures and message on the A-bis interface".

[31] CCITT Recommendation Q.821: "Q3 Interface for Alarm Surveillance".

3 Abbreviations

The majority of the definitions and abbreviations used in this ETS are listed in GSM 01.04 [15]. In addition, for the purposes of this ETS, the following abbreviations apply:

GDMO	Guidelines for the Definition of Managed Objects
ME	Managed Element
MFA	Management Functional Area
MOC	Managed Object Class
OMC	Operations and Maintenance Centre
OS	Operations System
PDU	Protocol Data Unit
RDN	Relative Distinguished Name
SMF	System Management Function

4 TMN services and functions

The management of the GSM PLMN is required (GSM 12.00 [24]) to be based on TMN principles and methodology as defined in CCITT M.3010 [1] and CCITT M.3020 [2] respectively. TMN principles provide for standardized management through the definition of a TMN information architecture which consists of:

- a management information model;
- and the management information exchange.

This ETS defines the management information model for the Q3 interface for the BSS Network Element. The management information exchange for this interface is specified in GSM 12.01 [25].

In order to help specify the management information model the TMN methodology starts from a limited number of Management Services and identifies management service components which lead to management service functions which use one or more managed objects.

To help provide a framework for the determination of management service applications, CCITT has categorized management into five broad Management Functional Areas as follows:

- performance management;
- fault management;
- configuration management;
- accounting management;
- security management.

This ETS addresses management aspects related to the areas of fault management and configuration management of the BSS.

4.1 TMN management service

CCITT has begun the specification of standard services, components and functions. The management of customer access service defined in CCITT M.3200 [4] specifies a service related to the configuration and fault management functional areas for customer access equipment. This equipment is defined as existing between the network termination and the exchange termination. While this applies more for a fixed network it can serve as a guide for a management service for the configuration and fault management aspects of a BSS Network Element.

4.2 TMN management service components

Several service components are specified for each of the relevant Management Functional Areas in CCITT M.3400 [4]. Fault management contains the following service components:

- alarm surveillance;
- NE fault localization;
- fault correction;
- testing;
- trouble administration.

Of these service components, only the alarm surveillance component is directly supported by the object model defined in this ETS. Functions and managed objects to support the remaining service components are subjects for further study.

Configuration management contains the following service components:

- provisioning;
- NE status and control.

This ETS addresses the functions and objects necessary for these service components.

4.3 TMN management functions

A TMN management function is the smallest part of the TMN management service as perceived by the user of the service. It will generally consist of operations on a defined managed object or objects. In the following clauses specific TMN management functions are described. These descriptions specify various operations on managed object classes. The terms create, delete, get, set, action, and notification, refer to the appropriate pass through service specified in CCITT X.730 [10]. The object classes are introduced in Clause 5 of this ETS and are formally defined in Clauses 6 through 13.

TMN management functions may be supported by one or more OSI System Management Functions (SMFs). The TMN management functions defined here are supported by the following SMFs:

- object management function (CCITT X.730 [10]);
- state management function (CCITT X.731 [11]);
- alarm reporting function (CCITT X.733 [12]);
- event report management function (CCITT X.734 [13]);
- log control function (CCITT X.735 [14]).

4.3.1 Alarm surveillance management functions

The complete set of alarm surveillance management functions is specified in GSM 12.11.

Alarm surveillance functions are used to monitor and/or interrogate the BSS about events or conditions. Event data is generated by the BSS upon the detection of an abnormal condition. Examples of such events are detection of faulty equipment or software failures. Event data can be reported at the time of occurrence, logged for future access, or both.

Report Alarm Function

The BSS notifies the OS of alarm information upon the occurrence of an alarm. The objects representing resources that may fail and thus contain the capability of generating alarm notifications are :

basebandTransceiver
bsc
bts
btsSiteManager
channel
gsmEquipment
eventForwardingDiscriminator (X.721)
lapdLink
operatingSoftwareUnit
pcmCircuit
radioCarrier
transcoder

These objects may generate the following notifications:

communicationsAlarm (X.721)
environmentalAlarm (X.721)
equipmentAlarm (X.721)
processingErrorAlarm (X.721)
qualityofServiceAlarm (X.721)

Route Alarm Report Function

The OS specifies to the BSS the destination address(es) for a specified set of alarm reports.

Set	eventForwardingDiscriminator (X.721)

Request Alarm Report Route Function

The OS requests the BSS to send the current assignment of the destination address(es) for a specified set of alarm reports. The BSS responds with the current assignment.

Get	eventForwardingDiscriminator (X.721)

Condition Alarm Reporting Function

The OS instructs the BSS to assign event forwarding discriminator attributes as specified by the OS.

Create, Set, Delete	eventForwardingDiscriminator (X.721)

Request Alarm Report Control Condition Function

The OS requests the BSS to send the current assignment of specified event forwarding discriminator attributes. The BSS responds with the current assignment.

Get	eventForwardingDiscriminator (X.721)

Allow/Inhibit Alarm Reporting Function

The OS instructs the BSS to allow/inhibit alarm reports to the OS.

Set	eventForwardingDiscriminator (X.721)

Request Alarm Report History Function

The OS requests the BSS to send specified historical alarm information. The BSS responds with the specified information.

Get	alarmRecord (X.721)

Delete Alarm Report History Function

The OS requests the BSS to delete specified historical alarm information.

Delete	alarmRecord (X.721) log (X.721)

Allow/Inhibit Logging Function

The OS instructs the BSS to allow/inhibit logging of log records. This is controlled through the use of the administrativeState attribute.

Set	log (X.721)

Condition Logging Function

The OS instructs the BSS to assign log attributes as specified by the OS.

Create, Set, Delete	log (X.721)

Request Log Condition Function

The OS requests the BSS to send the current assignment of specified log attributes. The BSS responds with the current assignment.

Get	log (X.721)

4.3.2 Provisioning management functions

Provisioning functions, as specified in GSM 12.06 and CCITT M.3400 [5], are used to bring equipment into service, not including installation. The state of the unit and selected parameters may also be controlled by provisioning functions.

Grow Configuration Function

The OS notifies the BSS of the presence of a new entity. The objects (or subclasses) associated with the create operation represent resources that are related to the hardware configuration of the BSS. While there is not necessarily a one to one correspondence between these objects and hardware units, these objects can generally be associated with such units.

Create	adjacentCellHandOver
	adjacentCellReselection
	basebandTransceiver
	bsc
	bts
	btsSiteManager
	channel
	gsmEquipment
	executableSoftwareUnit
	lapdLink
	operatingSoftwareUnit
	pcmCircuit
	radioCarrier
	replaceableSoftwareUnit
	transcoder

Prune Configuration Function

The OS notifies the BSS of the removal of an existing entity. The objects (or subclasses) associated with the delete operation represent resources that are related to the hardware configuration of the BSS. While there is not necessarily a one to one correspondence between these objects and hardware units, these objects can generally be associated with such units.

Delete	adjacentCellHandOver
	adjacentCellReselection
	basebandTransceiver
	bsc
	bts
	btsSiteManager
	channel
	gsmEquipment
	executableSoftwareUnit
	lapdLink
	operatingSoftwareUnit
	pcmCircuit
	radioCarrier
	replaceableSoftwareUnit
	transcoder

Condition Configuration Function

The OS instructs the BSS to assign attributes of specified entities as indicated by the OS. The objects (or subclasses) subject to the create operation are contained within the basic configuration objects and provide attributes associated with specific functional resource groups. The objects (or subclasses) associated with the set operation represent resources that are related to the hardware configuration of the BSS. While there is not necessarily a one to one correspondence between these objects and hardware units, these objects can generally be associated with such units. Attributes assigned values would be relatedGSMEquipment and administrativeState. The action and notification operations support the download of software and databases needed to complete the configuration.

Create, Delete	adjacentCellHandOverGSM0508
	adjacentCellHandOverGSM0508AndReselection
	frequencyHoppingSystem
	handoverControl
	handoverControlGSM0508
	powerControl
	powerControlGSM0508
	simpleFileTransferControl (GSM 12.00)
Set	basebandTransceiver
	bsc
	bts
	btsSiteManager
	channel
	gsmEquipment
	executableSoftwareUnit
	lapdLink
	operatingSoftwareUnit
	pcmCircuit
	radioCarrier
	replaceableSoftwareUnit
	transcoder
Action	requestTransferDown (GSM 12.00)
	transferDownComplete (GSM 12.00)
Notification	transferDownReady (GSM 12.00)

Request Configuration Function

The OS requests that the BSS report the current configuration of the specified entity. The BSS responds with the requested configuration information. Configuration information would consist, for example, of values for attributes such as relatedGSMEquipment, operationalState, unknownStatus, usageState, userLabel, vendorName, version, and object IDs for automatically created objects. The objects (or subclasses) associated with the get operation represent resources that are related to the hardware configuration of the BSS. While there is not necessarily a one to one correspondence between these objects and hardware units, these objects can generally be associated with such units.

Get	basebandTransceiver
	bsc
	bts
	btsSiteManager
	channel
	gsmEquipment
	executableSoftwareUnit
	lapdLink
	operatingSoftwareUnit
	pcmCircuit
	radioCarrier
	replaceableSoftwareUnit
	transcoder

Configuration Report Function

The BSS notifies the OS of configuration changes. The attribute subject to the attributeValueChange notification operation is relatedGSMEquipment.

Notification	attributeValueChange (X.721) objectCreation (X.721) objectDeletion (X.721) stateChange (X.721)

Route Configuration Report Function

The OS specifies to the BSS the destination address(es) for a specified set of configuration reports.

Set	eventForwardingDiscriminator (X.721)

Condition Configuration Reporting Function

The OS instructs the BSS to assign event forwarding discriminator attributes as specified by the OS.

Create, Set, Delete	eventForwardingDiscriminator (X.721)

Request Configuration Report History Function

The OS requests the BSS to send specified historical configuration information. The BSS responds with the specified information.

Get	attributeValueChangeRecord (X.721) objectCreationRecord (X.721) objectDeletionRecord (X.721) stateChangeRecord (X.721)

Delete Configuration Report History Function

The OS requests the BSS to delete specified historical configuration information.

Delete	attributeValueChangeRecord (X.721) objectCreationRecord (X.721) objectDeletionRecord (X.721) stateChangeRecord (X.721) log (X.721)

Allow/Inhibit Logging Function

The OS instructs the BSS to allow/inhibit logging of configuration Records. This is controlled through the use of the administrativeState attribute.

Set	log (X.721)

Condition Logging Function

The OS instructs the BSS to assign log attributes as specified by the OS.

Create, Set, Delete	log (X.721)

Request Log Condition Function

The OS requests the BSS to send the current assignment of specified log attributes. The BSS responds with the current assignment.

Get	log (X.721)

4.3.3 NE status and control management functions

Status and control functions, as specified in CCITT M.3400 [5], are used to monitor and control various aspects of the BSS on demand. Examples include checking or changing the administrative state of the BSS or one of its elements.

Allow/Inhibit Operation Function

The OS instructs the BSS to allow or inhibit the operation of various entities. This is controlled through the use of the administrativeState attribute.

Set	basebandTransceiver bsc bts btsSiteManager channel gsmEquipment executableSoftwareUnit lapdLink operatingSoftwareUnit pcmCircuit radioCarrier replaceableSoftwareUnit transcoder

Condition Operation Function

The OS instructs the BSS to assign attributes of various entities as specified. All defined settable attributes may affect the operating condition of the BSS.

Set	adjacentCellHandOverGSM0508 adjacentCellHandOverGSM0508AndReselection basebandTransceiver bsc bts btsSiteManager channel gsmEquipment executableSoftwareUnit frequencyHoppingSystem handoverControl handoverControlGSM0508 lapdLink operatingSoftwareUnit pcmCircuit powerControl powerControlGSM0508 radioCarrier replaceableSoftwareUnit simpleFileTransferControl (GSM 12.00) transcoder
Action	adjustExternalTime channelConfigModification
Notification	channelModComplete

Request Operation Condition Function

The OS requests the BSS to send current value information for attributes of various entities as specified. The BSS responds with the current values. All defined gettable attributes may have information concerning the operating condition of the BSS.

Get	adjacentCellHandOverGSM0508 adjacentCellHandOverGSM0508AndReselection basebandTransceiver bsc bts btsSiteManager channel gsmEquipment executableSoftwareUnit frequencyHoppingSystem handoverControl handoverControlGSM0508 lapdLink operatingSoftwareUnit pcmCircuit powerControl powerControlGSM0508 radioCarrier replaceableSoftwareUnit simpleFileTransferControl (GSM 12.00) transcoder

Report Operation Condition Function

The BSS notifies the OS of changes to attribute values of various entities..

Notification	attributeValueChange (X.721) objectCreation (X.721) objectDeletion (X.721) stateChange (X.721)

Route Operation Report Function

The OS specifies to the BSS the destination address(es) for a specified set of operation reports.

Set	eventForwardingDiscriminator (X.721)

Condition Operation Reporting Function

The OS instructs the BSS to assign event forwarding discriminator attributes as specified by the OS.

Create, Set, Delete	eventForwardingDiscriminator (X.721)

Request Operation Report History Function

The OS requests the BSS to send specified historical operation information. The BSS responds with the specified information.

Get	attributeValueChangeRecord (X.721) channelModCompleteRecord objectCreationRecord (X.721) objectDeletionRecord (X.721) stateChangeRecord (X.721)

Delete Operation Report History Function

The OS requests the BSS to delete specified historical configuration information.

Delete	attributeValueChangeRecord (X.721) channelModCompleteRecord objectCreationRecord (X.721) objectDeletionRecord (X.721) stateChangeRecord (X.721) log (X.721)

Allow/Inhibit Logging Function

The OS instructs the BSS to allow/inhibit logging of operation records. This is controlled through the use of the administrativeState attribute.

Set	log (X.721)

Condition Logging Function

The OS instructs the BSS to assign log attributes as specified by the OS.

Create, Set, Delete	log (X.721)

Request Log Condition Function

The OS requests the BSS to send the current assignment of specified Log attributes. The BSS responds with the current assignment.

Get	log (X.721)

5 Management information model

This clause presents the managed objects that form the management information model. It includes pictorial views which represent the inheritance, containment, and entity relationships that exist within the model. These are presented as an aid to understanding the model. All aspects of inheritance, containment, and relationships can be determined from the GDMO definitions in Clauses 6 through 12 and those templates constitute the formal definitions of the managed object classes.

For each managed object class there is text describing the purpose of the object. There is also a list of the associated packages and their contained attributes, an indication of whether these are mandatory (M) or optional (O), and a definition of each. In addition, there are descriptions of defined states, actions, notifications, and/or parameters. All attributes, actions, notifications, and parameters indicated as optional are optional with respect to the object class and not with respect to the package containing them. The formal GDMO definitions of these objects, packages, attributes, etc. are found in the following clauses.

5.1 Formal description of the model

The PLMN management information model is formally described by using the approved description techniques from CCITT X.722 [9], Guidelines for Definition of Managed Objects (GDMO), and from CCITT X.208 [6], Specification of Abstract Syntax Notation One (ASN.1). To summarize, the BSS will have the following items defined for the purposes of management:

– a collection of managed object classes represented/modelled, in both containment and inheritance trees.

Each managed object class will then be described via GDMO templates with the following elements:

– mandatory package(s);
– conditional package(s);
– attribute(s);
– action(s);
– notification(s),;
– parameter(s);
– name binding(s);
– for each above item the corresponding behaviour definition(s).

Also included, where relevant, are aspects concerning:

– shared management knowledge (SMK);
– object relationships.

Additionally, the formal syntax definitions of the elementary data units are defined:

– ASN.1 syntax type definitions.

5.2 Basis for the model

As indicated in Clause 4, this ETS addresses the configuration and fault management aspects of the BSS Network Element. As a result, the model necessarily contains object classes which correspond to elements that may be seen as hardware related. While it is true that a one to one relationship may exist between the managed object classes defined here and implementable hardware units, such a relationship is not required by this ETS. In fact significant effort has been made to identify units of manageable functionality that may be combined in different ways by various implementations. To allow for the case where it is possible for a manufacturer to represent a system using only the functional objects defined here, administrative control and alarming capabilities are provided through these functional objects. For the case where specific equipment units must be represented in the management information base, the functional objects provide relationship pointers to identify related equipment. Faulty equipment may cause an instance of a functional object to be automatically supported by alternative equipment, when equipment redundancy and automatic reconfiguration is supported. The new configuration will be reported to the manager using attributeValueChange notifications, which will be sent by the agent for the affected instances.

The object classes that are more closely related to equipment items may be identified from the equipment - functional relationship diagram (figure. 4) found later in this clause.

5.3 Extensions to the model

Several other standards provide definitions of managed object classes. CCITT M.3100 [3] defines a generic network information model and several of the objects in that model are referred to in this ETS. Other 12-series specifications including GSM 12.00 [24], GSM 12.02 [26], GSM 12.04 [27], and GSM 12.05 [28] define Managed Object Classes (MOCs) some of which may be used as part of BSS management.

The model presented here provides no restrictions on extensions. Any standard defined MOC and/or any operator or manufacturer defined MOC may be used in conjunction with this model. It is fully expected, especially in the case of equipment management, that manufacturer specific extensions to this model will be defined and used. However, it should be pointed out that the more extensions that are made, the more difficult interoperability between management and agent systems becomes. Extensions should be kept to a minimum and standardized objects should be used whenever possible.

Specific extensions are also expected in the case of a few of the MOCs defined here that are provided for subclassing only. This is notably the case for the classes adjacentCellHandOver, handoverControl and powerControl that act as pure base classes to be specialized. These objects provide the definitions that are required for operation in a standard environment but it is expected that additional definition of functionality will be required by the operator or manufacturer.

Manufacturer/operator specific extensions of the object model are likely to be necessary to allow management of actual networks, an example of this being management of handover and power control algorithms. Due to the fact that the GSM core specifications do not specify the handover and power control algorithms, the complete management cannot be standardized.

The mechanism proposed for manufacturer/operator specific extensions is inheritance, i.e. the manufacturer/operator specific object classes should be defined as subclasses of the GSM 12.20 or other standardized managed object classes. A new, unique abstract syntax name shall be allocated to denote the extended object model. Note that a set of abstract syntaxes may be proposed at association establishment time; a responder may thus accept or reject a specific abstract syntax depending on whether it has the extended capabilities or not.

5.4 Relationships to other models

The model defined in this ETS represents the manageable resources contained in the GSM BSS Network Element. To provide a framework for the model defined here and in other 12-Series specifications, a high level object model has been defined in GSM 12.00 [24]. This high level model provides the points of attachment for the models defined in other specifications. As indicated in the containment diagram and in the name binding clause, the managed object classes defined in this ETS mainly attach to instances of the bssFunction class defined in GSM 12.00 [24]. In special cases there was a need to define objects that were necessary for BSS management but could be useful for the management of other network elements. Where such use has already been defined, these objects have been included in a generic object clause in GSM 12.00 [24]. Where such use is currently only a potential, the objects have been placed in the general object clause in this and other 12-Series specifications.

Following TMN principles, it has been our goal to minimize the number of new objects defined in this ETS and to use already standardized object classes whenever possible. Therefore this ETS contains references to various other standards where managed object classes have been defined. Where such references are made, the object definitions have not been reproduced here. This was done to minimize the chance of errors being introduced.

5.5 Conformance to the model

In order for a system to claim conformance to the model presented in this ETS, the following requirements must be met.

The system shall:

a) supply a system conformance statement which identifies the standardized use of the managed objects defined in this ETS;
b) support all of the required packages for any of the managed objects for which conformance is claimed;
c) support the transfer syntax derived from the encoding rules specified in CCITT Recommendation X.209 | ISO/IEC 8825 and named {joint-iso-ccitt asn1(1) basic encoding(1)}, for the purpose of generating and interpreting the PDUs, defined by the abstract data types referenced in this ETS.

5.6 Inheritance relationships

An inheritance tree contains a graphical representation of the inheritance relationships of the indicated managed object classes. The process of inheritance results in the inclusion of all the characteristics of the superclass(es) of a managed object class in that managed object. A given managed object class therefore includes all characteristics of all the objects that form the managed object class's inheritance hierarchy. In some cases the inherited characteristics are conditional (optional) in the superclass(es) of the new class. In this case, those packages which have been identified as being useful in the management of a GSM PLMN are explicitly listed in the object class summaries later in this clause. Other conditional packages are allowed when the required condition is met. This ETS does not, however, define their use. The inheritance of a managed object class is explicitly provided in the template defining that managed object class in the "DERIVED FROM" construct. figure 1 shows the BSS inheritance tree.

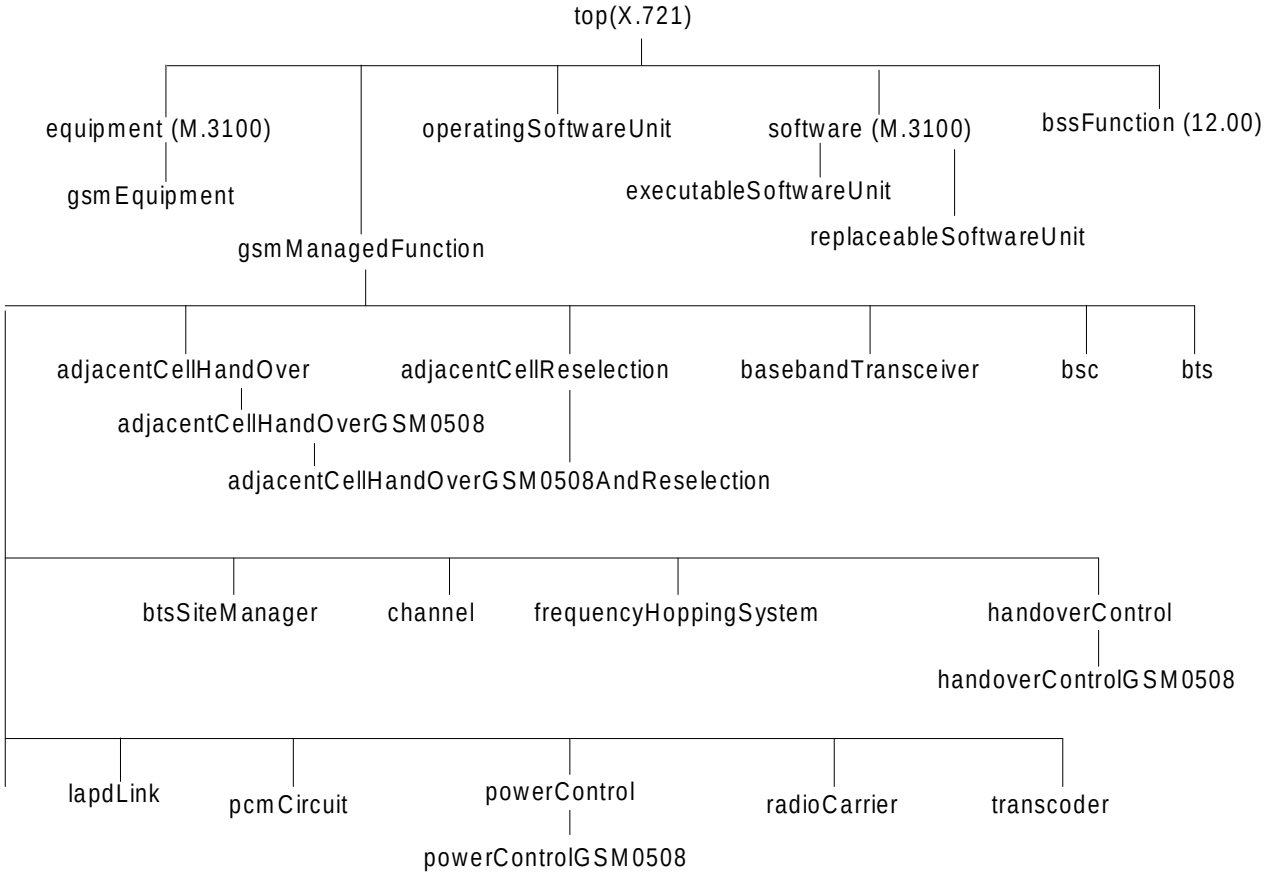
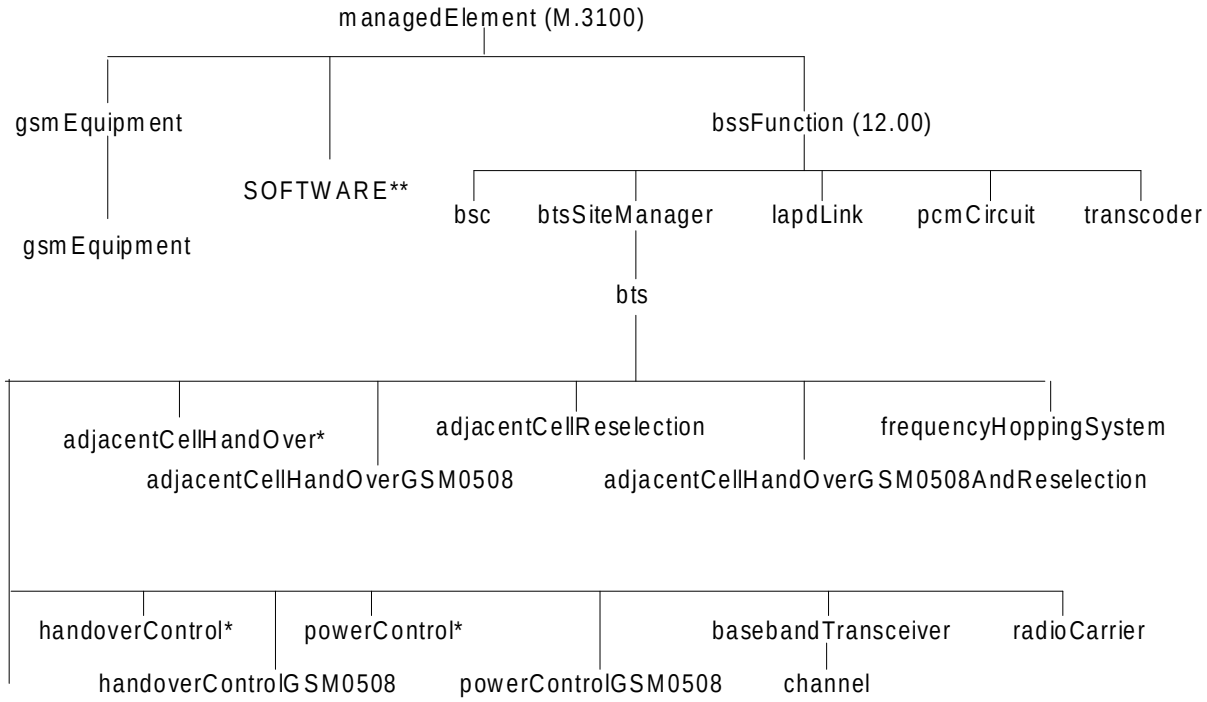


Figure 1: Inheritance for BSS Managed Objects

5.7 Containment relationships

A containment tree contains a graphical representation of the naming hierarchy of the indicated managed objects. The GDMO name binding templates specify the attribute, selected as the naming attribute, that shall be used when a subordinate object, which is an instance of a specified managed object class, is named. The naming attribute is used to construct the Relative Distinguished Name (RDN) of subordinate objects of that class. An RDN is constructed from the object identifier assigned to that attribute type and the value of the instance of the attribute. The distinguished name of the subordinate object is obtained by appending its RDN to the distinguished name of its superior object. Figure 2 shows the BSS naming tree.



* base class only - must be sub-classed to be instantiated

** Containment for software related object classes is shown in Figure 5.

Figure 2: Containment for BSS Managed Objects

5.8 Entity relationships

The entity relationship diagrams contain simplified entity relationships for the model defined in this ETS. Relationships describe how the operation of one part of a system affects the operation of other parts. Operators need to be able to change relationships in the system and be notified when changes occur. General object relationships are modelled in a limited capacity within this ETS. The relationships that are required for a complete object model within network management terms are:

- relationships between the functional managed object classes;
- and relationships between the functional and the equipment/software related managed object classes.

Within this ETS effort is directed at those relationships which are regarded as being within the realm of standardization, i.e. relationships among the functional managed object classes. It is outside the scope of standardization to define relationships between equipment related managed object classes, as equipment design and architecture differs from manufacturer to manufacturer. However, it is obvious that relationships between functionalities and equipment exist in real systems and are often used by network operators for network management purposes. Hence in this ETS a relationship attribute is defined whereby the equipment in question can be related to the associated GSM functionality for purposes of alarm notification.

The entity relationships shown in figures 3, 4 and 5 depict relationships of containment and relationships of association. A containment relationship is a one way relationship indicating naming, the subordinate object being named by (contained in) the superior object. The diagrams indicate where subordinate object instances may exist within the naming tree and, in some cases, restrictions/requirements on the number of named instances contained within a superior instance. The arrows in the diagrams indicate the direction from superior to subordinate instances. A containment relationship should be read as, "An instance of object class X may contain N instances of object class Y." For example figure 3 indicates that each bssFunction instance contains one bsc instance and each bssFunction instance contains one or more lapdLink instances.

An association relationship is two way in the sense that if A is associated with B, then B is always associated with A. The method of association between object instances is by means of an attribute value. The value may indicate an object instance name or, in the case the object class is well defined, an instance ID. The association may be one way only. That is, the attribute may exist in only one of the related object class instances. In the diagrams, the dot on the "is associated with" symbol is attached to the object class which contains the relationship attribute. The numbers indicate restrictions or requirements that may apply in the direction of the arrow between the related classes. An association relationship should be read as, "An instance of object class X is associated with N instances of object class Y."

Several of the relationships shown in figures 3 and 4 indicate that zero instances of certain objects may be related. This may indicate that the object in question is not required in all systems. For example pcmCircuit and lapdLink in bssFunction. In other cases this may indicate an optional relationship such as between channel and frequencyHopping or between bts and transcoder instances. Other cases indicate a fixed set of numbers such as the containment of one or two handover control instances in a bts instance. In such a case this indicates the required/allowed number of instances that may be created. Such restrictions are indicated in the behaviour descriptions of the objects in question.

The behaviour definitions of each managed object class indicate whether or not specific relationships must be removed prior to the deletion of an instance of the object class. If a delete request is accepted by an agent for an object instance that is identified as having a relationship with some other object, it is the responsibility of the agent to set any relationship indication attribute(s) to an appropriate value(s).

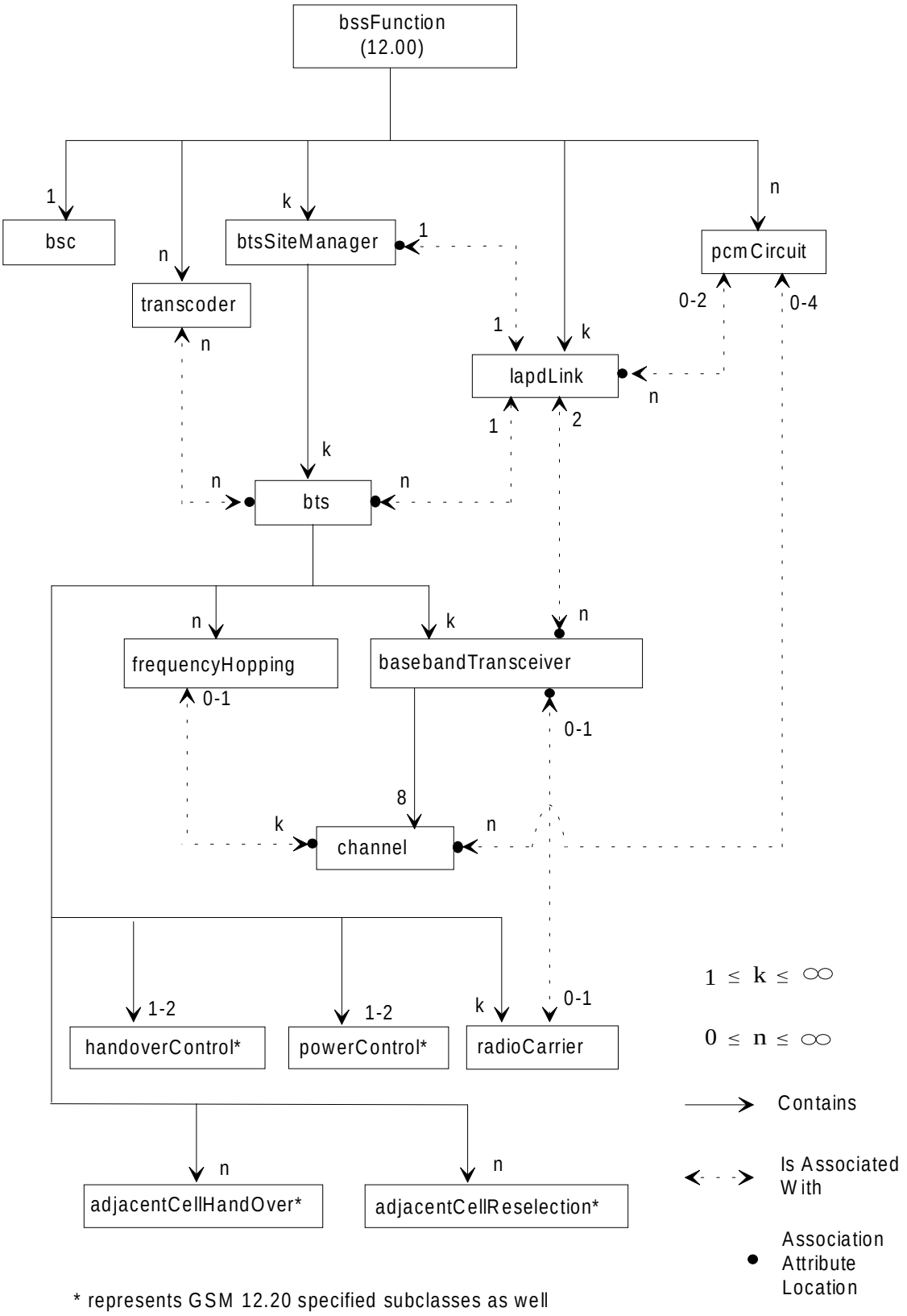


Figure 3: Functional Entity Relationships for BSS Managed Objects

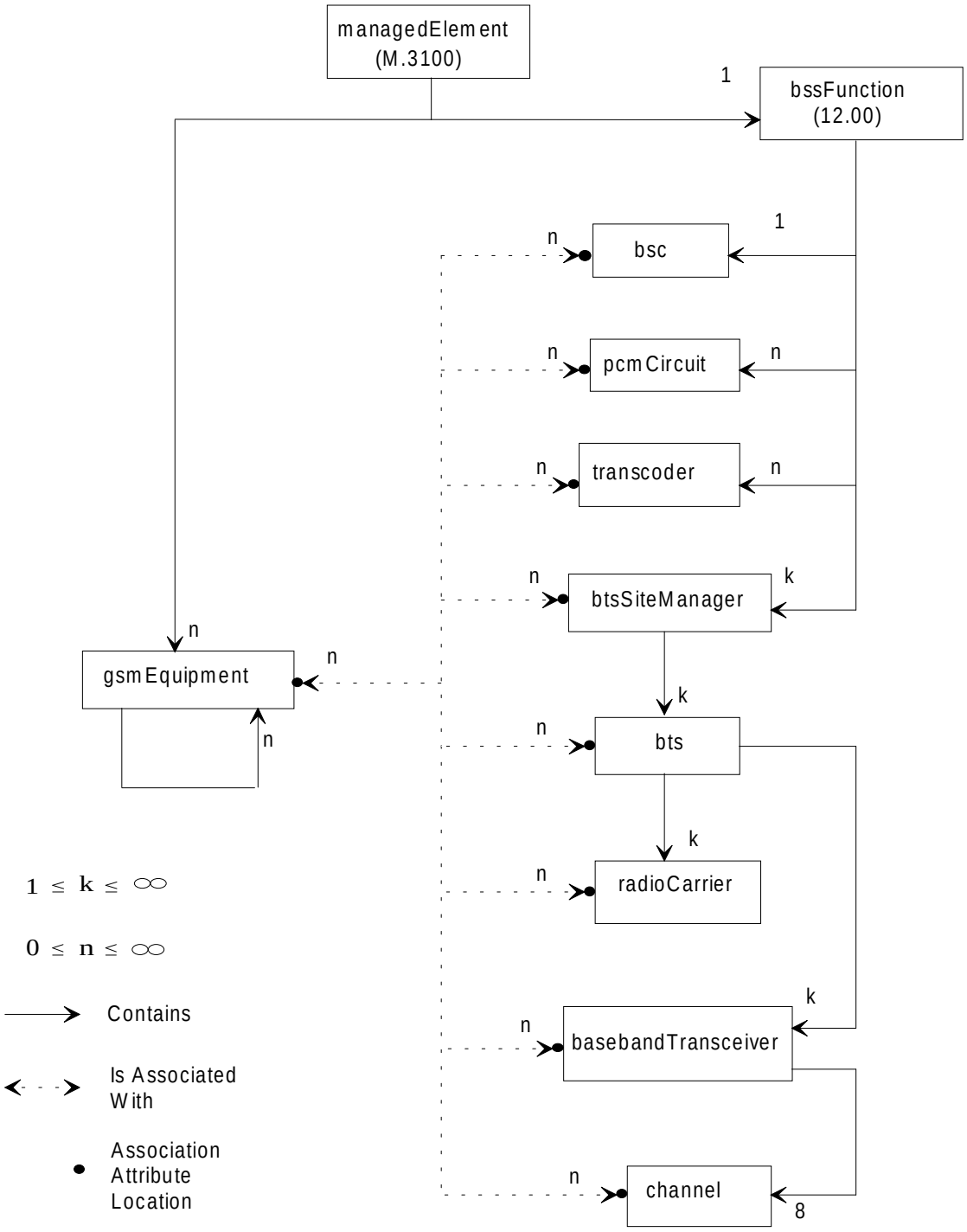


Figure 4: Equipment-Functional relationships for BSS Managed Objects

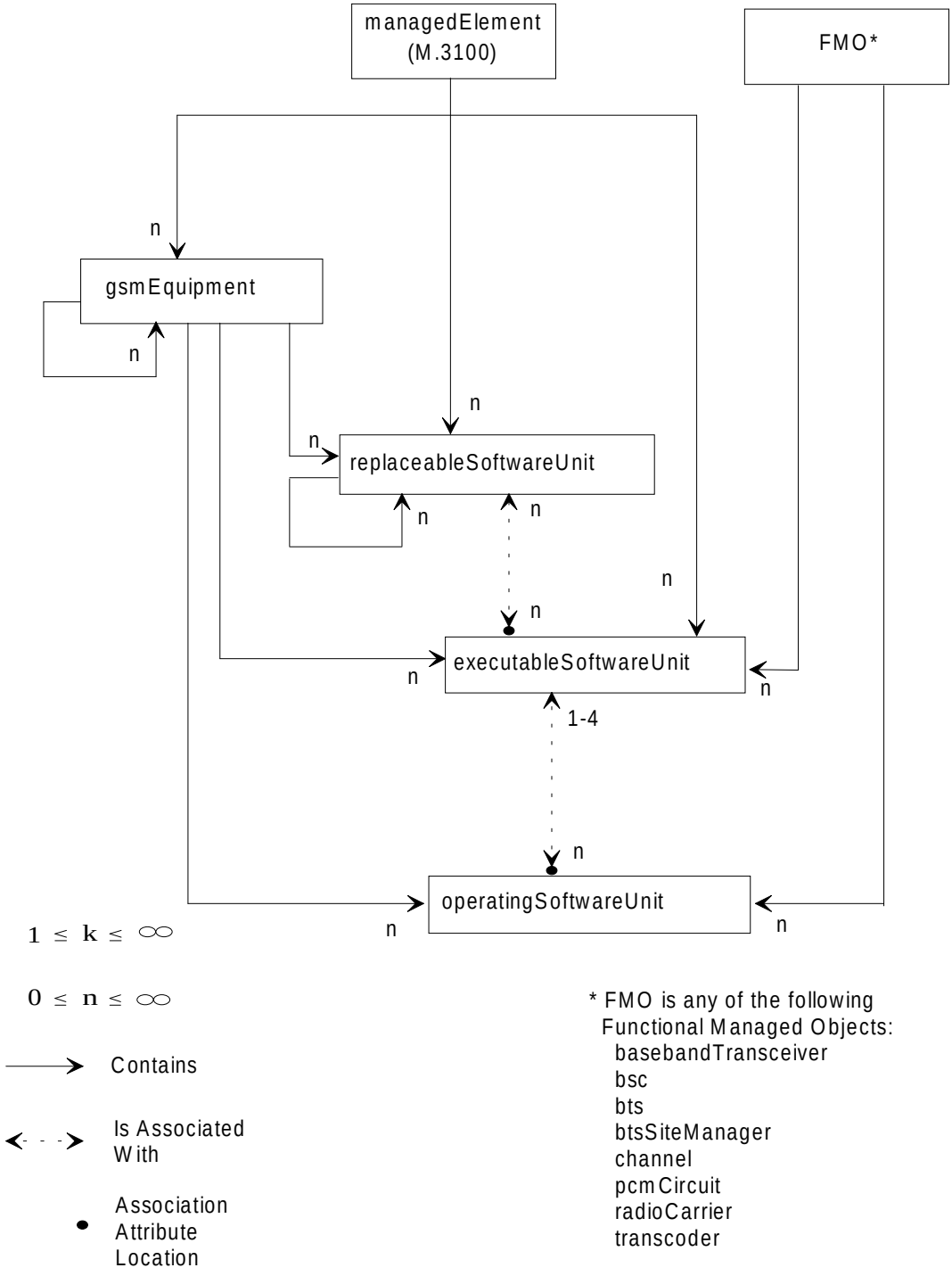


Figure 5: Software-Functional Relationships for BSS Managed Objects

5.9 BSS related managed object summaries

This clause presents the managed objects that are expected to have use only in the information model of the BSS. Additional objects that have been identified as needed in the information model for the management of the BSS but are expected to be of general use are described in a later clause.

The BSS is the functional entity which connects to the management system and contains the management agent that manipulates the associated managed objects. This means that the role of the BSS is to communicate with the managing entity for the purpose of being monitored and/or controlled by it. The following objects comprise a part of the management information base which this agent manipulates under the direction of the manager, or under its own direction, and about which it reports changes to the manager.

adjacentCellHandOver

The object adjacentCellHandOver contains handover related, adjacent cell specific, parameters that are independent of any particular handover algorithm.

The set of adjacent cells that are to be monitored for handover purposes is sent to a MS in the system information messages on the SACCH channel. This set is called BA_SACCH, see GSM 04.08 [18] and GSM 05.08 [21].

The class adjacentCellHandOver acts as a base class only, that is instances of it are never created. A handover algorithm specific subclass, (e.g. adjacentCellHandOverGSM0508) or a manufacturer specific subclass of adjacentCellHandOver should be instantiated for managing the parameters specific to that particular handover algorithm. One instance of the subclass would be contained in a bts instance for each adjacent cell used for handover. The maximum number of adjacent cells that may be used for handover is 32.

The following packages/attributes are defined for the adjacentCellHandOver object:

Name	M/O	Comments
adjacentCellHandOverPackage	M	
adjacentCellID	M	**No Replace Specified -** The adjacentCellHandOverPackage provides the attribute adjacentCellID for naming instances of adjacent cell objects, i.e. instances of the classes adjacentCellHandOver and adjacentCellReselection, as well as their subclasses.
bCCHFrequency	M	The bCCHFrequency attribute contains the absolute radio frequency channel number of the BCCH channel.
bsIdentityCode	M	The bsIdentityCode contains the Base Station Identity Code (BSIC), which is transmitted on the SCH and used for identifying a BTS. The BSIC consists of the Network Colour Code (NCC) and the Base Station Colour Code (BCC). Refer to Specification GSM 04.08 [18].
cellGlobalIdentity	M	The cellGlobalIdentity attribute contains the Cell Identification (CI) and the Location Area of the cell. A Location Area is unique within a GSM PLMN; a Cell Identification is unique within a location area. For further details see Specification GSM 03.03 [16].
synchronized	M	The synchronized attribute indicates whether the adjacent cell is synchronized with the origin cell. Refer to Specification GSM 05.08 [21] (N_CELL_LIST).
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the adjacentCellHandOver object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

adjacentCellReselection

The object adjacentCellReselection contains reselection related, adjacent cell specific, parameters. The set of adjacent cells that may be used for reselection is sent to the MSs in the system information messages on the BCCH channel of a cell. This set is the parameter BA_BCCH, see GSM 04.08 [18] and GSM 05.08 [21]. Instances of adjacentCellReselection may be created for representing an adjacent cell a MS may use for reselection, **only**. To represent an adjacent cell to which handovers are allowed, another object class must be used (see object classes adjacentCellHandOver, adjacentCellHandOverGSM0508 and adjacentCellHandOverGSM0508AndReselection). The maximum number of adjacent cells that may be used for reselection is 32.

The following packages/attributes are defined for the adjacentCellReselection object:

Name	M/O	Comments
adjacentCellReselectionPackage	M	
adjacentCellID	M	**No Replace Specified** - The adjacentCellReselectionPackage provides the attribute adjacentCellID for naming instances of adjacent cell objects, i.e. instances of subclasses of adjacentCellReselection.
bCCHFrequency	M	The bCCHFrequency attribute contains the absolute radio frequency channel number of the BCCH channel.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the adjacentCellReselection object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

adjacentCellHandOverGSM0508

The object class adjacentCellHandOverGSM0508 is a subclass of adjacentCellHandOver and contains inherited attributes of the superior object plus the adjacent cell specific handover parameters of the default handover algorithm of GSM 05.08 [21]. This object class shall be used, if the GSM 05.08 [21] default handover algorithm is employed.

It should be noted that an instance of adjacentCellHandOverGSM0508 represents an adjacent cell used for handover purposes, **only** (i.e. not for reselection).

The following packages/attributes are defined for the adjacentCellHandOverGSM0508 object:

Name	M/O	Comments
adjacentCellHandOverGSM0508Package	M	The adjacentCellHandOverGSM0508Package provides attributes of the default GSM 05.08 [21] algorithm.
hoMargin	M	The hoMargin attribute value is used as a threshold to prevent repetitive hand-over between adjacent cells, in case the handover is caused by received signal level or the power budget process. Refer to Annex A of Specification GSM 05.08 [21] (HO_MARGIN (n)).
hoPriorityLevel	M	The hoPriorityLevel attribute defines the handover priority level for an adjacent cell used for target cell evaluation in the handover control process. Eight distinct priority levels exist. By using priorities the physical location of the target cell may be taken into account in the handover decision process. One possible use of this feature could be favouring intra BSS handovers. Refer to Specification GSM 05.08 [21], Annex A.
msTxPwrMaxCell	M	The msTxPwrMaxCell attribute is used to indicate the maximum power level a MS may use in an adjacent cell. See Table 1 of Annex A of Specification GSM 05.08 [21] (MS_TXPWR_MAX (n)).
rxLevMinCell	M	The rxLevMinCell attribute holds the minimum received signal strength in a cell, for a MS to be handed over to that cell. See Annex A of Specification GSM 05.08 [21] (RXLEV_MIN (n)). Each adjacent cell may have a different specific value.
adjacentCellHandOverPackage	M	**Inherited** - See the adjacentCellHandOver object for inherited attribute information
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the adjacentCellHandOverGSM0508 object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

adjacentCellHandOverGSM0508AndReselection

The object class adjacentCellHandOverGSM0508AndReselection may be instantiated, if an adjacent cell may be used for both handover and reselection, and the GSM 05.08 [21] default handover algorithm is employed.

The object class adjacentCellHandOverGSM0508AndReselection is a subclass of adjacentCellHandOverGSM0508 and of adjacentCellReselection and contains inherited attributes of the superior objects. One instance of the subclass would be contained in a bts instance for each adjacent cell used for handover and reselection. The maximum number of adjacent cells that may be used for handover and reselection is 32.

The following packages/attributes are defined for the adjacentCellHandOverGSM0508AndReselection object:

Name	M/O	Comments
adjacentCellHandOverGSM0508AndReselectionPackage	M	This package is provided for behaviour only. The object class adjacentCellHandOverGSM0508AndReselection may be instantiated, if an adjacent cell may be used for both reselection and handover, and the GSM 05.08 [21] default handover algorithm is employed.
adjacentCellHandOverPackage	M	**Inherited** - See the adjacentCellHandOver object class for inherited attribute information.
adjacentCellReselectionPackage	M	**Inherited -** See the adjacentCellReselection object class for inherited attribute information.
adjacentCellHandOverGSM0508Package	M	**Inherited** - See the adjacentCellHandOverGSM0508 object class for inherited attribute information.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the adjacentCellHandOverGSM0508AndReselection object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

basebandTransceiver

The definition of the basebandTransceiver managed object class is a functional entity representing functions common to eight (8) channels which are mapped through the radio resource onto radio time slots. The underlying functionality to be managed includes speech rate adaptation, channel encoding and decoding, and frame building.

This definition covers what may be described as the baseband aspects of transmission in the GSM and DCS 1800 base station systems. This functionality is related to the radio carrier aspects by means of the associated radioCarrier and the channel definitions (see radioCarrier and channel managed object classes).

The following packages/attributes are defined for the basebandTransceiver object:

Name	M/O	Comments
basebandTransceiverPackage	M	The package basebandTransceiverPackage provides the attributes for the basic properties of the basebandTransceiver functionality.
basebandTransceiverID	M	**No Replace Specified -** The basebandTransceiverID attribute provides for instance naming.
relatedGSMEquipment	M	It is sometimes desirable to indicate a relationship between the performed GSM functionality and the required equipment which supports that functionality. This is achieved through the use of the relatedGSMEquipment attribute. Redundant equipment configurations can be activated by changing this value to point to the new object instance of the redundant equipment.
relatedOAMLapdLink	M	The relatedOAMLapdLink attribute identifies the instance of a lapdLink object which represents the logical connectivity between the manager functionality (BSC) and an agent functionality (BTS, TRX, ...) for the purposes of sending management messages and receiving management information and responses. The lapdLink object maps the logical connectivity on to some physical connection.
relatedRadioCarrier	M	The relatedRadioCarrier identifies the radioCarrier instance to which the basebandTransceiver is related. In the case of baseband hopping, this attribute has a NULL value.
relatedTelecomLapdLink	M	The relatedTelecomLapdLink attribute identifies the instance of a lapdLink object which represents the logical connectivity for telecom signalling.
administrativeState	M	**Rec. X.721:1992** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992** - The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
unknownStatus	M	**Rec. X.721:1992 - No Replace Specified** - The unknownStatus supports the status defined in the state table below.
functionalRelatedAlarmPackage	M	This package contains those CCITT alarm notifications that are expected to be needed in functional objects.
equipmentRelatedAlarmPackage	O	This package contains those CCITT alarm notifications that may be needed to report equipment failures via functional objects.
stateChangeNotification Package	M	Rec.M.3100:1992 - This package contains notifications only.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the basebandTransceiver object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
qualityofServiceAlarm	M	**Rec. X.721:1992** - The qualityofServiceAlarm notification is emitted whenever a quality of service alarm condition is detected.
communicationsAlarm	M	**Rec. X.721:1992** - The communicationsAlarm notification is emitted whenever a communications alarm condition is detected.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.
environmentalAlarm	O	**Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.

The following actions are defined for the basebandTransceiver object:

Name	M/O	Comments
forcedHO	M	This action may be used for a graceful close of a BTS or a TRX. It causes any traffic in the BTS/TRX to be attempted to be handed over to other BTSs (or other TRXs within the BTS). The shuttingDown administrative state must be used in order to prevent incoming handovers and new call setups.

The following parameters are defined for the basebandTransceiver object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.
relatedGSMEquipCeaseParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value is a Boolean that indicates if an alarm cease capability is defined for this alarm.
relatedGSMEquipLabelParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the user label of the equipment that has failed.
relatedGSMEquipLocParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the location of the equipment that has failed.
relatedGSMEquipNameParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the vendor name of the equipment that has failed.
relatedGSMEquipObjParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is an object instance indicating an object instance representing the equipment that has failed.
relatedGSMEquipTimeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value indicates the time that the equipment failed rather than the time of report.
relatedGSMEquipTypeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the type of the equipment that has failed.
relatedGSMEquipVersParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the version of the equipment that has failed.

State/Status Table for the basebandTransceiver object:

State/Status	Values	Comments
administrativeState	locked	No telecom traffic through this basebandTransceiver.
	unlocked	Telecom traffic allowed.
	shuttingDown	No new telecom traffic allowed. No incoming handovers, no paging, no call setup. When all calls terminate, transfer to locked state is automatic.
controlStatus	subjectToTest	The basebandTransceiver is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The basebandTransceiver has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the basebandTransceiver has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The basebandTransceiver is totally inoperable for telecom purposes. The basebandTransceiver itself is disabled.
	enabled	The basebandTransceiver is able to operate for telecom purposes.
availabilityStatus	inTest	The basebandTransceiver is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The basebandTransceiver has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The basebandTransceiver is not powered on. The operational state is disabled.
	offLine	The basebandTransceiver requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The basebandTransceiver has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The basebandTransceiver cannot operate because some other resource on which it depends is unavailable.
	degraded	The basebandTransceiver provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The basebandTransceiver is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
alarmStatus	cleared	The basebandTransceiver functionality has all alarms cleared.
	indeterminate	The alarm status of the basebandTransceiver functionality is unable to be determined.
	activeReportable-Critical	The basebandTransceiver functionality has one or more critical alarms. The operational state may be enabled or disabled.
	activeReportable-Major	The basebandTransceiver functionality has one or more major alarms. The operational state may be enabled or disabled.
	activeReportable-Minor	The basebandTransceiver functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The basebandTransceiver functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The basebandTransceiver functionality has an alarm pending.
unknownStatus		If true, the other states of the basebandTransceiver are unreliable.

bsc

The bsc object is a managed object class representing the functions of the network component Base Station Controller (BSC) of the BSS. A BSC performs the functions for control of one or more Base Transceiver Stations. Not more than one bsc instance can exist in a bssFunction instance.

The following packages/attributes are defined for the bsc object:

Name	M/O	Comments
bscBasicPackage	M	
bscID	M	**No Replace Specified -** The package bscBasicPackage provides the bscID attribute to name an instance of the object class BSC.
handoverReqParam	M	The handoverReqParam attribute defines the parameter 'n' used in generating the Handover Required message to the MSC. This parameter specifies the number of preferred target cells 'n' that are to be transferred in the handover required message.
relatedGSMEquipment	M	It is sometimes desirable to indicate a relationship between the performed GSM functionality and the required equipment which supports that functionality. This is achieved through the use of the relatedGSMEquipment attribute. Redundant equipment configurations can be activated by changing this value to point to the new object instance of the redundant equipment.
administrativeState	M	**Rec. X.721:1992** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992 -** The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
unknownStatus	M	**Rec. X.721:1992 - No Replace Specified** - The unknownStatus supports the status defined in the state table below.
usageState	M	**Rec. X.721:1992 - No Replace Specified** - The usageState supports the states defined in the state table below.
bssMapTimerPackage	M	The package bssMapTimerPackage provides the
bssMapT1	M	Timer T1 is associated with time to receipt of BLOCKING ACKNOWLEDGE.
bssMapT4	M	Timer T4 is associated with time to return of RESET ACKNOWLEDGE at the BSS
bssMapT7	M	Timer T7 is associated with handover required periodicity
bssMapT8	M	Timer T8 is associated with time to receipt of successful handover information
bssMapT10	M	Timer T10 is associated with time to return of ASSIGNMENT COMPLETE or ASSIGNMENT FAILURE from MS
bssMapT13	M	Timer T13 is associated with reset guard period at the BSS
bssMapT17	M	Timer T17 is associated with overload timer in the BSS
bssMapT18	M	Timer T18 is associated with overload timer in the BSS
bssMapT19	M	Timer T19 is associated with time to receipt of RESET CIRCUIT ACKNOWLEDGE
bssMapT20	M	Timer T20 is associated with time to receipt of CIRCUIT GROUP BLOCKING ACKNOWLEDGE.
functionalRelatedAlarmPackage	M	This package contains those CCITT alarm notifications that are expected to be needed in functional objects.
adjustExternalTimePackage	O	This package contains only the adjustExternalTime action. It is present in the bsc MOC if the CCITT M.3100 externalTimePackage is present in the instance of the CCITT M.3100 managedElement MOC which contains the bsc instance, and if the bsc instance supports the package.
bscProcForBTSPowerControlPackage	O	This package only contains behaviour. GSM 05.08 [21] indicates that BS power control is an option. Since this is the case, some BSCs may not support management of this option in attached BTSs. The bscProcForBTSPowerControlPackage is present in an instance of a bsc managed object if the bsc supports the management of BS power control. If this package is present and an attached BTS supports BS power control, the BSC may be configured to do the measurement processing.
equipmentRelatedAlarmPackage	O	This package contains those CCITT alarm notifications that may be needed to report equipment failures via functional objects.
internalInterCellHandoverPackage	O	GSM 08.08 defines two types of handover which are optional but if supported are manageable through O&M. The package internalInterCellHandoverPackage is included if the BSC supports internal inter-cell handovers which is one of these two types.
enableInternalInterCellHandover	O	The enableInternalInterCellHandover attribute allows a managing system to enable or disable BSC controlled inter-cell handovers. The attribute takes the following values: TRUE - BSC controlled inter-cell handovers are allowed, FALSE - BSC controlled inter-cell handovers are not allowed.

internalIntraCellHandoverPackage	O	GSM 08.08 defines two types of handover which are optional but if supported are manageable through O&M. The package internalIntraCellHandoverPackage is included if the BSC supports internal intra-cell handovers which is one of these two types.
enableInternalIntraCellHandover	O	The enableInternalInterCellHandover attribute allows a managing system to enable or disable BSC controlled intra-cell handovers. The attribute takes the following values: TRUE - BSC controlled intra-cell handovers are allowed, FALSE - BSC controlled intra-cell handovers are not allowed.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the bsc managed object class:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It will contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It will contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It will contain the value of the new state.
qualityofServiceAlarm	M	**Rec. X.721:1992** - The qualityofServiceAlarm notification is emitted whenever a quality of service alarm condition is detected.
communicationsAlarm	M	**Rec. X.721:1992** - The communicationsAlarm notification is emitted whenever a communications alarm condition is detected.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.
environmentalAlarm	O	**Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.

The following actions are defined for the bsc object:

Name	M/O	Comments
adjustExternalTime	O	The adjustExternalTime action is used for adjusting the time of the clock, either forwards or backwards. The time can be adjusted by milliseconds, seconds, minutes or hours. The time, when the actual time adjust action shall take place, can be given. If not given, the action will take place immediately.

The following parameters are defined for the bsc managed object class:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.
relatedGSMEquipCeaseParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value is a Boolean that indicates if an alarm cease capability is defined for this alarm.
relatedGSMEquipLabelParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the user label of the equipment that has failed.
relatedGSMEquipLocParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the location of the equipment that has failed.
relatedGSMEquipNameParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the vendor name of the equipment that has failed.
relatedGSMEquipObjParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is an object instance indicating an object instance representing the equipment that has failed.
relatedGSMEquipTimeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value indicates the time that the equipment failed rather than the time of report.
relatedGSMEquipTypeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the type of the equipment that has failed.
relatedGSMEquipVersParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the version of the equipment that has failed.

State/Status Table for the bsc object:

State/Status	Values	Comments
administrativeState	locked	No telecom traffic through this bsc. usageState is idle.
	unlocked	Telecom traffic allowed.
	shuttingDown	No new telecom traffic allowed. No incoming handovers, no paging, no call setup. When all calls terminate, transfer to locked state is automatic.
controlStatus	subjectToTest	The bsc is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The bsc has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the bsc has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The bsc is totally inoperable for telecom purposes. The bsc itself is disabled.
	enabled	The bsc is able to operate for telecom purposes.
availabilityStatus	inTest	The bsc is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The bsc has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The bsc is not powered on. The operational state is disabled.
	offLine	The bsc requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The bsc has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The bsc cannot operate because some other resource on which it depends is unavailable.
	degraded	The bsc provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The bsc is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
usageState	idle	There are currently no telecom users on the bsc.
	active	There are active telecom users on the bsc. There is spare capacity to allow for additional users.
	busy	There are active telecom users on the bsc. The bsc has no spare operating capacity such that no additional telecom users can use this bsc at this instant.
alarmStatus	cleared	The bsc functionality has all alarms cleared.
	indeterminate	The alarm status of the bsc functionality is unable to be determined.
	activeReportable-Critical	The bsc functionality has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The bsc functionality has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The bsc functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The bsc functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The bsc functionality has an alarm pending.
unknownStatus		If true, the other states of the bsc are unreliable.

bts

The bts managed object class represents the GSM functional element Base Transceiver Station. An instance of this class is associated by containment with a particular bssFunction instance and a particular btsSiteManager instance. Multiple instances of this class may be contained within a btsSiteManager instance. The packages and attributes of this object represent the configurable capabilities of this function as defined by the core specifications and the requirements in the 12-series specifications.

The following packages/attributes are defined for the bts managed object class:

Name	M/O	Comments
btsBasicPackage	M	The attributes within the package btsBasicPackage describe the basic properties of a BTS that are not related to the Common Control Channels.
bsIdentityCode	M	The bsIdentity code attribute contains the Base Station Identity Code (BSIC), which is transmitted on the SCH and used for identifying a BTS. The BSIC consists of the Network Colour Code (NCC) and the Base Station Colour Code (BCC). Refer to Specification GSM 04.08 [18].
btsID	M	**No Replace Specified** - The btsID attribute allows for instance naming.
cellAllocation	M	The cellAllocation attribute defines the set of radio frequencies allocated and available to a cell. The first element sets the BCCH frequency.
gsmdcsIndicator	M	The gsmdcsIndicator attribute indicates the type of system (GSM or DCS 1800) supported by the cell. This indication may be used to interpret or check the values of other attributes..
cellGlobalIdentity	M	The cellGlobalIdentity attribute contains the Cell Identification (CI) and the Location Area of the cell. A Location Area is unique within a GSM PLMN; a Cell Identification is unique within a location area. For further details see Specification GSM 03.03 [16].
cellReselectHysteresis	M	The cellReselectHysteresis attribute indicates the value of the receiver RF power level hysteresis required for cell reselection. Refer to Specification GSM 05.08 [21]. The MS shall reselect a new cell if the path loss criterion parameter C1 (see Specification GSM 05.08 [21]) for a non-serving suitable cell exceeds the value of C1 for the serving cell for a period of 5 seconds, except in the case of the new cell being in a different location area. In this case the C1 value for the new cell shall exceed the C1 value for the serving cell by at least cellReselectHysteresis for a period of 5 seconds.
ny1	M	The ny1 attribute indicates the maximum number of repetitions of the PHYSICAL INFORMATION message on the radio interface (GSM 04.08 [18]). This message is sent by the BTS to the MS during a handover procedure between two not synchronized cells, in order to establish a physical channel connection on the new cell.
relatedGSMEquipment	M	It is sometimes desirable to indicate a relationship between the performed GSM functionality and the required equipment which supports that functionality. This is achieved through the use of the relatedGSMEquipment attribute. Redundant equipment configurations can be activated by changing this value to point to the new object instance of the redundant equipment.
periodCCCHLoadIndication	M	The periodCCCHLoadIndication value indicates the frequency with which the CCCH load indication is sent to the BSC. Refer to GSM 08.58 [23] 'CCCH LOAD INDICATION'.
plmnPermitted	M	The plmnPermitted attribute contains the values of the Network Colour Code (NCC) for an accessing MS. Refer to Specification GSM 05.08 [21] (NCC_PERMITTED).
rACHBusyThreshold	M	The rACHBusyThreshold attribute defines a threshold for the received signal level during the RACH bursts. A signal level exceeding this threshold is interpreted as a busy RACH. Refer to Specifications GSM 08.58 [23] RACH Load.
rACHLoadAveragingSlots	M	The rACHLoadAveragingSlots attribute defines the number of RACH bursts over which RACH measurements are performed. Refer to Specifications GSM 08.58 [23] RACH Load.
radioLinkTimeout	M	The radioLinkTimeout attribute is used to indicate the maximum value of the radio link counter needed to detect a radio link failure. This value is used by the MS procedure and may also be used for the BSS procedure. See Specification GSM 05.08 [21] for more information. This attribute corresponds to the radio sub-system link control parameter RADIO_LINK_TIMEOUT. The radio link failure criterion is based on the radio link counter called 'S' in Specification GSM 05.08 [21]. If the MS is unable to decode a SACCH message, S is decreased by 1, while in the case of a successful reception of a SACCH message, S is increased by 2. In any case, S shall not exceed the value of RADIO_LINK_TIMEOUT. If S reaches 0 a radio link failure shall be declared.
relatedOAMLapdLink	M	The relatedOAMLapdLink attribute identifies the instance of a lapdLink object which represents the logical connectivity between the manager functionality (BSC) and an agent functionality (BTS, TRX, ...) for the purposes of sending management messages and receiving management information and responses. The lapdLink object maps the logical connectivity on to some physical connection.
relatedTranscoder	M	The relatedTranscoder indicates the instance(s) of the transcoder object (if any) that are related to a bts for purposes of TRAU O&M messages as specified in GSM 08.60 and GSM 12.21 [30].

rxLevAccessMin	M	The rxLevAccessMin attribute is used to indicate the minimum received level at the MS required for access to the system. See Specification GSM 05.08 [21] (RXLEV_ACCESS_MIN)). This parameter is used in order to evaluate the path loss criterion parameter C1 of a cell (GSM 05.08 [21]).
thresholdCCCHLoadIndication	M	The thresholdCCCHLoadIndication value is a threshold used by the BTS to inform the BSC on the load of CCCH. Refer to GSM 08.58 [23], 'CCCH LOAD INDICATION'.
administrativeState	M	**Rec. X.721:1992** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992 -** The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
unknownStatus	M	**Rec. X.721:1992 - No Replace Specified** - The unknownStatus supports the status defined in the state table below.
usageState	M	**Rec. X.721:1992 - No Replace Specified** - The usageState supports the states defined in the state table below.
btsCCCHConfigurationPackage	M	The package btsCCCHConfigurationPackage defines the properties of the Common Control Channels of the BTS . All attribute values are broadcast to the Mobile Stations on the BCCH within the SYSINFO messages.
maxNumberRetransmission	M	The value of the maxNumberRetransmission attribute is the maximum number of retransmissions a MS may perform on the RACH. The possible values are 1, 2, 4 and 7. Refer to Specification GSM 05.08 [21] (MAX_RETRAN).
mSTxPwrMaxCCH	M	The mSTxPwrMaxCCH attribute is used to indicate the maximum transmit power level a MS may use when accessing the cell until commanded otherwise. See Specification GSM 05.08 [21] (MS_TXPWR_MAX_CCH). This parameter is also used in order to evaluate the path loss criterion parameter C1 of a cell. See Specification GSM 05.08 [21].
noOfBlocksForAccessGrant	M	The noOfBlocksForAccessGrant attribute specifies the number of TDMA frames reserved for the Access Grant channel during a period of 51 TDMA frames (a multiframe). For details refer to Specification GSM 05.02 [19].
noOfMultiframesBetweenPaging	M	The noOfMultiframesBetweenPaging value denotes the number of multiframes (51 frames) between two transmissions of the same paging message to mobiles of the same paging group.
numberOfSlotsSpreadTrans	M	The numberOfSlotsSpreadTrans attribute (a.k.a. TX Integer) is used to represent the maximum number of RACH slots a MS must wait, after an unsuccessful random access attempt, before a new random access. The MS draws a random number between 0 and the value of this parameter, in order to decide when to start the new access. Hence this parameter allows the access retransmissions to be spread over a fixed number of RACH slots.
btsOptionsPackage	M	The package btsOptionsPackage is provided to control the various optional features of a BTS. Most values are of type Boolean, and are broadcast to the Mobile Stations on the BCCH.
allowIMSIAttachDetach	M	The allowIMSIAttachDetach attribute controls whether the IMSI attach/detach procedure is used in the cell. Ref. GSM 04.08 [18].
cellBarred	M	The cellBarred attribute indicates whether Mobile Stations may camp on the cell. The value true indicates that the cell is barred and camping on the cell is forbidden. Refer to Specification GSM 05.08 [21] (CELL_BAR_ACCESS).
callReestablishmentAllowed	M	The callReestablishmentAllowed attribute indicates whether call re-establishment is allowed in the cell.
dtxDownlink	M	Availability of downlink DTX is an implementation option. Its availability in a system is indicated by the dtxDownlink attribute. If available, use of the downlink DTX is controlled by the MSC (see GSM 04.08 [18]).
dtxUplink	M	The dtxUplink attribute specifies the Discontinuous Transmission (DTX) mode to be used by the Mobile Stations. The implementation of DTX for the uplink is compulsory in the Mobile Station and the Base Station System. However, its actual use is under control of the operator. GSM 04.08 [18] allows for three availability options to be broadcast to the MS. The information as to whether a MS can use uplink DTX is transmitted in the Cell Options of the SYSINFO3 message. The alternatives are uplink DTX is on in the BTS and usage is under the control of the MS (MS may use DTX), uplink DTX is on in the BTS and all MSs must use it.(MS shall use DTX), uplink DTX is off in the BTS (MS shall not use DTX).
emergencyCallRestricted	M	The emergencyCallRestricted attribute determines whether emergency calls are allowed to all MSs or restricted to MSs belonging to access classes in the range 11 to 15. The special access class ten (10) is used to carry the value on the Air Interface. See Specification 04.08 [18].
notAllowedAccessClasses	M	The notAllowedAccessClasses attribute contains a list of MS Access Classes which are not allowed to access the cell. It should be noted that the access class number ten (10) does not exist as a normal access class; it is used to restrict emergency calls (see also attribute emergencyCallRestricted). For further details refer to Specification 04.08 [18]
timerPeriodicUpdateMS	M	The timerPeriodicUpdateMS attribute specifies the interval for the MS periodic location updates.
btsTimerPackage	M	The package btsTimerPackage contains the set of timers used on layers 2 and 3 of the air interface.

t200	M	This attribute contains values for the LapDm timer T200, to be used on the different control channels. See Specification GSM 04.06 [17].
t31xx	M	This attribute contains the values of the set of timers used on the air interface. See Specification GSM 04.08 [18] for more details.
functionalRelatedAlarmPackage	M	This package contains those CCITT alarm notifications that are expected to be needed in functional objects.
btsPowerControlConfigPackage	O	This package contains no attributes, only behaviour. GSM 05.08 [21] indicates that BS power control is an option. The package btsPowerControlConfigPackage is present in a BTS instance when BS power control is supported. Each BTS hosted by the BSC may be configured differently in this respect.
btsQueuingPackage	O	The attributes in the package btsQueuingPackage are parameters used in handling call and handover queues in the BTS.
maxQueueLength	O	The maxQueueLength attribute specifies the maximum length of queues in the BTS.
msPriorityUsedInQueuing	O	The msPriorityUsedInQueuing attribute specifies whether call priority in an ASSIGNMENT REQUEST message (or a HANDOVER REQUEST message in ho) from MSC is taken into account in queue handling.
timeLimitCall	O	The attribute timeLimitCall is the maximum time a call attempt may wait for a traffic channel to be available. The value zero indicates that no call queuing is used in the BTS.
timeLimitHandover	O	The attribute timeLimitHandover is the maximum time a handover attempt may wait for a traffic channel to be available. The value zero indicates that no handover queuing is used in the BTS.
channelConfigModPackage	O	This package includes only actions and notifications. They are used to perform a dynamic modification of the radio definition of a BTS.
equipmentRelatedAlarmPackage	O	This package contains those CCITT alarm notifications that may be needed to report equipment failures via functional objects.
hoMsmtProcessingModePackage	O	GSM 08.58 [23] defines the mechanisms to be employed for the transfer of radio link measurements from the BTS to the BSC. These measurements are subsequently used by the handover determination algorithms. The normal mode of operation is for the measurements to be collected by the BTS and transferred in the MEASUREMENT RESULT message to the BSC for processing. GSM 08.58 [23] also describes the allowable measurement processing options for handover purposes. Measurement processing and threshold comparison are allowed to be configured to take place in the BTS. The package hoMsmtProcessingModePackage is present in a BTS instance when it supports the optional measurement processing modes.
hoMsmtProcessingMode	O	The hoMsmtProcessingMode attribute allows the management of the location of measurement processing.
pcMsmtProcessingModePackage	O	Radio link measurements are also used by the BSS for mobile station (MS) and, if supported, the Base Station (BS) power control algorithms. Measurement processing, threshold comparison, and decision making are allowed to be configured to take place in the BTS. This package is present in a BTS instance when it supports the optional measurement processing modes.
pcMsmtProcessingMode	O	The pcMsmtProcessingMode attribute allows the management of the location of measurement processing.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the bts object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
qualityofServiceAlarm	M	**Rec. X.721:1992** - The qualityofServiceAlarm notification is emitted whenever a quality of service alarm condition is detected.
communicationsAlarm	M	**Rec. X.721:1992** - The communicationsAlarm notification is emitted whenever a communications alarm condition is detected.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.
environmentalAlarm	O	**Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.
channelModComplete	O	This notification informs the Manager about the result of a channelConfigModification action

The following actions are defined for the bts object:

Name	M/O	Comments
forcedHO	M	This action may be used for a graceful close of a BTS or a TRX. It causes any traffic in the BTS/TRX to be attempted to be handed over to other BTSs (or other TRXs within the BTS). The shuttingDown administrative state must be used in order to prevent incoming handovers and new call setups.
channelConfigModification	O	This action is used to change the channel configuration. It allows the manager to communicate to the agent new values for all or part of the radio definition of a BTS.

The following parameters are defined for the bts object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.
relatedGSMEquipCeaseParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value is a Boolean that indicates if an alarm cease capability is defined for this alarm.
relatedGSMEquipLabelParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the user label of the equipment that has failed.
relatedGSMEquipLocParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the location of the equipment that has failed.
relatedGSMEquipNameParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the vendor name of the equipment that has failed.
relatedGSMEquipObjParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is an object instance indicating an object instance representing the equipment that has failed.
relatedGSMEquipTimeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value indicates the time that the equipment failed rather than the time of report.
relatedGSMEquipTypeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the type of the equipment that has failed.
relatedGSMEquipVersParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the version of the equipment that has failed.

State/Status Table for the bts object:

State/Status	Values	Comments
administrativeState	locked	No telecom traffic through this bts. usageState is idle.
	unlocked	Telecom traffic allowed.
	shuttingDown	No new telecom traffic allowed. No incoming handovers, no paging, no call setup. When all calls terminate, transfer to locked state is automatic.
controlStatus	subjectToTest	The bts is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The bts has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the bts has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The bts is totally inoperable for telecom purposes. The bts itself is disabled.
	enabled	The bts is able to operate for telecom purposes.
availabilityStatus	inTest	The bts is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The bts has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The bts is not powered on. The operational state is disabled.
	offLine	The bts requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The bts has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The bts cannot operate because some other resource on which it depends is unavailable.
	degraded	The bts provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The bts is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
usageState	idle	There are currently no telecom users on the bts.
	active	There are active telecom users on the bts. There is spare capacity to allow for additional users.
	busy	There are active telecom users on the bts. The bts has no spare operating capacity such that no additional telecom users can use this bts at this instant.
alarmStatus	cleared	The bts functionality has all alarms cleared.
	indeterminate	The alarm status of the bts functionality is unable to be determined.
	activeReportable-Critical	The bts functionality has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The bts functionality has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The bts functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The bts functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The bts functionality has an alarm pending.
unknownStatus		If true, the other states of the bts are unreliable.

btsSiteManager

The MOC btsSiteManager represents the O&M functionality related to a site and not to any specific BTS. A site is a logical grouping of one or more BTSs at a single physical location with common management needs. It is possible for multiple logical sites to exist at the same physical location. The purpose of this MOC is containment. That is, to provide relationship information. In addition, it is expected that this MOC will provide a mechanism for notifications such as alarms that relate to common site equipment.

The following packages/attributes are defined for the btsSiteManager object:

Name	M/O	Comments
btsSiteManagerBasicPackage	M	
btsSiteManagerID	M	**No Replace Specified** - The package btsSiteManagerBasicPackage provides the btsSiteManagerID attribute for instance naming.
relatedGSMEquipment	M	It is sometimes desirable to indicate a relationship between the performed GSM functionality and the required equipment which supports that functionality. This is achieved through the use of the relatedGSMEquipment attribute. Redundant equipment configurations can be activated by changing this value to point to the new object instance of the redundant equipment.
relatedOAMLapdLink	M	The relatedOAMLapdLink attribute identifies the instance of a lapdLink object which represents the logical connectivity between the manager functionality (BSC) and an agent functionality (BTS, TRX, ...) for the purposes of sending management messages and receiving management information and responses. The lapdLink object maps the logical connectivity on to some physical connection.
equipmentRelatedAlarmPackage	O	This package contains those CCITT alarm notifications that may be needed to report equipment failures via functional objects.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the btsSiteManager object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
environmentalAlarm	O	**Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.

The following parameters are defined for the btsSiteManager object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.
relatedGSMEquipCeaseParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value is a Boolean that indicates if an alarm cease capability is defined for this alarm.
relatedGSMEquipLabelParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the user label of the equipment that has failed.
relatedGSMEquipLocParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the location of the equipment that has failed.
relatedGSMEquipNameParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the vendor name of the equipment that has failed.
relatedGSMEquipObjParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is an object instance indicating an object instance representing the equipment that has failed.
relatedGSMEquipTimeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value indicates the time that the equipment failed rather than the time of report.
relatedGSMEquipTypeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the type of the equipment that has failed.
relatedGSMEquipVersParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the version of the equipment that has failed.

channel

The MOC object models the manageable characteristics of a time slot. See Specification GSM 05.02 [19] for details. Eight instances of the channel MOC are contained, and are created automatically, when an instance of the basebandTransceiver MOC is created. All attributes are assigned initial values at create time. A channel can carry several combinations of logical channels. The mobile station and the BTS determine the logical channel combination carried by a particular physical radio time slot at a given moment of time using the channel configuration and the cyclic frame number.

Logical channels can be subdivided into two groups: traffic channels and control channels. Traffic channels (TCH) are used for transmission of coded speech and data. There are two types of traffic channels: full rate and half rate traffic channels.

Control channels are used for call control, radio resource management and mobility management. There are three main types of control channels: Broadcast Control Channel (BCCH), Common Control Channel (CCCH) and Dedicated Control Channel (DCCH).

The BCCH is a unidirectional, point-to-multipoint channel from the BTS to (all) Mobile Stations. The BCCH carries information such as BCCH frequencies of the adjacent cells and location area information in the SYSINFO message (Ref.: GSM 04.08 [18]).

The CCCH is a bi-directional point-to-point channel used for call set-up. It consists of three unidirectional sub channels: the Paging Channel (PCH) is used by the BTS for paging an MS; the Random Access Channel (RACH) is used by the MS to request the allocation of a Dedicated Control Channel (SDCCH) for a call. The BTS uses the Access Grant Channel (AGCH) for granting the MS the access to the newly allocated SDCCH.

There are several restrictions as to which combinations of logical channels are allowed in a given physical radio time slot. The BCCH+CCCH channels may only reside in time slots 0,2,4 and 6 of the BCCH frequency. The main BCCH is always located in time slot 0, as well as the other broadcast channels Frequency Correction Channel (FCCH) and Synchronization Channel (SCH). The FCCH is used by the MS frequency correction, while the SCH transmits the Base Station Identity Code (BSIC) and the cyclic frame number.

The Dedicated Control Channels (DCCH) may be classified as Stand Alone Dedicated Control Channels (SDCCH) and Associated Control Channels (SACCH and FACCH). The SDCCH is used for the signalling during call set-up only. The Associated Control Channels are associated with a TCH or a SDCCH; they are used for signalling during a call e.g. for sending the measurement results. The SACCH/C channels are used to transmit signalling information during call set-up. The various SDCCH configurations allowed are specified in GSM 04.08 [18].

If frequency hopping is not used, a logical channel is associated with one radio frequency (carrier) and a time slot. If frequency hopping is used, a channel is associated with a set of frequencies called Mobile Allocation (MA). The sequence in which the allocated frequencies are used is determined by the Hopping Sequence Number (HSN). The Mobile Allocation Index Offset (MAIO) indicates the starting frequency within the Mobile Allocation.

The following packages/attributes are defined for the channel MOC:

Name	M/O	Comments
channelPackage	M	
channelID	M	**No Replace Specified -** The package channelPackage contains the channelID attribute to provide instance naming that corresponds to time slot number.
channelCombination	M	**Initial Value: tCHFull -** The channelCombination attribute defines the logical channel combination mapped onto the physical channel (time slot). For details Refer to Specification GSM 05.02 [19].
frequencyUsage	M	**Initial Value: NULL -** A channel may or may not use frequency hopping. The usage of frequency hopping is indicated by the attribute frequencyUsage. If no frequency hopping is used, the attribute contains an Absolute Radio Frequency Channel Number (ARFCN). If the channel is configured to BCCH usage, the BCCH frequency is set using the first value from the cellAllocation attribute in the btsBasicPackage and the frequencyUsage attribute value is ignored. If frequency hopping is used, the attribute contains a reference to a frequencyHoppingSystem instance plus the MAIO.
relatedGSMEquipment	M	**Initial Value: NULL -** It is sometimes desirable to indicate a relationship between the performed GSM functionality and the required equipment which supports that functionality. This is achieved through the use of the relatedGSMEquipment attribute. Redundant equipment configurations can be activated by changing this value to point to the new object instance of the redundant equipment.
terrTrafChannel	M	**Initial Value: NULL -** The terrTrafChannel attribute associates a radio time slot (channel) with a terrestrial channel of the Abis interface. Depending on the logical channels (TCH/F or TCH/H) mapped onto the radio time slot, one or two terrestrial channels are needed. In case of half rate channels, the first terrTrafChannel element is associated with TCH/H(0). See Specification GSM 08.58 [23]. A radio time slot needs to be associated with a terrestrial channel only if it carries traffic channel(s). Information on the various control channels is transferred on the Abis using the LapD signalling link(s) of the TRX. See definition of the object classes lapdLink and transceiver.
tsc	M	**Initial Value: NULL** - The tsc attribute provides the ability to set the training sequence code on a per channel basis. If NULL, the BCC of the bsIdentityCode (BSIC) is used as the training sequence code value.
administrativeState	M	**Rec. X.721:1992** - **Initial Value: locked** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992 -** The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
unknownStatus	M	**Rec. X.721:1992 - No Replace Specified** - The unknownStatus supports the status defined in the state table below.
functionalRelatedAlarmPackage	M	This package contains those CCITT alarm notifications that are expected to be needed in functional objects.
equipmentRelatedAlarmPackage	O	This package contains those CCITT alarm notifications that may be needed to report equipment failures via functional objects.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the channel object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
qualityofServiceAlarm	M	**Rec. X.721:1992** - The qualityofServiceAlarm notification is emitted whenever a quality of service alarm condition is detected.
communicationsAlarm	M	**Rec. X.721:1992** - The communicationsAlarm notification is emitted whenever a communications alarm condition is detected.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.
environmentalAlarm	O	**Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.

The following parameters are defined for the channel object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.
relatedGSMEquipCeaseParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value is a Boolean that indicates if an alarm cease capability is defined for this alarm.
relatedGSMEquipLabelParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the user label of the equipment that has failed.
relatedGSMEquipLocParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the location of the equipment that has failed.
relatedGSMEquipNameParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the vendor name of the equipment that has failed.
relatedGSMEquipObjParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is an object instance indicating an object instance representing the equipment that has failed.
relatedGSMEquipTimeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value indicates the time that the equipment failed rather than the time of report.
relatedGSMEquipTypeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the type of the equipment that has failed.
relatedGSMEquipVersParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the version of the equipment that has failed.

State/Status Table for the channel object:

State/Status	Values	Comments
administrativeState	locked	No telecom traffic allowed through this channel.
	unlocked	Telecom traffic allowed.
	shuttingDown	No new telecom traffic allowed. No incoming handovers, no paging, no call setup. When all traffic terminates, transfer to locked state is automatic.
controlStatus	subjectToTest	The channel is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The channel has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the channel has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The channel is totally inoperable for telecom purposes. The channel itself is disabled.
	enabled	The channel is able to operate for telecom purposes.
availabilityStatus	inTest	The channel is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The channel has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The channel is not powered on. The operational state is disabled.
	offLine	The channel requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The channel has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The channel cannot operate because some other resource on which it depends is unavailable.
	degraded	The channel provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The channel is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
alarmStatus	cleared	The channel functionality has all alarms cleared.
	indeterminate	The alarm status of the channel functionality is unable to be determined.
	activeReportable-Critical	The channel functionality has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The channel functionality has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The channel functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The channel functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The channel functionality has an alarm pending.
unknownStatus		If true, the other states of the channel are unreliable.

channelModCompleteRecord

The channelModCompleteRecord is a managed object class provided to allow the logging of channelModComplete notifications.

The following packages/attributes are defined for the channelModCompleteRecord object:

Name	M/O	Comments
channelModCompleteRecordPackage	M	This managed object class is provided to allow the logging of channelModComplete notifications.
channelModCompleteArg	M	**No Replace Specified -** This attribute allows the storing of channelModComplete notification results in a log.
logRecordPackage	M	
logRecordId	M	**Inherited - Rec. X.721:1992 - No Replace Specified -** Record naming attribute.
loggingTime	M	**Inherited - Rec. X.721:1992 - No Replace Specified -** Time stamp.
eventLogRecordPackage	M	
managedObjectClass	M	**Inherited - Rec. X.721:1992 - No Replace Specified -** Allows filtering of logged records.
managedObjectInstance	M	**Inherited - Rec. X.721:1992 - No Replace Specified -** Allows filtering of logged records.
eventType	M	**Inherited - Rec. X.721:1992 - No Replace Specified -** Allows filtering of logged records.
eventTimePackage	O	
eventTime	O	**Inherited - Rec. X.721:1992 - No Replace Specified -** Provides the event time.
notificationIdentifierPackage	O	
notificationIdentifier	O	**Inherited - Rec. X.721:1992 - No Replace Specified -** Provides unique number.
correlatedNotificationsPackage	O	
correlatedNotifications	O	**Inherited - Rec. X.721:1992 - No Replace Specified -** Identifies correlated notifications.
additionalTextPackage	O	
additionalText	O	**Inherited - Rec. X.721:1992 - No Replace Specified -** Allows for additional text.
additionalInformationPackage	O	
additionalInformation	O	**Inherited - Rec. X.721:1992 - No Replace Specified -** Allows for additional information.

frequencyHoppingSystem

The frequencyHoppingSystem MOC represents a set of radio frequency channels used in a specific frequency hopping sequence. An instance of frequencyHoppingSystem may be (and often is) shared by one or more channels. It should be noted that the system has to update the mobileAllocation attribute if a frequency is lost due to a TRX failure.

The following packages/attributes are defined for the frequencyHoppingSystem object:

Name	M/O	Comments
frequencyHoppingSystemPackage	M	
frequencyHoppingSystemID	M	**No Replace Specified** - The package frequencyHoppingSystemPackage provides the frequencyHoppingSystemID attribute for instance naming.
hoppingSequenceNumber	M	The Hopping Sequence Number (HSN) determines the order in which the allocated frequencies are used. Refer to Specification GSM 05.02 [19].
mobileAllocation	M	The attribute mobileAllocation specifies the set of radio frequencies allocated to this frequencyHoppingSystem instance.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the frequencyHoppingSystem object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

The following parameters are defined for the frequencyHoppingSystem object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.

handoverControl

The managed object class handoverControl models the handover algorithm used with a BTS and contains attributes that are generic to any handover algorithm. Manufacturers shall use the class handoverControl as a base class for specifying actual managed object classes for management of parameters specific to their handover algorithm (handoverControlGSM0508 is an example). The class handoverControl cannot be instantiated. There are, at most, two instances of these actual instantiated subclasses per BTS, one to manage parameters used by the BSC and one to manage parameters used by the BTS.

The following packages/attributes are defined for the handoverControl MOC:

Name	M/O	Comments
handoverControlPackage	M	
handoverControlID	M	**No Replace Specified -** The package handoverControlPackage provides the handoverControlID attribute for instance naming.
msmtProcParamLoc	M	**No Replace Specified -** Radio link measurements are transferred from the BTS to the BSC for use by the power control and handover algorithms. The measurements are transferred in their natural state or, optionally, they can be processed by the BTS with results being transferred. The msmtProcParamLoc attribute is contained in handover and power control objects along with parameters that control the algorithm processing. Different sets of parameters may be used for BSC and BTS processing. This indicator is used to determine to which processing mode the specific instance of the algorithm processing parameters apply.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the handoverControl object:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

handoverControlGSM0508

The handoverControlGSM0508 managed object class is a specialization of handoverControl for the case of the algorithm specified in GSM 05.08 [21] Annex A. Manufacturers shall use the class handoverControl as a base class for specifying actual managed object classes for management of parameters specific to their handover algorithm. There are, at most, two active instances of the handoverControlGSM0508 subclass per BTS. This subclass shall be used, if the BSS supports the default GSM 05.08 [21] handover algorithm.

The handover decisions made by the BSC are based on the measurement results reported by the MS/BTS and various parameters set for each cell. The parameters control the handover process in the BSC. By changing the values of the parameters it is possible to affect the handover decisions in all stages: the preprocessing, the threshold comparison and the decision algorithm. All parameters are administered on a cell by cell basis by means of O&M.

The handover is normally caused by radio criteria, but the BSC is also capable of executing handovers due to other reasons like: MSC directed handover using the HO candidate inquiry procedure or BSC internal traffic control.

When a Mobile Station moves from one cell coverage area to another, the handover measurements indicate a low received signal strength (RXLEV) and/or quality level (RXQUAL) on the current serving cell, and a better RXLEV/RXQUAL available from a neighbouring (adjacent) cell. Alternatively, a neighbouring cell may allow communication with a lower TX power level. These are the main selection criteria used by the BSC in selecting the target cell for a handover caused by radio criteria. If the handover is due to reasons other than the radio criteria, it is not necessary that the target cell be better than the serving cell, but it is sufficient that certain minimal quality requirements be fulfilled.

A handover may occur not only during a call from a TCH to a TCH, but it may also occur from a SDCCH to a SDCCH during the initial signalling period at call set up. Intra-BTS handover can occur either to a radio time slot on a new carrier or to a different time slot on the same carrier. A handover is either synchronized or nonsynchronized, depending on whether or not the target and origin cells are synchronized or not. The synchronization of an adjacent cell is indicated by the attribute synchronized of the object class adjacentCellHandOver.

The following packages/attributes are defined for the handoverControlGSM0508 object:

Name	M/O	Comments
handoverControlGSM0508Package	M	The package handoverControlGSM0508Package contains the parameters of the default handover algorithm defined in Annex A of Specification GSM 05.08 [21]. The several "averaging" attributes contain averaging parameters used in the handover process: the number of SACCH multiframes over which results are averaged, i.e. the window size (Hreqave in GSM 05.08 [21]), the number of results sent in the "handover required" message (Hreqt in GSM 05.08 [21]), and Weighting. The several "threshold" attributes contain threshold parameters used in the handover processing.
enableOptHandoverProc	M	The enableOptHandoverProc attribute enables the allowed optional power budget and MS distance handover processing as specified in GSM 05.08 [21] Annex A.
hoAveragingAdjCellParam	M	The hoAveragingAdjCellParam attribute contains averaging parameters used for averaging signal level measurements from adjacent cells.
hoAveragingDistParam	M	The hoAveragingDistParam attribute contains averaging parameters used in the handover process, in case the handover cause is distance between the Mobile Station and the BTS.
hoAveragingLevParam	M	The hoAveragingLevParam attribute contains averaging parameters for the signal strength measurements.
hoAveragingQualParam	M	The hoAveragingQualParam attribute contains averaging parameters for the signal quality measurements.
hoMarginDef	M	The hoMarginDef attribute holds the default value of hoMargin. It is used to evaluate handover to undefined cells. Refer to Annex A of Specification GSM 05.08 [21] (HO_MARGIN_DEF).
hoThresholdDistParam	M	The hoThresholdDistParam attribute contains parameters used in the handover process, in case the handover cause is distance between the Mobile Station and the BTS. See Specification GSM 05.08 [21].
hoThresholdInterferenceParam	M	The hoThresholdInterferenceParam attribute contains parameters for comparing the averaged uplink and downlink interference measurements.
hoThresholdLevParam	M	The hoThresholdLevParam attribute contains parameters for comparing averaged uplink and downlink signal strength measurements.
hoThresholdQualParam	M	The hoThresholdQualParam attribute contains parameters for comparing averaged uplink and downlink signal quality measurements.

interferenceAveragingParam	M	The interferenceAveragingParam attribute contains parameters used in averaging interference levels in the unallocated time slots.
msTxPwrMaxCellDef	M	The msTxPwrMaxCellDef attribute holds the default value of msTxPwrMaxCellDef (see adjacentCellHandOverGSM0508 MOC). It is used to evaluate handover to undefined adjacent cells (MS_TXPWR_MAX (n)).
rxLevMinCellDef	M	The rxLevMinCellDef attribute holds the default value of rxLevMinCell (see adjacentCellHandOverGSM0508 MOC). It is used to evaluate handover to undefined cells (RXLEV_MIN_DEF).
handoverControlPackage	M	**Inherited**
handoverControlID	M	**Inherited - No Replace Specified** - The package handoverControlPackage provides the handoverControlID attribute for instance naming.
msmtProcParamLoc	M	**Inherited - No Replace Specified** - Radio link measurements are transferred from the BTS to the BSC for use by the power control and handover algorithms. The measurements are transferred in their natural state or, optionally, they can be processed by the BTS with results being transferred. The msmtProcParamLoc attribute is contained in handover and power control objects along with parameters that control the algorithm processing. Different sets of parameters may be used for BSC and BTS processing. This indicator is used to determine to which processing mode the specific instance of the algorithm processing parameters apply.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the handoverControlGSM0508 object:

Name	M/O	Comments
attributeValueChange	M	**Inherited** - **gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited** - **gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited** - **gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

lapdLink

The MOC lapdLink models a logical LapD connection on a signaling link on the Abis interface. Both O&M and Telecom signaling are covered by lapdLink. A lapdLink object is associated with a PCM time slot by the abisSigChannel attribute. If optional sub multiplexing is used, a lapdLink is also associated with a subslot within the time slot.

The following packages/attributes are defined for the lapdLink MOC:

Name	M/O	Comments
lapdLinkPackage	M	
lapdLinkID	M	**No Replace Specified** - The package lapdLinkPackage provides the lapdLinkID attribute for instance naming.
abisSigChannel	M	**No Replace Specified -** The abisSigChannel attribute identifies the PCM time slot and optional subslot allocated for the LapD signaling link at the Abis interface.
sapi	M	**No Replace Specified -** The sapi attribute contains the Service Access Point Identifier.
tei	M	The tei attribute contains the Terminal Endpoint Identifier corresponding to the lapdLink object. See Specifications GSM 08.58 [23] and CCITT Q.921.
administrativeState	M	**Rec. X.721:1992** - **Initial Value: locked** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992 -** The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
unknownStatus	M	**Rec. X.721:1992 - No Replace Specified** - The unknownStatus supports the status defined in the state table below.
functionalRelatedAlarmPackage	M	This package contains those CCITT alarm notifications that are expected to be needed in functional objects.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the lapdLink MOC:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
qualityofServiceAlarm	M	**Rec. X.721:1992** - The qualityofServiceAlarm notification is emitted whenever a quality of service alarm condition is detected.
communicationsAlarm	M	**Rec. X.721:1992** - The communicationsAlarm notification is emitted whenever a communications alarm condition is detected.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.

The following parameters are defined for the lapdLink MOC:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.

State/Status Table for the lapdLink MOC:

State/Status	Values	Comments
administrativeState	locked	No traffic allowed on this lapdLink.
	unlocked	Traffic is allowed.
	shuttingDown	Not Applicable.
controlStatus	subjectToTest	The lapdlink is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The lapdlink has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the lapdlink has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The lapdLink is totally inoperable. The lapdLink itself is disabled.
	enabled	The lapdLink is able to operate.
availabilityStatus	inTest	The lapdlink is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The lapdlink has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The lapdlink is not powered on. The operational state is disabled.
	offLine	The lapdlink requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The lapdlink has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The lapdlink cannot operate because some other resource on which it depends is unavailable.
	degraded	The lapdlink provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The lapdlink is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
alarmStatus	cleared	The lapdLink functionality has all alarms cleared.
	indeterminate	The alarm status of the lapdLink functionality is unable to be determined.
	activeReportable-Critical	The lapdLink functionality has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The lapdLink functionality has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The lapdLink functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The lapdLink functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The lapdLink functionality has an alarm pending.
unknownStatus		If true, the other states of the lapdLink are unreliable.

pcmCircuit

The pcmCircuit MOC models a telecommunications facility. Its purpose is to allow identification for management in conjunction with other MOCs such as lapdLink and transcoder and to provide control and alarm capabilities. The generic network model in CCITT M.3100, considers connections and trails to exist between Managed Elements (MEs). As the BSS is modelled in this specification as a Managed Element, communication between component parts is considered to be an internal matter and is modelled as part of the BSS. Connections and termination points between GSM Managed Elements (e.g. MSC and BSS) are expected to be modelled at the PLMN model level.

The following packages/attributes are defined for the pcmCircuit MOC:

Name	M/O	Comments
pcmCircuitPackage	M	
pcmCircuitID	M	**No Replace Specified -** The package pcmCircuitPackage provides the attribute pcmCircuitID for instance naming.
relatedGSMEquipment	M	It is sometimes desirable to indicate a relationship between the performed GSM functionality and the required equipment which supports that functionality. This is achieved through the use of the relatedGSMEquipment attribute. Redundant equipment configurations can be activated by changing this value to point to the new object instance of the redundant equipment.
administrativeState	M	**Rec. X.721:1992 - Initial Value: locked** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992** - The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
unknownStatus	M	**Rec. X.721:1992 - No Replace Specified** - The unknownStatus supports the status defined in the state table below.
usageState	M	**Rec. X.721:1992 - No Replace Specified** - The usageState supports the states defined in the state table below.
functionalRelatedAlarmPackage	M	This package contains those CCITT alarm notifications that are expected to be needed in functional objects.
equipmentRelatedAlarmPackage	O	This package contains those CCITT alarm notifications that may be needed to report equipment failures via functional objects.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the pcmCircuit MOC:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
qualityofServiceAlarm	M	**Rec. X.721:1992** - The qualityofServiceAlarm notification is emitted whenever a quality of service alarm condition is detected.
communicationsAlarm	M	**Rec. X.721:1992** - The communicationsAlarm notification is emitted whenever a communications alarm condition is detected.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.
environmentalAlarm	O	**Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.

The following parameters are defined for the pcmCircuit MOC:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.
relatedGSMEquipCeaseParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value is a Boolean that indicates if an alarm cease capability is defined for this alarm.
relatedGSMEquipLabelParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the user label of the equipment that has failed.
relatedGSMEquipLocParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the location of the equipment that has failed.
relatedGSMEquipNameParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the vendor name of the equipment that has failed.
relatedGSMEquipObjParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is an object instance indicating an object instance representing the equipment that has failed.
relatedGSMEquipTimeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value indicates the time that the equipment failed rather than the time of report.
relatedGSMEquipTypeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the type of the equipment that has failed.
relatedGSMEquipVersParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the version of the equipment that has failed.

State/Status Table for the pcmCircuit MOC:

State/Status	Values	Comments
administrativeState	locked	No traffic is allowed on this pcmCircuit.
	unlocked	Traffic is allowed.
	shuttingDown	Not Applicable
controlStatus	subjectToTest	The pcmCircuit is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The pcmCircuit has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the pcmCircuit has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The pcmCircuit is totally inoperable. The pcmCircuit itself is disabled.
	enabled	The pcmCircuit is able to operate.
availabilityStatus	inTest	The pcmCircuit is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The pcmCircuit has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The pcmCircuit is not powered on. The operational state is disabled.
	offLine	The pcmCircuit requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The pcmCircuit has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The pcmCircuit cannot operate because some other resource on which it depends is unavailable.
	degraded	The pcmCircuit provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The pcmCircuit is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
usageState	idle	The pcmCircuit has no time slots assigned for traffic channel or other use.
	active	The pcmCircuit has some time slots assigned for traffic channel or other use. There is spare capacity to allow for additional users.
	busy	The pcmCircuit has some time slots assigned for traffic channel or other use. The pcmCircuit has no spare operating capacity at this instant.
alarmStatus	cleared	The pcmCircuit functionality has all alarms cleared.
	indeterminate	The alarm status of the pcmCircuit functionality is unable to be determined.
	activeReportable-Critical	The pcmCircuit functionality has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The pcmCircuit functionality has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The pcmCircuit functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The pcmCircuit functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The pcmCircuit functionality has an alarm pending.
unknownStatus		If true, the other states of the pcmCircuit are unreliable.

powerControl

The MOC powerControl models the power control algorithm used with a MS/BTS and contains attributes that are generic to any power control algorithm. Manufacturers shall use the class powerControl as a base class for specifying actual MOCs for management of parameters specific to their power control algorithm (see powerControlGSM0508 for example). The class powerControl cannot be instantiated. There are, at most, two instances of these actual instantiated subclasses per BTS, one to manage parameters used by the BSC and one to manage parameters used by the BTS.

The following packages/attributes are defined for the powerControl MOC:

Name	M/O	Comments
powerControlPackage	M	
powerControlID	M	**No Replace Specified,** The package powerControlPackage provides the attribute powerControlID for instance naming.
msmtProcParamLoc	M	Radio link measurements are transferred from the BTS to the BSC for use by the power control and handover algorithms. The measurements are transferred in their natural state or, optionally, they can be processed by the BTS with results being transferred. The msmtProcParamLoc attribute is contained in handover and power control objects along with parameters that control the algorithm processing. Different sets of parameters may be used for BSC and BTS processing. This indicator is used to determine to which processing mode the specific instance of the algorithm processing parameters apply.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the powerControl MOC:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

powerControlGSM0508

The managed object class powerControlGSM0508 contains the parameters of the default power control algorithm defined in Annex A of Specification GSM 05.08 [21]. This class shall be used, if the BSS supports the default power control algorithm.

The purpose of the RF power control process in the BSC is to determine the transmit power (TXPWR) to be used by the MS, and, optionally, the BTS. The main goal is to minimize the transmit power output of the MS, at the same time ensuring that adequate speech/data quality can be maintained.

The power level to be used is based on the measurement results reported by the MS/BTS, as well as on a set of cell specific parameters. The attributes of the MOC powerControlGSM0508 describe those cell specific parameters; it is possible to effect all stages of the power control by modifying the attribute values.

In general, power control and handover control are independent processes. In certain cases, however, they are strongly interrelated. For example, handover to a neighbor cell and increase of transmit power are often both viable alternatives. A handover should generally be chosen, if the target cell permits communication with a lower TX power. In case a handover cannot be performed e.g. for traffic reasons, a power increase may be used as first aid.

The following packages/attributes are defined for the powerControlGSM0508 MOC:

Name	M/O	Comments
powerControlGSM0508Package	M	The package powerControlGSM0508Package contains the parameters of the default power control algorithm defined in Annex A of Specification GSM 05.08 [21]. The "averaging" attributes contain averaging parameters used in the power control process: the number of SACCH multiframes over which results are averaged, i.e. the window size (Hreqave in GSM 05.08 [21]), the number of results sent in the "handover required" message (Hreqt in GSM 05.08 [21]), and Weighting. The "threshold" attributes contain threshold parameters used in the power control processing.
pcAveragingLev	M	The pcAveragingLev attribute contains averaging parameters for the signal strength measurements.
pcAveragingQual	M	The pcAveragingQual attribute contains averaging parameters for the signal quality measurements.
pcLowerThresholdLevParam	M	The pcLowerThresholdLevParam attribute contains the lower thresholds for the uplink and downlink signal strength.
pcLowerThresholdQualParam	M	The pcLowerThresholdQualParam attribute contains the lower thresholds for the uplink and downlink signal quality.
pcUpperThresholdLevParam	M	The pcUpperThresholdLevParam attribute contains the upper thresholds for the uplink and downlink signal strength.
pcUpperThresholdQualParam	M	The pcUpperThresholdQualParam attribute contains the upper thresholds for the uplink and downlink signal quality.
powerControlInterval	M	The powerControlInterval attribute contains the minimum interval between successive modifications of the RF power level (P_Con_INTERVAL).
powerIncrStepSize	M	The powerIncrStepSize attribute defines the step size used when increasing the MS transmit power. The step size is 2, 4 or 6 dB (Pow_Incr_Step_Size).
powerRedStepSize	M	The powerRedStepSize attribute defines the step size used when reducing the MS transmit power. The step size is 2 or 4 dB (Pow_Red_Step_Size).
powerControlPackage	M	**Inherited**
powerControlID	M	**Inherited - No Replace Specified,** The package powerControlPackage provides the attribute powerControlID for instance naming.
msmtProcParamLoc	M	**Inherited** - The msmtProcParamLoc attribute is contained in handover and power control objects along with parameters that control the algorithm processing. Different sets of parameters may be used for BSC and BTS processing. This indicator is used to determine to which processing mode the specific instance of the algorithm processing parameters apply.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the powerControlGSM0508 MOC:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

radioCarrier

The definition of the radioCarrier managed object class is a functional entity representing the manageable properties of a radio carrier. Together with the basebandTransceiver and channel MOCs, it is meant to accommodate various system architectures including fixed frequency, baseband hopping, and synthesized hopping systems.

This definition covers what may be described as the radio aspects of transmission in the GSM/DCS 1800 base station systems. This functionality is related to the baseband aspects by means of the associated channel definitions (see channel managed object class).

Faulty equipment may cause a radioCarrier instance to be supported by alternative equipment, i.e. equipment redundancy. The new configuration will be reported to the manager using attributeValueChange notifications, which will be sent by the agent for the affected radioCarrier instances.

The following packages/attributes are defined for the radioCarrier MOC:

Name	M/O	Comments
radioCarrierPackage	M	The radioCarrierPackage provides the attributes for the basic properties of the radioCarrier functionality.
radioCarrierID	M	**No Replace Specified** - The radioCarrierID attribute provides for instance naming.
relatedGSMEquipment	M	It is sometimes desirable to indicate a relationship between the performed GSM functionality and the required equipment which supports that functionality. This is achieved through the use of the relatedGSMEquipment attribute. Redundant equipment configurations can be activated by changing this value to point to the new object instance of the redundant equipment.
carrierFrequencyList	M	The attribute carrierFrequencyList defines the set of absolute radio frequency channel numbers, ARFCNs, which the carrier shall use. The set is reduced to one for systems with no hopping or with baseband hopping. For synthesized hopping systems, the set includes all frequencies of all of the channels that use this radioCarrier instance. Also in synthesized hopping systems, different radioCarrier instances may have common frequencies but they cannot use the same frequency in the same time slot.
powerClass	M	**No Replace Specified** - The value of the attribute powerClass denotes the maximum possible transmit power of the carrier, as defined in GSM TS 05.05 [20].
txPwrMaxReduction	M	The attribute txPwrMaxReduction is used to adjust the effective transmit power of the carrier, such that the maximum power given in the powerClass attribute is reduced by the value of this attribute (*2 dB).
administrativeState	M	**Rec. X.721:1992 - Initial Value: locked** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992** - The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
unknownStatus	M	**Rec. X.721:1992 - No Replace Specified** - The unknownStatus supports the status defined in the state table below.
functionalRelatedAlarmPackage	M	This package contains those CCITT alarm notifications that are expected to be needed in functional objects.
equipmentRelatedAlarmPackage	O	This package contains those CCITT alarm notifications that may be needed to report equipment failures via functional objects.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
createDeleteNotificationsPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited - gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited - gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the radioCarrier MOC:

Name	M/O	Comments
attributeValueChange	M	**Inherited - gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited - gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited - gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
qualityofServiceAlarm	M	**Rec. X.721:1992** - The qualityofServiceAlarm notification is emitted whenever a quality of service alarm condition is detected.
communicationsAlarm	M	**Rec. X.721:1992** - The communicationsAlarm notification is emitted whenever a communications alarm condition is detected.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.
environmentalAlarm	O	**Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.

The following parameters are defined for the radioCarrier MOC:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.
relatedGSMEquipCeaseParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value is a Boolean that indicates if an alarm cease capability is defined for this alarm.
relatedGSMEquipLabelParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the user label of the equipment that has failed.
relatedGSMEquipLocParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the location of the equipment that has failed.
relatedGSMEquipNameParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the vendor name of the equipment that has failed.
relatedGSMEquipObjParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is an object instance indicating an object instance representing the equipment that has failed.
relatedGSMEquipTimeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value indicates the time that the equipment failed rather than the time of report.
relatedGSMEquipTypeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the type of the equipment that has failed.
relatedGSMEquipVersParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the version of the equipment that has failed.

State/Status Table for the radioCarrier MOC:

State/Status	Values	Comments
administrativeState	locked	No transmission or reception through this radioCarrier.
	unlocked	Transmission and reception are allowed.
	shuttingDown	Not Applicable
controlStatus	subjectToTest	The radioCarrier is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The radioCarrier has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the radioCarrier has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The radioCarrier is totally inoperable for transmission/reception. The radioCarrier itself is disabled.
	enabled	The radioCarrier is able to operate for transmission/reception.
availabilityStatus	inTest	The radioCarrier is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The radioCarrier has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The radioCarrier is not powered on. The operational state is disabled.
	offLine	The radioCarrier requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The radioCarrier has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The radioCarrier cannot operate because some other resource on which it depends is unavailable.
	degraded	The radioCarrier provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The radioCarrier is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
alarmStatus	cleared	The radioCarrier functionality has all alarms cleared.
	indeterminate	The alarm status of the radioCarrier functionality is unable to be determined.
	activeReportable-Critical	The radioCarrier functionality has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The radioCarrier functionality has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The radioCarrier functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The radioCarrier functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The radioCarrier functionality has an alarm pending.
unknownStatus		If true, the other states of the radioCarrier are unreliable.

transcoder

The transcoder MOC models the functional entity that performs GSM-defined speech encoding, decoding, data rate adaption, and sub multiplexing functions. The speech transcoder interfaces the 64 kbps A-law PCM in the terrestrial network to the 13 kbps format used on the air interface. One instance of the transcoder object represents the functional entity that does the transcoding for one or more 64 kbps A-law PCM time slots.

The following packages/attributes are defined for the transcoder object:

Name	M/O	Comments
transcoderPackage	M	
transcoderID	M	**No Replace Specified** - The package transcoderPackage provides the attribute transcoderID for instance naming.
relatedGSMEquipment	M	It is sometimes desirable to indicate a relationship between the performed GSM functionality and the required equipment which supports that functionality. This is achieved through the use of the relatedGSMEquipment attribute. Redundant equipment configurations can be activated by changing this value to point to the new object instance of the redundant equipment.
administrativeState	M	**Rec. X.721:1992** - **Initial Value: locked** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992** - The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
unknownStatus	M	**Rec. X.721:1992 - No Replace Specified** - The unknownStatus supports the status defined in the state table below.
functionalRelatedAlarmPackage	M	This package contains those CCITT alarm notifications that are expected to be needed in functional objects.
equipmentRelatedAlarmPackage	O	This package contains those CCITT alarm notifications that may be needed to report equipment failures via functional objects.
transcoderMatrixPackage	O	
transcoderMatrix	O	The optional package transcoderMatrixPackage provides the attribute transcoderMatrix which is used to define the mapping between the 64 kbps A-law PCM in the terrestrial network to the 13 kbps format used on the air interface.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
createDeleteNotificationsPackage	M	**Inherited** - **gsmManagedFunction** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Inherited** - **gsmManagedFunction** - This package contains notifications only.
userLabelPackage	O	**Inherited** - **gsmManagedFunction** - This package provides the capability to assign a user friendly name.
locationNamePackage	O	**Inherited** - **gsmManagedFunction** - This package provides the capability to assign a location to the resource represented by this object instance.

The following notifications are defined for the transcoder object:

Name	M/O	Comments
attributeValueChange	M	**Inherited** - **gsmManagedFunction** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Inherited** - **gsmManagedFunction** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Inherited** - **gsmManagedFunction** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
qualityofServiceAlarm	M	**Rec. X.721:1992** - The qualityofServiceAlarm notification is emitted whenever a quality of service alarm condition is detected.
communicationsAlarm	M	**Rec. X.721:1992** - The communicationsAlarm notification is emitted whenever a communications alarm condition is detected.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.
environmentalAlarm	O	**Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.

The following parameters are defined for the transcoder object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.
relatedGSMEquipCeaseParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value is a Boolean that indicates if an alarm cease capability is defined for this alarm.
relatedGSMEquipLabelParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the user label of the equipment that has failed.
relatedGSMEquipLocParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the location of the equipment that has failed.
relatedGSMEquipNameParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the vendor name of the equipment that has failed.
relatedGSMEquipObjParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is an object instance indicating an object instance representing the equipment that has failed.
relatedGSMEquipTimeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported. The parameter value indicates the time that the equipment failed rather than the time of report.
relatedGSMEquipTypeParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the type of the equipment that has failed.
relatedGSMEquipVersParam	O	This parameter may be included when alarm conditions due to equipment failure are reported via functional object classes. The parameter value is a graphic string indicating the version of the equipment that has failed.

State/Status Table for the transcoder object:

State/Status	Values	Comments
administrativeState	locked	No traffic is allowed through this transcoder.
	unlocked	Traffic is allowed through this transcoder
	shuttingDown	Not Applicable.
controlStatus	subjectToTest	The transcoder is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The transcoder has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the transcoder has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The transcoder is totally inoperable for telecom purposes. The transcoder itself is disabled.
	enabled	The transcoder is able to operate for telecom purposes.
availabilityStatus	inTest	The transcoder is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The transcoder has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The transcoder is not powered on. The operational state is disabled.
	offLine	The transcoder requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The transcoder has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The transcoder cannot operate because some other resource on which it depends is unavailable.
	degraded	The transcoder provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The transcoder is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
alarmStatus	cleared	The transcoder functionality has all alarms cleared.
	indeterminate	The alarm status of the transcoder functionality is unable to be determined.
	activeReportable-Critical	The transcoder functionality has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The transcoder functionality has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The transcoder functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The transcoder functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The transcoder functionality has an alarm pending.
unknownStatus		If true, the other states of the transcoder are unreliable.

5.10 General managed object class summaries

This clause contains information for those managed object classes that have been determined to be needed in the information model of the BSS but that should be of general use in the management of a GSM PLMN but are not described elsewhere.

executableSoftwareUnit

An instance of this managed object class is used to represent a unit of software that is separately identifiable and is ready to be used by the system. Its association with the equipment or functional resource that uses it may be indicated by containment if needed, or an instance of this class may be pointed to by one or more operatingSoftwareUnit instances contained in the associated equipment or functional instances. When the resource represented by an instance of this class is made up of one or more separately identifiable and/or replaceable units, the relatedRSUs attribute may be set to identify these replaceableSoftwareUnit instances. When the relatedRSUs attribute is set to other than NULL (at create or by explicit setting), the resources represented by one or more replaceableSoftwareUnit instances are prepared as necessary by the agent to be used by the system. This might involve a linking step and/or creating a local disk or memory copy.

This MOC inherits characteristics from the CCITT M.3100 software object class and some of these are conditional (optional) in the superclass of this new class. Those packages which have been identified as being useful in the management of a GSM PLMN are explicitly listed below. Other conditional packages are allowed when the required condition is met. This ETS does not, however, define their use.

The following packages/attributes are defined for the executableSoftwareUnit object:

Name	M/O	Comments
executableSoftwareUnitPackage	M	
relatedRSUs	M	This attribute identifies instances of replaceableSoftwareUnit that are related to this object instance.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
attributeValueChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
softwarePackage	M	**Inherited - Rec. M.3100:1992**
softwareID	M	**Inherited - Rec. M.3100:1992 - No Replace Specified** - This attribute is provided for instance naming
userLabelPackage	O	**Inherited - Rec. M.3100:1992**
userLabel	O	**Inherited - Rec. M.3100:1992** - The userLabel attribute type assigns a user friendly name to the associated object.
vendorNamePackage	O	**Inherited - Rec. M.3100:1992**
vendorName	O	**Inherited - Rec. M.3100:1992** - The vendorName attribute type identifies the vendor of the associated managed object.
versionPackage	O	**Inherited - Rec. M.3100:1992**
version	O	**Inherited - Rec. M.3100:1992** - The version attribute type identifies the version of the associated managed object.
currentProblemListPackage	O	**Inherited - Rec. M.3100:1992**
currentProblemList	O	**Inherited - Rec. M.3100:1992 - No Replace Specified** - The currentProblemList attribute type identifies the current existing problems, with severity, associated with the managed object.

The following notifications are defined for the executableSoftwareUnit object:

Name	M/O	Comments
attributeValueChange	M	**Rec. X.721:1992** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Rec. X.721:1992** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Rec. X.721:1992** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

The following parameters are defined for the executableSoftwareUnit object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.

gsmEquipment

This MOC is provided for direct use or for subclassing equipment MOCs in a GSM system. This class adds an attribute to CCITT M.3100 equipment MOC which allows the identification of related functional object class instances for the purposes of generating equipment alarms by these functional objects. This is to allow systems to receive alarm notifications only from functional objects. An instance of this class (or its subclasses) represents the physical components of a GSM PLMN.

This MOC inherits characteristics from the equipment MOC and some of these are conditional (optional) in the superclass of this new class. Those packages which have been identified as being useful in the management of a GSM PLMN are explicitly listed below. Other conditional packages are allowed when the required condition is met. This ETS does not, however, define their use.

The following packages/attributes are defined for the gsmEquipment MOC:

Name	M/O	Comments
gsmEquipmentPackage	M	
equipmentType	M	This attribute is intended to allow various types of equipment to be distinguished without subclassing the gsmEquipment MOC.
relatedGSMFunctionalObjects	M	This attribute identifies instances of functional object classes that are related to this equipment object instance for the purposes of alarm generation.
equipmentPackage	M	**Inherited - Rec. M.3100:1992**
equipmentID	M	**Inherited - Rec. M.3100:1992 - No Replace Specified** - The equipmentID is an attribute type whose distinguished value can be used as a RDN when naming an instance of the equipment object class (or subclasses).
replaceable	M	**Inherited - Rec. M.3100:1992 - No Replace Specified** - The replaceable attribute indicates whether the associated managed object is replaceable or non-replaceable.
createDeleteNotificationsPackage	O	**Inherited - Rec. M.3100:1992** - This package contains notifications only.
attributeValueChangeNotificationPackage	O	**Inherited - Rec. M.3100:1992** - This package contains notifications only.
stateChangeNotificationPackage	O	**Inherited - Rec. M.3100:1992** - This package contains notifications only.
administrativeoperationalStatesPackage	O	**Inherited - Rec. M.3100:1992**
administrativeState	O	**Inherited - Rec. X.721:1992 - Initial Value: locked** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992** - The controlStatus supports the status defined in the state table below.
operationalState	O	**Inherited - Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
affectedObjectListPackage	O	**Inherited - Rec. M.3100:1992**
affectedObjectList	O	**Inherited - Rec. M.3100:1992 - No Replace Specified** - This attribute indicates the location of the equipment.
equipmentsEquipmentAlarmPackage	O	**Inherited - Rec. M.3100:1992**
alarmStatus	O	**Inherited - Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
environmentalAlarmPackage	O	**Inherited - Rec. M.3100:1992** - This package contains notifications only.
userLabelPackage	O	**Inherited - Rec. M.3100:1992**
userLabel	O	**Inherited - Rec. M.3100:1992** - The userLabel attribute type assigns a user friendly name to the associated object.
vendorNamePackage	O	**Inherited - Rec. M.3100:1992**
vendorName	O	**Inherited - Rec. M.3100:1992** - The vendorName attribute type identifies the vendor of the associated managed object.
versionPackage	O	**Inherited - Rec. M.3100:1992**
version	O	**Inherited - Rec. M.3100:1992** - The version attribute type identifies the version of the associated managed object.
locationNamePackage	O	**Inherited - Rec. M.3100:1992**
locationName	O	**Inherited - Rec. M.3100:1992** - This attribute indicates the location of the equipment.
currentProblemListPackage	O	**Inherited - Rec. M.3100:1992**
currentProblemList	O	**Inherited - Rec. M.3100:1992 - No Replace Specified** - The currentProblemList attribute type identifies the current existing problems, with severity, associated with the managed object.

The following notifications are defined for the gsmEquipment object:

Name	M/O	Comments
attributeValueChange	O	**Inherited - Rec. X.721:1992** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	O	**Inherited** - **Rec. X.721:1992** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	O	**Inherited** - **Rec. X.721:1992** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	O	**Inherited** - **Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
environmentalAlarm	O	**Inherited** - **Rec. X.721:1992** - The environmentalAlarm notification is emitted whenever an environmental alarm condition is detected.
equipmentAlarm	O	**Inherited** - **Rec. X.721:1992** - The equipmentAlarm notification is emitted whenever an equipment alarm condition is detected.

The following parameters are defined for the gsmEquipment object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.

State/Status Table for the gsmEquipment object:

State/Status	Values	Comments
administrativeState	locked	Normal operation of this equipment is stopped.
	unlocked	Normal operation of this equipment is started.
	shuttingDown	No new users of this equipment are allowed. When all current use ceases, the state changes to locked.
controlStatus	subjectToTest	The gsmEquipment is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The gsmEquipment has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the gsmEquipment has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The equipment is totally inoperable for normal purposes.
	enabled	The equipment is able to operate for normal purposes.
availabilityStatus	inTest	The gsmEquipment is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The gsmEquipment has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The gsmEquipment is not powered on. The operational state is disabled.
	offLine	The gsmEquipment requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The gsmEquipment has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The gsmEquipment cannot operate because some other resource on which it depends is unavailable.
	degraded	The gsmEquipment provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The gsmEquipment is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
alarmStatus	cleared	The equipment functionality has all alarms cleared.
	indeterminate	The alarm status of the equipment functionality is unable to be determined.
	activeReportable-Critical	The equipment has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The equipment has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The equipment has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The equipment has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The equipment functionality has an alarm pending.

gsmManagedFunction

This managed object class is provided for subclassing only. It provides the packages/attributes that are common to GSM PLMN functional MOCs. Included are packages providing notifications of object creation and deletion and attribute value change. This superclass also provides conditional packages that may be used to identify the name and location of the resource managed by instances of subclasses of this MOC.

The following packages/attributes are defined for the gsmManagedFunction MOC:

Name	M/O	Comments
createDeleteNotificationsPackage	M	**Rec. M.3100:1992** - This package contains notifications only.
attributeValueChangeNotificationPackage	M	**Rec. M.3100:1992** - This package contains notifications only.
userLabelPackage	O	**Rec. M.3100:1992**
userLabel	O	**Rec. M.3100:1992** - The userLabel attribute type assigns a user friendly name to the associated object.
locationNamePackage	O	**Rec. M.3100:1992**
locationName	O	**Rec. M.3100:1992** - This attribute indicates the location of the resource represented by this object instance.

The following notifications are defined for the gsmManagedFunction object:

Name	M/O	Comments
attributeValueChange	M	**Rec. X.721:1992** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Rec. X.721:1992** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Rec. X.721:1992** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

operatingSoftwareUnit

An instance of this MOC is used to represent the operating software resource for an instance of equipment or functionality and is associated with the related equipment or functional unit through containment. The software resource is identified by the runningESU attribute which identifies an instance of an executableSoftwareUnit. When this attribute is set (even if set to the same value), the executable instance is copied to the area of its use (e.g. loading to executable memory store) and use by the system begins unless prohibited by the administrative state. The administrative locked state prohibits operation of the instance of this resource while the unlocked state starts/restarts its operation. Failure of the operation of this resource is indicated by an alarm notification and by the alarmStatus attribute. If the automatic start/restart of this resource is supported (e.g. following initialization or failure) the managed system will set the value of the runningESU attribute to the value contained in the backupESU attribute, if any, and behave as indicated for setting of the runningESU attribute (attribute value and state change notifications will be issued as appropriate). Additional related executableSoftwareUnits may be identified for use by setting the values of the newESU and fallbackESU attributes.

The following packages/attributes are defined for the operatingSoftwareUnit object:

Name	M/O	Comments
operatingSoftwareUnitPackage	M	
operatingSoftwareID	M	**No Replace Specified** - The attribute operatingSoftwareID is provided for instance naming.
backupESU	M	This attribute identifies the instance of the executableSoftwareUnit MOC that will be run (if any) in the case that the system supports automatic start or restart of software in the case of initialization or failure. In this case the value of this attribute will be copied into the runningESU attribute and the behaviour of that attribute will be followed.
fallbackESU	M	This attribute identifies an instance of the executableSoftwareUnit MOC that is available on the system for use in recovery from failures in the running software.
newESU	M	This attribute identifies an instance of the executableSoftwareUnit MOC that is available on the system but that may be subject to verification before normal use.
runningESU	M	This attribute identifies the instance of the executableSoftwareUnit MOC that is currently running (subject to administrative state control and failure conditions) on the instance of the object that contains this object. Setting this attribute causes the identified instance of executableSoftwareUnit to be loaded into executable memory (if required) and executed (even if the new and old values of the attribute are equal). If set to NULL, execution shall be stopped.
administrativeState	M	**Rec. X.721:1992** - **Initial Value: locked** - The administrativeState attribute supports the states defined in the state table below.
controlStatus	M	**Rec. X.721:1992** - The controlStatus supports the status defined in the state table below.
alarmStatus	M	**Rec. M.3100:1992 - No Replace Specified** - The alarmStatus attribute supports the status defined in the state table below.
operationalState	M	**Rec. X.721:1992 - No Replace Specified** - The operationalState attribute supports the states defined in the state table below.
availabilityStatus	M	**Rec. X.721:1992 - No Replace Specified** - The availabilityStatus supports the status defined in the state table below.
createDeleteNotificationsPackage	M	Rec.M3100:1992 - This package contains notifications only.
attributeValueChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.

The following notifications are defined for the operatingSoftwareUnit object:

Name	M/O	Comments
attributeValueChange	M	**Rec. X.721:1992** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Rec. X.721:1992** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Rec. X.721:1992** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.
stateChange	M	**Rec. X.721:1992** - The stateChange notification is emitted whenever the administrative or operational state changes. It shall contain the value of the new state.
processingErrorAlarm	M	**Rec. X.721:1992** - The processingErrorAlarm notification is emitted whenever a processing alarm condition is detected.

The following parameters are defined for the operatingSoftwareUnit object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.

State/Status Table for the operatingSoftwareUnit object:

State/Status	Values	Comments
administrativeState	locked	This operatingSoftwareUnit shall cease normal processing.
	unlocked	This operatingSoftwareUnit shall start/restart normal processing
	shuttingDown	Not Applicable.
controlStatus	subjectToTest	The operatingSoftwareUnit is available to normal users, but tests may be conducted on it simultaneously at unpredictable times, which may cause it to exhibit unusual characteristics to users.
	partOfServicesLocked	This value indicates whether a manager has administratively restricted a particular part of a service. The administrative state is unlocked. Examples are: incoming service barred, outgoing service barred, write locked by media key, etc.
	reservedForTest	The operatingSoftwareUnit has been made administratively unavailable to normal users because it is undergoing a test procedure. The administrative state is locked.
	suspended	The service provided by the operatingSoftwareUnit has been administratively suspended and it is not resumed until the suspend condition is revoked. The administrative state is unlocked.
operationalState	disabled	The operatingSoftwareUnit is totally inoperable for normal processing purposes.
	enabled	The operatingSoftwareUnit is able to operate for normal processing purposes.
availabilityStatus	inTest	The operatingSoftwareUnit is undergoing a test procedure. If the administrative state is locked or shutting down, then the normal users are precluded from using this resource. and the controlStatus has the value reservedForTest.
	failed	The operatingSoftwareUnit has an internal fault that prevents it from operating. The operational state is disabled.
	powerOff	The operatingSoftwareUnit is not powered on. The operational state is disabled.
	offLine	The operatingSoftwareUnit requires a routine operation to be available for use. The operational state is disabled.
	offDuty	The operatingSoftwareUnit has been made inactive by an internal control process in accordance with a predetermined time schedule. The operational state is enabled or disabled.
	dependency	The operatingSoftwareUnit cannot operate because some other resource on which it depends is unavailable.
	degraded	The operatingSoftwareUnit provides a service which is degraded in some respect, however it remains available for service. The operational state is enabled.
	notInstalled	The operatingSoftwareUnit is not present or incomplete. The operational state is enabled.
	logFull	This value is not applicable to this object.
alarmStatus	cleared	The operatingSoftwareUnit functionality has all alarms cleared.
	indeterminate	The alarm status of the operatingSoftwareUnit functionality is unable to be determined.
	activeReportable-Critical	The operatingSoftwareUnit functionality has one or more critical alarms. The operationalState may be enabled or disabled.
	activeReportable-Major	The operatingSoftwareUnit functionality has one or more major alarms. The operationalState may be enabled or disabled.
	activeReportable-Minor	The operatingSoftwareUnit functionality has one or more minor alarms. The operationalState may be enabled or disabled.
	activeReportable-Warning	The operatingSoftwareUnit functionality has one or more warning alarms. The operationalState may be enabled or disabled.
	activePending	The operatingSoftwareUnit functionality has an alarm pending.

replaceableSoftwareUnit

An instance of this managed object class is used to represent a unit of software that needs to be separately identifiable and/or replaceable on the system. This might be a complete set of software or it might represent only a patch. This MOC can also be used to represent data-only modules such as the data segment of executable software or a database used by software on the system. The structure of the software resource may be shown by containment of an instance of this object in other instances of the same class. Containment within the equipment that uses this software unit is not necessary as that relationship will be indicated by the associated operatingSoftwareUnit instance(s) and attributes for related executableSoftwareUnits. When the resource represented by an instance of this class is able to be downloaded or exists locally, the relatedFiles attribute may be set to indicate the one or more files that make up this unit.

This object class inherits characteristics from the CCITT M.3100 software MOC and some of these are conditional (optional) in the superclass of this new class. Those packages which have been identified as being useful in the management of a GSM PLMN are explicitly listed below. Other conditional packages are allowed when the required condition is met. This ETS does not, however, define their use.

The following packages/attributes are defined for the replaceableSoftwareUnit MOC:

Name	M/O	Comments
replaceableSoftwareUnitPackage	M	
relatedFiles	M	This attribute identifies files that may be related to an instance of this object for the purposes of download and/or local file identification.
attributeValueChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
stateChangeNotificationPackage	M	Rec.M3100:1992 - This package contains notifications only.
softwarePackage	M	**Inherited** - **Rec. M.3100:1992**
softwareID	M	**Inherited** - **Rec. M.3100:1992 - No Replace Specified** - This attribute is provided for instance naming
userLabelPackage	O	**Inherited** - **Rec. M.3100:1992**
userLabel	O	**Inherited** - **Rec. M.3100:1992** - The userLabel attribute type assigns a user friendly name to the associated object.
vendorNamePackage	O	**Inherited** - **Rec. M.3100:1992**
vendorName	O	**Inherited** - **Rec. M.3100:1992** - The vendorName attribute type identifies the vendor of the associated managed object.
versionPackage	O	**Inherited** - **Rec. M.3100:1992**
version	O	**Inherited** - **Rec. M.3100:1992** - The version attribute type identifies the version of the associated managed object.
currentProblemListPackage	O	**Inherited** - **Rec. M.3100:1992**
currentProblemList	O	**Inherited** - **Rec. M.3100:1992 - No Replace Specified** - The currentProblemList attribute type identifies the current existing problems, with severity, associated with the managed object.

The following notifications are defined for the replaceableSoftwareUnit object:

Name	M/O	Comments
attributeValueChange	M	**Rec. X.721:1992** - The attributeValueChange notification is emitted whenever any attribute (except those noted in object, package, or attribute behaviours) changes value whether through manager or agent action. It shall contain the new attribute value.
objectCreation	M	**Rec. X.721:1992** - The objectCreation notification is emitted when this object is created whether through manager or agent action. It shall contain the values of all attributes.
objectDeletion	M	**Rec. X.721:1992** - The objectDeletion notification is emitted when this object is deleted whether through manager or agent action.

The following parameters are defined for the replaceableSoftwareUnit object:

Name	M/O	Comments
standard1220SpecificErrorInfo	M	The standard1220SpecificErrorInfo parameter is a Graphic String, that contains an error message which is passed as a parameter of a CMIS processing failure error and may be displayed to an operator at an OS facility.

6 Managed object class definitions

This clause of the ETS presents the definitions of the Managed Object Classes that form the Management Information Model. These definitions are provided following the GDMO format templates specified in CCITT X.722.

6.1 BSS related managed object classes

This clause provides the templates for Managed Object Class definition for the set of objects that are expected to have use only in the information model of the BSS. Additional objects that have been identified as needed in the information model for the management of the BSS but are expected to be of general use are defined in a later clause.

adjacentCellHandOver

```
adjacentCellHandOver MANAGED OBJECT CLASS
    DERIVED FROM
        gsmManagedFunction;
    CHARACTERIZED BY
        adjacentCellHandOverPackage;
REGISTERED AS {gsm1220objectClass 10} ;
```

adjacentCellHandOverGSM0508

```
adjacentCellHandOverGSM0508 MANAGED OBJECT CLASS
    DERIVED FROM
        adjacentCellHandOver ;
    CHARACTERIZED BY
        adjacentCellHandOverGSM0508Package ;
REGISTERED AS {gsm1220objectClass 20} ;
```

adjacentCellHandOverGSM0508AndReselection

```
adjacentCellHandOverGSM0508AndReselection MANAGED OBJECT CLASS
    DERIVED FROM
        adjacentCellHandOverGSM0508,  adjacentCellReselection ;
    CHARACTERIZED BY
        adjacentCellHandOverGSM0508AndReselectionPackage ;
REGISTERED AS {gsm1220objectClass 30} ;
```

adjacentCellReselection

```
adjacentCellReselection MANAGED OBJECT CLASS
    DERIVED FROM
        gsmManagedFunction;
    CHARACTERIZED BY
        adjacentCellReselectionPackage;
REGISTERED AS {gsm1220objectClass 40} ;
```

basebandTransceiver

basebandTransceiver **MANAGED OBJECT CLASS**
DERIVED FROM
gsmManagedFunction;
CHARACTERIZED BY
basebandTransceiverPackage,
functionalRelatedAlarmPackage,
"CCITT Rec. M.3100: 1992": stateChangeNotificationPackage ;
CONDITIONAL PACKAGES
equipmentRelatedAlarmPackage PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 50} ;

bsc

bsc **MANAGED OBJECT CLASS**
DERIVED FROM
gsmManagedFunction;
CHARACTERIZED BY
bscBasicPackage,
bssMapTimerPackage,
functionalRelatedAlarmPackage,
"CCITT Rec. M.3100: 1992": stateChangeNotificationPackage ;
CONDITIONAL PACKAGES
adjustExternalTimePackage PRESENT IF "the M.3100 externalTimePackage is present in the M.3100 managedElement MOC instance containing this object instance and if the instance supports it",
bscProcForBTSPowerControlPackage PRESENT IF "an instance supports it",
equipmentRelatedAlarmPackage PRESENT IF "an instance supports it",
internalIntraCellHandoverPackage PRESENT IF "an instance supports it",
internalInterCellHandoverPackage PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 60} ;

bssFunction

This MOC represents the functionality of the BSS Network Element in a GSM PLMN. It is used for containment and is fully defined in GSM 12.00 [24].

bts

```
bts MANAGED OBJECT CLASS
    DERIVED FROM
        gsmManagedFunction;
    CHARACTERIZED BY
        btsBasicPackage,
        btsCCCHConfigurationPackage,
        btsOptionsPackage,
        btsTimerPackage,
        functionalRelatedAlarmPackage,
        "CCITT Rec. M.3100: 1992": stateChangeNotificationPackage ;
    CONDITIONAL PACKAGES
        btsPowerControlConfigPackage    PRESENT IF "an instance supports it",
        btsQueuingPackage               PRESENT IF "an instance supports it",
        channelConfigModPackage         PRESENT IF "an instance supports it",
        equipmentRelatedAlarmPackage    PRESENT IF "an instance supports it",
        hoMsmtProcessingModePackage     PRESENT IF "an instance supports it",
        pcMsmtProcessingModePackage     PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 70} ;
```

btsSiteManager

```
btsSiteManager MANAGED OBJECT CLASS
    DERIVED FROM
        gsmManagedFunction;
    CHARACTERIZED BY
        btsSiteManagerBasicPackage;
    CONDITIONAL PACKAGES
        equipmentRelatedAlarmPackage   PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 80} ;
```

channel

```
channel MANAGED OBJECT CLASS
    DERIVED FROM
        gsmManagedFunction;
    CHARACTERIZED BY
        channelPackage,
        functionalRelatedAlarmPackage,
        "CCITT Rec. M.3100: 1992": stateChangeNotificationPackage ;
    CONDITIONAL PACKAGES
        equipmentRelatedAlarmPackage   PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 90};
```

channelModCompleteRecord

```
channelModCompleteRecord MANAGED OBJECT CLASS
    DERIVED FROM
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": eventLogRecord;
    CHARACTERIZED BY
        channelModCompleteRecordPackage;
REGISTERED AS {gsm1220objectClass 95};
```

frequencyHoppingSystem

frequencyHoppingSystem **MANAGED OBJECT CLASS**
DERIVED FROM
gsmManagedFunction;
CHARACTERIZED BY
frequencyHoppingSystemPackage;
REGISTERED AS {gsm1220objectClass 100} ;

handoverControl

handoverControl **MANAGED OBJECT CLASS**
DERIVED FROM
gsmManagedFunction;
CHARACTERIZED BY
handoverControlPackage;
REGISTERED AS {gsm1220objectClass 110};

handoverControlGSM0508

handoverControlGSM0508 **MANAGED OBJECT CLASS**
DERIVED FROM
handoverControl ;
CHARACTERIZED BY
handoverControlGSM0508Package;
REGISTERED AS {gsm1220objectClass 120};

lapdLink

lapdLink **MANAGED OBJECT CLASS**
DERIVED FROM
gsmManagedFunction;
CHARACTERIZED BY
lapdLinkPackage,
functionalRelatedAlarmPackage,
"CCITT Rec. M.3100: 1992": stateChangeNotificationPackage ;
REGISTERED AS {gsm1220objectClass 130} ;

pcmCircuit

pcmCircuit **MANAGED OBJECT CLASS**
DERIVED FROM
gsmManagedFunction;
CHARACTERIZED BY
pcmCircuitPackage,
functionalRelatedAlarmPackage,
"CCITT Rec. M.3100: 1992": stateChangeNotificationPackage ;
CONDITIONAL PACKAGES
equipmentRelatedAlarmPackage PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 140} ;

powerControl

```
powerControl MANAGED OBJECT CLASS
    DERIVED FROM
        gsmManagedFunction;
    CHARACTERIZED BY
        powerControlPackage;
REGISTERED AS {gsm1220objectClass 150};
```

powerControlGSM0508

```
powerControlGSM0508 MANAGED OBJECT CLASS
    DERIVED FROM
        powerControl;
    CHARACTERIZED BY
        powerControlGSM0508Package;
REGISTERED AS {gsm1220objectClass 160};
```

radioCarrier

```
radioCarrier MANAGED OBJECT CLASS
    DERIVED FROM
        gsmManagedFunction;
    CHARACTERIZED BY
        radioCarrierPackage,
        functionalRelatedAlarmPackage,
        "CCITT Rec. M.3100: 1992": stateChangeNotificationPackage ;
    CONDITIONAL PACKAGES
        equipmentRelatedAlarmPackage   PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 170} ;
```

transcoder

```
transcoder MANAGED OBJECT CLASS
    DERIVED FROM
        gsmManagedFunction;
    CHARACTERIZED BY
        transcoderPackage,
        functionalRelatedAlarmPackage,
        "CCITT Rec. M.3100: 1992": stateChangeNotificationPackage;
    CONDITIONAL PACKAGES
        equipmentRelatedAlarmPackage   PRESENT IF "an instance supports it",
        transcoderMatrixPackage        PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 180} ;
```

6.2 General managed object classes

This clause defines those Managed Object Classes that have been determined to be needed in the information model of the BSS but that should be of general use in the management of a GSM PLMN and are not defined elsewhere.

alarmRecord

This MOC represents a record for the storage of alarm notifications for later retrieval. It is fully described in CCITT X.721.

attributeValueChangeRecord

This MOC represents a record for the storage of attributeValueChange notifications for later retrieval. It is fully described in CCITT X.721.

eventForwardingDiscriminator

This MOC represents a resource for the management and control of the forwarding of potential notifications to a management system or a log. It is fully described in CCITT X.721.

executableSoftwareUnit

executableSoftwareUnit **MANAGED OBJECT CLASS**
DERIVED FROM
"CCITT Rec. M.3100: 1992": software;
CHARACTERIZED BY
executableSoftwareUnitPackage,
"CCITT Rec. M.3100: 1992": attributeValueChangeNotificationPackage,
"CCITT Rec. M.3100: 1992": createDeleteNotificationsPackage;
REGISTERED AS {gsm1220objectClass 190} ;

gsmEquipment

gsmEquipment **MANAGED OBJECT CLASS**
DERIVED FROM
"CCITT Rec. M.3100: 1992": equipment;
CHARACTERIZED BY
gsmEquipmentPackage;
REGISTERED AS {gsm1220objectClass 200} ;

gsmManagedFunction

gsmManagedFunction **MANAGED OBJECT CLASS**
DERIVED FROM
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": top ;
CHARACTERIZED BY
"CCITT Rec. M.3100: 1992": attributeValueChangeNotificationPackage,
"CCITT Rec. M.3100: 1992": createDeleteNotificationsPackage;
CONDITIONAL PACKAGES
"CCITT Rec. M.3100: 1992": userLabelPackage PRESENT IF "an instance supports it",
"CCITT Rec. M.3100: 1992": locationNamePackage PRESENT IF "an instance supports it";
REGISTERED AS {gsm1220objectClass 210} ;

log

This MOC represents a log for the storage of notifications for later retrieval. It is fully described in CCITT X.721.

objectCreationRecord

This MOC represents a record for the storage of objectCreation notifications for later retrieval. It is fully described in CCITT X.721.

objectDeletionRecord

This MOC represents a record for the storage of objectDeletion notifications for later retrieval. It is fully described in CCITT X.721.

operatingSoftwareUnit

operatingSoftwareUnit **MANAGED OBJECT CLASS**
DERIVED FROM
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": top ;
CHARACTERIZED BY
operatingSoftwareUnitPackage,
"CCITT Rec. M.3100: 1992": attributeValueChangeNotificationPackage,
"CCITT Rec. M.3100: 1992": createDeleteNotificationsPackage,
"CCITT Rec. M.3100: 1992": stateChangeNotificationPackage;
REGISTERED AS {gsm1220objectClass 220} ;

replaceableSoftwareUnit

replaceableSoftwareUnit **MANAGED OBJECT CLASS**
DERIVED FROM
"CCITT Rec. M.3100: 1992": software;
CHARACTERIZED BY
replaceableSoftwareUnitPackage,
"CCITT Rec. M.3100: 1992": attributeValueChangeNotificationPackage,
"CCITT Rec. M.3100: 1992": createDeleteNotificationsPackage;
REGISTERED AS {gsm1220objectClass 230} ;

simpleFileTransferControl

This MOC represents a resource for the management and control of the transfer of files between manager and agent systems. It is fully described in GSM 12.00 [24].

stateChangeRecord

This MOC represents a record for the storage of stateChange notifications for later retrieval. It is fully described in CCITT X.721.

7 Managed object class package definitions

This clause of the ETS presents the GDMO templates for the packages that define attributes and behaviours of the Managed Object Classes defined in the previous clause.

7.1 BSS related packages

The packages defined for objects related specifically to the BSS are found in this clause. Packages related to objects that may be of general use, but that are not defined elsewhere, are provided in a later clause.

adjacentCellHandOverGSM0508AndReselectionPackage

adjacentCellHandOverGSM0508AndReselectionPackage **PACKAGE**
BEHAVIOUR
adjacentCellHandOverGSM0508AndReselectionBehaviour ;
REGISTERED AS {gsm1220package 10} ;

adjacentCellHandOverGSM0508AndReselectionBehaviour **BEHAVIOUR**
DEFINED AS
"This package provides only behaviour. The object class adjacentCellHandOverGSM0508AndReselection may be instantiated, if an adjacent cell may be used for both reselection and handover, and the GSM 05.08 default handover algorithm is employed.";

adjacentCellHandOverGSM0508Package

adjacentCellHandOverGSM0508Package **PACKAGE**
BEHAVIOUR
adjacentCellHandOverGSM0508Behaviour ;
ATTRIBUTES

hoPriorityLevel	GET-REPLACE,
hoMargin	GET-REPLACE,
msTxPwrMaxCell	GET-REPLACE,
rxLevMinCell	GET-REPLACE;

REGISTERED AS {gsm1220package 20} ;

adjacentCellHandOverGSM0508Behaviour **BEHAVIOUR**
DEFINED AS
"The MOC adjacentCellHandOverGSM0508, by means of this package, contains the adjacent cell specific handover parameters of the default handover algorithm of GSM 05.08. This MOC shall be used, if the GSM 05.08 default handover algorithm is employed.
It should be noted that an instance of adjacentCellHandOverGSM0508 represents an adjacent cell used for handover purposes, only (i.e. not for reselection).";

adjacentCellHandOverPackage

adjacentCellHandOverPackage **PACKAGE**
BEHAVIOUR
adjacentCellHandOverBehaviour ;
ATTRIBUTES
adjacentCellID GET,
cellGlobalIdentity GET-REPLACE,
bCCHFrequency GET-REPLACE,
bsIdentityCode GET-REPLACE,
synchronized GET-REPLACE ;
REGISTERED AS {gsm1220package 30} ;

adjacentCellHandOverBehaviour **BEHAVIOUR**
DEFINED AS
"The MOC adjacentCellHandOver, by means of this package, contains handover related, adjacent cell specific, parameters that are independent of any particular handover algorithm.

The MOC adjacentCellHandOver acts as a base class only. Instances of it are never created. A handover algorithm specific subclass, such as adjacentCellHandOverGSM0508 or a manufacturer specific subclass of adjacentCellHandOver must be instantiated for managing the parameters specific to that particular handover algorithm. The maximum number of adjacent cells that may be used for handover is 32.

A CMIP Create command must include all attributes for the instance to be created. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL.

Attributes that are subject to the attributeValueChange notification are: all.

A CMIP Delete command for an instance of a subclass of this MOC may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.";

adjacentCellReselectionPackage

adjacentCellReselectionPackage **PACKAGE**
BEHAVIOUR
adjacentCellReselectionBehaviour ;
ATTRIBUTES
adjacentCellID GET,
bCCHFrequency GET-REPLACE ;
REGISTERED AS {gsm1220package 40} ;

adjacentCellReselectionBehaviour **BEHAVIOUR**
DEFINED AS
"Instances of adjacentCellReselection may be created for representing an adjacent cell a MS may use for reselection, only. To represent an adjacent cell to which handovers are allowed, another MOC must be used (see MOCs adjacentCellHandOver, adjacentCellHandOverGSM0508 and adjacentCellHandOverGSM0508AndReselection). The maximum number of adjacent cells that may be used for reselection is 32. This package contains the attributes necessary to identify the cell.
A CMIP Create command must include all attributes for the instance to be created. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL.
Attributes that are subject to the attributeValueChange notification are: all.
A CMIP Delete command for an instance of this MOC may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system. ";

adjustExternalTimePackage

adjustExternalTimePackage **PACKAGE**
BEHAVIOUR
adjustExternalTimePackageBehaviour ;
ACTIONS
adjustExternalTime ;
REGISTERED AS {gsm1220package 45} ;

adjustExternalTimePackageBehaviour **BEHAVIOUR**
DEFINED AS
"This package is provided to make the adjustExternalTime action available. It is present in the bsc MOC if the CCITT M.3100 externalTimePackage is present in the instance of the CCITT M.3100 managedElement MOC which contains the bsc instance, and if the bsc instance supports the package.";

basebandTransceiverPackage

basebandTransceiverPackage **PACKAGE**
BEHAVIOUR
basebandTransceiverBehaviour ;
ATTRIBUTES
basebandTransceiverID GET,
relatedGSMEquipment GET-REPLACE**,**
relatedOAMLapdLink GET-REPLACE**,**
relatedRadioCarrier GET-REPLACE**,**
relatedTelecomLapdLink GET-REPLACE**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. M.3100 (1992)": alarmStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": unknownStatus
GET standard1220SpecificErrorInfo;
ACTIONS
forcedHO ;
REGISTERED AS {gsm1220package 50} ;

basebandTransceiverBehaviour **BEHAVIOUR**
DEFINED AS
"The basebandTransceiver managed object class represents functions common to eight (8) channels which are mapped through the radio resource onto radio timeslots. The underlying functionality to be managed includes speech rate adaptation, channel encoding and decoding, and frame building.

This definition covers what may be described as the baseband aspects of transmission in the GSM and DCS 1800 base station systems. This functionality is related to the radio carrier aspects by means of the relatedRadioCarrier and the channel definitions (see radioCarrier and channel managed object classes). This package provides the basic set of attributes for identification and relationship management.

A CMIP Create command must include all attributes except for the state attributes. Upon creation of this object, the value of the administrative state shall be locked. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL. The behaviour of the object on Delete shall be as if the state were first set to locked.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship or the locking of the instance. Any such error shall be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

An attribute Set command may be refused by an agent if the agent requires the manager to lock the object prior to changing the attribute value. Any such error shall be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Set errors also apply.

Attributes that are subject to the attributeValueChange notification are: all except administrativeState, controlStatus, alarmStatus, operationalState and availabilityStatus. Attributes that are subject to the stateChange notification are administrativeState, operationalState and availabilityStatus.

All values of the administrative and operational states are supported. The availabilityStatus qualifies in more details the operationalState while the controlStatus provides information to support the test management. The M-SET command changing the administrative state shall not change any other attributes.

The basebandTransceiver administrative states have the following meanings: When the basebandTransceiver is unlocked, it is ready to accept traffic. When the basebandTransceiver is shutting down, no new traffic (handovers or call setups) are allowed. If all traffic is cleared, the basebandTransceiver changes to the locked state. When the basebandTransceiver is locked, no traffic is allowed and any existing calls must be cleared. The locked administrative state stops normal operations of the resource (not, for example, operations for test purposes).";

bscBasicPackage

bscBasicPackage **PACKAGE**
BEHAVIOUR
bscBasicBehaviour ;
ATTRIBUTES
bscID GET**,**
handoverReqParam GET-REPLACE,
relatedGSMEquipment GET-REPLACE**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
GET-REPLACE standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. M.3100 (1992)": alarmStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": unknownStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": usageState
GET standard1220SpecificErrorInfo**;**
REGISTERED AS {gsm1220package 60} ;

bscBasicBehaviour **BEHAVIOUR**
DEFINED AS
"The bsc MOC is a managed object representing the network component Base Station Controller (BSC) functions of the BSS. An instance of the MOC bsc is identified by the bscID attribute. This package provides the basic attributes for identification and configuration.

A CMIP Create command must include all attributes except for the state attributes. Upon creation of this object, the value of the administrative state will be locked. The locked administrative state stops normal operations of the resource (not, for example, operations for test purposes). The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL. The behaviour of the object on Delete will be as if the state were first set to locked.

A CMIP Delete command for an instance of this MOC may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship or the locking of the instance. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

An attribute Set command may be refused by an agent if the agent requires the manager to lock the object prior to changing the attribute value. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Set errors also apply.

Attributes that are subject to the attributeValueChange notification are: all except administrativeState, alarmStatus, operationalState, and usageState. Attributes that are subject to the stateChange notification are administrativeState, operationalState, and usageState.

All values of the administrative, operational, and usage states are supported. The availabilityStatus qualifies in more details the operationalState while the controlStatus provides information to support the test management. The M-SET command changing the administrative state shall not change any other attributes.";

bscProcForBTSPowerControlPackage

bscProcForBTSPowerControlPackage **PACKAGE**
BEHAVIOUR
bscProcForBTSPowerControlBehaviour ;
REGISTERED AS {gsm1220package 70} ;

bscProcForBTSPowerControlBehaviour **BEHAVIOUR**
DEFINED AS
"GSM 05.08 indicates that BS power control is an option. Since this is the case, some BSCs may not support management of this option in attached BTSs. This package is present in an instance of a bsc managed object if the bsc supports the management of BS power control. If this package is present and an attached BTS supports BS power control, the BSC may be configured to do the measurement processing.";

bssMapTimerPackage

bssMapTimerPackage **PACKAGE**
BEHAVIOUR
bssMapTimerBehaviour ;
ATTRIBUTES
bssMapT1 GET-REPLACE,
bssMapT4 GET-REPLACE,
bssMapT7 GET-REPLACE,
bssMapT8 GET-REPLACE,
bssMapT10 GET-REPLACE,
bssMapT13 GET-REPLACE,
bssMapT17 GET-REPLACE,
bssMapT18 GET-REPLACE,
bssMapT19 GET-REPLACE,
bssMapT20 GET-REPLACE;
REGISTERED AS {gsm1220package 75} ;

bssMapTimerBehaviour **BEHAVIOUR**
DEFINED AS
"The bssMapTimerPackage contains attributes for the timer values used in the BSSMAP procedures (GSM 08.08). Timers T2, T5, T6, T12, and T16 reside in the MSC and thus are not part of this package.";

btsBasicPackage

btsBasicPackage **PACKAGE**
BEHAVIOUR
btsBasicBehaviour ;
ATTRIBUTES
bsIdentityCode GET-REPLACE,
btsID GET,
cellAllocation GET-REPLACE,
gsmdcsIndicator GET-REPLACE,
cellGlobalIdentity GET-REPLACE,
cellReselectHysteresis GET-REPLACE,
ny1 GET-REPLACE,
relatedGSMEquipment GET-REPLACE,
periodCCCHLoadIndication GET-REPLACE,
plmnPermitted GET-REPLACE,
rACHBusyThreshold GET-REPLACE,
rACHLoadAveragingSlots GET-REPLACE,
radioLinkTimeout GET-REPLACE**,**
relatedOAMLapdLink GET-REPLACE**,**
relatedTranscoder GET-REPLACE**,**
rxLevAccessMin GET-REPLACE**,**
thresholdCCCHLoadIndication GET-REPLACE,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
GET-REPLACE standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. M.3100 (1992)": alarmStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": unknownStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": usageState
GET standard1220SpecificErrorInfo**;**
ACTIONS
forcedHO ;
REGISTERED AS {gsm1220package 80} ;

btsBasicBehaviour **BEHAVIOUR**
DEFINED AS
"The bts MOC represents the GSM functional element Base Transceiver Station. An instance of this MOC is associated by containment with a particular bssFunction instance and a particular btsSiteManager instance. Multiple instances of this MOC may be contained within a btsSiteManager instance. The attributes within the package btsBasicPackage describe the basic properties of a BTS that are not related to the Common Control Channels.

The attributes bsIdentityCode and cellGlobalIdentity can be modified by the M-SET command only when the administrative state of the bts is locked.

A CMIP Create command must include all attributes except for the state attributes. Upon creation of this object, the value of the administrative state will be locked. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL. The behaviour of the object on Delete will be as if the state were first set to locked.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship or the locking of the instance. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

An attribute Set command may be refused by an agent if the agent requires the manager to lock the object prior to changing the attribute value. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Set errors also apply.

Attributes that are subject to the attributeValueChange notification are: all except administrativeState, controlStatus, alarmStatus, operationalState, availabilityStatus and usageState. Attributes that are subject to the stateChange notification are administrativeState, operationalState, availabilityStatus and usageState.

All values of the administrative, operational, and usage states are supported. The availabilityStatus qualifies in more details the operationalState while the controlStatus provides information to support the test management. The M-SET command changing the administrative state shall not change any other attributes.

The administrative states for the BTS have the following meanings: In the shutting down state, no new traffic is allowed through the BTS. In this state, the BTS is barred (message sent to MS) and no incoming handovers are allowed. If all traffic is cleared, the BTS changes to the locked state. In the locked state, all calls through the BTS are disconnected. The BSC should clear all calls with cause set to 'O and M intervention'. No new traffic is possible on the BTS and no incoming handovers are allowed. In the unlocked state, new traffic is allowed through the BTS and incoming handovers are allowed. The locked administrative state stops normal operations of the resource (not, for example, operations for test purposes).";

btsCCCHConfigurationPackage

btsCCCHConfigurationPackage **PACKAGE**
BEHAVIOUR
btsCCCHConfigurationBehaviour;
ATTRIBUTES

maxNumberRetransmission	GET-REPLACE,
mSTxPwrMaxCCH	GET-REPLACE,
numberOfSlotsSpreadTrans	GET-REPLACE,
noOfBlocksForAccessGrant	GET-REPLACE,
noOfMultiframesBetweenPaging	GET-REPLACE;

REGISTERED AS {gsm1220package 90} ;

btsCCCHConfigurationBehaviour **BEHAVIOUR**
DEFINED AS
"The package btsCCCHConfigurationPackage defines the properties of the Common Control Channels of the BTS . All attribute values are broadcast to the Mobile Stations within the SYS INFO messages. Some of these may also be used by the BSS; e.g. to identify overload on the CCCH.";

btsOptionsPackage

btsOptionsPackage **PACKAGE**
BEHAVIOUR
btsOptionsBehaviour;
ATTRIBUTES
allowIMSIAttachDetach GET-REPLACE,
callReestablishmentAllowed GET-REPLACE,
cellBarred GET-REPLACE,
dtxDownlink GET-REPLACE,
dtxUplink GET-REPLACE,
emergencyCallRestricted GET-REPLACE,
notAllowedAccessClasses GET-REPLACE,
timerPeriodicUpdateMS GET-REPLACE;
REGISTERED AS {gsm1220package 100} ;

btsOptionsBehaviour **BEHAVIOUR**
DEFINED AS
"The package btsOptionsPackage is provided to control the various optional features of a BTS. Most values are of type Boolean, and are broadcast to the Mobile Stations on the BCCH.";

btsPowerControlConfigPackage

btsPowerControlConfigPackage **PACKAGE**
BEHAVIOUR
btsPowerControlConfigBehaviour ;
REGISTERED AS {gsm1220package 110} ;

btsPowerControlConfigBehaviour **BEHAVIOUR**
DEFINED AS
"GSM 05.08 indicates that BS power control is an option. This package is present in a BTS instance when BS power control is supported in that instance. Each BTS hosted by the BSC may be configured differently in this respect.";

btsQueuingPackage

btsQueuingPackage **PACKAGE**
BEHAVIOUR
btsQueuingBehaviour;
ATTRIBUTES
maxQueueLength GET-REPLACE,
msPriorityUsedInQueuing GET-REPLACE,
timeLimitCall GET-REPLACE,
timeLimitHandover GET-REPLACE;
REGISTERED AS {gsm1220package 120} ;

btsQueuingBehaviour **BEHAVIOUR**
DEFINED AS
"The attributes in the package btsQueuingPackage are parameters used in handling call and handover queues relevant to the BTS.";

btsSiteManagerBasicPackage

btsSiteManagerBasicPackage **PACKAGE**
BEHAVIOUR
btsSiteManagerBasicBehaviour ;
ATTRIBUTES
btsSiteManagerID GET,
relatedGSMEquipment GET-REPLACE**,**
relatedOAMLapdLink GET-REPLACE**;**
REGISTERED AS {gsm1220package 130} ;

btsSiteManagerBasicBehaviour **BEHAVIOUR**
DEFINED AS
"The managed object class btsSiteManager represents the O&M functionality related to a site and not to any specific BTS. A site is a logical grouping of one or more BTSs at a single physical location with common management needs. It is possible for multiple logical sites to exist at the same physical location. The purpose of this object is containment. That is, to provide relationship information. In addition, it is expected that this MOC will provide a mechanism for notifications such as alarms that relate to common site equipment. This package provides basic identification and relationship management.

A CMIP Create command must include all attributes. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be null. Attributes that are subject to the attributeValueChange notification are all.

A CMIP Delete command for an instance of this MOC may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system. ";

btsTimerPackage

btsTimerPackage **PACKAGE**
BEHAVIOUR
btsTimerBehaviour;
ATTRIBUTES
t200 GET-REPLACE,
t31xx GET-REPLACE**;**
REGISTERED AS {gsm1220package 140} ;

btsTimerBehaviour **BEHAVIOUR**
DEFINED AS
"This package contains a set of timers used on layers 2 and 3 of the air interface.";

channelConfigModPackage

channelConfigModPackage **PACKAGE**
BEHAVIOUR
channelConfigModBehaviour;
ACTIONS
channelConfigModification**;**
NOTIFICATIONS
channelModComplete**;**
REGISTERED AS {gsm1220package 150} ;

channelConfigModBehaviour **BEHAVIOUR**
DEFINED AS
"This package includes only actions and notifications. They are used to perform a dynamic modification of the radio definition of a BTS. It is conditional and, if not supported, atomic frequency redefinition is not necessarily guaranteed by the system. The presence of this package in an object instance does not prevent the manager from changing the configuration through elementary operations rather than the action provided by this package.";

channelPackage

channelPackage **PACKAGE**
BEHAVIOUR
channelBehaviour ;
ATTRIBUTES
channelID GET,
channelCombination **INITIAL VALUE** GSM1220TypeModule.initialChannelCombination
GET-REPLACE,
frequencyUsage **INITIAL VALUE** GSM1220TypeModule.initialFrequencyUsage
GET-REPLACE**,**
relatedGSMEquipment **INITIAL VALUE**
GSM1220TypeModule.initialRelatedGSMEquipment
GET-REPLACE**,**
terrTrafChannel **INITIAL VALUE** GSM1220TypeModule.initialTerrTrafChannel
GET-REPLACE,
tsc **INITIAL VALUE** GSM1220TypeModule.initialTsc
GET-REPLACE**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
INITIAL VALUE GSM1220TypeModule.initialAdministrativeState
GET-REPLACE standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. M.3100 (1992)": alarmStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": unknownStatus
GET standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220package 160} ;

channelBehaviour **BEHAVIOUR**
DEFINED AS

"The channel object class represents the manageable properties of a time slot. See Specification GSM 05.02 for details. This package provides attributes for identification and management of the properties of the channel. A channel may or may not use frequency hopping. The usage of frequency hopping is indicated by the attribute frequencyUsage.

The M-SET command changing the administrative state shall not change any other attributes. Eight instances of the channel object class are created automatically when an instance of the basebandTransceiver object class is created. Upon creation of this object, the value of the administrative state will be locked. All attributes are assigned values at create time. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL. The behaviour of the object on Delete will be as if the state were first set to locked.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship or the locking of the instance. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

An attribute Set command may be refused by an agent if the agent requires the manager to lock the object prior to changing the attribute value. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Set errors also apply.

Attributes that are subject to the attributeValueChange notification are: all except administrativeState, controlStatus, alarmStatus, operationalState and availabilityStatus. Attributes that are subject to the stateChange notification are administrativeState and operationalState.

All values of the administrative and operational states are supported. The availabilityStatus qualifies in more details the operationalState while the controlStatus provides information to support the test management. The M-SET command changing the administrative state shall not change any other attributes.

The administrative states of the channel object have the following meanings: When a channel is locked it will immediately stop transmitting or receiving any information in the time slot. If the channel is a control channel, all calls in the BTS may be affected. When a channel is unlocked, it is able to accept traffic. When a channel is shutting down, no new traffic is allowed, no inbound handovers are accepted. In this state, clearing of existing traffic results in transition to locked state. The locked administrative state stops normal operations of the resource (not, for example, operations for test purposes).";

channelModCompleteRecordPackage

channelModCompleteRecordPackage PACKAGE
BEHAVIOUR
channelModCompleteRecordBehaviour;
ATTRIBUTES
channelModCompleteArg GET;
REGISTERED AS {gsm1220package 165} ;

channelModCompleteRecordBehaviour BEHAVIOUR
DEFINED AS
"This managed object class is provided to allow the logging of channelModComplete notifications.";

frequencyHoppingSystemPackage

frequencyHoppingSystemPackage **PACKAGE**
BEHAVIOUR
frequencyHoppingSystemBehaviour;
ATTRIBUTES

frequencyHoppingSystemID	GET,
hoppingSequenceNumber	GET-REPLACE**,**
mobileAllocation	GET-REPLACE**;**

REGISTERED AS {gsm1220package 170} ;

frequencyHoppingSystemBehaviour **BEHAVIOUR**
DEFINED AS
"The frequencyHoppingSystem object class represents a set of radio frequency channels used in a specific frequency hopping sequence. An instance of frequencyHoppingSystem may be (and often is) shared by one or more channels. This package provides identification and the basic attributes for configuring the hopping system.
The frequencyHoppingSystem object is created and deleted by the system management protocol. A CMIP Create command must include all attribute values. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL. A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.
Attributes that are subject to the attributeValueChange notification are: all.";

handoverControlGSM0508Package

handoverControlGSM0508Package **PACKAGE**
BEHAVIOUR
handoverControlGSM0508Behaviour;
ATTRIBUTES

enableOptHandoverProcessing	GET-REPLACE,
hoAveragingAdjCellParam	GET-REPLACE,
hoAveragingDistParam	GET-REPLACE,
hoAveragingLevParam	GET-REPLACE,
hoAveragingQualParam	GET-REPLACE,
hoMarginDef	GET-REPLACE,
hoThresholdDistParam	GET-REPLACE,
hoThresholdInterferenceParam	GET-REPLACE,
hoThresholdLevParam	GET-REPLACE,
hoThresholdQualParam	GET-REPLACE,
interferenceAveragingParam	GET-REPLACE,
msTxPwrMaxCellDef	GET-REPLACE,
rxLevMinCellDef	GET-REPLACE;

REGISTERED AS {gsm1220package 180};

handoverControlGSM0508Behaviour **BEHAVIOUR**
DEFINED AS
"The object class handoverControlGSM0508, by means of this package, contains the parameters of the default handover algorithm defined in Annex A of Specification GSM 05.08. This class may be used, if the BSS supports the default handover algorithm.";

handoverControlPackage

handoverControlPackage **PACKAGE**
BEHAVIOUR
handoverControlBehaviour;
ATTRIBUTES
handoverControlID GET,
msmtProcParamLoc GET**;**
REGISTERED AS {gsm1220package 190};

handoverControlBehaviour **BEHAVIOUR**
DEFINED AS
"Manufacturers shall use the class handoverControl as a base class for specifying actual object classes for management of parameters specific to their handover algorithm. The class handoverControl cannot be instantiated. There are, at most, two instances of these actual instantiated subclasses per BTS, one to manage parameters used by the BSC and one to manage parameters used by the BTS. This package provides the attributes common to all subclasses.

A CMIP Create command (for a subclass to be instantiated) must include all attributes. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

Attributes that are subject to the attributeValueChange notification are: all.";

hoMsmtProcessingModePackage

hoMsmtProcessingModePackage **PACKAGE**
BEHAVIOUR
hoMsmtProcessingModeBehaviour ;
ATTRIBUTES
hoMsmtProcessingMode GET-REPLACE**;**
REGISTERED AS {gsm1220package 200} ;

hoMsmtProcessingModeBehaviour **BEHAVIOUR**
DEFINED AS
"GSM 08.58 defines the mechanisms to be employed for the transfer of radio link measurements from the BTS to the BSC. These measurements are subsequently used by the handover determination algorithms. The normal mode of operation is for the measurements to be collected by the BTS and transferred in the MEASUREMENT RESULT message to the BSC for processing. GSM 08.58 also describes the allowable measurement processing options for handover purposes. Measurement processing and threshold comparison are allowed to be configured to take place in the BTS. The package hoMsmtProcessingModePackage is present in a BTS instance when it supports the optional measurement processing modes. The hoMsmtProcessingMode attribute allows the management of the location of measurement processing. Each BTS hosted by the BSC may be configured differently in this respect.";

internalInterCellHandoverPackage

internalInterCellHandoverPackage **PACKAGE**
BEHAVIOUR
internalInterCellHandoverBehaviour ;
ATTRIBUTES
enableInternalInterCellHandover GET-REPLACE**;**
REGISTERED AS {gsm1220package 210} ;

internalInterCellHandoverBehaviour **BEHAVIOUR**
DEFINED AS
"GSM 08.08 defines two types of handover which are optional but if supported are manageable through O&M. This package is included if the BSC supports internal intercell handovers which is one of these two types. The attribute takes on the following values:
TRUE - internal intercell handovers are allowed,
FALSE - internal intercell handovers are not allowed.";

internalIntraCellHandoverPackage

internalIntraCellHandoverPackage **PACKAGE**
BEHAVIOUR
internalIntraCellHandoverBehaviour ;
ATTRIBUTES
enableInternalIntraCellHandover GET-REPLACE**;**
REGISTERED AS {gsm1220package 220} ;

internalIntraCellHandoverBehaviour **BEHAVIOUR**
DEFINED AS
"GSM 08.08 defines two types of handover which are optional but if supported are manageable through O&M. This package is included if the BSC supports internal intracell handovers which is one of these two types. The attribute takes on the following values:
TRUE - internal intracell handovers are allowed,
FALSE - internal intracell handovers are not allowed.";

lapdLinkPackage

lapdLinkPackage **PACKAGE**
BEHAVIOUR
lapdLinkBehaviour ;
ATTRIBUTES
abisSigChannelGET,
lapdLinkID GET,
sapi GET,
tei GET-REPLACE,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
GET-REPLACE standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. M.3100 (1992)": alarmStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": unknownStatus
GET standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220package 230} ;

lapdLinkBehaviour **BEHAVIOUR**
DEFINED AS
"The object class lapdLink models a logical LapD connection on a signaling link on the Abis interface. Both O&M and Telecom signaling are covered by lapdLink. This package provides the basic identification, control, and relationship attributes.

A lapdLink object is associated with a PCM time slot by the abisSigChannel attribute. If optional sub multiplexing is used, a lapdLink is also associated with a subslot within the time slot.

A CMIP Create command must include all attributes except for the state attributes. Upon creation of this object, the value of the administrative state will be locked. The locked administrative state stops normal operations of the resource (not, for example, operations for test purposes). The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL. The behaviour of the object on Delete will be as if the state were first set to locked.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship or the locking of the instance. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

An attribute Set command may be refused by an agent if the agent requires the manager to lock the object prior to changing the attribute value. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Set errors also apply.

Attributes that are subject to the attributeValueChange notification are: all except administrativeState, controlStatus, alarmStatus, operationalState and availabilityStatus. Attributes that are subject to the stateChange notification are administrativeState, operationalState and availabilityStatus.

The values locked and unlocked of the administrative state and all values of the operational state are supported. The M-SET command changing the administrative state shall not change any other attributes.";

pcmCircuitPackage

pcmCircuitPackage **PACKAGE**
BEHAVIOUR
pcmCircuitBehaviour ;
ATTRIBUTES
pcmCircuitID GET,
relatedGSMEquipment GET-REPLACE**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
GET-REPLACE standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. M.3100 (1992)": alarmStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": unknownStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": usageState
GET standard1220SpecificErrorInfo**;**
REGISTERED AS {gsm1220package 240} ;

pcmCircuitBehaviour **BEHAVIOUR**
DEFINED AS
"The pcmCircuit object class is a class of managed objects representing a telecommunications facility to allow identification for management in conjunction with other objects such as lapdLink and transcoder and to provide control and alarm capabilities. This package provides the basic identification, control, and relationship attributes.

A CMIP Create command must include all attributes except for the state attributes. Upon creation of this object, the value of the administrative state will be locked. The locked administrative state stops normal operations of the resource (not, for example, operations for test purposes). The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL. The behaviour of the object on Delete will be as if the state were first set to locked.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship or the locking of the instance. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

An attribute Set command may be refused by an agent if the agent requires the manager to lock the object prior to changing the attribute value. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Set errors also apply.

Attributes that are subject to the attributeValueChange notification are: all except administrativeState, controlStatus, alarmStatus, operationalState, availabilityStatus and usageState. Attributes that are subject to the stateChange notification are administrativeState, operationalState, availabilityStatus and usageState.

The values locked and unlocked of the administrative state and all values of the operational and usage states are supported. The availabilityStatus qualifies in more details the operationalState while the controlStatus provides information to support the test management. The M-SET command changing the administrative state shall not change any other attributes.";

pcMsmtProcessingModePackage

pcMsmtProcessingModePackage **PACKAGE**
BEHAVIOUR
pcMsmtProcessingModeBehaviour ;
ATTRIBUTES
pcMsmtProcessingMode GET-REPLACE**;**
REGISTERED AS {gsm1220package 250} ;

pcMsmtProcessingModeBehaviour **BEHAVIOUR**
DEFINED AS
"GSM 08.58 defines the mechanisms to be employed for the transfer of radio link measurements from the BTS to the BSC to be used by the mobile station (MS) and, if supported, the Base Station (BS) power control algorithms. Measurement processing, threshold comparison, and decision making are allowed to be configured to take place in the BTS. This package is present in a BTS instance when it supports the optional measurement processing modes. The pcMsmtProcessingMode attribute allows the management of the location of measurement processing. Each BTS hosted by the BSC may be configured differently in this respect. It should be noted that, if the BTS supports BS power control algorithm and measurement processing but the BSC does not, switching the processing to take place in the BSC will cause the loss of BS power control since processing for both BS and MS power control algorithms are assumed to be done in the same place. ";

powerControlGSM0508Package

powerControlGSM0508Package **PACKAGE**
BEHAVIOUR
powerControlGSM0508Behaviour;
ATTRIBUTES
pcAveragingLev GET-REPLACE,
pcAveragingQual GET-REPLACE,
pcLowerThresholdLevParam GET-REPLACE,
pcLowerThresholdQualParam GET-REPLACE,
pcUpperThresholdLevParam GET-REPLACE,
pcUpperThresholdQualParam GET-REPLACE,
powerControlInterval GET-REPLACE,
powerIncrStepSize GET-REPLACE,
powerRedStepSize GET-REPLACE;
REGISTERED AS {gsm1220package 260} ;

powerControlGSM0508Behaviour **BEHAVIOUR**
DEFINED AS
"The object class powerControlGSM0508 contains the parameters of the default power control algorithm defined in Annex A of Specification GSM 05.08. This class may be used, if the BSS supports the default power control algorithm.";

powerControlPackage

powerControlPackage **PACKAGE**
BEHAVIOUR
powerControlBehaviour;
ATTRIBUTES
msmtProcParamLoc GET**,**
powerControlID GET;
REGISTERED AS {gsm1220package 270} ;

powerControlBehaviour **BEHAVIOUR**
DEFINED AS
"Manufacturers shall use the class powerControl as a base class for specifying actual object classes for management of parameters specific to their power control algorithm. The class powerControl cannot be instantiated. There are, at most, two instances of these actual instantiated subclasses per BTS, one to manage parameters used by the BSC and one to manage parameters used by the BTS. This package provides the attributes common to all subclasses. If BS power control is supported, it is assumed that the processing for MS and BS power control measurements are performed in the same place (BSC or BTS) and that the same set of parameters are used for both MS and BS power control algorithms.

A CMIP Create command (for a subclass to be instantiated) must include all attributes. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

Attributes that are subject to the attributeValueChange notification are: all.";

radioCarrierPackage

radioCarrierPackage **PACKAGE**
BEHAVIOUR
radioCarrierBehaviour ;
ATTRIBUTES
carrierFrequencyList GET-REPLACE**,**
powerClass GET,
radioCarrierID GET,
relatedGSMEquipment GET-REPLACE**,**
txPwrMaxReduction GET-REPLACE,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
GET-REPLACE standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. M.3100 (1992)": alarmStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
GET standard1220SpecificErrorInfo**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": unknownStatus
GET standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220package 280} ;

radioCarrierBehaviour **BEHAVIOUR**
DEFINED AS
"The radioCarrier managed object class is a functional entity representing the manageable properties of a radio carrier. Together with the basebandTransceiver and channel MOCs, it is meant to accommodate various system architectures including fixed frequency, baseband hopping, and synthesized hopping systems.

This definition covers what may be described as the radio aspects of transmission in the GSM/DCS 1800 base station systems. This functionality is related to the baseband aspects by means of the associated channel definitions (see channel managed object class). This package provides the basic identification, control, and relationship attributes.

A CMIP Create command must include all attributes except for the state attributes. Upon creation of this object, the value of the administrative state will be locked. The attributeList field of the objectCreation notification shall contain all attributes of the created instance. The attributeList field of the objectDeletion notification shall be NULL. The behaviour of the object on Delete will be as if the state were first set to locked.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship or the locking of the instance. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.

An attribute Set command may be refused by an agent if the agent requires the manager to lock the object prior to changing the attribute value. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Set errors also apply.

Attributes that are subject to the attributeValueChange notification are: all except administrativeState, controlStatus, alarmStatus, operationalState and availabilityStatus. Attributes that are subject to the stateChange notification are administrativeState, operationalState and availabilityStatus.

The values locked and unlocked of the administrative state and all values of the operational state are supported. The availabilityStatus qualifies in more details the operationalState while the controlStatus provides information to support the test management. The M-SET command changing the administrative state shall not change any other attributes.

The radioCarrier administrative states have the following meanings: When the radioCarrier is locked transmission and reception in all radio time slots supported by this instance is ceased. When the radioCarrier is unlocked normal operation occurs. The locked administrative state stops normal operations of the resource (not, for example, operations for test purposes).";

transcoderMatrixPackage

transcoderMatrixPackage **PACKAGE**
BEHAVIOUR
transcoderMatrixBehaviour ;
ATTRIBUTES
transcoderMatrix GET-REPLACE;
REGISTERED AS {gsm1220package 290} ;

transcoderMatrixBehaviour **BEHAVIOUR**
DEFINED AS
"This package provides the attribute to specify transcoder timeslot mapping. It is conditional to allow the attribute transcoderMatrix to be optional.";

transcoderPackage

```
transcoderPackage PACKAGE
    BEHAVIOUR
        transcoderBehaviour;
    ATTRIBUTES
        transcoderID                    GET,
        relatedGSMEquipment             GET-REPLACE,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
                                        GET-REPLACE standard1220SpecificErrorInfo,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
                                        GET-REPLACE standard1220SpecificErrorInfo ,
        "CCITT Rec. M.3100 (1992)": alarmStatus
                                        GET standard1220SpecificErrorInfo,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
                                        GET standard1220SpecificErrorInfo,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
                                        GET standard1220SpecificErrorInfo,
        "CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": unknownStatus
                                        GET standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220package 300} ;

transcoderBehaviour BEHAVIOUR
    DEFINED AS
        "The transcoder class represents the functional entity that performs GSM-defined speech
        encoding and decoding, data rate adaption, and sub multiplexing functions. One instance
        of the transcoder object represents the functional entity that does the transcoding for one
        or more 64 kbps A-law PCM time slots. This package provides the basic identification,
        control, and relationship attributes.
        A CMIP Create command must include all attributes except for the state attributes. Upon
        creation of this object, the value of the administrative state will be locked. The locked
        administrative state stops normal operations of the resource (not, for example, operations
        for test purposes). The attributeList field of the objectCreation notification shall contain all
        attributes of the created instance. The attributeList field of the objectDeletion notification
        shall be NULL. The behaviour of the object on Delete will be as if the state were first set
        to locked.
        A CMIP Delete command for an instance of this object may be refused by an agent if the
        agent requires the manager to take some action such as the explicit removal of the
        instance from some relationship or the locking of the instance. Any such error will be
        indicated by the appropriate GSM 12.20 defined error code being returned. Other
        generally applicable Delete errors also apply. If the agent accepts a Delete command and
        relationships exist, the agent is responsible for adjusting the appropriate attributes and
        reporting such changes to the management system.
        An attribute Set command may be refused by an agent if the agent requires the manager
        to lock the object prior to changing the attribute value. Any such error will be indicated by
        the appropriate GSM 12.20 defined error code being returned. Other generally applicable
        Set errors also apply.
        Attributes that are subject to the attributeValueChange notification are: all except
        administrativeState, controlStatus, alarmStatus, operationalState and availabilityStatus.
        Attributes that are subject to the stateChange notification are administrativeState,
        operationalState and availabilityStatus.
        The values locked and unlocked of the administrative state and all values of the
        operational state are supported. The availabilityStatus qualifies in more details the
        operationalState while the controlStatus provides information to support the test
        management. The M-SET command changing the administrative state shall not change
        any other attributes.";
```

7.2 General packages

This clause contains packages that may be used in several managed object classes, even over several managed network elements.

equipmentRelatedAlarmPackage

equipmentRelatedAlarmPackage **PACKAGE**
BEHAVIOUR
equipmentRelatedAlarmBehaviour ;
NOTIFICATIONS
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": environmentalAlarm
relatedGSMEquipCeaseParam relatedGSMEquipLabelParam
relatedGSMEquipLocParam relatedGSMEquipNameParam
relatedGSMEquipObjParam relatedGSMEquipTimeParam
relatedGSMEquipTypeParam relatedGSMEquipVersParam,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": equipmentAlarm
relatedGSMEquipCeaseParam relatedGSMEquipLabelParam
relatedGSMEquipLocParam relatedGSMEquipNameParam
relatedGSMEquipObjParam relatedGSMEquipTimeParam
relatedGSMEquipTypeParam relatedGSMEquipVersParam;
REGISTERED AS {gsm1220package 310} ;

equipmentRelatedAlarmBehaviour **BEHAVIOUR**
DEFINED AS
"This package contains the alarm notifications that are needed in reporting the equipment or environmental alarms from a functional object.
If this package is contained in a functional object instance and the GSM functionality is affected by a failure in a related equipment or environmental condition, the alarm will be notified by the functional object. The Additional Information Field of the alarm notification must then contain the identification of the failed equipment as specified in one or more of the related GSM Equipment parameters. The environmental alarm notification won't have to contain these parameters if the environmental alarm condition isn't related to any specific equipment e.g. it is a condition that affects the whole site.";

executableSoftwareUnitPackage

executableSoftwareUnitPackage **PACKAGE**
BEHAVIOUR
executableSoftwareUnitBehaviour ;
ATTRIBUTES
relatedRSUs GET-REPLACE**;**
REGISTERED AS {gsm1220package 320} ;

executableSoftwareUnitBehaviour **BEHAVIOUR**
DEFINED AS
"An instance of this managed object class is used to represent a unit of software that is separately identifiable and is ready to be used by the system. This object class can also be used to represent data-only modules such as the data segment of executable software or a database used by software on the system. Its association with the equipment or functional resource that uses it may be indicated by containment if needed, or an instance of this class may be pointed to by one or more operatingSoftwareUnit instances contained in the associated equipment or functional instances. This package provides a relationship attribute. When the resource represented by an instance of this class is made up of one or more separately identifiable and/or replaceable units, the relatedRSUs attribute may be set to identify these replaceableSoftwareUnit instances. When the relatedRSUs attribute is set to other than NULL (at create or by explicit setting), the resources represented by one or more replaceableSoftwareUnit instances are prepared as necessary by the agent to be used by the system. This might involve a linking step and/or creating a local disk or memory copy.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system. ";

functionalRelatedAlarmPackage

functionalRelatedAlarmPackage **PACKAGE**
BEHAVIOUR
functionalRelatedAlarmBehaviour ;
NOTIFICATIONS
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": communicationsAlarm,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": processingErrorAlarm,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": qualityofServiceAlarm ;
REGISTERED AS {gsm1220package 330} ;

functionalRelatedAlarmBehaviour **BEHAVIOUR**
DEFINED AS
"This package gathers together all ISO/CCITT alarm types that are foreseen to occur on a certain GSM functionality. This serves as a notational shorthand for inclusion in each managed object class as needed.";

gsmEquipmentPackage

gsmEquipmentPackage **PACKAGE**
BEHAVIOUR
gsmEquipmentBehaviour ;
ATTRIBUTES
equipmentType GET-REPLACE,
relatedGSMFunctionalObjects GET-REPLACE**;**
REGISTERED AS {gsm1220package 340} ;

gsmEquipmentBehaviour **BEHAVIOUR**
DEFINED AS
"This package provides the relatedGSMFunctionalObjects attribute to the CCITT M.3100 equipment object class. Its purpose is to allow the identification of functional objects that will generate an equipment alarm when the resource represented by an instance of this class, or its subclasses, fails. This will allow the generation of only functional alarms for systems that desire this behaviour. It also provides the equipmentType attribute which is intended to allow various types of equipment to be distinguished without subclassing the gsmEquipment MOC.";

operatingSoftwareUnitPackage

operatingSoftwareUnitPackage **PACKAGE**
BEHAVIOUR
operatingSoftwareUnitBehaviour ;
ATTRIBUTES
operatingSoftwareID GET**,**
backupESU GET-REPLACE**,**
fallbackESU GET-REPLACE**,**
newESU GET-REPLACE**,**
runningESU GET-REPLACE**,**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": administrativeState
GET-REPLACE standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": controlStatus
GET-REPLACE standard1220SpecificErrorInfo ,
"CCITT Rec. M.3100 (1992)": alarmStatus
GET standard1220SpecificErrorInfo,
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": operationalState
GET standard1220SpecificErrorInfo**;**
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": availabilityStatus
GET standard1220SpecificErrorInfo**,**
NOTIFICATIONS
"CCITT Rec. X.721 (1992) | ISO/IEC 10165-2 : 1992": processingErrorAlarm;
REGISTERED AS {gsm1220package 350} ;

operatingSoftwareUnitBehaviour **BEHAVIOUR**
DEFINED AS
"An instance of this object is used to represent the operating software resource for an instance of equipment or functionality and is associated with the related equipment or functional unit through containment. This object class can also be used to represent data-only modules such as the data segment of executable software or a database used by software on the system. This package provides basic identification, control and relationship attributes. The software or data resource is identified by the runningESU attribute which identifies an instance of an executableSoftwareUnit. When this attribute is set (even if set to the same value), the executable instance is copied to the area of its use (e.g. loading to executable memory store) and use by the system begins unless prohibited by the administrative state. The administrative locked state prohibits operation of the instance of this resource while the unlocked state starts/restarts its operation. The locked administrative state stops normal operations of the resource (not, for example, operations for test purposes). The availabilityStatus and the controlStatus provide information to support the test management of the operatingSoftwareUnit. Failure of the operation of this resource is indicated by an alarm notification and by the alarmStatus attribute. If the automatic start/restart of this resource is supported (e.g. following initialization or failure) the managed system will set the value of the runningESU attribute to the value contained in the backupESU attribute, if any, and behave as indicated for setting of the runningESU attribute (attribute value and state change notifications will be issued as appropriate). Additional related executableSoftwareUnits may be identified for use by setting the values of the newESU and fallbackESU attributes.

A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship or the locking of the instance. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system. ";

replaceableSoftwareUnitPackage

replaceableSoftwareUnitPackage **PACKAGE**
BEHAVIOUR
replaceableSoftwareUnitBehaviour ;
ATTRIBUTES
relatedFiles GET-REPLACE**;**
REGISTERED AS {gsm1220package 360} ;

replaceableSoftwareUnitBehaviour **BEHAVIOUR**
DEFINED AS
"An instance of this managed object class is used to represent a unit of software that needs to be separately identifiable and/or replaceable on the system. This might be a complete set of software or it might represent only a patch. This object class can also be used to represent data-only modules such as the data segment of executable software or a database used by software on the system. The structure of the software resource may be shown by containment of an instance of this object in other instances of the same class. Containment within the equipment that uses this software unit is not necessary as that relationship will be indicated by the associated operatingSoftwareUnit instance(s) and attributes for related executableSoftwareUnits. When the resource represented by an instance of this class is able to be downloaded or exists locally, the relatedFiles attribute may be set to indicate the one or more files that make up this unit. This package provides this relationship attribute.
A CMIP Delete command for an instance of this object may be refused by an agent if the agent requires the manager to take some action such as the explicit removal of the instance from some relationship. Any such error will be indicated by the appropriate GSM 12.20 defined error code being returned. Other generally applicable Delete errors also apply. If the agent accepts a Delete command and relationships exist, the agent is responsible for adjusting the appropriate attributes and reporting such changes to the management system.";

8 Managed object class action definitions

This clause of the ETS presents the definitions of the Actions that form the Management Information Model. These definitions are provided following the GDMO format templates specified in CCITT X.722.

8.1 BSS related actions

This clause provides the templates for Managed Object Class Action definitions for the set of objects that are expected to have use only in the information model of the BSS. Additional actions that have been identified as needed in the information model for the management of the BSS but are expected to be of general use are defined in a later clause.

adjustExternalTime

adjustExternalTime **ACTION**
BEHAVIOUR
adjustExternalTimeBehaviour;
MODE
CONFIRMED ;
WITH INFORMATION SYNTAX
GSM1220TypeModule.AdjustExternalTimearg ;
REGISTERED AS {gsm1220action 10} ;

adjustExternalTimeBehaviour **BEHAVIOUR**
DEFINED AS
"This action is used for adjusting the time of the clock, either forwards or backwards. The time can be adjusted by milliseconds, seconds, minutes or hours.
The time, when the actual time adjust action shall take place, can be given. If not given, the action will take place immediately."
;

channelConfigModification

channelConfigModification **ACTION**
BEHAVIOUR
channelConfigModificationBehaviour;
MODE
CONFIRMED ;
WITH INFORMATION SYNTAX
GSM1220TypeModule.ChannelConfigModArg ;
REGISTERED AS {gsm1220action 20} ;

channelConfigModificationBehaviour **BEHAVIOUR**
DEFINED AS
"This action is used to change the channel configuration. It allows the manager to communicate to the agent new values for all or part of the radio definition of a BTS. It is applicable for the following attributes:
- frequencyUsage
- channelCombination
- mobileAllocation
- hoppingSequenceNumber
- carrierFrequencyList
- cellAllocation

The action can only be applied to a single bts instance and its sub-tree. All combinations of operations (several instances of different classes) are possible within one action. During the processing of one action, no other action shall be allowed on that bts instance. If the agent detects any problem with the action request, an error will be indicated in the confirmation. Once a successful confirmation has been returned, the agent is required to send the channelModComplete notification indicating the success or failure of the reconfiguration."
;

forcedHO

forcedHO **ACTION**
BEHAVIOUR
forcedHOBehaviour;
MODE
CONFIRMED ;
WITH INFORMATION SYNTAX
GSM1220TypeModule.ForcedHOarg ;
REGISTERED AS {gsm1220action 30} ;

forcedHOBehaviour **BEHAVIOUR**
DEFINED AS
"This action may be used for a graceful close of a BTS or a TRX. It causes any traffic in the BTS/TRX to be attempted to be handed over to other BTSs (or other TRXs within the BTS). The SHUTTING DOWN administrative state must be used in order to prevent incoming handovers and new call setups. The action argument provides a time after which calls, that are not yet handed over, will be cleared. A value of 0 indicates no time-out."
;

8.2 General actions

This clause defines those Managed Object Class Actions that have been determined to be needed in the information model of the BSS but that should be of general use in the management of a GSM PLMN and are not defined elsewhere.

requestTransferDown

This action is for the purposes of the management of file transfer between the manager and agent systems. It is fully described in GSM 12.00 [24].

transferDownComplete

This action is for the purposes of the management of file transfer between the manager and agent systems. It is fully described in GSM 12.00 [24].

9 Managed object class notification definitions

This clause of the ETS presents the definitions of the Notifications that help form the Management Information Model. These definitions are provided following the GDMO format templates specified in CCITT X.722.

9.1 BSS related notifications

This clause provides the templates for Managed Object Class Notification definitions for the set of objects that are expected to have use only in the information model of the BSS. Additional notifications that have been identified as needed in the information model for the management of the BSS but are expected to be of general use are defined in a later clause.

channelModComplete

channelModComplete **NOTIFICATION**
BEHAVIOUR
channelModCompleteBehaviour;
WITH INFORMATION SYNTAX
GSM1220TypeModule.ChannelModCompleteArg ;
REGISTERED AS {gsm1220notification 10} ;

channelModCompleteBehaviour **BEHAVIOUR**
DEFINED AS
"This notification informs the manager about the result of the channelConfigModification action. The notification information SuccessIndicator can take the values:
- success
- failed

A value of failed means that an error occurred during the execution of the modifications by the agent. If the channel modification has failed, the manager can reissue the same or another channelConfigModification action later."
;

9.2 General notifications

This clause defines those Managed Object Class Notifications that have been determined to be needed in the information model of the BSS but that should be of general use in the management of a GSM PLMN.

The only notifications identified so far are those specified by CCITT. The following text briefly discusses the meaning of certain fields of the alarmInfo parameter present in the alarm notifications. For a more detailed information refer to CCITT Recommendations X.721 and X.733.

The probableCause field identifies the alarm; manufacturer/operator specific values may be used to identify manufacturer/operator specific alarms. The perceivedSeverity field identifies the alarm class. An alarm is cancelled using the value clear as the perceivedSeverity. This cancels all alarms with the same probable cause and object instance values. The notificationID parameter contains a unique running number. The genericStateChange parameter contains the new operational state of the object instance, which sent the alarm. The problemText parameter contains textual information about the alarm. The problemData parameter contains the type of the system and optionally additional diagnostic information in textual format.

attributeValueChange

The attribute value change notification is used to report when there is a change in some of the attribute values of a managed object. It is fully defined in CCITT Recommendation X.721.

communicationsAlarm

The communications alarm notification type is used to report when the managed object detects a communications error. It is fully defined in CCITT Recommendation X.721.

environmentalAlarm

The environmental alarm notification type is used to report the managed object detects a problem in the environment. It is fully defined in CCITT Recommendation X.721.

equipmentAlarm

The equipment alarm notification type is used to report a failure in equipment. It is fully defined in CCITT Recommendation X.721.

objectCreation

The object creation notification type is used to report the creation of a managed object. It is fully defined in CCITT Recommendation X.721.

objectDeletion

The object deletion notification type is used to report the deletion of a managed object. It is fully defined in CCITT Recommendation X.721.

processingErrorAlarm

The processing error alarm notification type is used to report processing failure in a managed object. It is fully defined in CCITT Recommendation X.721.

qualityofServiceAlarm

The quality of service alarm notification type is used to report degradation of the quality of service in a managed object. It is fully defined in CCITT Recommendation X.721.

stateChange

The state change notification type is used to report when there is a change in some of the state values of a managed object. It is fully defined in CCITT Recommendation X.721.

transferDownReady

The transferDownReady notification type is used to report when the agent system is ready to accept a file transfer from the manager system. It is fully described in GSM 12.00 [24].

10 Managed object class parameter definitions

10.1 BSS related parameters

This clause provides the templates for Managed Object Class Parameter definitions for the set of objects that are expected to have use only in the information model of the BSS.

standard1220CreateErrorInfo

standard1220CreateErrorInfo **PARAMETER**
CONTEXT
SPECIFIC-ERROR ;
WITH SYNTAX
GSM1220TypeModule.Standard1220CreateErrorInfo ;
BEHAVIOUR
standard1220CreateErrorInfoBehaviour ;
REGISTERED AS {gsm1220parameter 10} ;

standard1220CreateErrorInfoBehaviour **BEHAVIOUR**
DEFINED AS
"If the maximum number of instances of the object class exist within the containing managed object, attempts to create additional instances shall result in the return of a CMIP Processing Failure error where the SpecificErrorInfo field is of the form:

```
SpecificErrorInfo ::= {
        errorid         OBJECT IDENTIFIER,
        errorinfo       ANY DEFINED BY errorid }
```

The OBJECT IDENTIFIER carried in errorid shall be the value under which this parameter definition is registered. The type carried in errorinfo shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type indicates the number of instances of this managed object class that currently exist in the containing managed object."
;

standard1220DeleteErrorInfo

standard1220DeleteErrorInfo **PARAMETER**
CONTEXT
SPECIFIC-ERROR ;
WITH SYNTAX
GSM1220TypeModule.Standard1220DeleteErrorInfo ;
BEHAVIOUR
standard1220DeleteErrorInfoBehaviour ;
REGISTERED AS {gsm1220parameter 15} ;

standard1220DeleteErrorInfoBehaviour **BEHAVIOUR**
DEFINED AS
"If the agent requires that actions be taken by the manager, such as the object instance be explicitly locked or removed from a relationship, prior to receipt of a delete request, attempts to delete the instance shall result in the return of a CMIP Processing Failure error where the SpecificErrorInfo field is of the form:

```
SpecificErrorInfo ::= {
        errorid         OBJECT IDENTIFIER,
        errorinfo       ANY DEFINED BY errorid }
```

The OBJECT IDENTIFIER carried in errorid shall be the value under which this parameter definition is registered. The type carried in errorinfo shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type indicates the applicable GSM 12.20 defined error code."
;

standard1220SpecificErrorInfo

standard1220SpecificErrorInfo **PARAMETER**
CONTEXT
SPECIFIC-ERROR ;
WITH SYNTAX
GSM1220TypeModule.Standard1220SpecificErrorInfo ;
BEHAVIOUR
standard1220SpecificErrorInfoBehaviour ;
REGISTERED AS {gsm1220parameter 20} ;

standard1220SpecificErrorInfoBehaviour **BEHAVIOUR**
DEFINED AS
"An error encountered in getting or setting (M_GET, M_SET, or M_ACTION operations) various attributes in the BSS object model shall result in the return of a CMIP Processing Failure error where the SpecificErrorInfo field is of the form:
SpecificErrorInfo ::= {
errorid OBJECT IDENTIFIER,
errorinfo ANY DEFINED BY errorid }
The OBJECT IDENTIFIER carried in errorid shall be the value under which this parameter definition is registered. The type carried in errorinfo shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type is a Graphic String, that contains an error message which may be displayed to an operator at an OS facility, or a defined GSM 12.20 error code."
;

10.2 General parameters

This clause provides the templates for Managed Object Class Parameter definitions for the set of objects that are expected to have general use in the information model of the PLMN.

relatedGSMEquipCeaseParam

relatedGSMEquipCeaseParam **PARAMETER**
CONTEXT
Notification-ASN1Module.AlarmInfo.additionalInformation;
WITH SYNTAX
GSM1220TypeModule.EquipmentCease;
BEHAVIOUR
relatedGSMEquipCeaseParamBehaviour;
REGISTERED AS {gsm1220parameter 30} ;

relatedGSMEquipCeaseParamBehaviour **BEHAVIOUR**
DEFINED AS
"If a GSM functionality is alarmed due to a failure or an environmental condition in related equipment, the Additional Information Field of the alarm notification shall contain an equipment description which is either a parameter containing a pointer to the equipment object or parameters containing the name, type, version, or location information for the failed equipment. The Additional Information Field is a set of ManagementExtensions which are of the following form:
ManagementExtension ::= SEQUENCE {

identifier OBJECT IDENTIFIER,
significance [1] BOOLEAN DEFAULT FALSE,
information [2] ANY DEFINED BY identifier }

The OBJECT IDENTIFIER carried by **identifier** shall be the value under which this parameter definition is registered. The type carried by **information** shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type identifies if alarm cease is defined for the equipment that has failed. TRUE means that alarm cease is defined."
;

relatedGSMEquipLabelParam

relatedGSMEquipLabelParam **PARAMETER**
CONTEXT
Notification-ASN1Module.AlarmInfo.additionalInformation;
WITH SYNTAX
GSM1220TypeModule.EquipmentLabel;
BEHAVIOUR
relatedGSMEquipLabelParamBehaviour;
REGISTERED AS {gsm1220parameter 40} ;

relatedGSMEquipLabelParamBehaviour **BEHAVIOUR**
DEFINED AS
"If a GSM functionality is alarmed due to a failure or an environmental condition in related equipment, the Additional Information Field of the alarm notification shall contain an equipment description which is either a parameter containing a pointer to the equipment object or parameters containing the name, type, version, or location information for the failed equipment. The Additional Information Field is a set of ManagementExtensions which are of the following form:
ManagementExtension ::= SEQUENCE {
identifier OBJECT IDENTIFIER,
significance [1] BOOLEAN DEFAULT FALSE,
information [2] ANY DEFINED BY identifier }

The OBJECT IDENTIFIER carried by **identifier** shall be the value under which this parameter definition is registered. The type carried by **information** shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type identifies the user label of the equipment that has failed."
;

relatedGSMEquipLocParam

relatedGSMEquipLocParam **PARAMETER**
CONTEXT
Notification-ASN1Module.AlarmInfo.additionalInformation;
WITH SYNTAX
GSM1220TypeModule.EquipmentLoc;
BEHAVIOUR
relatedGSMEquipLocParamBehaviour;
REGISTERED AS {gsm1220parameter 50} ;

relatedGSMEquipLocParamBehaviour **BEHAVIOUR**
DEFINED AS
"If a GSM functionality is alarmed due to a failure or an environmental condition in related equipment, the Additional Information Field of the alarm notification shall contain an equipment description which is either a parameter containing a pointer to the equipment object or parameters containing the name, type, version, or location information for the failed equipment. The Additional Information Field is a set of ManagementExtensions which are of the following form:

```
ManagementExtension ::= SEQUENCE {
        identifier      OBJECT IDENTIFIER,
        significance    [1] BOOLEAN DEFAULT FALSE,
        information     [2] ANY DEFINED BY identifier }
```

The OBJECT IDENTIFIER carried by **identifier** shall be the value under which this parameter definition is registered. The type carried by **information** shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type identifies the location of the equipment that has failed."
;

relatedGSMEquipNameParam

relatedGSMEquipNameParam **PARAMETER**
CONTEXT
Notification-ASN1Module.AlarmInfo.additionalInformation;
WITH SYNTAX
GSM1220TypeModule.EquipmentName;
BEHAVIOUR
relatedGSMEquipNameParamBehaviour;
REGISTERED AS {gsm1220parameter 60} ;

relatedGSMEquipNameParamBehaviour **BEHAVIOUR**
DEFINED AS
"If a GSM functionality is alarmed due to a failure or an environmental condition in related equipment, the Additional Information Field of the alarm notification shall contain an equipment description which is either a parameter containing a pointer to the equipment object or parameters containing the name, type, version, or location information for the failed equipment. The Additional Information Field is a set of ManagementExtensions which are of the following form:

```
ManagementExtension ::= SEQUENCE {
        identifier      OBJECT IDENTIFIER,
        significance    [1] BOOLEAN DEFAULT FALSE,
        information     [2] ANY DEFINED BY identifier }
```

The OBJECT IDENTIFIER carried by **identifier** shall be the value under which this parameter definition is registered. The type carried by **information** shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type identifies the vendor name of the equipment that has failed."
;

relatedGSMEquipObjParam

relatedGSMEquipObjParam **PARAMETER**
CONTEXT
Notification-ASN1Module.AlarmInfo.additionalInformation;
WITH SYNTAX
GSM1220TypeModule.EquipmentObj;
BEHAVIOUR
relatedGSMEquipObjParamBehaviour;
REGISTERED AS {gsm1220parameter 70} ;

relatedGSMEquipObjParamBehaviour **BEHAVIOUR**
DEFINED AS
"If a GSM functionality is alarmed due to a failure or an environmental condition in related equipment, the Additional Information Field of the alarm notification shall contain an equipment description which is either a parameter containing a pointer to the equipment object or parameters containing the name, type, version, or location information for the failed equipment. The Additional Information Field is a set of ManagementExtensions which are of the following form:

```
ManagementExtension ::= SEQUENCE {
        identifier      OBJECT IDENTIFIER,
        significance    [1] BOOLEAN DEFAULT FALSE,
        information     [2] ANY DEFINED BY identifier }
```

The OBJECT IDENTIFIER carried by **identifier** shall be the value under which this parameter definition is registered. The type carried by **information** shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type identifies the equipment object that has failed."
;

relatedGSMEquipTimeParam

relatedGSMEquipTimeParam **PARAMETER**
CONTEXT
Notification-ASN1Module.AlarmInfo.additionalInformation;
WITH SYNTAX
GSM1220TypeModule.EquipmentTime;
BEHAVIOUR
relatedGSMEquipTimeParamBehaviour;
REGISTERED AS {gsm1220parameter 80} ;

relatedGSMEquipTimeParamBehaviour **BEHAVIOUR**
DEFINED AS
"If a GSM functionality is alarmed due to a failure or an environmental condition in related equipment, the Additional Information Field of the alarm notification shall contain an equipment description which is either a parameter containing a pointer to the equipment object or parameters containing the name, type, version, or location information for the failed equipment. The Additional Information Field is a set of ManagementExtensions which are of the following form:

```
ManagementExtension ::= SEQUENCE {
        identifier      OBJECT IDENTIFIER,
        significance    [1] BOOLEAN DEFAULT FALSE,
        information     [2] ANY DEFINED BY identifier }
```

The OBJECT IDENTIFIER carried by **identifier** shall be the value under which this parameter definition is registered. The type carried by **information** shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type identifies the time that the equipment failed as opposed to the time of report."
;

relatedGSMEquipTypeParam

relatedGSMEquipTypeParam **PARAMETER**
CONTEXT
Notification-ASN1Module.AlarmInfo.additionalInformation;
WITH SYNTAX
GSM1220TypeModule.EquipmentType;
BEHAVIOUR
relatedGSMEquipTypeParamBehaviour;
REGISTERED AS {gsm1220parameter 90} ;

relatedGSMEquipTypeParamBehaviour **BEHAVIOUR**
DEFINED AS
"If a GSM functionality is alarmed due to a failure or an environmental condition in related equipment, the Additional Information Field of the alarm notification shall contain an equipment description which is either a parameter containing a pointer to the equipment object or parameters containing the name, type, version, or location information for the failed equipment. The Additional Information Field is a set of ManagementExtensions which are of the following form:

```
ManagementExtension ::= SEQUENCE {
        identifier      OBJECT IDENTIFIER,
        significance    [1] BOOLEAN DEFAULT FALSE,
        information     [2] ANY DEFINED BY identifier }
```

The OBJECT IDENTIFIER carried by **identifier** shall be the value under which this parameter definition is registered. The type carried by **information** shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type identifies the type of equipment that has failed."
;

relatedGSMEquipVersParam

relatedGSMEquipVersParam **PARAMETER**
CONTEXT
Notification-ASN1Module.AlarmInfo.additionalInformation;
WITH SYNTAX
GSM1220TypeModule.EquipmentVers;
BEHAVIOUR
relatedGSMEquipVersParamBehaviour;
REGISTERED AS {gsm1220parameter 100} ;

relatedGSMEquipVersParamBehaviour **BEHAVIOUR**
DEFINED AS
"If a GSM functionality is alarmed due to a failure or an environmental condition in related equipment, the Additional Information Field of the alarm notification shall contain an equipment description which is either a parameter containing a pointer to the equipment object or parameters containing the name, type, version, or location information for the failed equipment. The Additional Information Field is a set of ManagementExtensions which are of the following form:

```
ManagementExtension ::= SEQUENCE {
        identifier      OBJECT IDENTIFIER,
        significance    [1] BOOLEAN DEFAULT FALSE,
        information     [2] ANY DEFINED BY identifier }
```

The OBJECT IDENTIFIER carried by **identifier** shall be the value under which this parameter definition is registered. The type carried by **information** shall be the type identified by the WITH SYNTAX construct of this parameter definition. The value carried by this type identifies the version of the equipment that has failed."
;

11 Managed object class attribute definitions

This clause defines the attributes that can be managed in the information model that is defined by this ETS. Attributes and their required behaviours are contained here.

11.1 BSS related attributes

This clause defines the attributes and their behaviours that are defined for objects that relate directly to the BSS Managed Element. Other attributes that relate to objects that may be of general use are found in a later clause.

abisSigChannel

abisSigChannel **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.AbisChannel;
MATCHES FOR EQUALITY;
BEHAVIOUR abisSigChannelBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 10};

abisSigChannelBehaviour **BEHAVIOUR**
DEFINED AS
"The abisSigChannel attribute identifies the PCM time slot and optional subslot allocated for a LapD link at the Abis interface.";

adjacentCellID

adjacentCellID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR adjacentCellIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 20};

adjacentCellIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute is used for naming adjacent cell objects, i.e. instances of the classes adjacentCellHandOver and adjacentCellReselection, as well as their subclasses.";

allowIMSIAttachDetach

allowIMSIAttachDetach **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BooleanType;
MATCHES FOR EQUALITY;
BEHAVIOUR allowIMSIAttachDetachBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 30};

allowIMSIAttachDetachBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute controls whether the IMSI attach/detach procedure is used in the cell. The value true means that IMSI attach/detach is used. Ref. GSM 04.08.";

basebandTransceiverID

basebandTransceiverID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR basebandTransceiverIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 40};

basebandTransceiverIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names a basebandTransceiver.";

bCCHFrequency

bCCHFrequency **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.AbsoluteRFChannelNo ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR bCCHFrequencyBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 60};

bCCHFrequencyBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains the absolute radio frequency channel number of the BCCH channel of adjacent cells. This information is sent to the mobile station.";

bscID

bscID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR bscIDBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 70};

bscIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names a bsc object instance.";

bsIdentityCode

bsIdentityCode **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BSIdentityCode ;
MATCHES FOR EQUALITY ;
BEHAVIOUR bsIdentityCodeBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 80};

bsIdentityCodeBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains the Base Station Identity Code (BSIC), which is transmitted on the SCH and used for identifying a BTS. The BSIC consists of the Network Colour Code (NCC) and the Base Station Colour Code (BCC). Refer to Specification GSM 04.08.";

bssMapT1

bssMapT1 **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TimerData;
MATCHES FOR EQUALITY;
BEHAVIOUR bssMapT1Behaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 81} ;

bssMapT1Behaviour **BEHAVIOUR**
DEFINED AS
"The bssMapT1 is associated with time to receipt of BLOCKING ACKNOWLEDGE (GSM 08.08).";

bssMapT4

bssMapT4 **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TimerData;
MATCHES FOR EQUALITY;
BEHAVIOUR bssMapT4Behaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 82} ;

bssMapT4Behaviour **BEHAVIOUR**
DEFINED AS
"The bssMapT4 is associated with time to return of RESET ACKNOWLEDGE at the BSS (GSM 08.08).";

bssMapT7

bssMapT7 **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TimerData;
MATCHES FOR EQUALITY;
BEHAVIOUR bssMapT7Behaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 83} ;

bssMapT7Behaviour **BEHAVIOUR**
DEFINED AS
"The bssMapT7 is associated with handover required periodicity (GSM 08.08).";

bssMapT8

bssMapT8 **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TimerData;
MATCHES FOR EQUALITY;
BEHAVIOUR bssMapT8Behaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 84} ;

bssMapT8Behaviour **BEHAVIOUR**
DEFINED AS
"The bssMapT8 is associated with time to receipt of successful handover information (GSM 08.08).";

bssMapT10

bssMapT10 **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TimerData;
MATCHES FOR EQUALITY;
BEHAVIOUR bssMapT10Behaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 85} ;

bssMapT10Behaviour **BEHAVIOUR**
DEFINED AS
"The bssMapT10 is associated with time to return of ASSIGNMENT COMPLETE or ASSIGNMENT FAILURE from MS (GSM 08.08).";

bssMapT13

```
bssMapT13 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX    GSM1220TypeModule.TimerData;
    MATCHES FOR              EQUALITY;
    BEHAVIOUR                bssMapT13Behaviour;
    PARAMETERS               standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 86} ;

bssMapT13Behaviour BEHAVIOUR
    DEFINED AS
        "The bssMapT13 is associated with reset guard period at the BSS (GSM 08.08).";
```

bssMapT17

```
bssMapT17 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX    GSM1220TypeModule.TimerData;
    MATCHES FOR              EQUALITY;
    BEHAVIOUR                bssMapT17Behaviour;
    PARAMETERS               standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 87} ;

bssMapT17Behaviour BEHAVIOUR
    DEFINED AS
        "The bssMapT17 is associated with overload timer in the BSS (GSM 08.08).";
```

bssMapT18

```
bssMapT18 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX    GSM1220TypeModule.TimerData;
    MATCHES FOR              EQUALITY;
    BEHAVIOUR                bssMapT18Behaviour;
    PARAMETERS               standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 88} ;

bssMapT18Behaviour BEHAVIOUR
    DEFINED AS
        "The bssMapT18 is associated with overload timer in the BSS (GSM 08.08).";
```

bssMapT19

```
bssMapT19 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX    GSM1220TypeModule.TimerData;
    MATCHES FOR              EQUALITY;
    BEHAVIOUR                bssMapT19Behaviour;
    PARAMETERS               standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 89} ;

bssMapT19Behaviour BEHAVIOUR
    DEFINED AS
        "The bssMapT19 is associated with time to receipt of RESET CIRCUIT ACKNOWLEDGE
        (GSM 08.08).";
```

bssMapT20

bssMapT20 **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TimerData;
MATCHES FOR EQUALITY;
BEHAVIOUR bssMapT20Behaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 90} ;

bssMapT20Behaviour **BEHAVIOUR**
DEFINED AS
"The bssMapT20 is associated with time to receipt of CIRCUIT GROUP BLOCKING ACKNOWLEDGE (GSM 08.08).";

btsID

btsID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR btsIDBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 100};

btsIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names a bts object. Its value is an integral number, which must be unique within the superior btsSiteManager.";

btsSiteManagerID

btsSiteManagerID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR btsSiteManagerIDBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 110};

btsSiteManagerIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names a btsSiteManager object. Its value is an integral number, which must be unique within the superior bssFunction.";

callReestablishmentAllowed

callReestablishmentAllowed **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BooleanType;
MATCHES FOR EQUALITY ;
BEHAVIOUR callReestablishmentAllowedBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 120};

callReestablishmentAllowedBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute indicates whether call re-establishment is allowed in the cell. A value of TRUE means that it is allowed, a value of FALSE means not allowed.";

carrierFrequencyList

carrierFrequencyList **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.CarrierFrequencyList ;
MATCHES FOR EQUALITY;
BEHAVIOUR carrierFrequencyListBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 130} ;

carrierFrequencyListBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute is used to assign a set of (possibly one) constant radio frequencies to a radioCarrier object. In a fixed frequency or baseband hopping system, the set will contain only one single frequency. In case of a synthesizer hopping system, the set will contain all frequencies the carrier is allowed to use. This set of radio frequencies must be included in the allowed radio frequency values specified by the cellAllocation attribute of the containing bts object instance.";

cellAllocation

cellAllocation **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.CellAllocation ;
MATCHES FOR EQUALITY;
BEHAVIOUR cellAllocationBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 140};

cellAllocationBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute defines the set of radio frequencies allocated and available to a cell. The first element sets the BCCH frequency.";

cellBarred

cellBarred **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BooleanType;
MATCHES FOR EQUALITY ;
BEHAVIOUR cellBarredBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 160};

cellBarredBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute indicates whether Mobile Stations may camp on the cell. The value true indicates that the cell is barred and camping on the cell is forbidden. Refer to Specification GSM 05.08 (CELL_BAR_ACCESS).";

cellGlobalIdentity

cellGlobalIdentity **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.CellGlobalIdentity ;
MATCHES FOR EQUALITY;
BEHAVIOUR cellGlobalIdentityBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 170};

cellGlobalIdentityBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains the Cell Identification (CI) and the Location Area of the cell. A Location Area is unique within a GSM PLMN; a Cell Identification is unique within a location area. For further details see Specification GSM 03.03.";

cellReselectHysteresis

cellReselectHysteresis **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.CellReselectHysteresis ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR cellReselectHysteresisBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 180};

cellReselectHysteresisBehaviour **BEHAVIOUR**
DEFINED AS
"The cell-reselect-hysteresis attribute indicates the value of the receiver RF power level hysteresis required for cell reselection. Refer to Specification GSM 05.08.
This parameter has a range of 0 to 14 dB with a step size of 2 dB and is coded as an integer in the range 0 to 7 representing the number of the 2 dB steps.";

channelCombination

channelCombination **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ChannelCombination ;
MATCHES FOR EQUALITY ;
BEHAVIOUR channelCombinationBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 190};

channelCombinationBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute defines the logical channel combination mapped onto the physical channel (time slot). For details Refer to Specification GSM 05.02.
The following are the permitted ways, as defined by GSM 04.03, in which channels can be combined onto basic physical channels (numbers appearing in parenthesis after channel designations indicate sub-channel numbers; channels and sub-channels need not necessarily be assigned) :
i) TCH/F + FACCH/F + SACCH/F
ii) TCH/H(0,1) + FACCH/H(0,1) + SACCH/H(0,1)
iii) TCH/H(0,0) + FACCH/H(0,1) + SACCH/H(0,1) + TCH/H(1,1)
iv) FCCH + SCH + BCCH + CCCH
v) FCCH + SCH + BCCH + CCCH + SDCCH/4(0...3) + SACCH/C4(0...3)
vi) BCCH + CCCH
vii) SDCCH/8(0 ..7) + SACCH/C8(0 .. 7)
where CCCH = PCH + RACH + AGCH

Note 1: Where the SMSCB is supported, the CBCH replaces SDCCH number 2 in cases v) and vii) above.
Note 2: A combined CCCH/SDCCH allocation (case v) above) may only be used when no other CCCH channel is allocated.";

channelID

channelID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ChannelID;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR channelIDBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 200};

channelIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute is used for naming channel object instances, and corresponds to the channel's time slot number.";

channelModCompleteArg

channelModCompleteArg **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ChannelModCompleteArg;
MATCHES FOR EQUALITY ;
BEHAVIOUR channelModCompleteArgBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 202};

channelModCompleteArgBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute allows the storing of channelModComplete notification results in a log.";

dtxDownlink

dtxDownlink **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BooleanType;
MATCHES FOR EQUALITY ;
BEHAVIOUR dtxDownlinkBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 205} ;

dtxDownlinkBehaviour **BEHAVIOUR**
DEFINED AS
"Availability of downlink DTX is an implementation option. Its availability in a system is indicated by this attribute. If available, use of the downlink DTX is controlled by the MSC (see GSM 04.08). The boolean values of the dtxDownlink attribute are as follows:
true = downlink DTX is available in the BTS
false = downlink DTX is not available in the BTS";

dtxUplink

dtxUplink **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.DtxUplink ;
MATCHES FOR EQUALITY ;
BEHAVIOUR dtxUplinkBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 210} ;

dtxUplinkBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute specifies the Discontinuous Transmission (DTX) mode to be used by the Mobile Stations. The implementation of DTX for the uplink is compulsory in the Mobile Station and the Base Station System. However, its actual use is under control of the operator. GSM 04.08 allows for three availability options to be broadcast to the MS. The information as to whether a MS can use uplink DTX is transmitted in the Cell Options of the SYSINFO3 message. The alternatives are the following:
- Uplink DTX is on in the BTS and usage is under the control of the MS
(MS may use DTX)
- Uplink DTX is on in the BTS and all MSs must use it.
(MS shall use DTX)
- Uplink DTX is off in the BTS.
(MS shall not use DTX)";

emergencyCallRestricted

emergencyCallRestricted **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BooleanType;
MATCHES FOR EQUALITY ;
BEHAVIOUR emergencyCallRestrictedBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 215} ;

emergencyCallRestrictedBehaviour **BEHAVIOUR**
DEFINED AS
"The attribute determines whether emergency calls are allowed to all MSs or restricted to MSs belonging to access classes in the range 11 to 15. The value true indicates that emergency calls are restricted.
The special access class ten (10) is used to carry the value on the Air Interface. See Specification 04.08.";

enableInternalInterCellHandover

enableInternalInterCellHandover **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BooleanType;
MATCHES FOR EQUALITY ;
BEHAVIOUR enableInternalInterCellHandoverBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 220} ;

enableInternalInterCellHandoverBehaviour **BEHAVIOUR**
DEFINED AS
"The attribute allows a managing system to enable or disable BSC controlled inter Cell Handovers. The attribute takes the following values:
TRUE - BSC controlled inter-cell handovers are allowed,
FALSE - BSC controlled inter-cell handovers are not allowed.";

enableInternalIntraCellHandover

enableInternalIntraCellHandover **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX **GSM1220TypeModule.BooleanType;**
MATCHES FOR EQUALITY ;
BEHAVIOUR enableInternalIntraCellHandoverBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 225} ;

enableInternalIntraCellHandoverBehaviour **BEHAVIOUR**
DEFINED AS
"The attribute allows a managing system to enable or disable BSC controlled intra Cell Handovers. The attribute takes the following values:
TRUE - BSC controlled intra-cell handovers are allowed,
FALSE - BSC controlled intra-cell handovers are not allowed.";

enableOptHandoverProcessing

enableOptHandoverProcessing **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.EnableOptHandoverProcessing;
MATCHES FOR EQUALITY ;
BEHAVIOUR enableOptHandoverProcessingBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 230} ;

enableOptHandoverProcessingBehaviour **BEHAVIOUR**
DEFINED AS
"The attribute specifies the allowed optional handover processing as specified in GSM 05.08 Annex A. The following handover processing options exist:
- power budget
- MS distance.";

frequencyHoppingSystemID

frequencyHoppingSystemID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY ;
BEHAVIOUR frequencyHoppingSystemIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 240} ;

frequencyHoppingSystemIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names a frequencyHoppingSystem instance.";

frequencyUsage

frequencyUsage **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.FrequencyUsage ;
MATCHES FOR EQUALITY ;
BEHAVIOUR frequencyUsageBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 250} ;

frequencyUsageBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute defines the frequencies used by a radio time slot. If no frequency hopping is used, the attribute contains an Absolute Radio Frequency Channel Number (ARFCN). If the channel is configured to BCCH usage, the BCCH frequency is set using the first value from the cellAllocation attribute in the btsBasicPackage and the frequencyUsage attribute value is ignored. If frequency hopping is used, the attribute contains a reference to a frequencyHoppingSystem instance plus the MAIO.";

gsmdcsIndicator

gsmdcsIndicator **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmdcsIndicator ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR gsmdcsIndicatorBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 255};

gsmdcsIndicatorBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute indicates the type (GSM or DCS 1800) of the cell. The value may be used to interpret or check other attribute values.";

handoverControlID

handoverControlID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY ;
BEHAVIOUR handoverControlIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 260};

handoverControlIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names an instance of the object class handoverControl.";

handoverReqParam

handoverReqParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.NoOfPrefCells;
MATCHES FOR EQUALITY;
BEHAVIOUR handoverReqParamBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 270};

handoverReqParamBehaviour **BEHAVIOUR**
DEFINED AS
"The handoverReqParam attribute defines the parameter 'n' used in generating the Handover Required message to the MSC. This parameter specifies the number of preferred target cells 'n' that are to be transferred in the handover required message.";

hoAveragingAdjCellParam

hoAveragingAdjCellParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.AveragingParam;
MATCHES FOR EQUALITY;
BEHAVIOUR hoAveragingAdjCellParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 280} ;

hoAveragingAdjCellParamBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains averaging parameters used for averaging signal level measurements from adjacent cells (GSM 05.08 - RXLEV_NCELL(n)).
- The number of SACCH multiframes over which results are averaged, i.e. the window size (Hreqave in GSM 05.08).
- The number of results sent in the 'handover required' message (Hreqt in GSM 05.08).
- Weighting";

hoAveragingDistParam

hoAveragingDistParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.HoAveragingDistParam;
MATCHES FOR EQUALITY ;
BEHAVIOUR hoAveragingDistParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 290} ;

hoAveragingDistParamBehaviour **BEHAVIOUR**
DEFINED AS
"The hoAveragingDistParam attribute contains averaging parameters used in the handover process, in case the handover cause is distance between the Mobile Station and the BTS. See Specification GSM 05.08.
- The number of SACCH multiframes over which results are averaged, i.e. the window size (Hreqave).
- The number of results sent in the 'handover required' message (Hreqt). ";

hoAveragingLevParam

hoAveragingLevParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.AveragingParam;
MATCHES FOR EQUALITY ;
BEHAVIOUR hoAveragingLevParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 300} ;

hoAveragingLevParamBehaviour **BEHAVIOUR**
DEFINED AS
"The hoAveragingLevParam attribute contains averaging parameters for the signal strength measurements.
- The number of SACCH multiframes over which results are averaged, i.e. the window size (Hreqave in GSM 05.08).
- The number of results sent in the 'handover required' message (Hreqt in GSM 05.08).
- Weighting";

hoAveragingQualParam

hoAveragingQualParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.AveragingParam;
MATCHES FOR EQUALITY ;
BEHAVIOUR hoAveragingQualParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 310} ;

hoAveragingQualParamBehaviour **BEHAVIOUR**
DEFINED AS
"The hoAveragingQualParam attribute contains averaging parameters for the signal quality measurements.
- The number of SACCH multiframes over which results are averaged, i.e. the window size (Hreqave in GSM 05.08).
- The number of results sent in the 'handover required' message (Hreqt in GSM 05.08).
- Weighting";

hoMargin

hoMargin **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.HoMargin;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR hoMarginBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 320};

hoMarginBehaviour **BEHAVIOUR**
DEFINED AS
"The value of this attribute is used as a threshold to prevent repetitive hand-over between adjacent cells, in case the handover is caused by received signal level or the power budget process. Refer to Annex A of Specification GSM 05.08 (HO_MARGIN (n)).";

hoMarginDef

hoMarginDef **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.HoMargin;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR hoMarginDefBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 330};

hoMarginDefBehaviour **BEHAVIOUR**
DEFINED AS
"The hoMarginDef attribute holds the default value of hoMargin. It is used to evaluate handover to undefined cells. Refer to Annex A of Specification GSM 05.08 (HO_MARGIN_DEF).";

hoMsmtProcessingMode

hoMsmtProcessingMode **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.MsmtProcessingMode;
MATCHES FOR EQUALITY;
BEHAVIOUR hoMsmtProcessingModeAttributeBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 335} ;

hoMsmtProcessingModeAttributeBehaviour **BEHAVIOUR**
DEFINED AS
"The radio link measurements for the handover control algorithm may be transferred in their natural form to the BSC or the results of processing and threshold comparisons may be transferred. This attribute provides an indication of the mode of operation which is currently active in the BTS instance. The default value is all processing in the BSC. Modification of the attribute value will cause the BSC to send a PREPROCESS CONFIGURE message to the BTS. Ref.: 08.58, Measurement Reporting.";

hoppingSequenceNumber

hoppingSequenceNumber **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.HoppingSequenceNumber ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR hoppingSequenceNumberBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 340};

hoppingSequenceNumberBehaviour **BEHAVIOUR**
DEFINED AS
"The Hopping Sequence Number (HSN) determines the order in which the allocated frequencies are used. Refer to Specification GSM 05.02.";

hoPriorityLevel

hoPriorityLevel **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.HoPriorityLevel ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR hoPriorityLevelBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 350};

hoPriorityLevelBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute defines the handover priority level for an adjacent cell used for target cell evaluation in the handover control process. Eight distinct priority levels exist.";

hoThresholdDistParam

hoThresholdDistParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.HoThresholdDistParam;
MATCHES FOR EQUALITY ;
BEHAVIOUR hoThresholdDistParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 360} ;

hoThresholdDistParamBehaviour **BEHAVIOUR**
DEFINED AS
"The hoThresholdDistParam attribute contains parameters used in the handover process, in case the handover cause is distance between the Mobile Station and the BTS. See Specification GSM 05.08.
- The number of distance measurements that have to be taken into account, when making a handover decision, reason distance overflow (N8).
- The number of distances (out of total measurements) that have to be greater than the maximum distance, before making a handover decision (P8).
- The maximum timing advance (or distance) between the BTS and the MS which can be expressed in units of timing advance or km.
Refer to Specification GSM 05.08 (MS_RANGE_MAX).";

hoThresholdInterferenceParam

hoThresholdInterferenceParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ThresholdLev;
MATCHES FOR EQUALITY ;
BEHAVIOUR hoThresholdInterferenceParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 370} ;

hoThresholdInterferenceParamBehaviour **BEHAVIOUR**
DEFINED AS
"The hoThresholdInterferenceParam attribute contains parameters for comparing the averaged uplink and downlink interference measurements. See Specification GSM 05.08.
- Threshold level for handover, reason interference (RXLEV_UL_IH).
- Threshold level for handover, reason interference (RXLEV_DL_IH).
- The number of averages that have to be taken into account, when making a handover decision (N7).
- The number of averages (out of total averages) that have to be higher/lower than the threshold, before making a handover decision (P7).";

hoThresholdLevParam

hoThresholdLevParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ThresholdLev;
MATCHES FOR EQUALITY ;
BEHAVIOUR hoThresholdLevParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 380} ;

hoThresholdLevParamBehaviour **BEHAVIOUR**
DEFINED AS
"The hoThresholdLevParam attribute contains parameters for comparing averaged uplink and downlink signal strength measurements. See Specification GSM 05.08.
- Threshold level for handover, reason uplink signal strength (L_RXLEV_UL_H).

- Threshold level for handover, reason downlink signal strength (L_RXLEV_DL_H).
- The number of averages that have to be taken into account, when making a handover decision (N5).
- The number of averages (out of total averages) that have to be upper/lower than the threshold, before making a handover decision (P5).";

hoThresholdQualParam

hoThresholdQualParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ThresholdQual;
MATCHES FOR EQUALITY ;
BEHAVIOUR hoThresholdQualParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 390} ;

hoThresholdQualParamBehaviour **BEHAVIOUR**
DEFINED AS
"The hoThresholdQualParam attribute contains parameters for comparing averaged uplink and downlink signal quality measurements. See Specification GSM 05.08.
- Threshold level for handover, reason uplink signal quality (L_RXQUAL_UL_H).
- Threshold level for handover, reason downlink signal quality (L_RXQUAL_DL_H).
- The number of averages that have to be taken into account, when making a handover decision (N6).
- The number of averages (out of total averages) that have to be upper/lower than the threshold, before making a handover decision (P6).";

interferenceAveragingParam

interferenceAveragingParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.InterferenceAveragingParam;
MATCHES FOR EQUALITY ;
BEHAVIOUR interferenceAveragingParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 400} ;

interferenceAveragingParamBehaviour **BEHAVIOUR**
DEFINED AS
"The interferenceAveragingParam attribute contains parameters used in averaging interference levels in the unallocated time slots. See Specification GSM 05.08 for details.
- The number of SACCH multiframes over which the values are averaged (INTAVE).
- Boundary limits of five interference bands for the unallocated time slots. Refer to Specification GSM 05.08 (O-X5). The BSS shall map the averaged interference level measurements into these five bands. The range of each boundary is -110...-47 dBm. ";

lapdLinkID

lapdLinkID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY ;
BEHAVIOUR lapdLinkIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 410};

lapdLinkIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names a lapdLink object instance. Apart from providing a unique identifier, the value does not have any other specific semantics.";

maxNumberRetransmission

maxNumberRetransmission **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.MaxRetrans;
MATCHES FOR EQUALITY ;
BEHAVIOUR maxNumberRetransmissionBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 420};

maxNumberRetransmissionBehaviour **BEHAVIOUR**
DEFINED AS
"The value of the attribute is the maximum number of retransmissions a MS may perform on the RACH. The possible values are 1, 2, 4 and 7. Refer to Specification GSM 05.08 (MAX_RETRAN).";

maxQueueLength

maxQueueLength **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.MaxQueueLength;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR maxQueueLengthBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 430};

maxQueueLengthBehaviour **BEHAVIOUR**
DEFINED AS
"The attribute specifies the maximum length of queues in the BTS. The queue elements are call and handover attempts waiting for a TCH to be released in that BTS; the value is a percentage of the total number of working TCHs in the BTS.
- value 0: no queuing used.
- value 100: maximum queue length is equal to the total number of enabled TCHs.";

mobileAllocation

mobileAllocation **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.MobileAllocation ;
MATCHES FOR EQUALITY;
BEHAVIOUR mobileAllocationBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 440} ;

mobileAllocationBehaviour **BEHAVIOUR**
DEFINED AS
"The attribute mobileAllocation specifies the set of radio frequencies (ARFCNs) allocated to all channels that belong to the frequencyHoppingSystem instance that contains the attribute. This set of radio frequencies must be included in the allowed radio frequency values specified by the cellAllocation attribute of the containing bts object instance.";

msmtProcParamLoc

msmtProcParamLoc **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.MsmtProcessingMode;
MATCHES FOR EQUALITY;
BEHAVIOUR msmtProcParamLocBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 450};

msmtProcParamLocBehaviour **BEHAVIOUR**
DEFINED AS
"Radio link measurements for use by the power control and handover algorithms are transferred to the BSC in their natural state or, optionally, they can be processed by the BTS with results being transferred. This attribute is contained in handover and power control objects along with parameters that control the algorithm processing. Different sets of parameters may be used for BSC and BTS processing. This indicator is used to determine to which processing mode the specific instance of the parameters apply.";

msPriorityUsedInQueuing

msPriorityUsedInQueuing **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BooleanType;
MATCHES FOR EQUALITY ;
BEHAVIOUR msPriorityUsedInQueuingBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 460};

msPriorityUsedInQueuingBehaviour BEHAVIOUR
DEFINED AS
"This attribute specifies whether call priority in ASSIGNMENT REQUEST message (or HANDOVER REQUEST message in ho) from MSC is taken into account in queue handling.";

mSTxPwrMaxCCH

mSTxPwrMaxCCH **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TxPower;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR mSTxPwrMaxCCHBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 475} ;

mSTxPwrMaxCCHBehaviour **BEHAVIOUR**
DEFINED AS
"The mSTxPwrMaxCCH attribute is used to indicate the maximum transmit power level a MS may use when accessing the cell until commanded otherwise. See Specification GSM 05.08 (MS_TXPWR_MAX_CCH). This parameter is also used in order to evaluate the path loss criterion parameter (C1) of a cell. See Specification GSM 05.08.";

msTxPwrMaxCell

msTxPwrMaxCell **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TxPower;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR msTxPwrMaxCellBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 480} ;

msTxPwrMaxCellBehaviour **BEHAVIOUR**
DEFINED AS
"The msTxPwrMaxCell attribute is used to indicate the maximum power level a MS may use in an adjacent cell. See Table 1 of Annex A of Specification GSM 05.08 (MS_TXPWR_MAX (n))."";

msTxPwrMaxCellDef

msTxPwrMaxCellDef **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TxPower;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR msTxPwrMaxCellDefBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 490} ;

msTxPwrMaxCellDefBehaviour **BEHAVIOUR**
DEFINED AS
"The msTxPwrMaxCell attribute is used to indicate the maximum power level a MS may use in an adjacent cell. The msTxPwrMaxCellDef attribute is used to evaluate handover to undefined adjacent cells. See Table 1 of Annex A of Specification GSM 05.08 (MS_TXPWR_MAX (n))."";

noOfBlocksForAccessGrant

noOfBlocksForAccessGrant **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.NoOfBlocksForAccessGrant;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR noOfBlocksForAccessGrantBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 500};

noOfBlocksForAccessGrantBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute specifies the number of TDMA frames reserved for the Access Grant channel during a period of 51 TDMA frames (a multiframe). For details refer to Specification GSM 05.02.";

noOfMultiframesBetweenPaging

noOfMultiframesBetweenPaging **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.NoOfMultiframesBetweenPaging;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR noOfMultiframesBetweenPagingBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 510};

noOfMultiframesBetweenPagingBehaviour **BEHAVIOUR**
DEFINED AS
"This value denotes the number of multiframes (51 frames) between two transmissions of the same paging message to mobiles of the same paging group.";

notAllowedAccessClasses

notAllowedAccessClasses **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.AccessControlClassSet;
MATCHES FOR EQUALITY ;
BEHAVIOUR notAllowedAccessClassesBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 520};

notAllowedAccessClassesBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains a list of MS Access Classes, which are not allowed to access the cell. It should be noted that the access class number ten (10) does not exist as a normal access class; it is used to restrict emergency calls (see also attribute emergencyCallRestricted). For further details refer to Specification 04.08.";

numberOfSlotsSpreadTrans

numberOfSlotsSpreadTrans **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TxInteger;
MATCHES FOR EQUALITY ;
BEHAVIOUR numberOfSlotsSpreadTransBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 530};

numberOfSlotsSpreadTransBehaviour **BEHAVIOUR**
DEFINED AS
"The numberOfSlotsSpreadTrans attribute (TX Integer) is used to represent the maximum number of RACH slots a MS must wait, after an unsuccessful random access attempt, before a new random access. The MS draws a random number between 0 and the value of this parameter, in order to decide when to start the new access. Hence this parameter allows the access retransmissions be spread over a fixed number of RACH slots.
The value is coded as an integer in the range 0 to 15; the corresponding numbers of slots used to spread transmission (3 to 50) is indicated in Specification GSM 04.08.";

ny1

ny1 **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.Ny1 ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR ny1Behaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 540} ;

ny1Behaviour **BEHAVIOUR**
DEFINED AS
"The ny1 attribute indicates the maximum number of repetitions of the PHYSICAL INFORMATION message on the radio interface (GSM 04.08). This message is sent by the BTS to the MS during a handover procedure between two not synchronized cells, in order to establish a physical channel connection on the new cell.";

pcAveragingLev

pcAveragingLev **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.AveragingParam;
MATCHES FOR EQUALITY ;
BEHAVIOUR pcAveragingLevBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 550} ;

pcAveragingLevBehaviour **BEHAVIOUR**
DEFINED AS
"The pcAveragingLev attribute contains averaging parameters for the signal strength measurements. The values are used in the power control process.
- The number of SACCH multiframes over which results are averaged, i.e. the window size (Hreqave in GSM 05.08).
- The number of results sent in the 'handover required' message (Hreqt in GSM 05.08).
- Weighting";

pcAveragingQual

pcAveragingQual **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.AveragingParam;
MATCHES FOR EQUALITY ;
BEHAVIOUR pcAveragingQualBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 560} ;

pcAveragingQualBehaviour **BEHAVIOUR**
DEFINED AS
"The pcAveragingQual attribute contains averaging parameters for the signal quality measurements. The values are used in the power control process.
- The number of SACCH multiframes over which results are averaged, i.e. the window size (Hreqave in GSM 05.08).
- The number of results sent in the 'handover required' message (Hreqt in GSM 05.08).
- Weighting";

pcLowerThresholdLevParam

pcLowerThresholdLevParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ThresholdLev;
MATCHES FOR EQUALITY ;
BEHAVIOUR pcLowerThresholdLevParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 570} ;

pcLowerThresholdLevParamBehaviour **BEHAVIOUR**
DEFINED AS
"The pcLowerThresholdLevParam attribute contains the lower thresholds for the uplink and downlink signal strength. The values are used in the power control process. See Specification GSM 05.08.
- Threshold level for uplink power increase (L_RXLEV_UL_P).
- Threshold level for downlink power increase (L_RXLEV_DL_P).
- The total number of averages that have to be taken into account before power increase decision (N1).
- The number of averages (out of total averages) that have to be lower than the threshold, before making a power increase decision (P1).";

pcLowerThresholdQualParam

pcLowerThresholdQualParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ThresholdQual;
MATCHES FOR EQUALITY ;
BEHAVIOUR pcLowerThresholdQualParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 580} ;

pcLowerThresholdQualParamBehaviour **BEHAVIOUR**
DEFINED AS
"The pcLowerThresholdQualParam attribute contains the lower thresholds for the uplink and downlink signal quality. The values are used in the power control process. See Specification GSM 05.08.
- Threshold level for uplink power increase (L_RXQUAL_UL_P).
- Threshold level for downlink power increase (L_RXQUAL_DL_P).
- The total number of averages that have to be taken into account before power increase decision (N3).
- The number of averages (out of total averages) that have to be lower than the threshold, before making a power increase decision (P3).";

pcmCircuitID

pcmCircuitID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.PCMCircuitID;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR pcmCircuitIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 590};

pcmCircuitIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names a 2 Mbps PCM circuit and is referenced by lapdLink objects.";

pcMsmtProcessingMode

pcMsmtProcessingMode **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.MsmtProcessingMode;
MATCHES FOR EQUALITY;
BEHAVIOUR pcMsmtProcessingModeAttributeBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 595} ;

pcMsmtProcessingModeAttributeBehaviour **BEHAVIOUR**
DEFINED AS
"The radio link measurements for the power control algorithm are collected by the BTS. These may then be transferred in their natural form to the BSC for processing or processing and threshold comparisons may be done in the BTS. This attribute provides an indication of the mode of operation which is currently active in the BTS instance. The default value is all processing in the BSC. Modification of the attribute value will cause the BSC to send a PREPROCESS CONFIGURE message to the BTS. Ref.: 08.58, Measurement Reporting. It should be noted that, if the BTS supports BS power control algorithm and measurement processing but the BSC does not, switching the processing to take place in the BSC will cause the loss of BS power control since processing for both BS and MS power control algorithms are assumed to be done in the same place.";

pcUpperThresholdLevParam

pcUpperThresholdLevParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ThresholdLev;
MATCHES FOR EQUALITY ;
BEHAVIOUR pcUpperThresholdLevParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 600} ;

pcUpperThresholdLevParamBehaviour **BEHAVIOUR**
DEFINED AS
"The pcUpperThresholdLevParam attribute contains the upper thresholds for the uplink and downlink signal strength. The values are used in the power control process. See Specification GSM 05.08.
- Threshold level for uplink power reduction (U_RXLEV_UL_P).
- Threshold level for downlink power reduction (U_RXLEV_DL_P).
- The total number of averages that have to be taken into account before power reduction decision (N2).
- The number of averages (out of total averages) that have to be lower than the threshold, before making a power reduction decision (P2).";

pcUpperThresholdQualParam

pcUpperThresholdQualParam **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ThresholdQual;
MATCHES FOR EQUALITY ;
BEHAVIOUR pcUpperThresholdQualParamBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 610} ;

pcUpperThresholdQualParamBehaviour **BEHAVIOUR**
DEFINED AS
"The pcUpperThresholdQualParam attribute contains the upper thresholds for the uplink and downlink signal quality. The values are used in the power control process. See Specification GSM 05.08.
- Threshold level for uplink power reduction (U_RXQUAL_UL_P).
- Threshold level for downlink power reduction (U_RXQUAL_DL_P).
- The total number of averages that have to be taken into account before power reduction decision (N4).
- The number of averages (out of total averages) that have to be lower than the threshold, before making a power reduction decision (P4).";

periodCCCHLoadIndication

periodCCCHLoadIndication **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule. PeriodCCCHLoadIndication ;
MATCHES FOR EQUALITY ;
BEHAVIOUR periodCCCHLoadIndicationBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 620} ;

periodCCCHLoadIndicationBehaviour **BEHAVIOUR**
DEFINED AS
"This value indicates the frequency with which the CCCH load indication is sent to the BSC. Refer to GSM 08.58, 'CCCH LOAD INDICATION'";

plmnPermitted

plmnPermitted **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.PlmnPermitted;
MATCHES FOR EQUALITY ;
BEHAVIOUR plmnPermittedBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 630};

plmnPermittedBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains the values of the Network Colour Code (NCC) for an accessing MS. Refer to Specification GSM 05.08 (NCC_PERMITTED).";

powerClass

powerClass **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.PowerClass ;
MATCHES FOR EQUALITY ;
BEHAVIOUR powerClassBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 640};

powerClassBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute indicates the power class (max peak power) of the transmitter. For further details refer to Specification GSM 05.05.";

powerControlID

powerControlID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY ;
BEHAVIOUR powerControlIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 650};

powerControlIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names an instance of the class powerControl.";

powerControlInterval

powerControlInterval **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.PowerControlInterval;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR powerControlIntervalBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 660} ;

powerControlIntervalBehaviour **BEHAVIOUR**
DEFINED AS
"The powerControlInterval attribute contains the minimum interval between successive modifications of the RF power level. Refer to the Specification GSM 05.08 (P_Con_INTERVAL). The range is 0...30 seconds and the step size 0.96 seconds.";

powerIncrStepSize

powerIncrStepSize **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.PowerIncrStepSize;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR powerIncrStepSizeBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 670} ;

powerIncrStepSizeBehaviour **BEHAVIOUR**
DEFINED AS
"The powerIncrStepSize attribute defines the step size used when increasing the MS transmit power. The step size is 2, 4 or 6 dB. Refer to Specification GSM 05.08 (Pow_Incr_Step_Size).";

powerRedStepSize

powerRedStepSize **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.PowerRedStepSize;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR powerRedStepSizeBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 680} ;

powerRedStepSizeBehaviour **BEHAVIOUR**
DEFINED AS
"The powerRedStepSize attribute defines the step size used when reducing the MS transmit power. The step size is 2 or 4 dB. Refer to Specification GSM 05.08 (Pow_Red_Step_Size).";

rACHBusyThreshold

rACHBusyThreshold **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RxLev ;
MATCHES FOR EQUALITY;
BEHAVIOUR rACHBusyThresholdBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 690} ;

rACHBusyThresholdBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute defines a threshold for the received signal level during the RACH bursts. A signal level exceeding this threshold is interpreted as a busy RACH. Refer to Specifications GSM 08.58, RACH Load.";

rACHLoadAveragingSlots

rACHLoadAveragingSlots **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RachLoadAveragingSlots ;
MATCHES FOR EQUALITY;
BEHAVIOUR rACHLoadAveragingSlotsBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 700} ;

rACHLoadAveragingSlotsBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute defines the number of RACH bursts over which RACH measurements are performed. Refer to Specifications GSM 08.58 RACH Load.";

radioCarrierID

radioCarrierID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR radioCarrierIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 710};

radioCarrierIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names a radioCarrier instance.";

radioLinkTimeout

radioLinkTimeout **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RadioLinkTimeout;
MATCHES FOR EQUALITY ;
BEHAVIOUR radioLinkTimeoutBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 720} ;

radioLinkTimeoutBehaviour **BEHAVIOUR**
DEFINED AS
"The radioLinkTimeout attribute is used to indicate the maximum value of the radio link counter needed to detect a radio link failure. This value is used by the MS procedure and may also be used for the BSS procedure. See Specification GSM 05.08 for more information. This attribute corresponds to the radio sub-system link control parameter RADIO_LINK_TIMEOUT.
The radio-link-time-out parameter has a range from 4 to 64 SACCH blocks with a step size of 4 SACCH blocks.";

relatedRadioCarrier

relatedRadioCarrier **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObject;
MATCHES FOR EQUALITY ;
BEHAVIOUR relatedRadioCarrierBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 730};

relatedRadioCarrierBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies the instance of a radioCarrier object which represents the RF aspects related to a basebandTransceiver, if any. This attribute will take the value 'NULL' when the basebandTransceiver object instance has no direct relationship with any one radioCarrier object instance (i.e. the timeslots handled by a basebandTransceiver are possibly spread over several radioCarrier object instances). ";

relatedOAMLapdLink

relatedOAMLapdLink **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObject;
MATCHES FOR EQUALITY ;
BEHAVIOUR relatedOAMLapdLinkBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 740};

relatedOAMLapdLinkBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies the instance of a lapdLink object which represents the logical connectivity between the manager functionality (BSC) and an agent (BTS, TRX, ...) functionality for the purposes of sending management messages and receiving management information and responses. The lapdLink object maps the logical connectivity on to some physical connection. Different instances of this attribute in various objects may all point to the same or separate physical connections. ";

relatedTelecomLapdLink

relatedTelecomLapdLink **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObject;
MATCHES FOR EQUALITY ;
BEHAVIOUR relatedTelecomLapdLinkBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 750};

relatedTelecomLapdLinkBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies the instance of a lapdLink object which represents the logical connectivity for telecom signaling. ";

relatedTranscoder

relatedTranscoder **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObjectList;
MATCHES FOR EQUALITY ;
BEHAVIOUR relatedTranscoderBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 760};

relatedTranscoderBehaviour **BEHAVIOUR**
DEFINED AS
"The relatedTranscoder indicates the instance(s) of the transcoder object (if any) that are related to a bts for purposes of TRAU O&M messages as specified in GSM 08.60 and GSM 12.21.";

rxLevAccessMin

rxLevAccessMin **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RxLev ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR rxLevAccessMinBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 770};

rxLevAccessMinBehaviour **BEHAVIOUR**
DEFINED AS
"The rxLevAccessMin attribute is used to indicate the minimum receive level at the MS required for access to the system. See Specification GSM 05.08 (RXLEV_ACCESS_MIN). This parameter is used in order to evaluate the path loss criterion parameter (C1) of a cell (GSM 05.08). The value is an integer in the range 0 to 63 (GSM 05.08).";

rxLevMinCell

rxLevMinCell **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RxLev;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR rxLevMinCellBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 780};

rxLevMinCellBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute holds the minimum received signal strength in a cell, for a MS to be handed over to that cell. See Annex A of Specification GSM 05.08 (RXLEV_MIN (n)). This is an attribute of the object class adjacentCellHandOverGSM0508; each adjacent cell may thus have a specific value.";

rxLevMinCellDef

rxLevMinCellDef **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RxLev;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR rxLevMinCellDefBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 790};

rxLevMinCellDefBehaviour **BEHAVIOUR**
DEFINED AS
"The rxLevMinCellDef attribute holds the default value of rxLevMinCell. It is used to evaluate handover to undefined cells. See Annex A of Specification GSM 05.08 (RXLEV_MIN_DEF).";

sapi

sapi **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.SAPI ;
MATCHES FOR EQUALITY ;
BEHAVIOUR sapiBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 800};

sapiBehaviour **BEHAVIOUR**
DEFINED AS
"The sapi attribute contains the Service Access Point Identifier corresponding to the lapdLink object. See Specifications GSM 08.58 and CCITT Q.921.";

synchronized

synchronized **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.BooleanType;
MATCHES FOR EQUALITY;
BEHAVIOUR synchronizedBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 810} ;

synchronizedBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute of the object class adjacentCellHandOver indicates whether the adjacent cell is synchronized with the origin cell. Refer to Specification GSM 05.08 (N_CELL_LIST).";

t200

t200 **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.T200 ;
MATCHES FOR EQUALITY;
BEHAVIOUR t200Behaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 820};

t200Behaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains values for the LapDm timer T200, to be used on the different control channels. See Specification GSM 04.06.";

t31xx

t31xx **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.T31xxTimers ;
MATCHES FOR EQUALITY;
BEHAVIOUR t31xxBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 830};

t31xxBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains the values of the set of timers used on the air interface. See Specification GSM 04.08 for more details.";

tei

tei **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TEI ;
MATCHES FOR EQUALITY ;
BEHAVIOUR teiBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 840};

teiBehaviour **BEHAVIOUR**
DEFINED AS
"The tei attribute contains the Terminal Endpoint Identifier corresponding to the lapdLink object. See Specifications GSM 08.58 and CCITT Q.921.";

terrTrafChannel

terrTrafChannel **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TerrTrafChannel;
MATCHES FOR EQUALITY ;
BEHAVIOUR terrTrafChannelBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 850} ;

terrTrafChannelBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute associates a radio time slot (channel MOC) with a terrestrial channel of the Abis interface. Depending on the logical channels (TCH/F or TCH/H) mapped onto the radio time slot, one or two terrestrial channels are needed. In case of half rate channels, the first TerrTrafChannel element is associated with TCH/H(0). See Specification GSM 08.58.
A radio time slot needs to be associated with a terrestrial channel only if it carries traffic channel(s). Information on the various control channels is transferred on the Abis using the LapD signaling link of the basebandTransceiver. See definition of the object classes lapdLink and basebandTransceiver.";

thresholdCCCHLoadIndication

thresholdCCCHLoadIndication **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.ThresholdCCCHLoadIndication ;
MATCHES FOR EQUALITY ;
BEHAVIOUR thresholdCCCHLoadIndicationBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 860} ;

thresholdCCCHLoadIndicationBehaviour **BEHAVIOUR**
DEFINED AS
"This value is a threshold used by the BTS to inform the BSC on the load of CCCH. Refer to GSM 08.58, 'CCCH LOAD INDICATION'";

timeLimitCall

timeLimitCall **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.QueueTimeLimit ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR timeLimitCallBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 870};

timeLimitCallBehaviour **BEHAVIOUR**
DEFINED AS
"This is the maximum time a call attempt may wait for a traffic channel to be available (GSM 08.08 T11). The unit of measure is seconds. The value zero indicates that no call queuing is used in the BTS.";

timeLimitHandover

timeLimitHandover **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.QueueTimeLimit ;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR timeLimitHandoverBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 880};

timeLimitHandoverBehaviour **BEHAVIOUR**
DEFINED AS
"This is the maximum time a handover attempt may wait for a traffic channel to be available (GSM 08.08 Tqho). The unit of measure is seconds. The value zero indicates that no handover queuing is used in the BTS.";

timerPeriodicUpdateMS

timerPeriodicUpdateMS **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TimerPeriodicUpdateMS;
MATCHES FOR EQUALITY, ORDERING ;
BEHAVIOUR timerPeriodicUpdateMSBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 890};

timerPeriodicUpdateMSBehaviour **BEHAVIOUR**
DEFINED AS
"This specifies the interval for the MS periodic location updates. The interval is measured in decihours; the range is 0 to 255 decihours (25.5 hours). The value zero indicates that the MS should not perform any periodic location updates.";

transcoderID

transcoderID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY ;
BEHAVIOUR transcoderIDBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 900};

transcoderIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names an instance of a transcoder";

transcoderMatrix

transcoderMatrix **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TranscoderMatrix ;
MATCHES FOR EQUALITY ;
BEHAVIOUR transcoderMatrixAttributeBehaviour ;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 910} ;

transcoderMatrixAttributeBehaviour **BEHAVIOUR**
DEFINED AS
"The attribute transcoderMatrix which is used to define the mapping between the 64 kbps A-law PCM in the terrestrial network to the 13 kbps format used on the air interface. The attribute consists of a set of one or more elements, each identifying an air time slot and a corresponding land time slot.";

tsc

tsc **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.Tsc;
MATCHES FOR EQUALITY ;
BEHAVIOUR tscBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 920};

tscBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute contains the Training Sequence Code (TSC) of a radio channel. For control channels, TSC is always equal to the BCC (Base Station Colour Code). For other channels, there are no restrictions.";

txPwrMaxReduction

txPwrMaxReduction **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.TxPwrMaxReduction;
MATCHES FOR EQUALITY ;
BEHAVIOUR txPwrMaxReductionBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 930};

txPwrMaxReductionBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute specifies the number of 2 dB steps the TX should be reduced from the maximum transmit power, for tuning the cell coverage. The resulting attenuated transmit power is the maximum nominal power Pn. See Specifications GSM 05.05, GSM 05.08, and 08.58.";

11.2 General attributes

This clause defines the attributes and their behaviours that are defined for objects that may be of general use.

administrativeState

The semantics of the administrativeState attribute type are specified in Recommendation X.731 and the syntax is defined in Recommendation X.721.

alarmStatus

The semantics and syntax of the alarmStatus attribute type are specified in Recommendation M.3100.

availabilityStatus

The semantics of the availabilityStatus attribute type are specified in Recommendation X.731 and the syntax is defined in Recommendation X.721.

backupESU

backupESU **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObject;
MATCHES FOR EQUALITY ;
BEHAVIOUR backupESUBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 940};

backupESUBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies the instance of the executableSoftwareUnit object class that will be run (if any) in the case that the system supports automatic start or restart of software in the case of initialization or failure. In automatic start and restart the value of this attribute shall be copied into the runningESU attribute and the behaviour of that attribute shall be followed.";

controlStatus

The semantics of the controlStatus attribute type are specified in Recommendation X.731 and the syntax is defined in Recommendation X.721.

equipmentType

equipmentType **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.EquipmentType;
MATCHES FOR EQUALITY ;
BEHAVIOUR equipmentTypeBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 945} ;

equipmentTypeBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute is intended to allow various types of equipment to be distinguished without subclassing the gsmEquipment MOC.";

fallbackESU

fallbackESU **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObject;
MATCHES FOR EQUALITY ;
BEHAVIOUR fallbackESUBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 950};

fallbackESUBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies an instance of the executableSoftwareUnit object class that is available on the system for use in recovery from failures in the running software.";

newESU

newESU **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObject;
MATCHES FOR EQUALITY ;
BEHAVIOUR newESUBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 960};

newESUBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies an instance of the executableSoftwareUnit object class that is available on the system but that may be subject to verification before normal use.";

operatingSoftwareID

operatingSoftwareID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.GsmGeneralObjectID;
MATCHES FOR EQUALITY ;
BEHAVIOUR operatingSoftwareIDBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 970};

operatingSoftwareIDBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute names an instance of the class operatingSoftwareUnit.";

operationalState

The semantics of the operationalState attribute type is specified in Recommendation X.731. A specification of the syntax is found in Recommendation X.721.

relatedFiles

relatedFiles **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.FileList;
MATCHES FOR EQUALITY ;
BEHAVIOUR relatedFilesBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 980};

relatedFilesBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies files that may be related to an instance of this object for the purposes of download and/or local file identification. When this attribute is set, either explicitly or at create time, the files are processed as required by the agent system.";

relatedGSMEquipment

relatedGSMEquipment **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObjectList;
MATCHES FOR EQUALITY;
BEHAVIOUR relatedGSMEquipmentBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 990} ;

relatedGSMEquipmentBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute represents the relationship between the GSM functionality and the required equipment which supports that functionality.";

relatedGSMFunctionalObjects

relatedGSMFunctionalObjects **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObjectList;
MATCHES FOR EQUALITY;
BEHAVIOUR relatedGSMFunctionalObjectsBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 1000} ;

relatedGSMFunctionalObjectsBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute represents the relationship between the GSM equipment and the functions that are supported by it. When set to identify one or more functional object class instances, those instances shall generate equipment alarms when the resource represented by the instance containing this attribute fails.";

relatedRSUs

relatedRSUs **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObjectList;
MATCHES FOR EQUALITY ;
BEHAVIOUR relatedRSUsBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 1010};

relatedRSUsBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies instances of replaceableSoftwareUnit that are related to this object instance.";

runningESU

runningESU **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX GSM1220TypeModule.RelatedGSMObject;
MATCHES FOR EQUALITY ;
BEHAVIOUR runningESUBehaviour;
PARAMETERS standard1220SpecificErrorInfo;
REGISTERED AS {gsm1220attribute 1020};

runningESUBehaviour **BEHAVIOUR**
DEFINED AS
"This attribute identifies the instance of the executableSoftwareUnit object class that is currently running (subject to administrative state control and failure conditions) on the instance of the object that contains this object. Setting this attribute causes the identified instance of executableSoftwareUnit to be loaded into executable memory (if supported) and executed (even if the new and old values of the attribute are equal). If set to NULL, execution shall be stopped.";

unknownStatus

The semantics of the unknownStatus attribute type is specified in Recommendation X.731. A specification of the syntax is found in Recommendation X.721.

usageState

The semantics of the usageState attribute type is specified in Recommendation X.731. A specification of the syntax is found in Recommendation X.721.

12 Managed object class name binding definitions

12.1 BSS related name bindings

Root is a fictitious object class that represents the root of the containment tree. A name binding with root as the superior object class means that the object class specified as the subordinate object class is effectively the top of the containment sub-tree within the context of the management entity that supports this name binding.

adjacentCellHandOver-bts Name Binding

adjacentCellHandOver-bts **NAME BINDING**
SUBORDINATE OBJECT CLASS
adjacentCellHandOver **AND SUBCLASSES** ;
NAMED BY SUPERIOR OBJECT CLASS
bts;
WITH ATTRIBUTE
adjacentCellID;
BEHAVIOUR
adjacentCellHandOver-btsBehaviour ;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING standard1220CreateErrorInfo;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 10};

adjacentCellHandOver-btsBehaviour **BEHAVIOUR**
DEFINED AS
"The maximum number of instances of subclasses of adjacentCellHandOver in a BTS is 32. This name binding is provided to define name bindings for subclasses of the adjacentCellHandOver MOC."
;

adjacentCellReselection-bts Name Binding

adjacentCellReselection-bts **NAME BINDING**
SUBORDINATE OBJECT CLASS
adjacentCellReselection **AND SUBCLASSES** ;
NAMED BY SUPERIOR OBJECT CLASS
bts;
WITH ATTRIBUTE
adjacentCellID;
BEHAVIOUR
adjacentCellReselection-btsBehaviour ;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING standard1220CreateErrorInfo;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 20};

adjacentCellReselection-btsBehaviour **BEHAVIOUR**
DEFINED AS
"The maximum number of instances of adjacentCellReselection (and of its subclasses) in a BTS is 32."
;

basebandTransceiver-bts Name Binding

basebandTransceiver-bts **NAME BINDING**
SUBORDINATE OBJECT CLASS
basebandTransceiver;
NAMED BY SUPERIOR OBJECT CLASS
bts ;
WITH ATTRIBUTE
basebandTransceiverID ;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
DELETES-CONTAINED-OBJECTS standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 30} ;

bsc-bssFunction Name Binding

bsc-bssFunction **NAME BINDING**
SUBORDINATE OBJECT CLASS
bsc;
NAMED BY SUPERIOR OBJECT CLASS
bssFunction ;
WITH ATTRIBUTE
bscID ;
BEHAVIOUR
bsc-bssFunctionBehaviour ;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING standard1220CreateErrorInfo;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 40} ;

bsc-bssFunctionBehaviour **BEHAVIOUR**
DEFINED AS
"The maximum number of instances of bsc in a bssFunction is 1."
;

bssFunction-managedElement Name Binding

The name bindings for the bssFunction managed object class are specified in GSM 12.00 [24].

bts-btsSiteManager Name Binding

```
bts-btsSiteManager NAME BINDING
    SUBORDINATE OBJECT CLASS
        bts;
    NAMED BY SUPERIOR OBJECT CLASS
        btsSiteManager AND SUBCLASSES ;
    WITH ATTRIBUTE
        btsID;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        DELETES-CONTAINED-OBJECTS standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 50};
```

btsSiteManager-bssFunction Name Binding

```
btsSiteManager-bssFunction NAME BINDING
    SUBORDINATE OBJECT CLASS
        btsSiteManager AND SUBCLASSES ;
    NAMED BY SUPERIOR OBJECT CLASS
        bssFunction ;
    WITH ATTRIBUTE
        btsSiteManagerID ;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        DELETES-CONTAINED-OBJECTS standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 60};
```

channel-basebandTransceiver Name Binding

```
channel-basebandTransceiver NAME BINDING
    SUBORDINATE OBJECT CLASS
        channel;
    NAMED BY SUPERIOR OBJECT CLASS
        basebandTransceiver;
    WITH ATTRIBUTE
        channelID;
REGISTERED AS {gsm1220nameBinding 70};
```

channelModCompleteRecord Name Binding

The name bindings for the channelModCompleteRecord managed object class are specified by the name bindings for CCITT X.721 logRecord.

frequencyHoppingSystem-bts Name Binding

frequencyHoppingSystem-bts **NAME BINDING**
SUBORDINATE OBJECT CLASS
frequencyHoppingSystem;
NAMED BY SUPERIOR OBJECT CLASS
bts;
WITH ATTRIBUTE
frequencyHoppingSystemID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 80} ;

handoverControl-bts Name Binding

handoverControl-bts **NAME BINDING**
SUBORDINATE OBJECT CLASS
handoverControl **AND SUBCLASSES** ;
NAMED BY SUPERIOR OBJECT CLASS
bts;
WITH ATTRIBUTE
handoverControlID;
BEHAVIOUR
handoverControl-btsBehaviour ;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING standard1220CreateErrorInfo;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 90} ;

handoverControl-btsBehaviour **BEHAVIOUR**
DEFINED AS
"A bts contains, at most, two instances of subclasses of handoverControl."
;

lapdLink-bssFunction Name Binding

lapdLink-bssFunction **NAME BINDING**
SUBORDINATE OBJECT CLASS
lapdLink;
NAMED BY SUPERIOR OBJECT CLASS
bssFunction;
WITH ATTRIBUTE
lapdLinkID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 100} ;

pcmCircuit-bssFunction Name Binding

```
pcmCircuit-bssFunction NAME BINDING
    SUBORDINATE OBJECT CLASS
        pcmCircuit;
    NAMED BY SUPERIOR OBJECT CLASS
        bssFunction;
    WITH ATTRIBUTE
        pcmCircuitID ;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 110} ;
```

powerControl-bts Name Binding

```
powerControl-bts NAME BINDING
    SUBORDINATE OBJECT CLASS
        powerControl  AND SUBCLASSES ;
    NAMED BY SUPERIOR OBJECT CLASS
        bts AND SUBCLASSES ;
    WITH ATTRIBUTE
        powerControlID ;
     BEHAVIOUR
        powerControl-btsBehaviour ;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING standard1220CreateErrorInfo;
    DELETE
        standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 120};

powerControl-btsBehaviour BEHAVIOUR
    DEFINED AS
        "A bts contains, at most, two instances of subclasses of powerControl."
        ;
```

radioCarrier-bts Name Binding

```
radioCarrier-bts NAME BINDING
    SUBORDINATE OBJECT CLASS
        radioCarrier;
    NAMED BY SUPERIOR OBJECT CLASS
        bts ;
    WITH ATTRIBUTE
        radioCarrierID ;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        DELETES-CONTAINED-OBJECTS standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 130} ;
```

transcoder-bssFunction Name Binding

transcoder-bssFunction **NAME BINDING**
SUBORDINATE OBJECT CLASS
transcoder;
NAMED BY SUPERIOR OBJECT CLASS
bssFunction;
WITH ATTRIBUTE
transcoderID ;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 140} ;

12.2 General name bindings

This clause defines those name bindings that are needed in the information model of the BSS and/or for objects that are of general use in the management of a GSM PLMN and are not defined elsewhere.

executableSoftwareUnit-basebandTransceiver Name Binding

executableSoftwareUnit-basebandTransceiver **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
basebandTransceiver;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 150};

executableSoftwareUnit-bsc Name Binding

executableSoftwareUnit-bsc **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
bsc;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 160};

executableSoftwareUnit-bts Name Binding

executableSoftwareUnit-bts **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
bts;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 170};

executableSoftwareUnit-btsSiteManager Name Binding

executableSoftwareUnit-btsSiteManager **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
btsSiteManager;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 180};

executableSoftwareUnit-channel Name Binding

executableSoftwareUnit-channel **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
channel;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 190};

executableSoftwareUnit-equipment Name Binding

executableSoftwareUnit-equipment **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
"CCITT Rec. M.3100:1992": equipment **AND SUBCLASSES**;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 200};

executableSoftwareUnit-managedElement Name Binding

executableSoftwareUnit-managedElement **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
"CCITT Rec. M.3100:1992": managedElement **AND SUBCLASSES**;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 210};

executableSoftwareUnit-pcmCircuit Name Binding

executableSoftwareUnit-pcmCircuit **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
pcmCircuit;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 220};

executableSoftwareUnit-radioCarrier Name Binding

executableSoftwareUnit-radioCarrier **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
radioCarrier;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 230};

executableSoftwareUnit-transcoder Name Binding

executableSoftwareUnit-transcoder **NAME BINDING**
SUBORDINATE OBJECT CLASS
executableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
transcoder;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 240};

gsmEquipment-gsmEquipment Name Binding

The name bindings for the gsmEquipment managed object class are specified in the name bindings for CCITT M.3100 equipment.

gsmEquipment-managedElement Name Binding

The name bindings for the gsmEquipment managed object class are specified in the name bindings for CCITT M.3100 equipment.

operatingSoftwareUnit-basebandTransceiver Name Binding

operatingSoftwareUnit-basebandTransceiver **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
basebandTransceiver;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 250};

operatingSoftwareUnit-bsc Name Binding

operatingSoftwareUnit-bsc **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
bsc;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 260} ;

operatingSoftwareUnit-bts Name Binding

operatingSoftwareUnit-bts **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
bts;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 270};

operatingSoftwareUnit-btsSiteManager Name Binding

operatingSoftwareUnit-btsSiteManager **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
btsSiteManager;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 280};

operatingSoftwareUnit-channel Name Binding

operatingSoftwareUnit-channel **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
channel;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 290};

operatingSoftwareUnit-gsmEquipment Name Binding

operatingSoftwareUnit-gsmEquipment **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
gsmEquipment **AND SUBCLASSES**;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 300};

operatingSoftwareUnit-pcmCircuit Name Binding

operatingSoftwareUnit-pcmCircuit **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
pcmCircuit;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 310};

operatingSoftwareUnit-radioCarrier Name Binding

operatingSoftwareUnit-radioCarrier **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
radioCarrier;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 320};

operatingSoftwareUnit-transcoder Name Binding

operatingSoftwareUnit-transcoder **NAME BINDING**
SUBORDINATE OBJECT CLASS
operatingSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
transcoder;
WITH ATTRIBUTE
operatingSoftwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 330};

replaceableSoftwareUnit-gsmEquipment Name Binding

replaceableSoftwareUnit-gsmEquipment **NAME BINDING**
SUBORDINATE OBJECT CLASS
replaceableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
gsmEquipment **AND SUBCLASSES**;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
DELETES-CONTAINED-OBJECTS standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 340};

replaceableSoftwareUnit-managedElement Name Binding

replaceableSoftwareUnit-managedElement **NAME BINDING**
SUBORDINATE OBJECT CLASS
replaceableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
"CCITT Rec. M.3100:1992": managedElement **AND SUBCLASSES**;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
DELETES-CONTAINED-OBJECTS standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 350};

replaceableSoftwareUnit-replaceableSoftwareUnit Name Binding

replaceableSoftwareUnit-replaceableSoftwareUnit **NAME BINDING**
SUBORDINATE OBJECT CLASS
replaceableSoftwareUnit;
NAMED BY SUPERIOR OBJECT CLASS
replaceableSoftwareUnit;
WITH ATTRIBUTE
softwareID;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
DELETES-CONTAINED-OBJECTS standard1220DeleteErrorInfo;
REGISTERED AS {gsm1220nameBinding 360};

13 Abstract syntax definitions

This clause contains the ASN.1 module defining the attribute, action and notification syntaxes referenced by the attribute, action and notification templates.

The application context name of the GSM 12.20 application context shall have the following object identifier value:

{gsm-OM-DomainId gsm-12-20 protocolSupport (1) applicationContext (0) gsm-Management (0)}

and the following object descriptor value:

"GSM 12.20 management application context"

```
GSM1220TypeModule {ccitt (0) identified-organization (4) etsi (0) mobileDomain (0) gsm-Operation-Maintenance (3)
                        gsm-12-20 (20) informationModel (0) asn1Module (2) asn1TypeModule (0)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

    --
    IMPORTS
    AttributeId, ModifyOperator, ObjectClass, ObjectInstance
        FROM CMIP-1 {joint-iso-ccitt ms(9) cmip(1) modules(0) protocol(3)}
    AdministrativeState
        FROM Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2(2) asn1Module(2) 1}
    FileList
        FROM GSM1200BTypeModule {ccitt (0) identified-organization (4) etsi (0) mobileDomain (0)
        gsm-Operation-Maintenance (3)  gsm-12-00 (0) annexB (1) informationModel (0) asn1Module (2) version1 (1)};

    --
    -- Object Identifiers.
    --

    gsm1220Prefix      OBJECT IDENTIFIER ::= {ccitt(0) identified-organization (4) etsi (0) mobileDomain (0)
                                             gsm-Operation-Maintenance (3) gsm-12-20 (20)}

    -- Information Model Related Identifiers

    gsm1220informationModel         OBJECT IDENTIFIER ::= {gsm1220Prefix informationModel (0)}
    gsm1220objectClass              OBJECT IDENTIFIER ::= {gsm1220informationModel managedObjectClass (3)}
    gsm1220package                  OBJECT IDENTIFIER ::= {gsm1220informationModel package (4)}
    gsm1220parameter                OBJECT IDENTIFIER ::= {gsm1220informationModel parameter (5)}
    gsm1220nameBinding              OBJECT IDENTIFIER ::= {gsm1220informationModel nameBinding (6)}
    gsm1220attribute                OBJECT IDENTIFIER ::= {gsm1220informationModel attribute (7)}
    gsm1220action                   OBJECT IDENTIFIER ::= {gsm1220informationModel action (9)}
    gsm1220notification             OBJECT IDENTIFIER ::= {gsm1220informationModel notification (10)}

    -- Initial Value Definitions

    initialAdministrativeState AdministrativeState ::= locked
    initialChannelCombination ChannelCombination ::= tCHFull
    initialFrequencyUsage FrequencyUsage ::=  noUse  NULL
    initialRelatedGSMEquipment RelatedGSMObject ::=  notAvailable NULL
    initialTerrTrafChannel TerrTrafChannel ::=  notUsed  NULL
    initialTsc Tsc ::=  useBCC  NULL
```

```
-- Type Definitions

AbisChannel ::= SEQUENCE        -- due to possible BTS front end switch these may be different time slots
   {
        bsctimeslot             MultiplexedTimeslot,
        btstimeslot             MultiplexedTimeslot OPTIONAL
   }

AbsoluteRFChannelNo ::= INTEGER (0..1023)  -- also called ARFCN, Ref. GSM 05.05

AccessControlClassSet ::= SET SIZE (0..15) OF ClassNumber

AdjustExternalTimearg ::= SEQUENCE
    {
        timeUnits               AdjustTimeUnits,
        timeValue               INTEGER,
        direction               Direction,
        actualActionTime        GeneralizedTime OPTIONAL
    }

AdjustTimeUnits ::= ENUMERATED
    {
        msecs           (0),
        secs            (1),
        minutes         (2),
        hours           (3)
    }

AirToLandMapping ::= SEQUENCE
    {
        airSlot         MultiplexedTimeslot,
        landSlot        MultiplexedTimeslot
    }

AveragingNumber ::= INTEGER (1..31)

AveragingParam ::= SEQUENCE
    {
        hreqave         Hreqave,                    -- Ref. GSM 05.08 (Hreqave)
        hreqt           [1] Hreqt DEFAULT 1,        -- Ref. GSM 05.08 (Hreqt)
        weighting       [2] Weighting
    }

BooleanType ::= BOOLEAN

BSIdentityCode ::= SEQUENCE
    {
        ncc     NetworkColourCode,
        bcc     BTSColourCode
    }

BTSColourCode ::= INTEGER (0..7)

BtsMeasAver ::= INTEGER (1..4)

CarrierFrequencyList ::= SET OF AbsoluteRFChannelNo

CellAllocation ::= SEQUENCE SIZE (1..64) OF AbsoluteRFChannelNo

CellGlobalIdentity ::= SEQUENCE
    {
        lai     LocationAreaIdentity,
        ci      CellIdentity
    }

CellIdentity ::= INTEGER (0..65535)

CellReselectHysteresis ::= INTEGER (0..7) -- times 2 dB

ChannelID  ::= INTEGER  (0..7)
```

```
ChannelCombination  ::= ENUMERATED
    {
        tCHFull                 (0),    -- TCH/F + FACCH/F + SACCH/F
        tCHHalf                 (1),    -- TCH/H(0,1) + FACCH/H(0,1) + SACCH/H(0,1)
        tCHHalf2                (2),    -- TCH/H(0,0) + FACCH/H(0,1) + SACCH/H(0,1) + TCH/H(1,1)
        sDCCH                   (3),    -- SDCCH/8(0 ..7) + SACCH/C8(0 .. 7)
        mainBCCH                (4),    -- FCCH + SCH + BCCH + CCCH
        bCCHCombined            (5),    -- FCCH + SCH + BCCH + CCCH + SDCCH/4(0...3) + SACCH/C4(0...3)
        cCH                     (6),    -- BCCH + CCCH
        bCCHwithCBCH            (7),    -- combination 5 with CBCH as 05.02 Note 1
        sDCCHwithCBCH           (8)     -- combination 3 with CBCH as 05.02 Note 1
    }
    -- CCCH stands for the PCH, RACH and AGCH channels
    -- Where the SMSCB is supported, the CBCH replaces SDCCH number 2

ChannelConfigModArg ::= SET OF ObjectModif

ChannelModCompleteArg ::= SEQUENCE
    {
        successIndicator        BOOLEAN,        -- TRUE equals success
        notificationIdentifier  NotificationID,
        errorInformation        GraphicString   OPTIONAL
    }

Cic ::= INTEGER (0..65535)

ClassNumber ::= INTEGER (0..15)

Direction ::= ENUMERATED
    {
        forwards        (0),
        backwards       (1)
    }

DtxUplink ::= INTEGER
    {-- DTX = Discontinuous Transmission
        msMayUseDTx             (0),
        msShallUseDTx           (1),
        msShallNotUseDTx        (2)
    }

EnableOptHandoverProcessing ::= SET OF EnableHoType

EnableHoType ::= ENUMERATED
    {
        enablePwrBudgetHandover         (0),
        enableMSDistanceProcess         (1)
    }

EquipmentCease  ::= BOOLEAN
EquipmentLoc  ::= GraphicString         -- As locationName attribute from CCITT M.3100
EquipmentObj  ::= ObjectInstance
EquipmentLabel ::= GraphicString        -- As userLabel attribute from CCITT M.3100
EquipmentName  ::= GraphicString                -- As vendorName attribute from CCITT M.3100
EquipmentTime  ::= GeneralizedTime      -- Time of occurrence rather than time of report
EquipmentType  ::= GraphicString        -- As equipment type from CCITT M.3100
EquipmentVers  ::= GraphicString        -- As version attribute from CCITT M.3100

ForcedHOarg ::= WaitTrafficClear        -- Number of seconds to wait before clearing all remaining calls
                                        -- 0 means no time-out

FrequencyUsage ::= CHOICE
    {
        noUse           [0] NULL,                       -- Used as initial value on create
        nonHopping      [1] AbsoluteRFChannelNo,
        hopping         [2] HoppingChannel
    }
```

```
GSM1220ErrorCode ::= CHOICE
    {
        unknown         NULL,
        definedCode     INTEGER
    }

    -- The following error codes are defined for various GSM 12.20 identified errors

        needLock        GSM1220ErrorCode ::= definedCode : 1        -- This error indicates that the operation will
                                                                    -- not be accepted unless the object instance
                                                                    -- is locked.
        clearRelation   GSM1220ErrorCode ::= definedCode : 2        -- This error indicates that the operation will
                                                                    -- not be accepted unless a relationship
                                                                    -- involving the object instance is cleared.

GsmdcsIndicator ::=  ENUMERATED
    {
        gsm             (0),
        extendedgsm     (1),
        dcs             (2)
    }

GsmGeneralObjectID ::= INTEGER

HoAveragingDistParam ::=  SEQUENCE
    {
        hreqave         Hreqave,                    -- Ref.  GSM 05.08 (Hreqave)
        hreqt           Hreqt   DEFAULT 1           -- Ref.  GSM 05.08 (Hreqt)
     }

HoMargin ::= INTEGER (0..24) -- dB

HoPeriod ::= INTEGER (0..63) -- number of SACCH multiframes

HoppingChannel ::= SEQUENCE
    {
        maio            MAIO,
        hoppingGroup    GsmGeneralObjectID  -- Denotes a frequencyHoppingSystem instance
    }

HoppingSequenceNumber ::= INTEGER (0..63)

HoPriorityLevel ::= INTEGER (0..7)

HoThresholdDistParam ::=  SEQUENCE
    {
        mSRangeMax          CHOICE          -- timing advance
          {                                             -- GSM 05.08 range is 35 km max.
                km              INTEGER,    -- in units of km compatible with Phase 1
                timeadv                 INTEGER     -- in units of timing advance
          },
        p8                  AveragingNumber,
        n8                  AveragingNumber
     }

Hreqave ::= AveragingNumber
-- The averaging period defined in number of SACCH multiframes.
-- See  GSM 05.08 Annex A Table 1

Hreqt ::= NumberOfResults
-- Number of averaged results that can be sent in a
-- "hand-over required message".
-- See  GSM 05.08 Annex A Table 1.

InterferenceAveragingParam ::= SEQUENCE
    {
        averagingPeriod  AveragingNumber,   -- Ref.  GSM 05.08 (INTAVE)
                                            -- interference averaging period in number of
                                            -- SACCH multiframe (INTAVE)
        thresholds      InterferenceThresholdBoundaries     -- Sequence of boundary limits of five interference
                                            -- bands for unallocated time slots.
                                            -- Ref.  GSM 05.08 (O-X5)
    }
```

```
InterferenceThresholdBoundaries ::= SEQUENCE
    {
        boundary0       RxLev,
        boundary1       RxLev,
        boundary2       RxLev,
        boundary3       RxLev,
        boundary4       RxLev,
        boundary5       RxLev
    }

LocationAreaCode ::= INTEGER (0..65535)
-- LAC, Ref.  GSM 04.08

LocationAreaIdentity ::= SEQUENCE
    {
        mcc     MobileCountryCode,
        mnc     MobileNetworkCode,
        lac     LocationAreaCode
    }

L2Timer ::= INTEGER -- in five millisecond units

L3Timer ::= INTEGER -- in ten millisecond units

MAIO ::= INTEGER (0..63)

MaxRetrans ::= ENUMERATED
    {-- Ref.  GSM 05.08 (MAX_RETRAN)
        one     (1),
        two     (2),
        four    (4),
        seven   (7)
    }

MaxQueueLength ::= INTEGER (0..100)
-- expressed as a percentage of all TCHs

MobileAllocation ::= SEQUENCE SIZE  (1..64) OF AbsoluteRFChannelNo

MobileCountryCode ::= TBCD-STRING (SIZE(2))
-- 3 BCD digits according to CCITT E.212

MobileNetworkCode ::= TBCD-STRING (SIZE(1))
-- 2 BCD digits according to CCITT E.212

ModificationList ::=  SET OF SEQUENCE
    {
        modifyOperator   ModifyOperator DEFAULT replace,
        attributeId              AttributeId,
        attributeValue   ANY DEFINED BY attributeId   OPTIONAL     -- absent for SET TO DEFAULT
    }

MsmtProcessingMode ::= ENUMERATED
    {
        basicMeasurementReporting                   (0),    -- default no pre-processing
        btsProcessedMeasurementReporting                    (1)     -- BTS performs pre-processing
    }

MultiplexedTimeslot ::= SEQUENCE
    {
        timeslot   PCMTimeslot,
        subslot    Subslot OPTIONAL -- if sub multiplexing is used
    }
-- MultiplexedTimeslot represents a 64 Kbps time slot or a 16 Kbps
-- sub time slot on a PCM trunk.

NetworkColourCode ::= INTEGER (0..7)

NetworkIndicator ::= INTEGER
    {
        international          (0),
        spare                  (1),
        national               (2),
        reservedNationalUse    (3)
    }
```

```
NoOfBlocksForAccessGrant ::= INTEGER (0..7)
--  GSM 05.02 6.5 (BS_AG_BLKS_RES)
-- The value must be in line with channel configuration
-- if BCCH combined, the range is limited).

NoOfMultiframesBetweenPaging ::= INTEGER (2..9)
-- the number of 51 TDMA multiframes between two transmissions of the same
-- paging message to mobiles of the same paging group.
--  GSM 05.02 6.5 (BS_PA_MFRMS)

NoOfPrefCells ::= INTEGER (0..16)
-- Ref. GSM 08.08,  ("n")

NotificationID ::= INTEGER -- ISO/IEC DIS 10165-2

NumberOfResults ::=  INTEGER (1..31)

NumberOfZeroResults ::= INTEGER (0..7)

Ny1 ::= INTEGER
-- Maximum number of repetitions of the PHYSICAL INFO
-- message. Ref.  GSM 04.08

ObjectModif ::= SEQUENCE
    {
        managedObjectClass      ObjectClass,
        managedObjectInstance   ObjectInstance,
        modificationList        ModificationList
    }

PCMCircuitID ::= INTEGER (0..2047)

PCMTimeslot ::= SEQUENCE
    {
        pcm     PCMCircuitID,
        tsl     TimeslotNumber
    }

PeriodCCCHLoadIndication ::= TimerData

PlmnPermitted ::= SET SIZE (0..8) OF NetworkColourCode
-- Ref.  GSM 05.08 (PLMN_PERMITTED)

PowerClass ::= ENUMERATED
    {
        powerClass1 (1),        -- Power Class 1 (320W-GSM900 20W-DCS1800)
        powerClass2 (2),        -- Power Class 2 (160W-GSM900 10W-DCS1800)
        powerClass3 (3),        -- Power Class 3 (80W-GSM900 5W-DCS1800)
        powerClass4 (4),        -- Power Class 4 ( 40W-GSM900 2.5W-DCS1800)
        powerClass5 (5),        -- Power Class 5 (20W-GSM900)
        powerClass6 (6),        -- Power Class 6 (10W-GSM900)
        powerClass7 (7),        -- Power Class 7 (5W-GSM900)
        powerClass8 (8)         -- Power Class 8 (2.5W-GSM900)

    }

PowerControlInterval ::= INTEGER (0..31)
-- Ref.  GSM 05.08 (P_Con_INTERVAL)

PowerIncrStepSize ::= INTEGER (0..2)
-- 0 : 2 dB
-- 1 : 4 dB
-- 2 : 6 dB
-- Ref.  GSM 05.08 (Pow_Incr_Step_Size)

PowerRedStepSize ::= INTEGER (0..1)
-- 0 : 2 dB
-- 1 : 4 dB
-- Ref.  GSM 05.08 (Pow_Red_Step_Size)

QueuingPriority ::= INTEGER (0..15)

QueueTimeLimit ::= INTEGER      -- in seconds

RachLoadAveragingSlots ::= INTEGER (0..65535)
```

```
RadioLinkTimeout ::= INTEGER (0..15)
-- unit is 4 SACCH frames
-- Ref.  GSM 05.08 (RADIO_LINK_TIMEOUT)

RelatedGSMObject ::= CHOICE
    {
        notAvailable      NULL,
        relatedObject     ObjectInstance
    }

RelatedGSMObjectList ::= SET OF ObjectInstance

RxLev ::= INTEGER (0..63)
-- 0 : < -110 dB,
-- 1 : -110 dB .. -109 dB
-- 2 : -109 dB .. -108 dB
--
-- 63: > -48 dB
-- Ref.  GSM 05.08 (RXLEV)

RxQual ::= INTEGER (0..7)
-- 0: less than 0.2%
-- 1: 0.2% to  0.4%
-- 2: 0.4% to  0.8%
-- 3: 0.8% to  1.6%
-- 4: 1.6% to  3.2%
-- 5: 3.2% to  6.4%
-- 6: 6.4% to 12.8%
-- 7: greater than 12.8%

SAPI ::= INTEGER (0..63)

SoftwareID ::= GraphicString

Standard1220CreateErrorInfo ::= INTEGER

Standard1220DeleteErrorInfo ::= GSM1220ErrorCode

Standard1220SpecificErrorInfo ::= CHOICE
    {
        errorCode         GSM1220ErrorCode,
        errorString       GraphicString
    }

Subslot ::= INTEGER (0..3)

TBCD-STRING ::= OCTET STRING
-- as in  GSM 09.02
-- digits 0 through 9, two digits per octet,
-- each digit encoded 0000 to 1001,
-- 1111 used as filler when there is an odd number of digits

TEI ::= INTEGER (0..127)

TerrTrafChannel ::= CHOICE
    {
        notUsed           [0] NULL,                -- Used as initial value at create
        controlChannel    [1] NULL,
        trafficChannel    [2] SEQUENCE SIZE (1..2) OF AbisChannel
    }
-- Only traffic channels are connected to a terrestrial channel
-- A full rate radio channel is connected to one terrestrial channel.
-- The two half rate channels of a half rate radio channel are both
-- connected to separate terrestrial channels

ThresholdCCCHLoadIndication ::= INTEGER

ThresholdLev ::=  SEQUENCE
    {
        rxLevelUL         RxLev,
        rxLevelDL         RxLev,
        px                AveragingNumber,
        nx                AveragingNumber
    }
```

```
ThresholdQual ::=  SEQUENCE
    {
        rxQualUL        RxQual,
        rxQualDL        RxQual,
        px              AveragingNumber,
        nx              AveragingNumber
    }

TimerData ::= SEQUENCE
    {
        timeUnit        TimeUnit,
        timeValue       INTEGER
    }

TimeUnit ::= ENUMERATED                 -- which value is used is vendor dependent
    {
        mSec                    (0),
        sec                     (1),
        min                     (2),
        noOfTDMAFrames          (3),
        noOfSlots               (4),
        factor                  (5)
    }

TimerPeriodicUpdateMS ::= INTEGER (0..255)
-- in deci-hours
-- see  GSM 04.08

TimeslotNumber ::= INTEGER

TranscoderMatrix ::= SET OF AirToLandMapping

Tsc ::= CHOICE
    {
        useBCC  [0] NULL,               -- Use BTS Colour Code, used as initial value at create
        useTSC  [1] INTEGER (0..7)      -- training sequence code
    }

TxInteger ::= INTEGER (0..15) -- see  GSM 04.08

TxPower ::= INTEGER
-- Value in dBm
-- TXPWR range in GSM:          5..43 dBm
-- TXPWR range in DCS 1800:     0..30 dBm

TxPwrMaxReduction ::= INTEGER (0..15)
--2 dB steps
-- see  GSM 05.05

T200 ::= SEQUENCE
    {
        sdcchSAPI0              L2Timer,        -- SDCCH, SAPI 0
        facchTCHF               L2Timer,        -- associated with a full rate TCH
        facchTCHH               L2Timer,        -- associated with a half rate TCH
        sacchTCHSAPI0           L2Timer,        -- SACCH with TCH, SAPI 0
        sacchSDCCH              L2Timer,        -- SACCH with SDCCH
        sdcchSAPI3              L2Timer,        -- SDCCH, SAPI 3
        sacchTCHSAPI3           L2Timer         -- SACCH with TCH, SAPI 3
    }

T31xxTimers ::= SEQUENCE
    {
        t3101           L3Timer,        -- used with IMMEDIATE ASSIGNMENT
        t3103           L3Timer,        -- used with HANDOVER COMMAND
        t3105           L3Timer,        -- used with PHYSICAL INFORMATION
        t3107           L3Timer,        -- used with ASSIGNMENT COMMAND
        t3109           L3Timer,        -- used for lower layer failures
        t3111           L3Timer,        -- used for channel activation delay
        t3113           L3Timer         -- used with PAGING messages
    }

WaitTrafficClear ::= INTEGER -- time in seconds, 0 means no time-out

Weighting ::= INTEGER (1..3)

END -- End of GSM1220TypeModule module
```

Annex A (informative): System feature partitioning - use of the model

The BSS management model can be sorted according to management function (as in Clause 4 of GSM 12.20) or according to each item's relationship to defined features of the BSS. The following clauses contain the management information model sorted according to manageable features of the BSS. Items are included in the area that explains their primary purpose. A few of these items are entered in more than one area, all but one entry being underlined. Underlined entries are included for information only, showing where relevant packages or attributes may be found in the model. Following each list, there is text to explain how the items in the model might be used for the management of these system features.

A.1 Cell configuration management

Managed Object Classes	Packages	Attributes/Actions/Notifications
bts	btsBasicPackage	bsIdentityCode cellGlobalIdentity cellReselectHysteresis gsmdcsIndicator ny1 periodCCCHLoadIndication plmnPermitted rACHBusyThreshold rACHLoadAveragingSlots radioLinkTimeout rxLevAccessMin thresholdCCCHLoadIndication
	btsCCCHConfigurationPackage	maxNumberRetransmission mSTxPwrMaxCCH noOfBlocksForAccessGrant noOfMultiframesBetweenPaging numberOfSlotsSpreadTrans
	btsOptionsPackage	allowIMSIAttachDetach callReestablishmentAllowed cellBarred dtxDownlink dtxUplink emergencyCallRestricted notAllowedAccessClasses timerPeriodicUpdateMS
channel	channelPackage	channelCombination tsc
radioCarrier	radioCarrierPackage	powerClass txPwrMaxReduction

Cell configuration management requires that the management information model support management of the various parameters that define the basic operation of a particular cell. As defined in GSM 12.06 [29], this includes the following areas:

a) cell identification and location area of the cell;
b) the Network Colour Code for an accessing MS, refer to GSM 05.08 [21];
c) the receiver RF power level hysteresis required for cell reselection as defined in GSM 05.08 [21];
d) threshold and control parameters for RACH measurements as defined in GSM 08.58 [23];
e) the minimum received level at the MS required for access to the cell, (RXLEV_ACCESS_MIN), refer to GSM 05.08 [21];
f) radio link timers to detect radio link failures as defined in GSM 05.08 [21];
g) the maximum transmit power level a MS may use when accessing the cell, refer to GSM 05.08 [21];
h) the number of TDMA frames reserved for the Access Grant channel during a multiframe, (BS_AG_BLKS_RES), refer to GSM 05.02 [19];
i) the number of multiframes between two transmissions of the same paging message to mobiles of the same paging group;
j) whether the IMSI attach/detach procedure and call re-establishment is used in the cell, refer to GSM 04.08 [18];

k) whether a MS may camp on a cell, (CELL_BAR_ACCESS), refer to GSM 05.08 [21];
l) access class barring, (Access Control Class), refer to GSM 04.08 [18];
m) the availability of DTX downlink or uplink mode as defined in GSM 04.08 [18];
n) the interval for the MS periodic location updates.

The cell configuration management in this model is provided by various attributes in the bts managed object class (which represents a cell) and by attributes in the channel and radioCarrier object classes. These specific object classes and their basic packages are more related to the architectural model and therefore belong to the part of the model described in clause A.7.

A number of somewhat unrelated attributes were gathered in the btsBasicPackage simply to minimize the number of packages defined in the model. Items a) and b) in the list are provided by the cellGlobalIdentity and bsIdentityCode attributes respectively. Item c) is covered by the cellReselectHysteresis attribute, item d) by rACHBusyThreshold and rACHLoadAveragingSlots, and item e) by rxLevAccessMin. Item f) is covered in part by the radioLinkTimeout attribute. Specific radio link timers are provided elsewhere in the model and are described in clause A.2.

In addition to those specified in GSM 12.06 [29], a number of other attributes are provided in the btsBasicPackage to cover other cell configuration capabilities. The gsmdcsIndicator attribute indicates the type of network supported by this BTS. This may be used to analyze the values of various other attributes which depend on the type of the network. The ny1 attribute specifies the retransmission count for the PHYSICAL INFORMATION message sent to the mobile during unsynchronized handovers. The thresholdCCCHLoadIndication attribute sets the threshold used by the BTS to determine when to inform the BSC of CCCH load and the periodCCCHLoadIndication attribute specifies the frequency for sending the load indication message to the BSC as specified in GSM 08.58 [23]. The plmnPermitted attribute specifies a set of Network Colour Codes for accessing mobiles as specified in GSM 05.08 [21].

A set of attributes which control the operation of, and provide information for the common control channels of the BTS are gathered in the btsCCCHConfigurationPackage. Items g), h), and i) are provided for by the mSTxPwrMaxCCH, noOfBlocksForAccessGrant, and NoOfMultiframesBetweenPaging attributes respectively. In addition, the maxNumberRetransmission attribute provides the number of times a mobile may retransmit on the RACH (GSM 05.08 [21]). Also, the numberOfSlotsSpreadTrans attribute indicates the maximum number of RACH slots a mobile must wait between random access attempts.

A set of manageable cell options are gathered in the btsOptionsPackage. Item j) is supported by the allowIMSIAttachDetach and callReestablishmentAllowed attributes and item k) by the cellBarred attribute. the emergencyCallRestricted and notAllowedAccessClasses attributes cover item l) and the dtxDownlink and dtxUplink attributes cover item m). Finally item n) is supported by the timerPeriodicUpdateMS attribute.

In addition to these attributes which are common to the cell, there are a few other configuration attributes that need to be specified for each radio channel (channel object class) and for each frequency transmitter (radioCarrier object class). The instances of these object classes belonging to a particular cell are denoted by containment rather than by specific relationship attributes. For each channel, the channelCombination attribute provides the logical configuration of that channel and the tsc attribute provides the training sequence code. For each transmitter, the powerClass identifies the transmitter's power class and the txPwrMaxReduction attribute controls the static maximum output power. Dynamic power control management of the BTS and of the MS is provided by the power control portion of the model (see clause A.4).

A.2 Protocol configuration management

Managed Object Classes	Packages	Attributes/Actions/Notifications
bsc	bscBasicPackage	handoverReqParam
	bssMapTimerPackage	bssMapT1 bssMapT4 bssMapT7 bssMapT8 bssMapT10 bssMapT13 bssMapT17 bssMapT18 bssMapT19 bssMapT20
bts	btsQueuingPackage	maxQueueLength msPriorityUsedInQueuing timeLimitCall timeLimitHandover
	btsTimerPackage	t200 t31xx

The core specifications define a number of parameters which govern certain aspects of communications on the various interfaces of the BSS. To support this, the model defines a collection of attributes in both the bsc and bts managed object classes. As indicated in GSM 12.06 [29], the model must provide for management of the following capabilities:

a) maximum queue lengths if queuing is implemented;
b) priority handling in queues if queuing is implemented;
c) maximum values for such items as the time a handover/call attempt may wait for a traffic channel to be released, if queuing is implemented;
d) BSSMAP timers as defined in GSM 08.08 [22];
e) LapDm timer (T200) to be used on the different control channels as defined in GSM 04.06 [17];
f) Layer 3 timers (T31xx) to be used on the air interface as defined in GSM 04.08 [18].

On a per BSC basis, the handoverReqParam attribute is provided to allow the management of the number of candidate target cells indicated in a HANDOVER REQUIRED message as specified in GSM 08.08 [22]. Also on a per BSC basis, the various MAP timers specified in GSM 08.08 [22] (item 'd' above) for use by the BSC are managed by the set of attributes contained in the bssMapTimerPackage. Two specified timers are not provided for in this package. These are the T11 and Tqho timers related to queuing.

Since call and handover queuing is an optional feature of the BSS, the related attributes are all contained in a conditional package called the btsQueuingPackage. This package is provided for the bts object class as it was felt that separate queues would need to be maintained for each cell to prevent blocking. The attributes thus allow independent tuning of each BTS queue. The package contains the maxQueueLength and the msPriorityUsedInQueuing attributes which provide control as indicated in items a) and b) above. The timeLimitCall and timeLimitHandover attributes allow the setting of T11 and Tqho as identified by item c) in the list above.

Also provided on a per BTS basis are the timers for air interface procedures as specified by items e) and f) above. These are contained in the btsTimerPackage in the t200 and t31xx attributes respectively.

A.3 Adjacent cell configuration management

Managed Object Classes	Packages	Attributes/Actions/Notifications
adjacentCellHandOver	adjacentCellHandOverPackage	adjacentCellID bCCHFrequency (from cellAllocation) bsIdentityCode (as in cell config) cellGlobalIdentity (as above) synchronized
adjacentCellReselection	adjacentCellReselectionPackage	adjacentCellID bCCHFrequency

Cells adjacent to an operating cell may be identified in a GSM system for use in handover procedures, for reselection, or for both. To provide a basis for the management of the set of adjacent cells that may be considered in handover and reselection procedures, the model provides two objects. Adjacency is indicated by the containment of instances of these classes (or their subclasses) in an instance of a bts object class. For adjacency configuration management, the model must support the following capabilities as identified by GSM 12.06 [29]:

a) identification of adjacent cells for both handover and reselection purposes;
b) reselection related, adjacent cell specific parameters, i.e. the ARFCN of the BCCH channel;

The adjacentCellHandOver object class is provided as a base class only. To be used for handover control it is necessary that algorithm specific attributes be provided through subclassing. For purposes of adjacent cell management, attributes indicating identification and basic characteristics are provided. The bsIdentityCode, the cellGlobalIdentity, and the bCCHFrequency all provide cell identification while the synchronized attribute indicates whether or not this adjacent cell is synchronized with the cell in which the instance is contained.

The adjacentCellReselection object class may be used directly if used to manage an adjacent cell for reselection purposes only. In this case the only necessary cell identification is provided by the bCCHFrequency attribute. This class must be subclassed if this adjacent cell is to be used for both reselection and handover.

The adjacentCellID attribute is provided for both object classes to provide instance identification/naming only.

A.4 Power control management

Managed Object Classes	Packages	Attributes/Actions/Notifications
bsc	bscProcForBTSPowerControlPackage	
bts	btsPowerControlConfigPackage	
	pcMsmtProcessingModePackage	pcMsmtProcessingMode
powerControl	powerControlPackage	powerControlID msmtProcParamLoc
GSM 05.08 Algorithm Management Related		
powerControlGSM0508	powerControlGSM0508Package	pcAveragingLev pcAveragingQual pcLowerThresholdLevParam pcLowerThresholdQualParam pcUpperThresholdLevParam pcUpperThresholdQualParam powerControlInterval powerIncrStepSize powerRedStepSize

The GSM system allows for the dynamic control of the output power of the mobile and, optionally, of the BTS. Support for the management of these features is provided by managed object classes and attributes in the part of the model described in this section. Power is controlled to manage the trade off between minimizing power output while still achieving the planned and desired coverage. Model support for management of the following configuration capabilities is required by the core specifications as indicated in GSM 12.06 [29]:

a) maximum and minimum threshold values for such items as signal strength and signal quality on uplink and down link;
b) power control parameters for processing, comparison and decision making sufficient to manage the example algorithm in the Annex A of GSM 05.08 [21] or the management of operator or vendor specific algorithms;
c) the location where measurement processing, threshold comparison and decision making for power control is supported to take place;
d) the support of the optional BS RF power control process.

The model supporting the dynamic management of power control is broken into two parts; MS power control which is required of all systems, and BS power control which is optional.

A.4.1 MS power control management

In order to manage MS power control within a BSS in a manufacturer independent way, the following capabilities are considered necessary:

1) Define the MS power control algorithm and set the parameters for BSC processing, comparison, and decision making for each BTS; and,
2) Indicate if the BTS supports MS power control processing, comparison, and decision making and, if so, be able to:
   2a) set enable/disable of BTS processing and,
   2b) define the MS power control algorithm and set the parameters for BTS use.

In this model, item 1 is supported by instantiated objects derived from the powerControl object class. Each subclass will represent an algorithm and the associated parameters. One object is required to be instantiated for each BTS in the BSC.

Items 2 and 2a are supported by the conditional package pcMsmtProcessingModePackage (present if the BTS supports processing/comparison/decision). This package contains the attribute pcMsmtProcessingMode indicating where the activity is to take place. For power control it is assumed that processing, threshold comparison, and decision making will all be done in the same place, either the BSC or the BTS.

Item 2b (like item 1) is supported by the instantiation of an object derived from the powerControl MOC (e.g. powerControlGSM0508). One instance is required to set the parameters for the BTS if the presence and value of the pcMsmtProcessingMode attribute indicates that the BTS is to do power control.

For each instance of the objects derived from the powerControl MOC (maximum of two per BTS instance), the attribute msmtProcParamLoc indicates if the parameters specified by the instance apply to the BSC processing or to the BTS processing. The powerControlID attribute provides for instance naming.

To provide an example of powerControl subclassing and to support the example algorithm specified in the annex of GSM 05.08 [21], the necessary parameters are defined as attributes in the powerControlGSM0508Package.

A.4.2 BTS power control management

BTS power control is optional in the GSM network. In order to manage BTS power control within a BSS in a manufacturer independent way, the following capabilities are considered necessary:

1) Indicate if the BSC supports BTS power control processing/comparison/decision making;
2) Indicate if each BTS supports BTS power control and, if so:
3) Indicate if each BTS supports power control processing/comparison/decision making and, if so:
   3a) Set enable/disable of BTS processing/comparison/decision making;
4) Define the power control algorithm and set the parameters for the BSC use;
5) Define the power control algorithm and set the parameters for BTS use.

This is obviously a complex capability and the model supporting it is complex. Item 1 is supported by the conditional package bscProcForBTSPowerControlPackage in the bsc MOC. This package is included if the BSC has the necessary capability.

Item 2 is supported by the conditional package btsPowerControlConfigPackage in the bts MOC. This package is included if the BTS supports BTS power control.

Items 3 and 3a are supported by the bts MOC conditional package pcMsmtProcessingModePackage. This package is present if BTS supports processing/comparison/decision making. This package contains the attribute pcMsmtProcessingMode which indicates where the activity is to take place. Note that this is the same package as for MS power control. It is assumed that, if the BTS supports power control algorithm processing, it will support it for what ever type of power control it can do, and that the algorithms and parameters will be the same. If the BSC is configured to do the processing/comparison/decision making but it does not support the optional BTS power control, then no BTS power control will be possible.

Items 4 and 5 are supported by the instantiation of objects derived from the powerControl MOC (e.g. powerControlGSM0508). One instance is required to set the parameters for the BSC and/or for the BTS depending on the presence and value of the pcMsmtProcessingMode attribute. Note that this is the same object as for MS power control. The parameters and processing location are the same for both types if supported.

For each instance of the objects derived from the powerControl MOC (maximum of two per BTS instance), the attribute msmtProcParamLoc indicates if the algorithm and parameters specified by the instance apply to the BSC processing or to the BTS processing.

A.5 Handover control management

Managed Object Classes	Packages	Attributes/Actions/Notifications
basebandTransceiver	basebandTransceiverPackage	forcedHO (action)
bsc	internalInterCellHandoverPackage	enableInternalInterCellHandover
	internalIntraCellHandoverPackage	enableInternalIntraCellHandover
bts	btsBasicPackage	forcedHO (action)
	hoMsmtProcessingModePackage	hoMsmtProcessingMode
handoverControl	handoverControlPackage	handoverControlID msmtProcParamLoc
GSM 05.08 Algorithm Management Related		
adjacentCellHandOverGSM0508	adjacentCellHandOverGSM0508Package	hoMargin hoPriorityLevel msTxPwrMaxCell (as in mSTxPwrMaxCCH) rxLevMinCell
handoverControlGSM0508	handoverControlGSM0508Package	enableOptHandoverProcessing hoAveragingAdjCellParam hoAveragingDistParam hoAveragingLevParam hoAveragingQualParam hoMarginDef hoThresholdDistParam hoThresholdInterferenceParam hoThresholdLevParam hoThresholdQualParam interferenceAveragingParam msTxPwrMaxCellDef rxLevMinCellDef

The processes of power control and handover control are often inter-related in a GSM system. Operators require the capability to control these processes. The control of the algorithms and parameters used to manage mobile handover is provided by object classes and attributes described in this section. Handover is managed to meet operator goals, such as to minimize the power output or to balance network load, while still maintaining satisfactory quality of service. The model is required to support management of the following configuration capabilities as identified in GSM 12.06 [29]:

a) enable/disable the allowed optional BSS controlled handover types;
b) support for forced handovers to clear a TRX or BTS of traffic;
c) the location where measurement processing and threshold comparison for handover determination is supported;
d) parameters used to prevent repetitive handovers between adjacent cells;
e) priority levels of adjacent cells for handover;
f) the maximum transmit power level a MS may use in the specified adjacent cells;
g) the minimum required received power level for the specified adjacent cells;
h) maximum and minimum threshold values for such items as signal strength, signal quality and interference level on uplink and downlink as defined in GSM 05.08 [21];
i) the maximum permitted absolute distance between MS and serving BTS;
j) other handover control parameters for processing, comparison and decision making sufficient to manage the example algorithm in the Annex A of GSM 05.08 [21]; or,
k) the management of operator or vendor specific algorithms.

The management of the optional capabilities related to handover is provided by two conditional packages in the bsc object class; the internalInterCellHandoverPackage, and the internalIntraCellHandoverPackage. If a BSC supports these capabilities, then the conditional packages are included in the bsc object instance. The capabilities are then enabled or disabled through the use of the contained attributes. Support for forced clearing of a transceiver or a cell is provided by the forcedHO action in the basebandTransceiver and the bts object classes.

As with power control it is possible to configure where measurement processing and threshold comparison will be done (BSC or BTS). Unlike power control, the decision making process for performing

a handover (as opposed to simply recommending one) is always left to the BSC or MSC. Once threshold comparisons have been done however, it is assumed that the result is to recommend, or not to recommend, a handover. Where the processing and comparisons are done is indicated and controlled by the optional hoMsmtProcessingModePackage in a bts object instance. Indication of support is given if the package is included in the bts instance. Control of where the operations take place is provided for by the contained attribute.

The ability to define a handover algorithm and to set its related parameters is provided by instantiated objects derived from the handoverControl object class (e.g. handoverControlGSM0508). Each subclass represents an algorithm and includes the controllable parameters as attributes. One instance is required to set parameters for each BTS in the BSC. This handoverControl MOC is provided only for subclassing as the particular set of parameters is assumed to be algorithm specific. This base class provides an attribute for instance naming (handoverControlID) and one to indicate whether the contained attributes apply to BSC or BTS processing/comparison operations. This allows an alternate set of parameters to be defined prior to being switched to via the hoMsmtProcessingMode attribute.

As an example of subclassing, and to provide support for the example algorithm provided in the annex of GSM 05.08 [21], the handoverControlGSM0508 and the adjacentCellHandOverGSM0508 object classes are defined. The first provides the set of parameters and thresholds defined for the serving cell. The second provides a set of values necessary to be available on a per adjacent cell basis. All of these are specified in GSM 05.08 [21]. Other algorithms may be provided by manufacturer/operator specified subclasses.

A.6 Frequency control management

Managed Object Classes	Packages	Attributes/Actions/Notifications
basebandTransceiver	basebandTransceiverPackage	relatedRadioCarrier
bts	btsBasicPackage	cellAllocation
	channelConfigModPackage	channelConfigModification (action) channelModComplete (notification)
channel	channelPackage	frequencyUsage
frequencyHoppingSystem	frequencyHoppingSystemPackage	frequencyHoppingSystemID hoppingSequenceNumber mobileAllocation
radioCarrier	radioCarrierPackage	carrierFrequencyList

GSM systems support a wide variety of configurations with respect to frequency transmission and reception. The part of the model described in this section, supports the configuration aspects of the BSS that relate to frequency assignment. It supports this for non-hopping, baseband hopping, and synthesized hopping configurations. A non-hopping system is one in which the radio channels (time slots) are fixed in their frequency assignment. Hopping systems vary the frequency of a time slot each time it is used. Baseband hopping systems do this by switching the time slots among a set of fixed radio carriers. Synthesized hopping systems do this by switching the frequency of the radio carrier itself. As indicated in GSM 12.06 [29], the model must support management of the following capabilities:

a) the set of radio frequencies allocated and available to a cell (CA);
b) the frequency band used by the BCCH;
c) the ARFCN(s) that each radio carrier uses;
d) the set of radio frequencies allocated to a hopping group (MA);
e) the order in which the allocated frequencies are to be used (HSN);
f) the values of the index offset (MAIO);
g) operations to perform a dynamic modification of the radio definition of a BTS. These operations are optional. They are used on-line for frequency redefinition and modification of any other parameter which gives the frequencies related to the channels;

Independent of the hopping configuration certain aspects of the model remain the same. For all configurations, the set of frequencies for the cell is specified by the cellAllocation attribute contained in each bts object instance. The first entry of this set of ARFCNs sets the BCCH frequency for the cell. Also in all cases the set of transceivers related to a cell and the set of eight channels related to each transceiver are shown by containment of the object instances. For the case of channel containment, the transceiver is represented by the basebandTransceiver object class. Again, for all configurations, the

carrierFrequencyList attribute in the radioCarrier object class contains the ARFCN(s) used by this transmitter/receiver. In the case of a synthesized configuration, this may be more than one frequency. These one or more frequencies must of course be in the set contained in the cellAllocation attribute.

For the case of a simple non-hopping system, the baseband transceiver will be associated with a radio carrier by means of the relatedRadioCarrier attribute in the basebandTransceiverPackage. In addition, the channel object instances contained in a basebandTransceiver instance will have their frequencyUsage attribute values set to the ARFCN which agrees with the associated radioCarrier carrierFrequencyList attribute.

For synthesized hopping systems, it is still possible to identify a radioCarrier instance that is related to a basebandTransceiver instance. Again the relatedRadioCarrier attribute is used for this. For this case however, the frequencyUsage attributes in the associated channel instances are set to point to the frequencyHoppingSystem object instances which contain the parameters for these (and possibly other) channels. This attribute also provides the MAIO for the channel in this case. The frequencyHoppingSystem object class provides the frequencyHoppingSystemID for instance naming. In addition the hoppingSequenceNumber attribute allows the management of the hopping sequence number as specified in GSM 05.02 [19], and the mobileAllocation attribute allows the management of the set of frequencies allocated to this frequencyHoppingSystem instance.

For baseband hopping systems, the relatedRadioCarrier attribute will not identify any radioCarrier object instances since the channels of a given basebandTransceiver instance will be switched among a set of radio carriers. Each channel instance's frequencyUsage attribute will again identify a frequencyHoppingSystem to which the channel is associated and the frequencyHoppingSystem instance attributes are as in the synthesized case.

It should be noted that, in all cases it is necessary for the various frequency related attributes (cellAllocation, frequency usage, mobileAllocation, and carrierFrequencyList) of an associated set of object instances to be kept consistent. For example, it is important that the system update the mobileAllocation attribute if a frequency is lost due to a failure. As another example, it is required that the frequencyUsage attribute value of two different channel object instances, having the same rank within a TDMA frame and having the same instance number under two different basebandTransceiver instances within the same cell, must be assigned such that no frequency collision can occur.

Finally, to support dynamic reconfiguration of systems that support the capability of reconfiguration without administrative locking of the units involved, the conditional package channelConfigModPackage provides the channelConfigModification action and the channelModComplete notification. These provide the capability to modify any or all of these frequency related attributes within a BTS in one operation.

A.7 Architectural element management

Managed Object Classes	Packages	Attributes/Actions/Notifications
basebandTransceiver	basebandTransceiverPackage	basebandTransceiverID relatedGSMEquipment relatedOAMLapdLink relatedTelecomLapdLink State/Status Attributes***
	equipmentRelatedAlarmPackage*	
	functionalRelatedAlarmPackage**	
bsc	bscBasicPackage	bscID relatedGSMEquipment State/Status Attributes***
	adjustExternalTimePackage	adjustExternalTime (action)
	equipmentRelatedAlarmPackage*	
	functionalRelatedAlarmPackage**	
bssFunction		
bts	btsBasicPackage	btsID relatedGSMEquipment relatedOAMLapdLink relatedTranscoder State/Status Attributes***
	equipmentRelatedAlarmPackage*	
	functionalRelatedAlarmPackage**	
btsSiteManager	btsSiteManagerBasicPackage	btsSiteManagerID relatedGSMEquipment relatedOAMLapdLink
	equipmentRelatedAlarmPackage*	
channel	channelPackage	channelID relatedGSMEquipment terrTrafChannel State/Status Attributes***
	equipmentRelatedAlarmPackage*	
	functionalRelatedAlarmPackage**	
gsmManagedFunction	locationNamePackage	locationName
	userLabelPackage	userLabel
lapdLink	lapdLinkPackage	lapdLinkID abisSigChannel sapi tei State/Status Attributes***
	functionalRelatedAlarmPackage**	
pcmCircuit	pcmCircuitPackage	pcmCircuitID relatedGSMEquipment administrativeState State/Status Attributes***
	equipmentRelatedAlarmPackage*	
	functionalRelatedAlarmPackage**	
radioCarrier	radioCarrierPackage	radioCarrierID relatedGSMEquipment State/Status Attributes***
	equipmentRelatedAlarmPackage*	
	functionalRelatedAlarmPackage**	
transcoder	transcoderPackage	transcoderID relatedGSMEquipment State/Status Attributes***
	transcoderMatrixPackage	transcoderMatrix
	equipmentRelatedAlarmPackage*	
	functionalRelatedAlarmPackage**	

*environmentalAlarm (notification)	**communicationAlarm (notification)	***State/Status Attributes
equipmentAlarm (notification)	processingErrorAlarm (notification)	Some or all of:
relatedGSMEquipCeaseParam	qualityOfServiceAlarm (notification)	administrativeState
relatedGSMEquipLabelParam		controlStatus
relatedGSMEquipLocParam		alarmStatus
relatedGSMEquipNameParam		operationalState
relatedGSMEquipObjParam		availabilityStatus
relatedGSMEquipTimeParam		unknownStatus
relatedGSMEquipTypeParam		usageState
relatedGSMEquipVersParam		
relatedGSMFunctionalObjects		

The part of the model described in this section is provided to allow the configuration management of the elements that are defined in the architecture of a GSM BSS. Operators require the capability of managing characteristics of these elements that define the number of these units that exist in a system, their user names and locations, the state of their operation, related alarms, and their relationship to each other and to real equipment. These managed object classes also provide convenient places to locate the various functionalities that are defined for the BSS. Managed object classes are defined for each of the following elements:

- BSC;
- BSS;
- BTS;
- BTS Site;
- Channel;
- LAP-D Link;
- PCM Circuit;
- Transceiver (baseband and carrier parts);
- Transcoder.

For each of the classes in this section, an instance ID is provided which allows the numbering of instances. For the purpose of GSM 12.21 [30] management messages, the BSC will use these instance numbers to address management messages to parts of the BTS represented by the btsSiteManager, bts, basebandTransceiver, and channel object classes.

Through inheritance, the gsmManagedFunction managed object class provides each of the sub-classes in this section with the capability of having a user specified label and location information. The functionalRelatedAlarmPackage and the equipmentRelatedAlarmPackage, defined in each object class, provide the required set of alarm notifications. Of the MOCs described in this section, bssFunction, btsSiteManager, and lapdLink objects are exceptions to this. The bssFunction MOC does not contain any alarm notifications. It was felt that this was too high a level to need to aggregate any alarms. The btsSiteManager MOC does not have functional related alarms as there are no functional capabilities defined for this class. Its use is to provide a place where site-common equipment alarms (e.g. heating, cooling, flood, ...) may be aggregated. The lapdLink MOC does not have equipment related alarms as each LAP-D link is meant to represent a virtual circuit and therefore may be associated with a pcmCircuit instance which does support the equipment alarms. All classes which support the equipment alarms also contain an attribute (relatedGSMEquipment) which may be used to identify related equipment object instances.

Each of the MOCs in this section is also provided with the administrative state and controlStatus to provide operator control and the operational state, availabilityStatus, alarm status, and unknown status to allow monitoring of the collective functionality and test management. An exception to this is the btsSiteManager which contains no state/status attributes. As mentioned earlier, it does not have any defined functionality other than alarm reporting. For those MOCs of this group, for which it was felt to be useful, the usage state is also provided.

The bsc MOC is provided with an optional package which may be supported if the system supports the externalTime attribute which is defined for the M.3100 managedElement MOC. This package contains an action which may be used to modify this time attribute in incremental amounts at a specified time.

To allow the BSC to communicate with management agents in the BTS using the defined GSM 12.21 [30] management messages, the bts, btsSiteManager, and basebandTransceiver MOCs are provided with a

relatedOAMLapdLink attribute. This is used to identify the logical link that is used by the BSC when managing these elements over the A-bis interface. This attribute identifies an instance of the lapdLink MOC which contains the TEI and SAPI of the virtual circuit and also identifies the pcmCircuit and timeslot which represents the link to be used for management of these elements. Most likely each relatedOAMLapdLink attribute will identify a different instance of lapdLink but, for cases where the management of multiple BTSs is done through a common site manager or for the management of multiple transceivers through a common BTS agent, it is allowed to have multiple relatedOAMLapdLink attributes identify the same lapdLink instance. The BSC will examine this attribute when needing to send a GSM 12.21 [30] message to see which link to use.

The basebandTransceiver MOC is also provided with the relatedTelecomLapdLink attribute which identifies the virtual circuit to be used by the BSC for telecom signalling messages. This attribute identifies an instance of the lapdLink MOC.

The channel MOC is provided with an attribute (terrTrafChannel) to identify the terrestrial link that is used to carry traffic channel information. The attribute identifies a circuit number and timeslot that is to be used for this communications.

The lapdLink MOC is provided with the abisSigChannel attribute which can identify a circuit number and timeslot used for the virtual circuit represented by the instance and also contains sapi and tei attributes to provide logical addressing.

The transcoder MOC is provided with an optional package which contains an attribute (transcoderMatrix) to manage the mapping of air channels to land channels for channels which are transcoded.

A.8 Software management

Managed Object Classes	Packages	Attributes/Actions/Notifications
executableSoftwareUnit	executableSoftwareUnitPackage	relatedRSUs
operatingSoftwareUnit	operatingSoftwareUnitPackage	operatingSoftwareID backupESU fallbackESU newESU runningESU administrativeState controlStatus alarmStatus operationalState availabilityStatus
replaceableSoftwareUnit	replaceableSoftwareUnitPackage	relatedFiles
simpleFileTransferControl		requestTransferDown (action) transferDownComplete (action) transferDownReady (notification)

Management of software in the GSM PLMN may be broken down into two aspects; distribution management and operating version management. To manage the distribution of software, the general FTAM file transfer mechanism defined in the GSM 12.00 [24] Specification is used. This mechanism defines objects which provide the necessary actions and notifications to allow either the agent system or the manager to initiate an arbitrary file transfer. Attributes exist to identify the files as software for the case of software download. This transfer mechanism is file based and therefore, for software download, there must be some way to provide an association between the file(s) and the object(s) used to manage software on the agent system.

With respect to operating version management there are several requirements that must be met by the model:

1) Units of manageable software must be able to be combined in arbitrarily complex configurations.
2) Units of manageable software must be able to be identified by vendor names and version numbers and by user friendly labels.
3) Units of manageable software must be able to be associated with file name(s) for downloading and/or for local storage if necessary.

4) Sets of software units must be able to be combined, designated, and identified by their role in the system as new, running, backup, or fallback, and must be able to be associated with pieces of equipment. This may be a many to one, a one to many, or a many to many relationship.
5) There must be a way to start and stop sets of software units from running.
6) Running software must be able to notify alarms but should not report multiple alarms for the set of running software units.

From these requirements three objects have been identified:

- replaceableSoftwareUnit;
- executableSoftwareUnit;
- operatingSoftwareUnit.

An instance of the replaceableSoftwareUnit managed object class is used to represent a unit of software that needs to be separately identifiable and/or replaceable on the system. This might be a complete set of software or it might represent only a patch. This MOC can also be used to represent data-only modules such as the data segment of executable software or a database used by software on the system. The structure of the software resource may be shown by containment of an instance of this object in other instances of the same class. Containment within the equipment that uses this software unit is not necessary as that relationship will be indicated by the associated operatingSoftwareUnit instance(s) and attributes for related ESUs. When the resource represented by an instance of this MOC is able to be downloaded or is made up of local files, the relatedFiles attribute may be set to indicate the one or more files that make up this unit.

An instance of the executableSoftwareUnit managed object class is used to represent a unit of software that is separately identifiable and is ready to be used by the system. Its association with the equipment or functional resource that uses it may be indicated by containment if needed, or an instance of this MOC may be pointed to by one or more operatingSoftwareUnit instances contained in the associated equipment or functional instances. When the resource represented by an instance of this MOC is made up of one or more separately identifiable and/or replaceable units, the relatedRSUs attribute may be set to identify these instances. When the relatedRSUs attribute is set to other than NULL (at create or by explicit setting), the resources represented by one or more replaceableSoftwareUnit instances are prepared as necessary by the agent to be used by the system. This might involve a linking step and/or creating a local disk or memory copy.

An instance of the operatingSoftwareUnit object is used to represent the operating software resource for an instance of equipment or functionality and is associated with the related equipment or functional unit through containment. The software resource is identified by the runningESU attribute which identifies an instance of an ESU. When this attribute is set (even if set to the same value), the executable instance is copied to the area of its use (e.g. loading to executable memory store) and use by the system begins unless prohibited by the administrative state. The administrative locked state prohibits operation of the instance of this resource while the unlocked state allows its operation. The availabilityStatus and the controlStatus provide information to support the test management of the operatingSoftwareUnit. Failure of the operation of this resource is indicated by an alarm notification and by the alarmStatus attribute. If the automatic start/restart of this resource is supported (e.g. following initialization or failure) the managed system will set the value of the runningESU attribute to the value contained in the backupESU attribute, if any, and behave as indicated for setting of the runningESU attribute (attribute value and state change notifications will be issued as appropriate). Additional related ESUs may be identified for use by setting the values of the newESU and fallbackESU attributes.

A.9 Equipment management

Managed Object Classes	Packages	Attributes/Actions/Notifications
gsmEquipment	gsmEquipmentPackage	equipmentType relatedGSMFunctionalObjects

For the GSM PLMN equipment is modelled by using the gsmEquipment Managed Object Class (MOC) derived from the M.3100 equipment MOC. This object and its subclasses are contained in instances of the M.3100 managedElement object or in instances of itself or other subclasses of the gsmEquipment MOC. In the gsmEquipment MOC the type of equipment is indicated by the value of the equipmentType attribute or another attribute such as the equipmentID or userLabel or by the object name via subclassing.

Besides the equipmentType attribute, the only GSM specific requirement/restriction added by this object is that the attribute relatedGSMFunctionalObjects is used to indicate a functional object for which an alarm notification will be generated in the case of an equipment alarm being detected. Whether or not the equipment also generates an alarm notification is up to the implementation. Functional objects may generate equipment alarm notifications even when they are not identified by a relatedGSMFunctionalObjects attribute. If the system implicitly knows the relationship between the functional object and its equipment and can provide the appropriate information to identify the failed equipment in the equipmentAlarm notification generated by the functional object, then it may generate this notification even if no corresponding equipment object exists.

Equipment objects are not required to be instantiated in a system in order to allow the system to be managed. For systems where there is a close correspondence between the defined functional objects and the equipment implementing these objects, and where the only management operations necessary are available in the defined functional objects (alarm notifications, state notifications, state controls, ...), the system can internally map between the functionality and the associated equipment. Where this is not the case or where other reasons dictate, equipment objects can be defined and instantiated. In this case the relationship between a functional object and the associated equipment object(s) which make it up can be known internally by the system or may be indicated explicitly by use of the relatedGSMEquipment attribute. Unlike the affectedObjectList attribute, this attribute does not imply any alarm notification relationship.

Due to the inherent proprietary nature of most of the equipment that makes up a GSM PLMN, few (if any) equipment objects will be standardized. Manufacturers and perhaps operators will define those equipment objects that are necessary for the management of their systems. Even with these proprietary extensions to the standard management information base, it is expected that the major aspects of configuration management of this equipment (administrative state control and state and alarm notification) will be able to be handled in a multi-vendor environment.

Annex B (informative): Lists of functions and GDMO definitions

B.1 List of Management Functions

B.2 List of Managed Object Classes

B.3 List of Packages

B.4 List of Actions

B.5 List of Notifications

B.6 List of Parameters

B.7 List of Attributes

B.8 List of Name Bindings

Annex C (informative): Index

History

Document history		
July 1995	Public Enquiry	PE 88: 1995-07-24 to 1995-11-17
March 1996	Vote	V 100: 1996-03-25 to 1996-05-17