900/1800MHz TDMA 数字蜂窝移动通信网网络管理接口技术要求 ——基于 CMIP 的接口定义

900/1800MHz TDMA Digital Celler Mobile Telecemmunication
network management interface technical specification
——Interface definition based on CMIP

目　　次

前　　言

本标准是《900/1800MHz TDMA 数字蜂窝移动通信网网络管理接口技术要求》系列标准中的第 1 项标准。该系列标准由两个标准组成，其名称如下：

—《900/1800MHz TDMA 数字蜂窝移动通信网网络管理接口技术要求——基于 CMIP 的接口定义》；

—《900/1800MHz TDMA 数字蜂窝移动通信网网络管理接口技术要求——基于 CORBA 的接口定义》。

本标准是参考国际电信联盟——电信标准部（ITU-T）X.72x 系列、X.73x 系列、X.90x 系列、Q.82x 系列、M.3100、M.3020 等相关建议以及欧洲电信标准协会（ETSI）的 GSM 12.xx 系列标准，并结合我国具体情况编制而成的。

附录 A、B、C、D、E 和 F 是规范性附录。

本标准由中国通信标准化协会提出并归口。

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900/1800MHz TDMA数字蜂窝移动通信网
网络管理接口技术要求——基于CMIP的接口定义

1 范围

本标准规定了900/1800MHz TDMA数字蜂窝移动通信网网络管理接口的管理功能需求、管理信息模型和通信协议。本标准定义的接口类型为基于CMIP的网络管理接口。

本标准适用于对900/1800MHz TDMA数字蜂窝移动通信网的网络管理。

2 规范性引用文件

下列文件中的条款通过本标准的引用而成为本标准的条款。凡是注日期的引用文件，其随后所有的修改单（不包括勘误的内容）或修订版均不适用于本标准，然而，鼓励根据本标准达成协议的各方研究是否可使用这些文件的最新版本。凡是不注日期的引用文件，其最新版本适用于本标准。

YD/T 871-1996（1996）	电信管理网通用网络信息模型
ITU-T E.502（1992）	数字通信交换话务测量需求
ITU-T Q.544（1988）	数字交换测量
ITU-T Q.722（1992）	电话消息和信号的通用功能
ITU-T Q.811（1992）	Q3和X接口的低层协议轮廓
ITU-T Q.812（1992）	Q3和X接口的高层协议轮廓
ITU-T Q.821（1993）	Q3接口的告警监视功能
ITU-T Q.822（1994）	Q3接口性能管理的第1，2，3阶段描述
ITU-T Q.823（1996）	话务量管理的第2和第3阶段功能规范
ITU-T X.721（1992）	信息技术—开放系统互连—管理信息结构：管理信息定义
ITU-T X.730（1992）	信息技术—开放系统互连—系统管理：对象管理功能
ITU-T X.731（1992）	信息技术—开放系统互连—管理信息结构：状态管理功能
ITU-T X.733（1992）	信息技术—开放系统互连—系统管理：告警上报功能
ITU-T X.734（1992）	信息技术—开放系统互连—系统管理：事件报告管理功能
ITU-T X.735（1992）	信息技术—开放系统互连—系统管理：日志控制功能
ETSI GSM 02.16（V4.3.4，1994）	数字蜂窝通信系统（第二阶段）：国际移动台设备标识
ETSI GSM 04.08（V4.10.1，1995）	数字蜂窝通信系统（第二阶段）：移动无线接口第三层规范
ETSI GSM 04.11（V5.3.0，2000）	数字蜂窝通信系统（第二阶段）：在无线接口上的点到点短消息业务支持
ETSI 3GPP TS 04.60（V8.9.0，2001）	数字蜂窝通信系统（第二阶段）：通用分组无线业务—移动台与基站系统接口—无线链路控制/媒质接入控制协议
ETSI GSM 08.08（V4.12.1，1998）	数字蜂窝通信系统（第二阶段）：移动交换中心与基站系统（MSC-BSS）之间接口的第三层规范
ETSI GSM 09.02（V5.3.0，1996）	数字蜂窝通信系统（第二阶段）：MAP规范
ETSI GSM 12.00（V4.5.1，1996）	数字蜂窝通信系统（第二阶段）：网络管理的目标和结构
ETSI GSM 12.04（V4.3.1，2000）	数字蜂窝通信系统（第二阶段）：GSM PLMN的性能管理和测量
ETSI GSM 12.11（V6.3.0，1999）	数字蜂窝通信系统（第二阶段）：基站子系统的故障管理

ETSI GSM 12.20 (V4.2.1, 1996) 数字蜂窝通信系统（第二阶段）：基站子系统的管理信息

3 术语、定义和缩略语

3.1 术语和定义

下列术语和定义适用于本标准。

3.1.1 PLMN 子网 PLMN subnetwork

由一个 OMC 及其所管辖的所有设备、资源组成的网络，是整个 PLMN 的一个子集。

3.2 缩略语

下列缩略语适用于本标准。

ACSE	连接控制服务单元（Association Control Service Element）
ASN.1	抽象语法标记 No.1（Abstract Syntax Notation number one）
AUC	鉴权中心（Authentication Center）
BER	基本编码规则（Basic Encoding Rules）
BHCA	忙时试呼次数（Busy Hour Call Attemps）
BSC	基站控制器（Base Station Controller）
BSS	基站子系统（Base Station Subsystem）
BTS	基站收发信机（Base Transceiver Station）
CM	配置管理（Configuration Management）
CMIP	公共管理信息协议（Common Management Information Protocol）
CMISE	公共管理信息服务单元（Common Management Information Service Element）
COM	公共管理（Common Management）
CORBA	公共对象请求代理体系结构（Common Object Request Broker Architecture）
DN	可识别名（Distinguished Name）
EFD	事件转发鉴别器（Event Forwarding Discriminator）
EIR	设备身份寄存器（Equipment Identity Register）
FM	故障管理（Fault Management）
FTP	文件传输协议（File Transfer Protocol）
GDMO	管理对象定义指南（Guidelines for the Definition of Managed Objects）
GPRS	通用分组无线业务（General Packet Radio Service）
GSM	全球移动通信系统（Global System for Mobile communication）
HLR	归属位置寄存器（Home Location Register）
HO，HDO	切换（Handover）
IMSI	国际移动用户标识（International Mobile Subscriber Identifier）
MIT	管理信息树（Management Information Tree）
MO	管理对象（Managed Object）
MOC	管理对象类（Managed Object Class）
MOI	管理对象实例（Managed Object Instance）
MSC	移动交换中心（Mobile Switching Center）
MSRN	移动用户漫游号码（Mobile Subscriber Roaming Number）
NE	网元（Network Element）
NMC	网络管理中心（Network Management Center）
NR	网络资源（Network Resource）
OMC	操作维护中心（Operation & Maintenance Center）
OSI	开放系统互连（Open System Interconnection）

PCU	分组控制单元（Packet Control Unit）
PLMN	公用陆地移动网（Public Land Mobile Network）
PM	性能管理（Performance Management）
PSTN	公用交换电话网（Public Switched Telephone Network）
QoS	服务质量（Quality of Service）
RDN	相对可识别名（Relative Distinguished Name）
ROSE	远端操作服务单元（Remote Operation Service Element）
SMASE	系统管理应用服务单元（Systems Management Application Service Element）
SMSC	短消息交换中心（Short Message Switching Center）
VLR	拜访位置寄存器（Visiting Location Register）

4 接口的位置

900/1800MHz TDMA 数字蜂窝移动通信网网络管理接口在 900/1800MHz TDMA 数字蜂窝移动通信网的管理网中位置如图 1 所示。
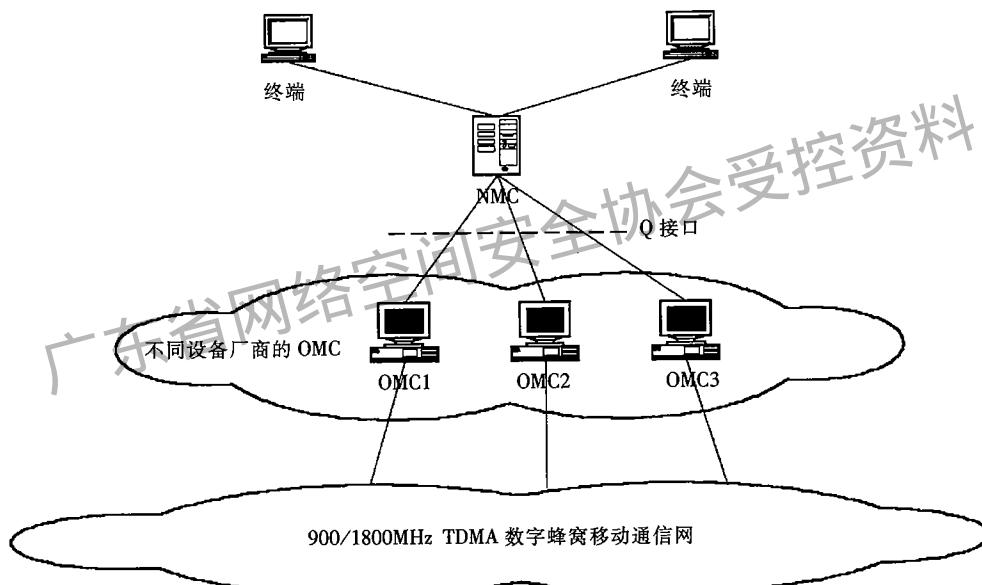
图 1 900/1800MHz TDMA 数字蜂窝移动通信网网络管理接口
在 900/1800MHz TDMA 数字蜂窝移动通信网管理网中的位置示意

在图 1 中，OMC 由各设备供应商提供，用于管理其自身的设备。NMC 在 OMC 的协同工作下，负责监视和控制整个 900/1800MHz TDMA 数字蜂窝移动通信网的运行状态，对 900/1800MHz TDMA 数字蜂窝移动通信网进行统一管理。

NMC 和 OMC 之间通过 Q 接口相连，本标准定义了基于 CMIP 的 NMC 和 OMC 间 Q 接口的管理功能需求和管理信息模型。本标准第 5 章对接口的管理功能需求进行了规定，分别从公共管理、配置管理、故障管理和性能管理等方面进行了详述。本标准的附录 A 对公共管理部分的信息模型进行了定义，附录 B 对故障管理部分的信息模型进行了描述，附录 C 对配置管理部分的信息模型进行定义，附录 D 对性能管理部分的信息模型进行定义。

NMC 和 OMC 之间的物理连接可以采用 DDN、X.25 和其他的物理媒质。

5 接口管理功能

5.1 公共管理功能

5.1.1 事件管理

5.1.1.1 事件报告模型

在一个 NMC 和多个 OMC 之间的接口中使用的事件报告功能应符合 ITU-T 建议 X.734 的定义。

接口的事件报告机制如图 2 所示。

由 NE 产生的事件以内部格式传递给 OMC，OMC 应将其转化为标准格式，并通过 EFD 上报给 NMC。事件报告功能通过管理对象类事件前向鉴别器（EFD）来实现，所有从 NE 来的事件都可能发送到 NMC。EFD 用来确定哪些事件通知将被发送到某个特定的 NMC。所有转发给 NMC 的事件都必须在 OMC 本地进行存储。
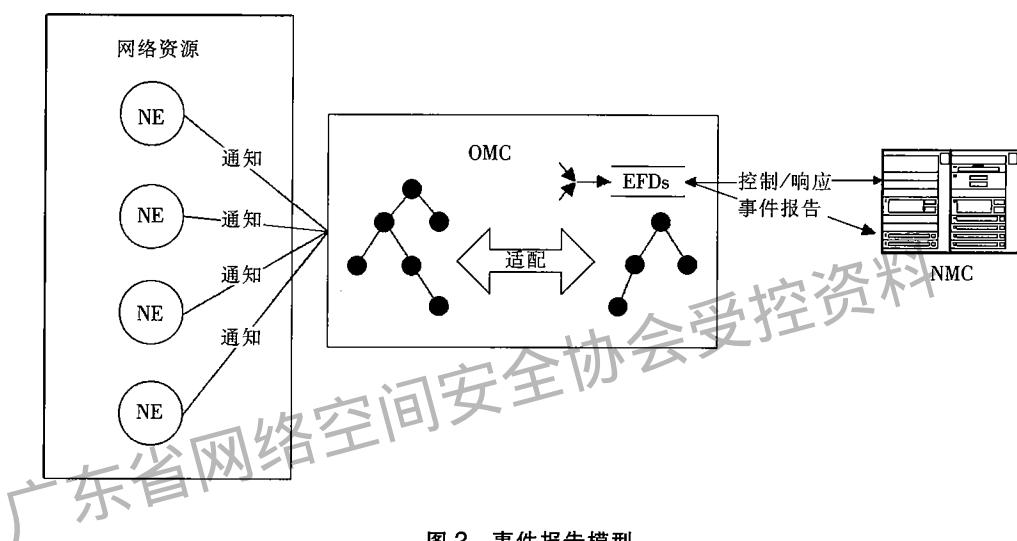
图 2 事件报告模型

EFD 管理对象类具有的必备属性和条件包见表 1。

表 1 EFD 必备属性及条件包

属性名/条件包名	访问方式	描　述
必备属性		
discriminatorId	只读	EFD 管理对象实例标识，在创建 EFD 实例时赋值
administativeState	读写	管理状态，可被 NMC 控制或修改。当其值被设为锁定（"locked"）时，EFD 实例将不能发出任何事件通知，直到被解锁（"unlocked"）
operationalState	只读	表示 EFD 实例的运行状态。当由于某些原因 OMC 不能向 NMC 发送事件通知时，此属性的值将变为不可用（"disabled"）
discriminatorConstruct	读写	指 EFD 的过滤条件，用于测试接收到的通知。如果"过滤器条件"值为真，EFD 会发送该事件到由属性 destination 所指定的管理者 NMC。该属性可被管理者 NMC 读取和改写
destination	读写	指事件通知上报的目的地。该属性可在创建一个 EFD 实例时由 NMC 赋值

表 1（续）

属性名/条件包名	访问方式	描 述
		条件包
availabilityStatusPackage		此包中只定义了"availability status"属性，该属性的值依赖于"dailyScheduling"包和"weeklyScheduling"包的计算结果。改变此属性值不会引起发送"attributeValueChange"消息的激活
backUpDestinationListPackage		备份目的地
duration		此包有"startTime"和"stopTime"两个属性，用于自动控制一个EFD的开始和停止的时间
dailyScheduling		dailyScheduling提供了鉴别器以24h为周期的可运行的时间段
weeklyScheduling		weeklyScheduling提供了鉴别器以一周为周期的可运行的时间段
externalScheduler		外部定义的时间表
modePackage		可用于指定事件报告模式，为确认型通知或非确认型通知

对表1中EFD条件包的详细信息，请参阅ITU-T建议X.734中的定义。

在本标准中，EFD需支持如下过滤条件参数或这些参数由运算符"AND"、"OR"和"NOT"所连接的组合：

— Managed Object Class（管理对象类）；

— Managed Object Instance（管理对象实例）；

— Event Type（事件类型）；

— Perceived Severity（告警级别，如果该EFD实例用于转发告警事件通知）；

— Probable Cause（可能原因，如果该EFD实例用于转发告警事件通知）。

5.1.1.2 事件种类定义

在本标准中，OMC支持的事件类型见表2的说明。

表 2 事件类型说明

事件类型	说 明	用 法
communicationsAlarm	通信告警	FM
environmentalAlarm	环境告警	FM
equipmentAlarm	设备告警	FM
processingErrorAlarm	处理错误告警	FM
qualityofServiceAlarm	服务质量告警	FM
stateChange	状态改变	CM
attributeValueChange	属性值改变	CM
cTelObjectCreation	对象创建	CM
cTelObjectDeletion	对象删除	CM
cTelRequestCMSynchronization	要求进行CM信息同步	CM
transferUpReady	批量文件传输准备就绪	COM
bulkTransferError	批量文件传输准备失败	COM
heartbeatReport	心跳	COM

关于表 2 中各类型事件的详细信息可参阅相关的 ITU-T 建议和本标准中的 5.2 节和 5.3 节。

5.1.1.3　事件报告管理功能

NMC 通过 EFD 来灵活地控制事件报告功能。OMC 应支持下面的 EFD 控制功能，包括：

— 创建一个 EFD 实例；

— 删除一个 EFD 实例；

— 修改一个 EFD 实例的属性值；

— 获取 EFD 实例的属性值；

— 挂起一个活跃的 EFD；

— 重新激活一个 EFD。

OMC 应能同时支持几个不同用途的 EFD 实例，例如支持告警通知或配置改变通知。当 OMC 在第一次初始化时，应自动创建一个 EFD，并允许上报下列通知："cTelRequestCMSynchronization"、"transferUpReady"、"heartbeatReport"、"bulkTransferError" 和 "processingError"。初始化完成后，由 NMC 根据需要再创建、删除和修改 EFD 实例。

5.1.1.4　事件缓冲功能

异常情况下为了避免事件丢失，OMC 应在本地实现一种事件缓冲机制，使得当从 NE 到来事件的速度比 OMC 转发给 NMC 的速度快时，能将这些事件暂时缓存起来。事件缓冲对 NMC 是不可见的，不受 NMC 的控制和管理。

当 NMC 和 OMC 的接口发生短时间的通信中断时，事件缓冲机制也能够避免事件的丢失。在链路中断期间，所有的事件通知都应被缓存（在缓冲区的允许的范围内）。当链路恢复时，所有被缓存的通知将以它们产生的次序依次发送给 NMC。

缓冲机制的具体实现由 OMC 决定。OMC 可以将事件缓存在内存中、文件中或数据库中。当缓冲区溢出时，OMC 将产生告警通知，告知 NMC 发生了事件缓冲溢出。在 NMC 收到该通知后，可以根据需要对事件进行同步。例如，NMC 可要求 OMC 将在缓冲区溢出期间内产生的事件采用批量数据传输机制上传。

注：事件缓存不等于事件保存。所有要发往 NMC 的事件都要被物理保存于 OMC 本地，不论它们是否被缓存。

5.1.1.5　事件同步功能

5.1.1.5.1　通信链路监视

NMC 和 OMC 之间通信链路的状态对双方都很重要。如果链路连接中断，NMC 将不能从 OMC 取得任何信息，OMC 也无法将事件上报给 NMC。因此，NMC 需要监视通信链路以便及时发现通信故障。

在本标准中定义了管理对象类 *cTelHeartbeat*，该对象类的实例周期性地发送一个心跳通知（"heartbeatReport"）给 NMC 以告知通信链路的完好。OMC 在初始化时应自动创建该对象。在正常情况下，NMC 将会周期性地收到心跳通知并以此判定链路连接是否正常。然而，如果 NMC 连续几个周期没有收到该通知，则可以得出链路中断的结论。此时，NMC 以何种方式通知网管操作员，则由 NMC 本地实现来决定。

在链路中断期间，*cTelHeartbeat* 对象实例将会持续发送 "heartbeatReport" 通知。但该通知不应被缓存，也不用进行物理存储。如果向 NMC 发送该通知不成功，OMC 只是将它丢弃。

OMC 周期发送 "heartbeatReport" 通知的时间间隔由 *cTelHeartbeat* 的属性 "period" 决定。NMC 可以改变该属性的值，从而改变心跳通知的上报周期。

注：*cTelHeartbeat* 的功能只是在与其相关的 EFD 处于激活状态时才有效。如果由于某种原因，EFD 被 NMC 挂起，则 *cTelHeartbeat* 就不会再将心跳通知发送给 NMC。这表示在此期间，NMC 不关心 NMC 和 EFD 之间的连接状况，因此在此期间收不到心跳通知不能被认为是连接中断。

5.1.1.5.2　事件同步过程

如前所述，OMC 应支持本地缓冲功能，这样在 OMC-NMC 之间连接中断时，可以缓存除 "heartbeartReport" 外的所有通知；当 OMC-NMC 间的通信连接恢复后，OMC 按照事件产生的时间先后顺序自动向 NMC 发送这些缓存的事件通知。

在 OMC 缓冲区即将溢出时，管理对象类 *cTelOmcFunction* 的实例将产生一个缓冲区溢出告警并被记录在缓冲区内。缓冲区溢出告警通知的"EventType"（事件类型）是"processingError"（处理出错），"AlarmSeverity"（告警级别）是"major"，"ProbableCause"（可能原因）是"storage capacity problem"（存储容量问题），"AdditionalText"（附加文本信息）是"buffer overflow"（缓冲区溢出）。当 OMC 的缓冲区已满，则此后产生的所有通知都不会被缓存。在连接恢复时，OMC 将缓冲区内所有的通知都发送给 NMC。如果 NMC 收到了缓冲区溢出告警通知，这意味着从连接中断到恢复的过程中可能会丢失一些事件通知；NMC 可根据需要采取措施以保证事件信息的同步。因为 OMC 保存着上报给 NMC 事件的物理拷贝，所以 NMC 可使用 5.1.3 节中描述的"批量数据传输机制"，从 OMC 得到某段时间间隔内的历史事件。

5.1.2 日志管理

5.1.2.1 日志管理模型

日志控制功能提供了一种由 NMC 控制、在 OMC 中存储事件信息的机制。本标准中使用的日志控制功能遵从 ITU–T 建议 X.735。

日志控制功能机制如图 3 所示。

此功能是通过管理对象类 *log* 实现的，所有从 NE 发来的事件可以作为日志记录存入 OMC 侧的日志中。管理对象类 *log* 的实例将判断哪些事件通知可以存入日志中。
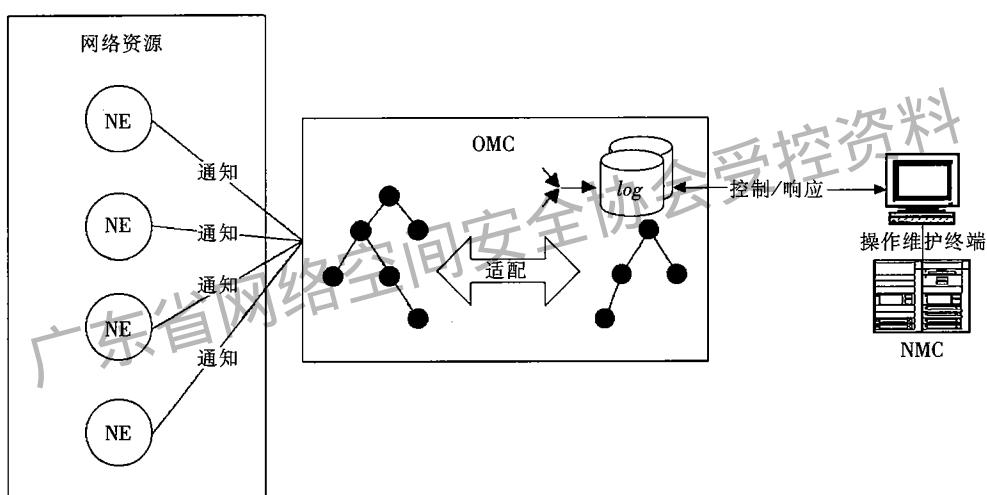
图 3　日志管理模型

log 管理对象类的必备属性和条件包描述见表 3。

表 3　*log* 必备属性及条件包

属性名	访问方式	描　　述
必备属性		
logId	只读	*log* 管理对象实例的标识符，当创建 *log* 实例时赋值
administativeState	读写	指管理状态，可被 NMC 控制或修改。当值设定为锁定（"locked"）时，此 *log* 实例不再存储任何日志记录
operationalState	只读	指 *log* 实例的运行状态。当 OMC 由于某些原因不能存储日志记录时，此属性的值将变为"disable"
discriminatorConstruct	读写	指过滤条件，用于测试和接收通知。对于接收到的事件，如果过滤条件为真，且允许此 *log* 写日志，则此 *log* 将收到的事件存储为一条日志记录。此属性可被管理者 NMC 读写

表 3（续）

属性名	访问方式	描　述
availabilityStatus	只读	指可用状态
logFullAction	读写	指日志满时的动作。此属性提供给管理者 NMC 处理 log 中日志记录溢出问题的能力。如果此属性设定为覆盖（"wrap"），当到达日志满时，该 log 中最早的日志记录将被新记录所覆盖；如果此属性设为暂停（"halt"），当 log 满了以后将不再存储新的日志记录
条件包		
finiteLogSizePackage		如果一个 log 被限定了大小，将使用此条件包。在此包中包含 3 个属性，即 maxLogSize、currentLogSize 和 numberOfRecords
logAlarmPackage		此条件包只有一个属性，即告警能力阈值。此属性指定了当存储的日志记录达到日志最大存储空间的某个百分比时，将会产生处理错误告警，以表明日志已经快满了
duration		此包有 "startTime" 和 "stopTime" 两个属性，用于自动控制一个 log 的开始记录和停止记录的时间
dailyScheduling		dailyScheduling 提供了 log 以 24h 为周期的可运行的时间段
weeklyScheduling		weeklyScheduling 提供了 log 以一周为周期的可运行的时间段
externalScheduler		外部定义的时间表

在本标准中，log 支持如下过滤条件参数以及这些参数通过运算符 "AND"、"OR" 和 "NOT" 连接的组合：
—— Managed Object Class （管理对象类）；
—— Managed Object Instance （管理对象实例）；
—— Event Type （事件类型）；
—— Perceived Severity （告警级别，如果 log 实例用于存储告警事件通知）；
—— Probable Cause （可能原因，如果 log 实例用于存储告警事件通知）。
—— processingErrorAlarm （处理错误告警）。

5.1.2.2　日志记录类型

在本接口中，OMC 支持的日志记录类型见表 4。

表 4　日志记录类型

日志记录类型	说　明	用　途
alarmRecord	告警记录	FM
stateChangeRecord	状态改变记录	CM
attributeValueChangeRecord	属性值改变记录	CM
cTelObjectCreationRecord	对象创建记录	CM
cTelObjectDeletionRecord	对象删除记录	CM
cTelRequestCMSynchronizationRecord	请求 CM 信息同步记录	CM
cTelTransferReadyRecord	文件传输准备就绪记录	COM
cTelBulkTransferErrorRecord	文件传输准备失败通知记录	COM

关于表 4 中各类日志记录的详细信息请查阅相关的 ITU-T 建议以及本规范附录 A 和附录 C 的信息模型定义。

5.1.2.3 日志管理功能

OMC 应向 NMC 支持如下日志控制功能：

— 在 OMC 中创建一个 *log* 实例；

— 删除 OMC 中的一个 *log* 实例；

— 修改 OMC 中一个 *log* 实例的属性；

— 获取一个 *log* 实例的属性；

— 查询一个日志中的日志记录；

— 删除一个日志中的日志记录。

OMC 应该能同时支持多个 *log* 实例，每一日志实例可用于不同的目的，例如告警事件记录和配置改变事件记录。NMC-OMC 接口中使用的 *log* 由 NMC 控制和管理。但在 OMC 第一次初始化时，应该自动创建 3 个缺省的 *log* 实例，各 *log* 实例的 RDN、用途以及可记录的事件类型见表 5。

表 5 日志实例描述

RDN	用途	日志记录类型
1	FM	alarmRecord
2	CM	stateChangeRecord attributeValueChangeRecord cTelObjectCreationRecord cTelObjectDeletionRecord cTelRequestCMSynchronizationRecord
3	COM	cTelTransferReadyRecord cTelBulkTransferErrorRecord

当 OMC 第一次和 NMC 连接时，所有上述 *log* 实例应自动创建，并且其初始状态和其过滤条件应设为允许收集 FM、CM 和 COM 事件记录。在以后 OMC 重启时，这些日志实例以及相应的日志记录实例应能够被恢复。理论上这些 *log* 实例的所占空间的大小是无限的。NMC 可以在任何时候向 OMC 查询历史日志记录信息。当日志空间不足时，OMC 的日志记录存储发生问题可能会导致事件的永久丢失。此时，OMC 应向 NMC 发送 *log* 实例处理错误告警通知。

5.1.3 批量数据传送功能

5.1.3.1 批量数据传送模型

批量数据传送功能用于在 OMC 与 NMC 之间传送大量网管数据。例如，当一个 OMC 第一次连接到 NMC 时向 NMC 传送配置信息，以及性能数据的批量传送和事件通知的批量传送等。

NMC 与 OMC 之间批量数据传送功能的实现采用文件传输协议 FTP。

NMC 与 OMC 之间的批量数据传送过程由 NMC 控制。控制功能由对象类 *cTelSimpleFileTransferControl* 实现。每个 OMC 都应在系统初始化时建立一个该类的实例。

本标准定义了以下两种批量数据传送过程：

—由 NMC 主动请求的从 OMC 向 NMC 传送的数据；

—由 OMC 自发上报的从 OMC 向 NMC 传送的数据。

二者进行批量数据传送的流程如图 4 所示。
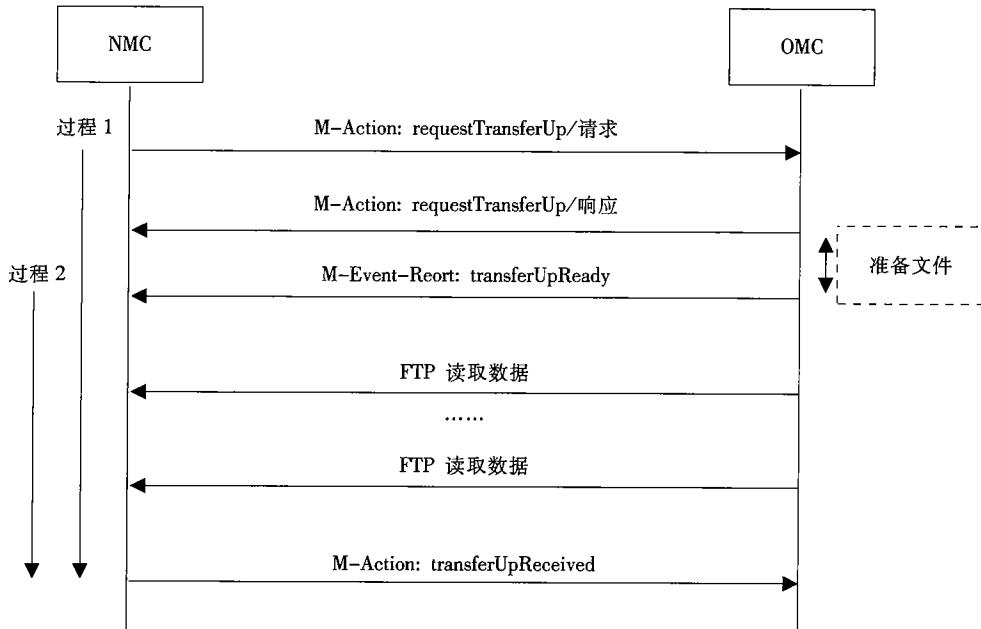
图 4　批量数据文件传输过程

5.1.3.2　批量数据传送方式

5.1.3.2.1　NMC 主动请求的从 OMC 到 NMC 的数据传送

NMC 可以通过"requestTransferUp"动作向 OMC 请求传送批量数据，请求中含有下面的参数。

— fileType：表示 NMC 向 OMC 所请求的数据类型。

— objectSelection：NMC 可以通过设置特定的对象选择过滤条件来获取特定的数据。

— transferId：该参数用于标识一次批量数据传送过程的一组相关操作及响应。

当 OMC 收到该动作请求后应进行相关数据的采集和处理，生成一个或多个数据文件。当所有的数据文件准备完毕后，OMC 应向 NMC 发送"transferUpReady"通知，通知中包括以下参数。

— fileName：所要传送的数据文件名。

— fileType：数据文件类型。

— fileSize：文件的大小（可选，单位是字节）。

— transferId：该参数用于标识一次批量数据传送过程的一组相关操作及响应。

收到该通知后，NMC 就可以通过 FTP 开始读取文件。当文件传输结束后，NMC 发送"transferUpReceived"动作告知 OMC 所传送的数据文件是否已经被正确获取。

在当 NMC 主动请求批量数据传送的情况时，动作请求"requestTransferUp"中的"transferId"参数值应为正值，且 NMC 必须保证在某一相当长的时期内每个数据传送过程中所用的传输标识"transferId"值是惟一的。在每个数据传送过程中，"transferUpReady"通知中的"transferId"参数值应与所响应的"requestTransferUp"动作中的同名参数值保持一致。

5.1.3.2.2　OMC 主动上报的数据从 OMC 到 NMC 的数据传送

OMC 也可以在必要时主动请求 NMC 来获取数据文件，例如在测量周期到达时上报所采集的性能测量数据。在文件传送前，OMC 要按与 NMC 双方都认可的格式准备好文件，并向 NMC 发送"transferUpReady"通知，其后的操作与前面所述相同。

这种情况下，OMC 应将通知"transferUpReady"中的"transferId"参数值设为负值。当 NMC 收到"transferId"为负值的"transferUpReady"通知时，能够判定这是 OMC 主动请求上报的数据传送通知。OMC 必须保证在某一相当长的时期内传输标识"transferId"的值是惟一的。

5.1.3.3 批量数据的内容及格式

批量数据传送功能可传送 4 种类型的数据文件，可以是性能数据文件、配置数据文件、事件通知文件或日志记录文件，见表6。

表 6 文件内容与格式

文件类型	适用类型	内容	格式
配置文件	CM	GetResult 所表示的管理对象信息	BER 编码
性能文件	PM	GetResult 所表示的历史性能数据对象信息	BER 编码
事件文件	COM	EventReportArgument 表示的事件信息	BER 编码
日志文件	COM	GetResult 表示的日志记录对象信息	BER 编码

配置文件用于传输大量配置信息，例如整个 MIT 或者只是其中几个 ME 所包含的对象信息。配置文件常用于信息同步，比如网络中增加了新的 OMC 或者 NMC 和 OMC 间信息失步。配置文件的内容是一系列管理对象的 GetResult 信息，按照各管理对象在 MIT 树中的位置，从上到下组织。GetResult 是 CMISE 原语 M-GET 获取某个对象所有属性值的操作结果。配置文件将可以用来传送 MIT 中除历史性能数据和日志记录对象实例以外的所有对象信息。

性能文件用于传输性能测量结果。性能文件的内容是一系列历史性能数据对象的 GetResult 信息。

事件文件用于传输大量的事件通知，尤其适用于在 NMC-OMC 长时间通信中断后，NMC 要求获取该期间产生的所有事件。文件内容是一系列的 EventReportArgument 信息，以事件发生的先后顺序进行排列。

日志文件用于传送日志记录。内容是一系列日志记录的 GetResult 信息，可以传递多种类型的日志记录，因此应将相同种类的日志记录组合在一起，按照时间戳升序排列。

用 ASN.1 定义的数据文件信息模型见附录 E。

为了能向 NMC 提供正确的文件信息，OMC 应支持动作 "requestTransferUp" 中特定的信息参数值，OMC 必须支持的动作参数值的最小集合见表7。

表 7 OMC 应支持的 requestTransferUp 动作参数

动作参数名		参数值设置情况			
		获取配置文件时的参数值设置	获取性能文件时的参数值设置	获取事件文件时的参数值设置	获取日志文件时的参数值
fileType		*cmDataFile*	*pmDataFile*	*eventDataFile*	*logFile*
object Selection	baseMO	*	*	*N/A*	*
	scope	*WholeSubTree*	*WholeSubTree*	*N/A*	*WholeSubTree*
	filter	*N/A*	*periodEndTime, objectClass of historyData*	*eventTime, eventType, alarmSeverity*	*loggingTime, objectClass of logRecord*
transferId		*	*	*	*
注：符号 "*" 表示该参数值可由 NMC 根据实际需要进行设置。					

5.1.3.4 批量数据传送异常处理

以下描述了批量数据传送过程中的几种异常处理。

a) OMC 不能处理 "requestTransferUp" 动作请求。这将产生一条动作请求失败的确认消息。OMC 将

终止文件准备传输进程。

b）OMC 从 NMC 收到请求后在准备文件时出错。OMC 将会产生一个"bulkTransferError"通知，其"probableCause"域将说明可能的原因。如果通知"bulkTransferError"的告警级别的值为"warning"（提示告警）或"minor"（次要告警），那么即使有错误，文件还是会生成，也即 OMC 在后续还将发送相应文件准备就绪通知；如果该通知的"bulkTransferError"项的值为"major"（主要告警）或"critical"（紧急告警）或"indeterminate"（级别未确定），则该过程将被终止。失败通知中将包含与相对应的"requestTransferUp"动作请求中的传输标识 transferId。

c）NMC 未将所有的数据文件正确获取。NMC 应通过动作"transferUpReceived"告知 OMC 其文件获取情况，OMC 应该请求重新传送那些没有传输成功的文件。重传的次数由本地实现所决定。数据重传过程中使用的传输标识 transferId 应与原传输标识保持一致。

5.2 配置管理

5.2.1 配置修改功能

配置修改功能描述了需要施加在网元（NE 或 NR）上的动作和期望的应答。本标准目前不要求 OMC 向 NMC 通过标准化接口提供这些功能。关于配置修改功能部分的要求，有待进一步研究。

5.2.2 配置监视功能

5.2.2.1 配置信息的查询

NMC 可以通过两种方式向 OMC 请求配置信息：

a）通过 CMISE GET 原语直接查询，NMC 发送 GET 原语向 OMC 查询配置信息；

b）通过批量数据传送方式（见 5.1.3.2.1 节），NMC 通过文件方式主动进行配置信息的获取。

5.2.2.2 配置改变信息的报告

除了能够按照 NMC 的请求提供配置信息，OMC 还应具有自动上报配置改变信息的能力。一般情况下，OMC 中的任何改变都会触发相应的属性值改变通知（参数说明见表 8）、状态改变通知（参数说明见表 9）、对象创建通知（参数说明见表 10）、对象删除通知（参数说明见表 11）或要求进行 CM 信息同步的通知（参数说明见表 12），并以 CMISE M-EVENT-REPORT 原语报告给 NMC。以上各类配置改变通知应按要求在 OMC 本地进行物理存储，NMC 可以在任何时候通过批量数据传送功能对某时间段内产生的配置改变通知信息以事件文件的形式进行获取。

a）属性值改变通知（*attributeValueChange*）：这类通知用于报告对象实例的一个或多个属性值的改变，详细的通知信息参数见表 8。

表 8 属性值改变通知（attributeValueChange）

参数名		中文名称	说　明
managedObjectInstance		管理对象实例	产生该通知的管理对象实例标识
managedObjectClass		管理对象类	产生该通知的管理对象实例所属的管理对象类
eventType		事件类型	事件类型：attributeValueChange
eventTime		事件发生时间	事件产生时间
eventInfo	sourceIndicator	事件产生原因标识	可选域，用于标识此通知消息是由于管理操作引起的还是由于在资源侧的操作引起的
	attributeIdentifierList	属性标识列表	可选域，属性标识符列表
	attributeValueChangeDefinition	属性值改变情况	此域标识哪些属性的值发生了改变，变化之后的属性的取值，变化之前属性的取值（可选）
	notificationIdentifier	通知流水号	可选域，用于在管理范围内惟一地标识该通知

表8（续）

参数名		中文名称	说　明
eventInfo	correlatedNotifications	相关通知流水号	可选域，用于标识与此通知相关的其他通知的流水号
	additionalText	附加文本	可选域，附加的文本信息，其类型为GraphicString，由OMC厂商自己实现，但其附加的文本格式必须在NMC中注册
	additionalInformation	附加信息	可选域，附加信息

　　b）状态改变通知（*stateChange*）：这类通知用于报告对象实例的一个或多个状态值的改变，详细的通知信息参数见表9。

表9　状态改变通知（stateChange）

参数名		中文名称	说　明
managedObjectInstance		管理对象实例	产生该通知的管理对象实例标识
managedObjectClass		管理对象类	产生该通知的管理对象实例所属的管理对象类
eventType		事件类型	事件类型：stateChange
eventTime		事件发生时间	事件产生时间
eventInfo	sourceIndicator	事件产生原因标识	可选域，用于标识此通知消息是由于管理操作引起的还是由于在资源侧的操作引起的
	attributeIdentifierList	属性标识列表	可选域，属性标识符列表
	attributeValueChangeDefinition	属性值改变情况	此域标识哪些状态属性的值发生了改变，变化之后的状态属性的取值，变化之前状态属性的取值（可选）
	notificationIdentifier	通知流水号	可选域，用于在管理范围内唯一地标识该通知
	correlatedNotifications	相关通知流水号	可选域，用于标识与此通知相关的其他通知的流水号
	additionalText	附加文本	可选域，附加的文本信息，其类型为GraphicString，由OMC厂商自己实现，但其附加的文本格式必须在NMC中注册
	additionalInformation	附加信息	可选域，附加信息

　　c）对象创建通知（*cTelObjectCreation*）：这类通知用于报告一个对象实例（除历史数据对象和日志记录对象外）的创建，详细的通知信息参数见表10。这类通知用于少量对象实例被创建的情况。

表 10　对象创建通知（cTelObjectCreation）

参数名		中文名称	说　明
managedObjectInstance		管理对象实例	产生该通知的管理对象实例标识，*cTelCMObjectControl* 对象实例
managedObjectClass		管理对象类	产生该通知的管理对象实例所属的管理对象类：*cTelCMObjectControl*
eventType		事件类型	事件类型：cTelObjectCreation
eventTime		事件发生时间	事件产生时间。
eventInfo	createdMOC	新创建的对象实体类型	已创建对象实体的管理对象类标识
	createdMOI	新创建的对象实体标识	已创建对象实体的对象实例标识
	creationTime	对象实体创建时间	对象实体创建的时间
	attributeList	新创建对象的属性列表	已创建对象实体的属性标识和属性值列表

　　d）对象删除通知（*cTelObjectDeletion*）：这类通知用于报告一个对象实例（除历史数据对象和日志记录对象外）或一个子树的删除，详细的通知信息参数见表 11。当 MIT 树中的一个子树整个被删除时，只需报告这个子树的根节点对象实例的删除信息即可。

表 11　对象删除通知（cTelObjectDeletion）

参数名		中文名称	说　明
managedObjectInstance		管理对象实例	产生该通知的管理对象实例标识，*cTelCMObjectControl* 对象实例
managedObjectClass		管理对象类	产生该通知的管理对象实例所属的管理对象类：*cTelCMObjectControl*
eventType		事件类型	事件类型：cTelObjectDeletion
eventTime		事件发生时间	事件产生时间
eventInfo	deletedMOC	被删除的对象实体类型	已删除对象实体的管理对象类标识
	deletedMOI	被删除的对象实体标识	已删除对象实体的对象实例标识
	deletionTime	对象实体删除时间	对象实体删除的时间

　　e）要求进行 CM 信息同步的通知（*cTelRequestCMSynchronization*）：这类通知用于在大量对象实体被创建/删除时或整个网络的信息发生了重大变化时，OMC 通知 NMC 应通过批量数据文件的传递来进行 CM 信息的同步。NMC 收到该通知后，可下发动作 *requestTransferUp* 来启动一个配置数据文件的获取传递过程。另外，在 OMC 第一次初始化时，也应上报该通知以告知 NMC 可以开始进行配置信息获取。详细的告警参数说明见表 12。

表 12 要求进行 CM 信息同步的通知 (cTelRequestCMSynchronization)

参数名		中文名称	说　明
managedObjectInstance		管理对象实例	产生该通知的管理对象实例标识，*cTelCMObjectControl* 对象实例
managedObjectClass		管理对象类	产生该通知的管理对象实例所属的管理对象类：*cTelCMObjectControl*
eventType		事件类型	事件类型：cTelRequestCMSynchronization
eventTime		事件发生时间	事件产生时间
eventInfo	baseMO	配置同步根对象实例	需进行整棵子树配置信息同步的根对象实例
	scope	配置同步范围	范围设置（一般用 *WholeSubTree*）
	filter	配置同步条件	过滤设置（可选）

5.2.2.3　不同阶段的配置信息获取过程

本节描述以下 3 个阶段的配置信息获取过程。

a）初始化阶段

OMC 第一次初始化阶段，NMC 对 OMC 中配置信息获取流程参见 6.4.2 节中的详细描述。

b）正常阶段

在正常情况下，OMC 支持实时的配置信息改变通知发送功能以保证配置数据的一致性。如果与 CM 相关的 EFD 始终是开启的，则涉及到配置数据改变的 5 类通知会发送给 NMC。

此外，NMC 操作员也可以使用以下方法得到所需的配置信息：

—— 对于完整配置信息的同步，可以使用"requestTransferUp" M-ACTION 通过批量数据传送方式向 OMC 请求完整的配置信息，OMC 向 NMC 提供相应的配置文件数据；

—— 对于局部配置信息的同步（例如只进行 BSS 相关配置信息的同步或根据 OMC 发送的 cTelRequestCMSynchronization 通知信息），可以使用带有适当参数（baseMO、scope、filter 等）的 "requestTransferUp" M-ACTION 通过批量数据传送方式向 OMC 请求部分的配置信息，OMC 向 NMC 提供相应的配置文件数据；

—— 对于少量配置信息的查询，可以通过 CMISE M-GET 原语对指定的管理对象实例进行属性信息的获取，OMC 向 NMC 返回相应的查询结果；

—— 对于配置改变通知信息的同步，可以使用"requestTransferUp" M-ACTION 通过批量数据传送方式向 OMC 请求某时间段内产生的配置改变通知信息（stateChange、attributeValueChange、cTelObjectCreation、cTelObjectDeletion、cTelRequestCMSynchronization），OMC 向 NMC 提供相应的事件文件数据；

—— 对于配置改变通知信息的同步，可以使用 CMISE M-GET 原语向 OMC 查询相关的日志记录（如 stateChangeRecord、attributeValueChangeRecord、cTelObjectCreationRecord、cTelObjectDeletionRecord、cTelRequestCMSynchronizationRecord）信息，OMC 向 NMC 返回日志记录的查询结果；

—— 对于配置改变通知信息的同步，还可以使用"requestTransferUp" M-ACTION 通过批量数据传送方式向 OMC 请求相关的日志记录（如 stateChangeRecord、attributeValueChangeRecord、cTelObjectCreationRecord、cTelObjectDeletionRecord、cTelRequestCMSynchronizationRecord）信息，OMC 向 NMC 提供相应的日志文件数据。

c）当 OMC-NMC 之间的连接重新建立后

当 OMC 和 NMC 间的连接中断并重新建立时，配置改变通知信息的获取过程参见 5.1.1.5 节中的描述。

5.3 故障管理

本接口中故障管理的总体目标如下：

— 通知 NMC 被管网元和 OMC 的当前状态；

— 及时和准确地提供被管网元和 OMC 自身的异常数据；

— 保持 NMC、OMC 的故障管理信息和网络的实际状态一致。

为达到以上目标，OMC 和相关网元应该提供下面的功能集：

— 故障监视功能，监视系统的故障、缺陷和异常并及时报告；

— 故障定位功能，在故障发生时，确认故障所在的一个或多个资源。
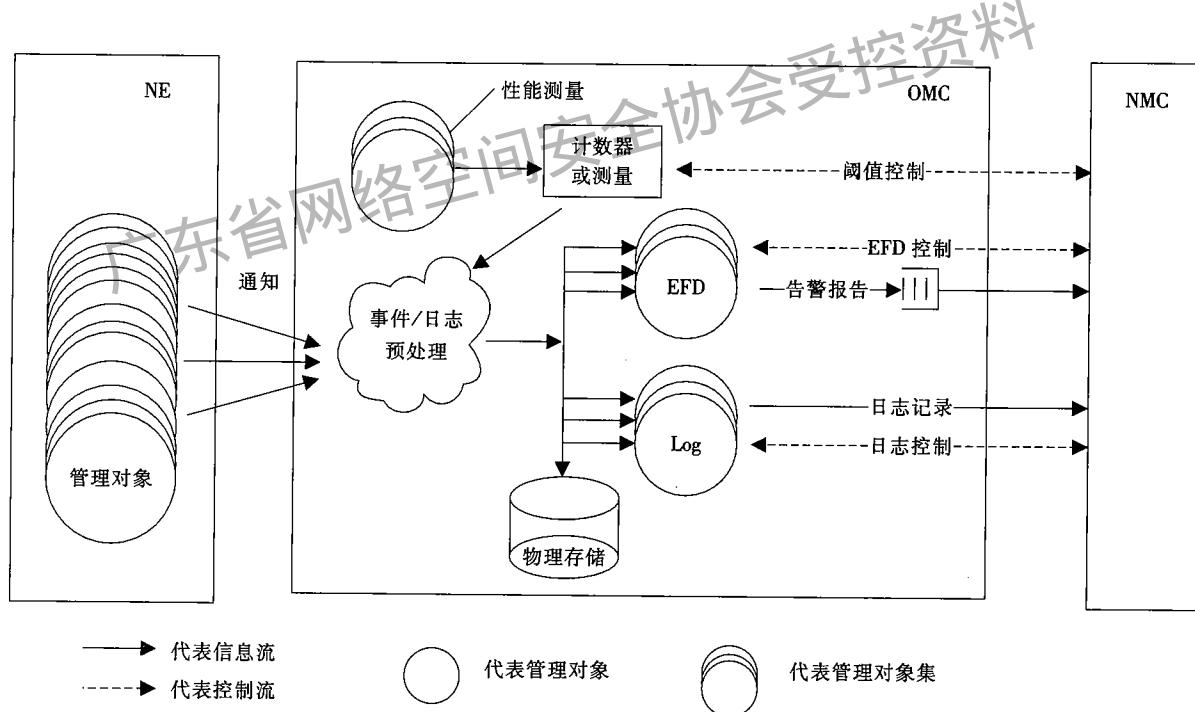
5.3.1 故障监视

5.3.1.1 告警监控模型

本接口中故障监视包括如下需求：

— 所有检测到的 OMC 或 NE 中的故障、缺陷和异常应实时报告给 NMC（当符合 NMC 设置的事件上报条件时）；

— 告警上报应通过 EFD 进行控制，可以设置事件上报过滤器（哪些事件应该被丢弃，哪些事件应该发送）和事件上报目的地；

— OMC 应在本地对告警信息进行物理存储，支持以后 NMC 对告警通知信息的同步；

— OMC 能够把告警信息以告警记录的形式记入日志，并支持以后 NMC 对日志记录的查询。

告警（也适用于事件通知）监控模型如图 5 所示。

注：1. "事件/日志预处理"是 OMC 的内部功能，不受本标准的约束；

　　2. 带阴影的部分（关于性能逾门限值告警控制）在本接口中不作强制要求。

图 5　告警监控模型

告警监控模型由以下功能模型组成：

a）故障监测功能，它不需被 NMC 管理，因此不在本标准中进行规定；

b）告警报告功能，它由以下部分实现：

— 故障监测器，源告警通知的产生；

— 事件预处理；

— 事件上报（包括鉴别器设置、通知发送和 EFD 管理），详细描述可参见 5.1.1 节及 ITU-T X.733、X.734。

d）日志控制功能，它由如下部分实现：

— 日志预处理功能；

— 日志记录存储（包括鉴别器设置、日志记录格式化和存储、日志记录查询和日志管理），详细描述可参见 5.1.2 节及 ITU-T X.733、X.735。

5.3.1.2 告警信息参数

本节描述包含在告警通知中的可能参数信息，其中注解"M"代表该参数为"必备参数"，"U"代表该参数为"用户可选"。关于各参数的信息说明请参见 ITU-T X.733，参数名称如下所示。

— Probable cause（M）。告警可能原因，在附录 B.3 节列出了在 ITU-T M.3100、X.721 和 ETSI GSM 12.11 中定义的告警原因。此外，设备提供商可以定义自己特有的告警原因，但不能与 ITU-T M.3100、X.721 及 GSM 12.11 中的相关定义冲突，且在使用前必须向 NMC 注册。

— Specific problem（U）。

— Perceived severity（M）。该参数的值定义在 ITU-T X.721 中，分 critical（紧急）、major（主要）、minor（次要）、warning（提示）、cleared（已清除）和 indeterminate（不确定）6 个等级。

— Backed-up status（U）。

— Backed-up object（U）。

— Trend indication（U）。

— Threshold information（U）。

— Notification identifier（U）。该参数提供告警的惟一标识，这个唯一标识还可能被"Correlated notifications"参数携带来表达告警间的相关性（如告警的清除）。对告警标识的指配由 OMC 决定，OMC 应保证在较长的一段时间内各告警的标识惟一性。

— Correlated Notifications（U）。该参数包括相关告警标识的集合和（或）相关的对象实例。该参数可用于在向 NMC 报告告警清除通知（告警级别为"cleared"）中，明确指明是对哪一个或哪几个告警的清除。

— State change definition（U）。

— Monitored attributes（U）。

— Proposed repair actions（U）。

— Additional text（U）。该参数用来提供 OMC 所检测到的故障、缺陷和异常的更详细信息。如使用该参数，应按以下的规定对该参数的 ASCII 文本进行语法和格式约束。字符 ' ' 被用来作为各子参数的分割符，它的 ASCII 码值是 96。

该参数可拥有的子参数见表 13。

表 13 "Additional text" 的子参数

子参数名	说 明
locatingInfo	发生告警的网络实体的具体定位信息，如定位到某个机架的槽和板位甚至端口的信息。该信息中包含的已知网元标识应与其内部标识"userLabel"保持一致
originalType	厂商设置的告警原始类型
originalSeverity	厂商设置的告警原始级别
detailedContext	厂商对告警的更详细的文本说明
repairProposal	厂商提供的故障修复建议

以下是定义"Additional text"参数 ASCII 码流格式的 BNR 范式。

additionalText ::= <fieldInfo> [<seperator> <fieldInfo>] * | ""

fieldInfo ::= <fieldName><connector><fieldValue>

<fieldName > ::= "locatingInfo" | "originalType" | "originalSeverity" | "detailedContext" | "repairProposal"

<connector> ::= '='

<fieldValue>::= ASCII string, which are all printable characters，except the character '`'.

<seperator> ::= '`'

字符'`'用于分割各个子参数，字符'='用于连接各子参数的名字和值。各子参数的值序列中不应包含分割字符'`'。

—— Additional information (U)。

5.3.1.3 告警通知映射规则

ITU-T X.733 定义了 5 种基本告警类别。这 5 类告警可以分为两组：一组是功能相关告警，包括 communicationsAlarm（通信告警）、processingErrorAlarm（处理错误告警）和 qualityofServiceAlarm（服务质量告警）；另一组是设备相关告警，有 equipmentAlarm（设备告警）和 environmentalAlarm（环境告警）。在本接口中，各类告警到各管理对象类的映射见表 14。

表 14 管理对象类的相关告警

管理对象类	告警类型	必选/条件可选
cTelBsc	communicationsAlarm	必选
	processingErrorAlarm	必选
	qualityofServiceAlarm	可选
	environmentalAlarm	由相关的 cTelGsmEquipment 对象上报
	equipmentAlarm	由相关的 cTelGsmEquipment 对象上报
cTelBts	与 cTelBsc 相同	
cTelPcu	与 cTelBsc 相同	
cTelBtsSiteManager	与 cTelBsc 相同	
cTelGsmEquipment	communicationsAlarm	必选
	processingErrorAlarm	必选
	environmentalAlarm	必选
	equipmentAlarm	必选
cTelLapdLink	communicationsAlarm	必选
	processingErrorAlarm	必选
	qualityofServiceAlarm	可选
cTelTranscoder	与 cTelBsc 相同	
software	processingErrorAlarm	必选
cTelPcmCircuit	与 cTelBsc 相同	
cTelPcu	与 cTelBsc 相同	

表 14（续）

管理对象类	告警类型	必选/条件可选
cTelSignallingLinkTP	communicationsAlarm	必选
	processingErrorAlarm	必选
cTelCircuitEndPointSubgroup	communicationsAlarm	必选
	processingErrorAlarm	必选
cTelOmcFunction	processingErrorAalrm	必选
	communicationsAlarm	必选
	processingErrorAlarm	必选
	qualityofServiceAlarm	可选
	environmentalAlarm	由相关的 *cTelGsmEquipment* 对象上报
	equipmentAlarm	由相关的 *cTelGsmEquipment* 对象上报
cTelSimpleFileTransferControl	bulkTransferError	必选

一个来自于 NE 的非标准的告警通知可能触发 OMC 产生一个到 EFD 和 *log* 实例的标准告警通知。在 OMC 进行非标准告警通知到标准告警通知的转换时，应遵循以下映射规则：

a）管理对象类 *cTelPlmnSubnetwork* 和 *managedElement* 只用于表达 OMC 域的包含关系，来自于 NE 或 OMC 内部的告警不会被映射为这两个管理对象类的告警通知；

b）对于基站子系统，所有来自于 NE 的功能相关告警事件都将被映射到相应的功能实体上，例如 *cTelBsc*、*cTelBts*、*cTelBtsSiteManager*、*cTelLapdLink*、*cTelPcmCircuit* 和 *cTelTranscoder*，所有来自于 NE 的设备相关告警事件都应该被映射到相关的物理设备 *cTelGsmEquipment* 上；

c）对于交换子系统，如 MSC、VLR、HLR、EIR 和 AUC，并没有为它们的功能实体相应 *xxxFunction* 对象类定义告警通知，所有来自于这些网元的告警事件都应被映射到它们相关物理设备 *cTelGsmEquipment* 上；

d）对于 OMC，功能相关告警映射到其功能实体 *cTelOmcFunction* 上，而设备相关告警映射到相关物理设备 *cTelGsmEquipment* 上。

注：对于各类功能实体与物理设备 *cTelGsmEquipment* 的关联关系请参考附录 C。

5.3.1.4 告警信息的传递

5.3.1.4.1 告警实时上报

OMC 能够向 NMC 实时上报被管网络中所发生的异常告警。告警通知的实时上报通过管理对象 EFD 来控制，通过对 EFD 属性的设置可以控制告警上报的条件及上报目的地。关于 EFD 的管理可参见 5.1.1.3 节。

5.3.1.4.2 告警同步

告警同步属于事件同步，参见 5.1.1.5 节的描述。

5.3.2 故障定位

故障定位的目标是当 OMC 通知 NMC 有故障发生时，通过 OMC 提供的信息能够确定故障单元。如果需要，也可以通过定位程序的进一步确认（例如测试）得到更详细的信息。

本接口要求包含在告警通知中的信息应该尽量详细，以支持故障定位功能。除了故障原因和严重程度，告警通知信息还应该指出告警来自哪个管理对象实例。

关于故障定位和检测的更进一步信息也可在告警通知中的"附加文本"子参数域提供。

5.4 性能管理

5.4.1 性能测量对象模型

性能管理用来监测 GSM 通信网络的运行状况，以实施网络维护和调整，保证网络以经济、有效的方式运行。性能管理的内容包括进行性能测量，收集性能测量数据并上报给 NMC。NMC 根据这些数据进行性能分析，以发现整个网络的运行趋向和模式，定位潜在的问题。性能测量对象模型如图 6 所示。
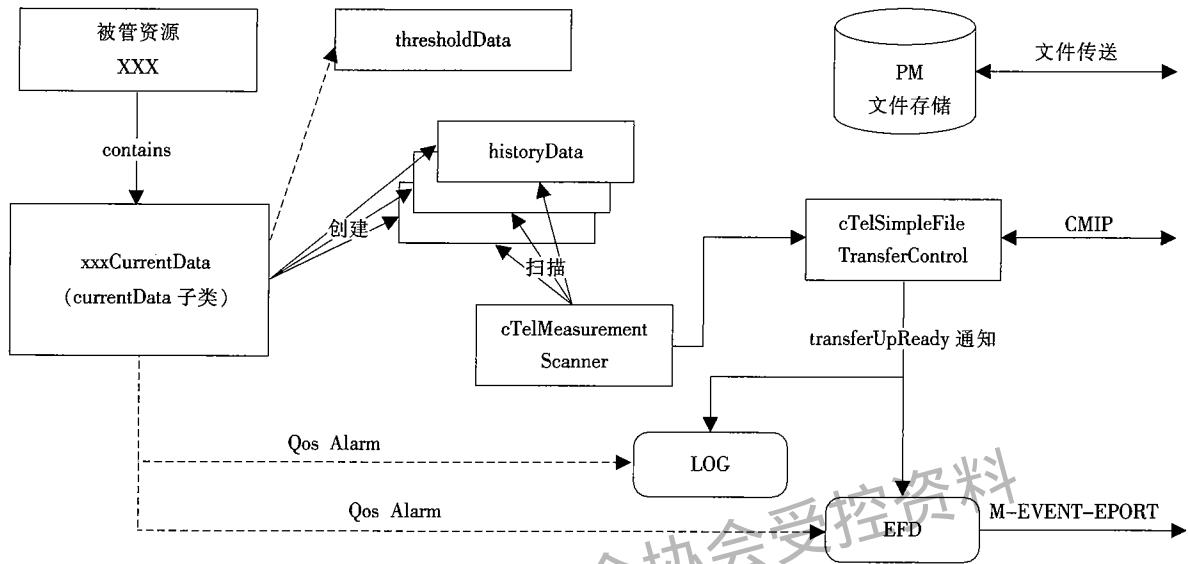

图 6　性能测量对象模型

在这个模型中，管理对象类 *xxxCurrentData* 负责各性能参数的采集，这些管理对象类继承自 ITU-T Q.822 中定义的 *currentData* 类。每个 *xxxCurrentData* 的实例都周期性地从相应的资源采集所需的性能数据，采集周期由对象实例中的 *granularityPeriod* 属性决定。在每个采集周期结束后，OMC 将会创建一个 *xxxHistoryData* 对象实例来记录这个周期内的性能数据。

对于性能逾门限监视，本模型中采用 *threshholdData* 对象，可以设置一个或多个性能门限。当某个性能参数的测量结果超出了由 *threshholdData* 设定的门限时，就由相应的 *xxxCurrentData* 实例触发 QoS 告警，并可能作为告警记录记入日志。本接口不对性能阈值监视作强制要求。

性能测量结果的传递采用批量数据传输机制，可以由 OMC 周期性地自动地将性能测量结果上报给 NMC，也可以由 NMC 主动进行性能数据的查询。本标准中定义管理对象 *cTelMeasurementScanner* 作为性能测量上报任务，周期性地从 *xxxHistoryData* 收集性能数据，生成相应的性能数据文件。之后，这些测量结果文件将由对象 *cTelSimpleFileTransferControl* 负责传送给 NMC。该对象将在每个测量周期结束时触发 "transferUpReady" 通知给 NMC，详细的文件传送流程参见 5.1.3.2.2 节。此外，NMC 也可以根据需要在任何时候对指定时间段内的指定类型的性能数据（*xxxHistoryData*）进行批量查询，详细的文件传送流程参见 5.1.3.2.1 节。

5.4.2 性能数据的采集

性能数据的采集由 *currentData* 的子类实例 *xxxCurrentData* 完成。OMC 必须支持对 *xxxCurrentData* 的下列操作功能。

— 自动创建一个性能采集任务。当 OMC 在初始化时，应该尽可能为每个有测量需求的管理对象创建相应的 *xxxCurrentData* 对象实例进行性能数据采集，而不论 NMC 是否会开启测量任务。对于某个管理对象下的每种性能采集，OMC 只需实例化一个 *xxxCurrentData* 对象来进行数据采集即可，缺省的采集周期设为 15min。在本接口中，只有 *cTelObservedDestinationCurrentData* 和 *cTelObservedHandoverCurrentData* 两

种性能采集任务需要由 NMC 显式地进行创建。

—— 创建/删除一个性能采集任务。NMC 可以主动创建一个性能采集任务 *xxxCurrentData* 的对象实例。OMC 应支持的采集任务最小采集周期粒度为 15min。直接删除一个激活的性能采集任务（即正在执行的性能采集任务）是不允许的，只能删除已挂起的性能采集任务。因此应首先将某个激活的性能采集任务挂起，然后再将其删除掉。

—— 定义/修改性能采集时间表参数。在创建 *xxxCurrentData* 时将会定义性能采集任务的时间表参数，包括采集周期和采集起止时间。任何对时间表的修改只能在采集任务处于挂起状态时进行。

—— 改变性能采集任务的管理状态以挂起或恢复性能采集。

—— 查询性能采集任务的参数设置。

5.4.3 性能数据的上报

性能数据的测量上报由 *cTelMeasurementScanner* 的对象实例完成。OMC 必须支持对 *cTelMeasurementScanner* 的下列操作功能。

—— 创建/删除一个测量上报任务。直接删除一个激活的对象（即正在执行的测量上报任务）是不允许的，只能删除已挂起的对象（即挂起的测量上报任务）。

—— 定义/修改测量上报任务的时间表参数。在创建 *cTelMeasurementScanner* 时将会定义测量任务的时间表属性，包括上报周期和上报起止时间。任何对测量上报任务时间表的修改只能在该对象处于非运行状态时进行（上报任务被挂起时）。

—— 改变该对象的管理状态以挂起或恢复测量上报任务。

—— 查询测量上报任务的参数设置。

5.4.4 性能测量结果的存储及传输

在正常情况下，OMC 应周期性地自动上报测量结果给 NMC。上报周期由 *cTelMeasurementScanner* 对象的属性 granularityPeriod 确定。对上报周期内收集到的所有测量结果，OMC 应在每个上报周期结束时把它们按照性能文件格式（格式参考附录 E）组成一个或多个性能文件。然后，*cTelSimpleFileTransferControl* 对象将发送一个 transferUpReady 通知给 NMC，进行性能文件传输。

此外，NMC 也可以主动要求 OMC 上传所需的性能数据文件。

详细的文件传输过程参阅本标准的 5.1.3 节的批量数据传送功能。

5.5 安全管理

安全管理功能主要由 NMC 系统和 OMC 系统实现，阻止任何对 NMC、OMC 和网络资源的非法访问。

—些相关的安全管理功能应该通过 Q3 接口实现，例如在连接建立阶段在连接请求消息中承载一些附加信息以验证连接有效性。本接口目前对安全管理没有特殊的要求。

6 接口协议

6.1 概述

基于 CMIP 的 Q3 接口的通信协议栈模型在 ITU–T Q.811 和 Q.812 建议中有详尽的描述。在这些建议中，采用 OSI/RM 描述 Q3 接口协议栈，栈中的所有协议分为高层和低层两部分，它们在功能上是独立的。这些相应的轮廓可以根据不同的物理传输网络定义，网络由相应的协议组成。在基于 TCP/IP 的 GSM 管理网中，NMC 和 OMC 间的 Q3 接口使用 RFC1006 规范来连接上层 OSI 协议与下层 TCP 传输协议。

NMC 和 OMC 间的 Q3 接口的通信协议栈如图 7 所示。
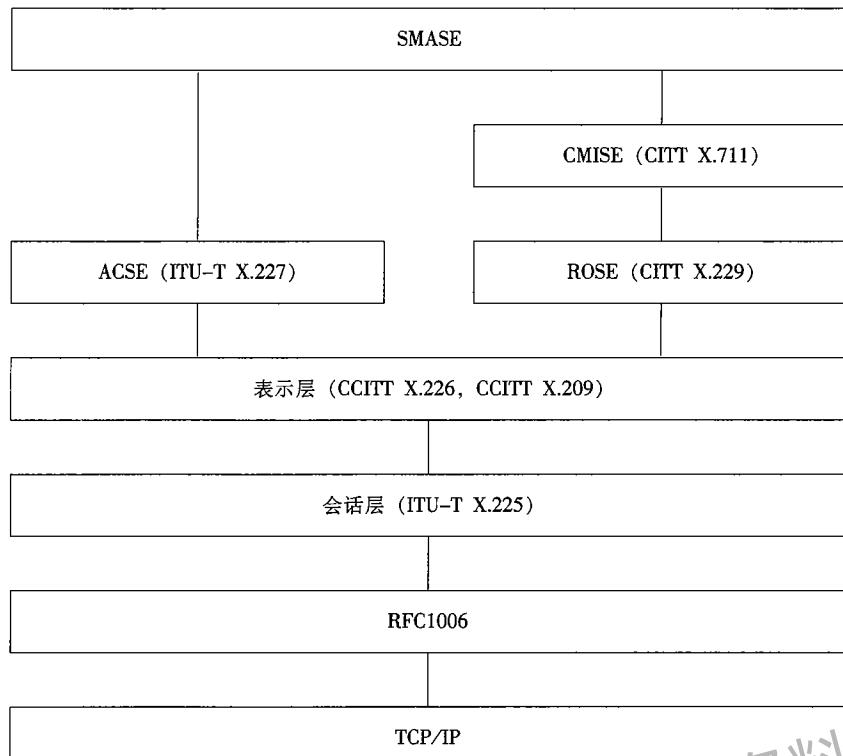
图 7　NMC 和 OMC 间的 Q3 接口的通信协议栈

6.2　Q3 接口的高层

NMC-OMC 的 Q3 接口的高层完全符合 ITU-T 建议 Q.812。高层包括应用层、表示层和会话层。

6.2.1　应用层

应用层应该包含以下单元：

a）CMISE（公共管理信息服务单元）。该单元的服务部分应该符合 CCITT X.710 中的 CMIS 规范，而协议部分应该符合定义在 CCITT X.711 中的 CMIP 规范。

b）ROSE（远端操作服务单元）。该单元的服务部分应该符合 CCITT X.219 规范，而协议部分应该符合 CCITT X.229 规范。

c）ACSE（连接控制服务单元）。该单元的服务部分应该符合 ITU-T X.217 规范，而协议部分应该符合 ITU-T X.227 规范。

6.2.2　表示层

该单元的服务部分应该符合 CCITT X.216 规范，而协议部分应该符合 CCITT X.226 规范。用于表示层的传输语法 APDU 应该符合定义在 CCITT X.208 中的 ASN.1 和定义在 CCITT X.209 中的 BER。

6.2.3　会话层

该单元的服务部分应该符合 ITU-T X.215 规范，而协议部分应该符合 ITU-T X.225 规范。

6.3　Q3 接口的低层

6.3.1　概述

Q3 接口的低层由传输层、网络层、数据链路层和物理层组成。如上所述，在 NMC 和 OMC 间采用广泛使用的 TCP/IP。由于与高层协议相对独立，Q3 接口的低层可以有多种实现方法。通过在会话层和 TCP 层之间引入 RFC1006，可以实现 TCP/IP 上的 Q3 接口。

6.3.2　RFC1006

RFC1006 说明了如何在 Internet TCP 上实现传输层的功能。除了一些细微差异以外，RFC1006 提供了功能上等同于 OSI TP0 的服务设施。详细情况请参考 RFC1006。

6.3.3 传输层

用在本规范中的传输层协议是 TCP，它应该与 IAB 定义的 RFC 793 一致。

6.3.4 网络层

用在本规范中的传输层协议是 IP，它应该与 IAB 定义的 RFC 791 一致。

6.3.5 数据链路层和物理层

数据链路层和物理层应支持 IP。

6.4 接口的使用

6.4.1 管理者和代理者的关系

在本规范定义的接口中，NMC 作为管理者（Manager），OMC 作为代理者（Agent）。作为管理者，NMC 可以使用 CMIP 原语对 OMC 发起 M-GET、M-SET、M-ACTION、M-CREATE 和 M-DELETE 操作，而 OMC 也可以使用 CMIP 的 M-EVENT-REPORT 来发送各种通知给 NMC，例如，告警通知、对象创建通知等。

6.4.2 初始化过程描述

在可以正常工作之前，OMC 和 NMC 需要进行初始化，初始化流程如图 8 所示。

6.4.2.1 Agent（OMC）初始化

Agent 初始化过程的主要目的是使其与其管理的 NE 同步。初始化工作包括配置信息和告警信息的同步。

当 Agent 初始化时，它将创建管理对象以构建自己的 MIT，同时要对告警进行同步。该 MIT 应当与本规范的信息模型一致，OMC 应当为其管理的所有资源，按照规范中的模型建立对象实例。

然而，OMC 初始化创建对象时，它不需将对象创建通知发给 NMC。初始化完成后，整个 MIT 将通过大数据传输机制传送到 NMC。为了禁止这些对象创建通知事件的上报，Agent 将在其他管理对象创建完成后，最后创建 EFD 和 log 实例。此时，OMC 将触发通知 *cTelRequestCMSynchronization*，告知 NMC 配置信息初始化完成，可以开始进行配置数据文件传递。最后，Agent 同步告警信息，所有的活跃告警将通过通知发送到 NMC，Agent 初始化完成。

Agent 的初始化流程如下：

a）操作系统引导；

b）正确设置运行环境，例如设置 NMC 的网络地址；

c）建立资源模型，Agent 创建 cTelPlmnSubnetwork，Agent 创建代表管理资源的管理对象，相应的 *xxxCurrentData* 同样可能被创建，Agent 为每个 cTelPlmnSubnetwork 实例创建 1 个 cTelHeartbeat、1 个 cTelSimpleFileTransferControl、1 个 cTelCMObjectControl、1 个 EFD 和 3 个 log 实例；

d）Agent 配置部分初始化完成后，将触发 *cTelRequestCMSynchronization* 通知给 NMC，在收到 NMC 下发的 *requestTransferUp* 动作后，Agent 准备好相应的配置数据文件并向 NMC 发送 *transferUpReady* 通知；

e）Agent 同步所辖网元中的活跃告警，并通过实时通知形式向 NMC 上报告警；

f）Agent 初始化完成。

6.4.2.2 Manager（NMC）初始化

Manager 初始化过程的主要目的是使其与其管理的 Agent 同步。初始化工作包括配置信息和告警信息的同步。

初始化过程应该包含下面的操作：

a）操作系统引导；

b）正确设置运行环境，例如设置 OMC 的网络地址；

c）通过批量数据文件传送机制，获得每个 OMC 管理的资源模型并建立整个网络的管理信息，根据网管功能和业务需求，NMC 应该创建相应的资源模型，NMC 可以要求得到 OMC 的全部或者部分管理信息；

d）根据网管功能和业务需求，NMC 可能发起支持 OMC 中的对象实例的任何操作，例如创建/修改/删除对象实例。

6.4.3 处理流程举例

6.4.3.1 初始化流程图

初始化流程示意如图 8 所示。
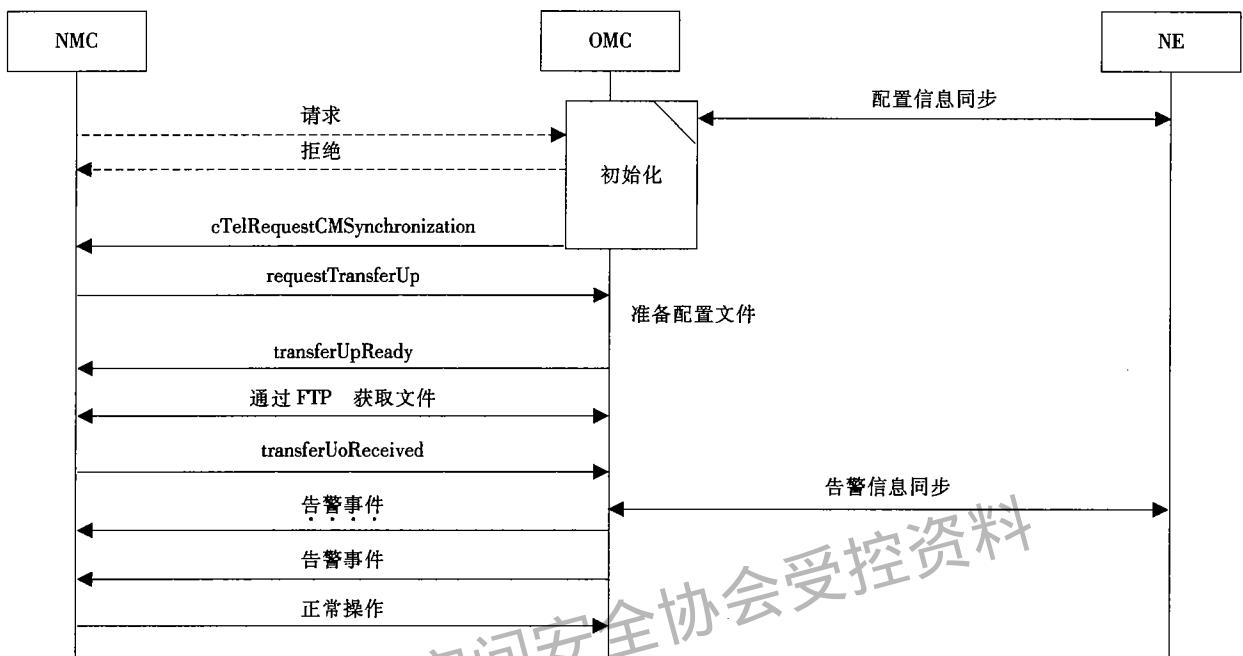
图 8 初始化流程示意

6.4.3.2 NMC-OMC 通信链路监测

NMC-OMC 通信链路监测示意如图 9 所示。
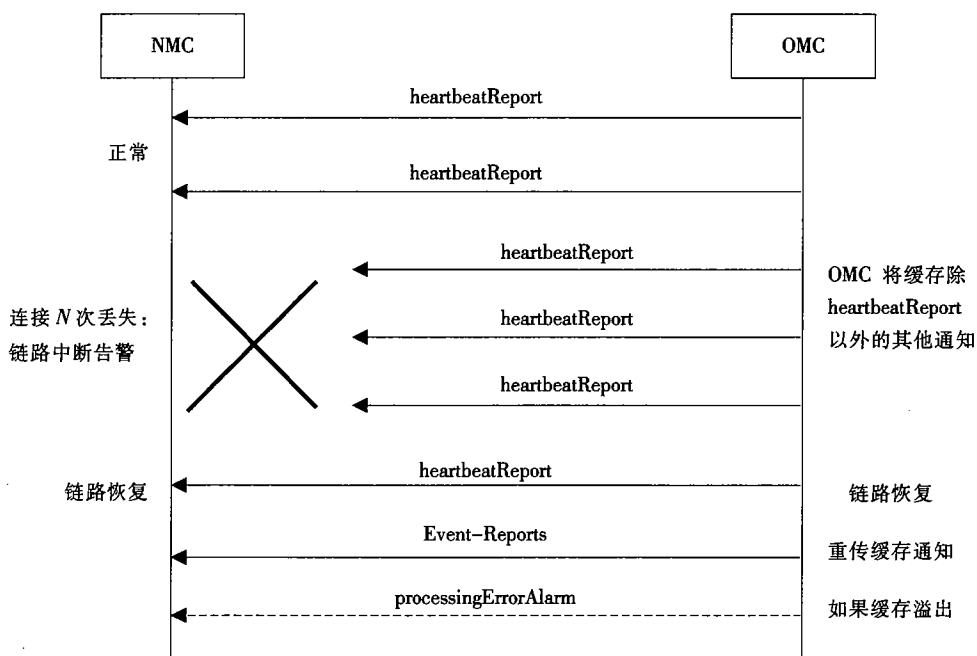
图 9 NMC-OMC 通信链路监测

附录 A
（规范性附录）
公共管理信息模型

A.1 公共管理部分信息模型概览

A.1.1 公共管理部分的管理对象继承树

公共管理对象继承树如图 A.1 所示。
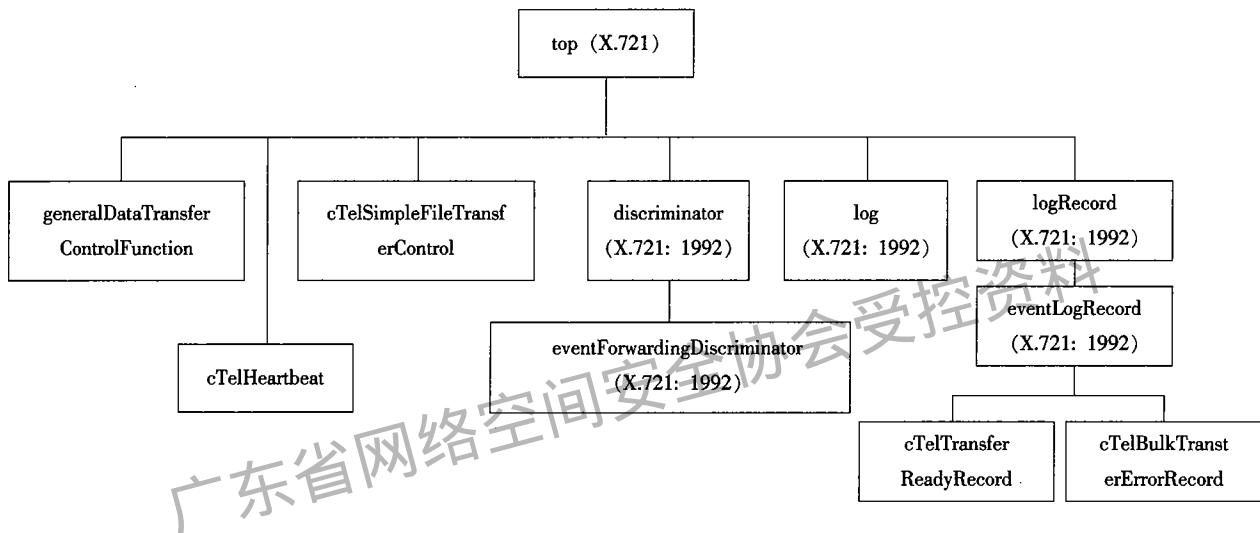
图 A.1 公共管理对象继承树

### A.1.2 公共管理部分的管理对象包含树

公共管理对象包含树如图 A.2 所示。
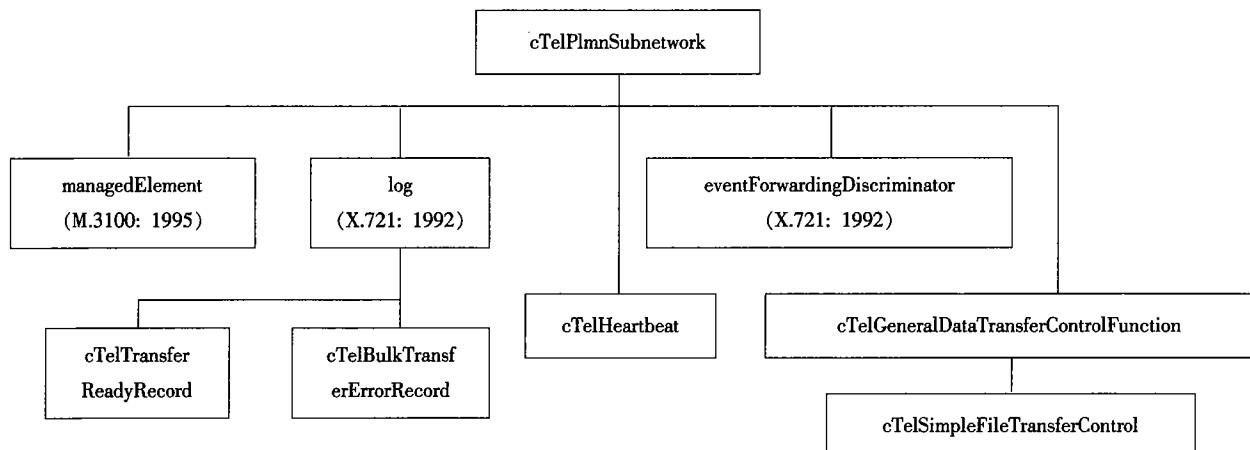
图 A.2 公共管理对象包含树

A.2 公共管理部分的信息模型定义

A.2.1 公共管理部分信息模型的 GDMO 定义

--DOCUMENT "cTelCom"

cTelHeartbeat MANAGED OBJECT CLASS
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":top;
CHARACTERIZED BY
  cTelHeartbeatPackage PACKAGE
  BEHAVIOUR cTelHeartbeatPackageBehaviour BEHAVIOUR
   DEFINED AS
"The cTelHeartbeat MOC is used to monitor the communication between OMC and NMC.

The cTelHeartbeat object instance will periodically send a 'heartbeatReport' notification to all the EFDs in OMC inorder to tell NMC its existence. This object is automatically created by OMC when it is initiated. Normally NMC will receive this notification and know that the link is right. However if NMC loses several successive heartbeatReport notifications, it will conclude that the link is broken.

The 'period' attribute of this MOC is used to control the reporting period of heartbeat. When a new value is set by NMC, the object should send a heartbeatReport notification with the new attribute value immediately. If the value is set to 0, after the immediately-sent notification, it will not send the heartReport notifications anymore, until this value is reset to some positive integer.
";;

  ATTRIBUTES ·
   heartbeatId GET,
   period GET-REPLACE
    cTelInvalidPeriodErrorInfo;
  NOTIFICATIONS
   heartbeatReport;;;
REGISTERED AS {cTel-gsm-nmc-com-objectClass 10} ;

---cTelGeneralDataTransferControlFunction
cTelGeneralDataTransferControlFunction MANAGED OBJECT CLASS
  DERIVED FROM
   "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;
  CHARACTERIZED BY
   generalDataTransferControlFunctionPackage PACKAGE
    BEHAVIOUR generalDataTransferControlFunctionBehaviour BEHAVIOUR
    DEFINED AS
"This object class is used to model common properties of a general data transfer control function of a cTelPlmnSubnetwork. Its purpose is to represent a top level data transfer function in which various objects that may be defined independently for specific data transfer control (e.g. simple FTP file transfer) can be contained.

One instance of this class is contained in a cTelPlmnSubnetwork if it is required to transfer data between the NMC and the OMC contained in the cTelPlmnSubnetwork. This object is identified by the value of the Attribute 'generalDataTransferControlFunctionId'.";;

ATTRIBUTES
  generalDataTransferControlFunctionId GET;
NOTIFICATIONS
  "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectCreation,
  "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectDeletion;;;
REGISTERED AS {cTel-gsm-nmc-com-objectClass 20} ;

cTelSimpleFileTransferControl MANAGED OBJECT CLASS
  DERIVED FROM
    "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;
  CHARACTERIZED BY
    simpleFileTransferControlBasicPackage PACKAGE
      BEHAVIOUR simpleFileTransferControlBasicBehaviour BEHAVIOUR
      DEFINED AS
"This object class represents the facilities to control simple file transfer from the NMC to a OMC that is contained in the cTelPlmnSubnetwork, and vice versa. One instance of this class shall be contained in the appropriate 'generalDataTransferControlFunction' object if simple file transfer is required. This object is identified by the value of the Attribute 'simpleFileTransferControlId'.";;
    ATTRIBUTES
      simpleFileTransferControlId GET;
    NOTIFICATIONS
      "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectCreation,
      "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectDeletion;;;
  CONDITIONAL PACKAGES
    cTelDataTransferUploadControlPackage
      PRESENT IF "it is required to upload files using FTP from a managed element";
REGISTERED AS {cTel-gsm-nmc-com-objectClass 30} ;

cTelTransferReadyRecord MANAGED OBJECT CLASS
  DERIVED FROM
    "Rec. X.721 | ISO/IEC 10165-2 : 1992": eventLogRecord;
    --- The identifier values for the eventType attribute inherited from eventLogRecord
    --- shall be transferUpReady
  CHARACTERIZED BY
    transferNotificationArgPackage PACKAGE
      BEHAVIOUR transferNotificationArgPackageBehaviour BEHAVIOUR
      DEFINED AS
"This package provides the attributes for storing the contents of transferUp Ready notifications on the log as eventLogRecords.";;
    ATTRIBUTES
      fileListValues GET,
      transferIdValue GET;;;
REGISTERED AS {cTel-gsm-nmc-com-objectClass 40} ;

cTelBulkTransferErrorRecord MANAGED OBJECT CLASS
    DERIVED FROM
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": eventLogRecord;
        ——— The identifier values for the eventType attribute inherited from eventLogRecord
        ——— shall be bulkTransferError
    CHARACTERIZED BY
        bulkTransferErrorRecordPackage PACKAGE
            BEHAVIOUR bulkTransferErrorRecordPackageBehaviour BEHAVIOUR
            DEFINED AS
"This package provides the attributes for storing the contents of bulkTransferError notifications on the log as eventLogRecords.";;
            ATTRIBUTES
                transferIdValue GET,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": probableCause GET,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": perceivedSeverity GET;;;
REGISTERED AS {cTel-gsm-nmc-com-objectClass 41} ;

——— Package definitions
cTelDataTransferUploadControlPackage PACKAGE
    BEHAVIOUR dataTransferUploadControlBehaviour BEHAVIOUR
        DEFINED AS
"This package provides the Actions and Notifications for the control of the upload procedure of the FTP file Transfer (see appropriate Action and Notification definitions) . On receipt of the Action 'requestTransferUp' the requested information will be prepared for transfer to NMC in the form of one or more files. Once preparations are complete the object will issue a 'transferUpReady' Notification. The NMC informs the OMC that the files have been successfully transferred using the Action 'transferUpReceived'. An unsolicited 'transferUpReady' Notification may be emitted by the object
——— to inform the OMC that one or more file (s) the OMC has generated without a request from NMC (e.g. call records) are ready for transfer
If, upon receipt of the 'requestTransferUp' Action, OMC is unable to process the NMC' s request, this shall be indicated in the Action response (failure response) . If, after acknowledgement of the 'requestTransferUp' Action, problems with respect to the preparation/formatting of the file (s) occur within the OMC (e.g. the files cannot be compiled due to internal resource limitation) , the object will issue a bulkTransferError notification with the appropriate probable cause value.";;
    ACTIONS
        requestTransferUp, —— 1st message
        transferUpReceived; —— 3rd message
    NOTIFICATIONS
        transferUpReady, —— 2nd message
        bulkTransferError;
REGISTERED AS {cTel-gsm-nmc-com-package 10} ;

———Attribute defintions
heartbeatId ATTRIBUTE

WITH ATTRIBUTE SYNTAX Com-TMN-ASN1Module. HeartbeatId;

MATCHES FOR EQUALITY;

BEHAVIOUR heartbeatIdBehaviour BEHAVIOUR

DEFINED AS

"This attribute is the naming attrbiute of the heartbeat object instance";;

REGISTERED AS { cTel-gsm-nmc-com-attribute 10} ;

period ATTRIBUTE

WITH ATTRIBUTE SYNTAX Com-TMN-ASN1Module. HeartbeatPeriod;

MATCHES FOR EQUALITY;

BEHAVIOUR periodBehaviour BEHAVIOUR

DEFINED AS

"This attribute is used to control the reporting period of heartbeat notification. (Unit : second) ";;

REGISTERED AS { cTel-gsm-nmc-com-attribute 20} ;

transferIdValue ATTRIBUTE

WITH ATTRIBUTE SYNTAX Com-TMN-ASN1Module.TransferId;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR transferIdValueBehaviour BEHAVIOUR

DEFINED AS

"This attribute represents the value of transferId to be used. e.g. for filtering purposes.";;

REGISTERED AS {cTel-gsm-nmc-com-attribute 30} ;

fileListValues ATTRIBUTE

WITH ATTRIBUTE SYNTAX Com-TMN-ASN1Module.FileList;

MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;

BEHAVIOUR fileListValuesBehaviour BEHAVIOUR

DEFINED AS

"This attribute represents the contents of the fileList field of a transferUpReady notification.";;

REGISTERED AS {cTel-gsm-nmc-com-attribute 40} ;

generalDataTransferControlFunctionId ATTRIBUTE

WITH ATTRIBUTE SYNTAX Com-TMN-ASN1Module.GeneralDataTransferControlFunctionId;

BEHAVIOUR generalDataTransferControlFunctionIdBehaviour BEHAVIOUR

DEFINED AS

"This attribute names a 'generalDataTransferControlFunction' object. Apart from providing a unique identifier, the value does not have any other specific semantics.";;

REGISTERED AS {cTel-gsm-nmc-com-attribute 50} ;

simpleFileTransferControlId ATTRIBUTE

WITH ATTRIBUTE SYNTAX Com-TMN-ASN1Module.SimpleFileTransferControlId;

BEHAVIOUR simpleFileTransferControlIdBehaviour BEHAVIOUR

DEFINED AS

"This attribute names a 'simpleFileTransferControl' object. Apart from providing a unique identifier, the

value does not have any other specific semantics.";;

REGISTERED AS {cTel-gsm-nmc-com-attribute 60} ;

---ACTIONS Definitions

requestTransferUp ACTION

      BEHAVIOUR requestTransferUpBehaviour BEHAVIOUR

         DEFINED AS

"This Action is used to request the preparation of data for subsequent transfer via FTP services. In some cases the data may already exist in the form of one or more files. For other applications the files must first be produced or formatted for transfer to the NMC. If the request from NMC can be accepted, a success response shall be generated by the object. If, upon receipt of the 'requestTransferUp' Action, the Managed Element is unable to process the OSF's request, this shall be indicated in the Action response with the appropriate error indication set.

The RequestTransferUpArg argument of the syntax contains the following parameters:

1 fileType: the type of requested information

2 objectSelection: allows the OS to request information about any managed object. The file type will be determined by the NE on a case by case basis.

3 transferId: the parameter that identifies the group of CMIP operations that together form the control for one bulk data transfer between NMC and OMC.

";;

     MODE CONFIRMED;

     WITH INFORMATION SYNTAX Com-TMN-ASN1Module.RequestTransferUpArg;

     WITH REPLY SYNTAX Com-TMN-ASN1Module.RequestTransferUpReply;

REGISTERED AS {cTel-gsm-nmc-com-action 10} ;

transferUpReceived ACTION

      BEHAVIOUR transferUpReceivedBehaviour BEHAVIOUR

         DEFINED AS

"This Action is used to inform OMC that one or more FTP files have been successfully transferred. The files transferred may then be deleted and allocated resources be freed. The 'FileList' in the 'ActionInfo' field of the PDU identifies the file (s) that have successfully been collected by the NMC.

The receipt of the Action will be acknowledged by OMC in an appropriate success or error Action response.

The TransferActionArg argument of the syntax contains the following parameters:

1 fileReceivedInfo: file name and file received status for each file listed in 'transferUpReady' notification

2 transferId: the parameter that identifies the group of CMIP operations that together form the control for one bulk data transfer between NMC and OMC.";;

     MODE CONFIRMED;

     WITH INFORMATION SYNTAX Com-TMN-ASN1Module.TransferReceivedArg;

REGISTERED AS {cTel-gsm-nmc-com-action 20} ;

heartbeatReport NOTIFICATION

      BEHAVIOUR   heartbeatReportBehaviour BEHAVIOUR

         DEFINED AS "";;

WITH INFORMATION SYNTAX Com–TMN–ASN1Module.HeartbeatReportInformation

AND ATTRIBUTE IDS

       period   period;

REGISTERED AS {cTel–gsm–nmc–com–notification 10} ;

transferUpReady NOTIFICATION

     BEHAVIOUR transferUpReadyBehaviour BEHAVIOUR

     DEFINED AS

"This Notification is issued by the object to indicate that one or more FTP files are now ready for transfer from the OMC to the NMC. The 'FileList' contained in the 'EventInfo' field of the PDU identifies the file (s) that have been prepared for NMC read.

The TransferNotificationArg of the syntax contains the following parameters:

1 loginInfo: this field contains the userName and password of the logining infomation, which NMC shall use for FTP

2 fileName: name (s) of the file (s) that shall be used by the FTP services

3 fileType: the type of requested information

4 fileSize: optional, file size in bytes

5 transferId: the parameter that identifies the group of CMIP operations that together form the control for one bulk data transfer between OS and NE.

";;

     WITH INFORMATION SYNTAX Com–TMN–ASN1Module.TransferNotificationArg;

REGISTERED AS {cTel–gsm–nmc–com–notification 20} ;

bulkTransferError NOTIFICATION

     BEHAVIOUR bulkTransferErrorBehaviour BEHAVIOUR

      DEFINED AS

"This notification informs the OS that a processing error in the NE has occurred while preparing the FTAM files for subsequent transfer to the OS. The notification contains the following parameters:

1 transferId: the parameter that identifies the group of CMIP operations that together form the control for one bulk data transfer between NMC and OMC in the case of a previous requestTransferUp action.

2 fields of alarmInfo: as defined in CCITT X.721

";;

     WITH INFORMATION SYNTAX Com–TMN–ASN1Module.BulkTransferError

      AND ATTRIBUTE IDS

         transferId transferIdValue,

         –– Following attribute Ids are from X.721: alarmInfo

         probableCause "Rec. X.721 | ISO/IEC 10165-2 : 1992":probableCause,

         perceivedSeverity "Rec. X.721 | ISO/IEC 10165-2 : 1992":perceivedSeverity,

         specificProblems "Rec. X.721 | ISO/IEC 10165-2 : 1992":specificProblems,

         backedUpStatus "Rec. X.721 | ISO/IEC 10165-2 : 1992":backedUpStatus,

         backUpObject "Rec. X.721 | ISO/IEC 10165-2 : 1992":backUpObject,

         trendIndication "Rec. X.721 | ISO/IEC 10165-2 : 1992":trendIndication,

         thresholdInfo "Rec. X.721 | ISO/IEC 10165-2 : 1992":thresholdInfo,

notificationIdentifier "Rec. X.721 | ISO/IEC 10165-2 : 1992":notificationIdentifier,

correlatedNotifications "Rec. X.721 | ISO/IEC 10165-2 : 1992":correlatedNotifications,

stateChangeDefinition "Rec. X.721 | ISO/IEC 10165-2 : 1992":stateChangeDefinition,

monitoredAttributes "Rec. X.721 | ISO/IEC 10165-2 : 1992":monitoredAttributes,

proposedRepairActions "Rec. X.721 | ISO/IEC 10165-2 : 1992":proposedRepairActions,

additionalText "Rec. X.721 | ISO/IEC 10165-2 : 1992":additionalText,

additionalInformation "Rec. X.721 | ISO/IEC 10165-2 : 1992":additionalInformation;

REGISTERED AS {cTel-gsm-nmc-com-notification 30} ;

---Parameter Definitions

cTelInvalidPeriodErrorInfo PARAMETER

CONTEXT SPECIFIC-ERROR;

WITH SYNTAX Com-TMN-ASN1Module.InvalidPeriodErrorInfo;

BEHAVIOUR cTelInvalidPeriodErrorInfoBehaviour BEHAVIOUR

DEFINED AS

"The cTelInvalidPeriodErrorInfo parameter is used by OMC when when the period value to be set by NMC is not reasonable in OMC's implementation. A very short period may cause OMC to send many heartbeatReports in a short time, which may decrease the performance of OMC. To prevent this, OMC may set the lower limit period in its system implemntation. When the period to be set is shorter the lower limit period, OMC may give this parameter to reject setting the period to new value.

Note: set the period to zero must be allowed. The behaviour of setting period to zero is described in the behaviour of attribute 'period'.

The format of this parameter is listed below:

InvaliePeriodErrorInfo ::= SEQUENCE

{

periodLowerLimit INTEGER,

reason GraphicString

}

";;

REGISTERED AS {cTel-gsm-nmc-com-parameter 10} ;

---Name Binding Definitions

cTelHeartbeat-cTelPlmnSubnetwork NAME BINDING

SUBORDINATE OBJECT CLASS cTelHeartbeat;

NAMED BY

SUPERIOR OBJECT CLASS "cTelCM":cTelPlmnSubnetwork;

WITH ATTRIBUTE heartbeatId;

REGISTERED AS {cTel-gsm-nmc-com-nameBinding 10} ;

cTelGeneralDataTransferControlFunction-cTelPlmnSubnetwork NAME BINDING

SUBORDINATE OBJECT CLASS cTelGeneralDataTransferControlFunction;

NAMED BY

SUPERIOR OBJECT CLASS "cTelCM":cTelPlmnSubnetwork;

WITH ATTRIBUTE generalDataTransferControlFunctionId;

CREATE ;

DELETE ;

REGISTERED AS {cTel-gsm-nmc-com-nameBinding 20} ;

cTelSimpleFileTransferControl-cTelGeneralDataTransferControlFunction NAME BINDING

SUBORDINATE OBJECT CLASS cTelSimpleFileTransferControl;

NAMED BY

SUPERIOR OBJECT CLASS cTelGeneralDataTransferControlFunction;

WITH ATTRIBUTE simpleFileTransferControlId;

CREATE;

DELETE;

REGISTERED AS {cTel-gsm-nmc-com-nameBinding 30} ;

eventForwardingDiscriminator-cTelPlmnSubnetwork NAME BINDING

SUBORDINATE OBJECT CLASS "Rec. X.721 | ISO/IEC 10165-2 : 1992":eventForwardingDiscriminator;

NAMED BY

SUPERIOR OBJECT CLASS "cTelCM":cTelPlmnSubnetwork AND SUBCLASSES;

WITH ATTRIBUTE "Rec. X.721 | ISO/IEC 10165-2 : 1992":discriminatorId;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE

ONLY-IF-NO-CONTAINED-OBJECTS;

REGISTERED AS {cTel-gsm-nmc-com-nameBinding 40} ;

log-cTelPlmnSubnetworkmanagedElement NAME BINDING

SUBORDINATE OBJECT CLASS"Rec. X.721 | ISO/IEC 10165-2 : 1992":log;

NAMED BY

SUPERIOR OBJECT CLASS "cTelCM":cTelPlmnSubnetwork AND SUBCLASSES;

WITH ATTRIBUTE "Rec. X.721 | ISO/IEC 10165-2 : 1992":logId;

CREATE

WITH-REFERENCE-OBJECT,

WITH-AUTOMATIC-INSTANCE-NAMING;

DELETE

ONLY-IF-NO-CONTAINED-OBJECTS;

REGISTERED AS {cTel-gsm-nmc-com-nameBinding 50} ;

A.2.2 公共管理部分信息模型的 ASN.1 定义

Com-TMN-ASN1Module { ccitt (0) identified-organisation (4) chinaTeleCom (8) mobileDomain (0) gsm-Operation-Maintenance (3) version2 (2) nmc-omc-standard-com (0) informationModel (0) asn1Model (2) typeDefinitions (1)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

IMPORTS

cTel-gsm-nmc-com

FROM ChinaTeleCom-GSM-DomainDefinitions { ccitt (0) identified-organisation (4) chinaTeleCom (8) mobileDomain (0) gsm-Operation-Maintenance (3) version2 (2) nmc-omc-standard-com (0) informationModel (0) asn1Model (2) oM-DomainDefinitions (0)}

SimpleNameType

FROM Attribute-ASN1Module { joint-iso-ccitt ms (9) smi (3) part2 (2) 2 1 }

GetArgument, GetResult

FROM CMIP-1 { joint-iso-ccitt ms (9) cmip (1) modules (0) protocol (3)}

AlarmInfo

FROM Notification-ASN1Module {joint-iso-ccitt ms (9) smi (3) part2 (2) asn1Module (2) 2} ;

cTel-gsm-nmc-com-informationModel OBJECT IDENTIFIER ::= { cTel-gsm-nmc-com informationModel (0)}

cTel-gsm-nmc-com-objectClass OBJECT IDENTIFIER :: = { cTel-gsm-nmc-com-informationModel managedObjectClass (3)}

cTel-gsm-nmc-com-package OBJECT IDENTIFIER ::= { cTel-gsm-nmc-com-informationModel packag (4)}

cTel-gsm-nmc-com-parameter OBJECT IDENTIFIER ::= { cTel-gsm-nmc-com-informationModel paramete (5)}

cTel-gsm-nmc-com-nameBinding OBJECT IDENTIFIER ::= { cTel-gsm-nmc-com-informationModel nameBinding (6)}

cTel-gsm-nmc-com-attribute OBJECT IDENTIFIER ::= { cTel-gsm-nmc-com-informationModel attribute (7)}

cTel-gsm-nmc-com-action OBJECT IDENTIFIER ::= { cTel-gsm-nmc-com-informationModel action (9)}

cTel-gsm-nmc-com-notification OBJECT IDENTIFIER :: = { cTel-gsm-nmc-com-informationModel notification (10)}

HeartbeatId ::= GraphicString

HeartbeatPeriod ::= INTEGER (0..MAX)

HeartbeatReportInformation ::= SEQUENCE
{
    period   HeartbeatPeriod -- unit : second
}

FileType ::= ENUMERATED
{
    cmDataFile (0) ,
    eventDataFile (1) ,
    pmDataFile (2) ,
    logFile (3)
}

```
FileSpec ::= SEQUENCE
{
    fileName  [1]  SimpleNameType,
    fileType  [2]  FileType,
    fileSize  [3]  INTEGER OPTIONAL  -- in bytes
}


FileList ::= SEQUENCE OF FileSpec


ResultType ::= SEQUENCE
{
    fileType [0] FileType,
    objectSelection [1] GetArgument -- can be used for getting deliberate selection
                                    -- of objects or retrieving log records
}


TransferId ::= INTEGER


RequestTransferUpArg ::= SEQUENCE
{
    resultType ResultType,
    transferId TransferId
}


RequestTransferUpReply ::= SEQUENCE
{
    result       BOOLEAN,
    failReason   GraphicString
}


FileReceivedStatus ::= ENUMERATED  {
    fileOK (0) ,
    fileNotFound (1) ,
    fileFormatInvalid (2) ,
    fileFaildFrOtherReason (3)
}


FileReceivedInfo ::= SEQUENCE OF SEQUENCE
{
    fileName SimpleNameType,
    fileReceivedStatus FileReceivedStatus
}


TransferReceivedArg ::= SEQUENCE
```

```
{
    fileReceivedInfo FileReceivedInfo,
    transferId TransferId
}


TransferNotificationArg ::= SEQUENCE
{
    loginInfo LoginInfo,
    fileList FileList,
    transferId TransferId
}


LoginInfo ::= SEQUENCE
{
    userName GraphicString,
    password GraphicString
}


GeneralDataTransferControlFunctionId ::= SimpleNameType


SimpleFileTransferControlId ::= SimpleNameType


BulkTransferError ::= SEQUENCE
{
    COMPONENTS OF AlarmInfo,
    transferId TransferId
}


InvalidPeriodErrorInfo ::= SEQUENCE
{
    periodLowerLimit INTEGER,
    reason GraphicString
}


END
```

A.2.3 其他从 ITU-T 建议 M.3100 和 X.721 中引入的管理对象类

本规范从 ITU-T 建议 M3100（1995）和 X721（1992）中引入了一些标准的管理对象类，关于其具体的内容，请参考这些建议中的详细定义。

A.3 接口信息模型中对象标识符分配 ASN.1 定义

ChinaTeleCom-GSM-DomainDefinitions {ccitt (0) identified-organisation (4) chinaTeleCom (8) mobileDomain (0) gsm-Operation-Maintenance (3) version2 (2) nmc-standard-com (0) informationModel (0) asn1Model (2) oM-DomainDefinitions (0)}

----If the identifer shall be used with the digit start from ccitt (0) then the digit for identified – organisation shall be registerred.

--- Otherwise it is recommended to the local identifier assignment start from ChinaTeleCom (8) for this specification.

DEFINITIONS ::=

BEGIN

cTel –gsm –nmc OBJECT IDENTIFIER :: =   { ccitt (0) identified –organisation (4) chinaTeleCom (8) mobileDomain (0) gsm–Operation–Maintenance (3) version2 (2)}

--- Sub domain identifiers

cTel–gsm–nmc–com OBJECT IDENTIFIER ::=   { cTel–gsm–nmc nmc–standard–com (0)} --for common function

cTel –gsm –nmc –fm OBJECT IDENTIFIER :: =   { cTel –gsm –nmc nmc –standard –fm (1) } --for fault management

cTel–gsm–nmc–pm OBJECT IDENTIFIER ::=   { cTel–gsm–nmc nmc–standard–pm (2)} --for performance management

cTel–gsm–nmc–cm OBJECT IDENTIFIER ::=   { cTel–gsm–nmc nmc–standard–cm (3)} --for configuration management

END

附录 B

（规范性附录）

故障管理信息模型

B.1 故障管理部分信息模型概览

B.1.1 故障管理部分的管理对象继承树

故障管理对象继承树如图 B.1 所示。
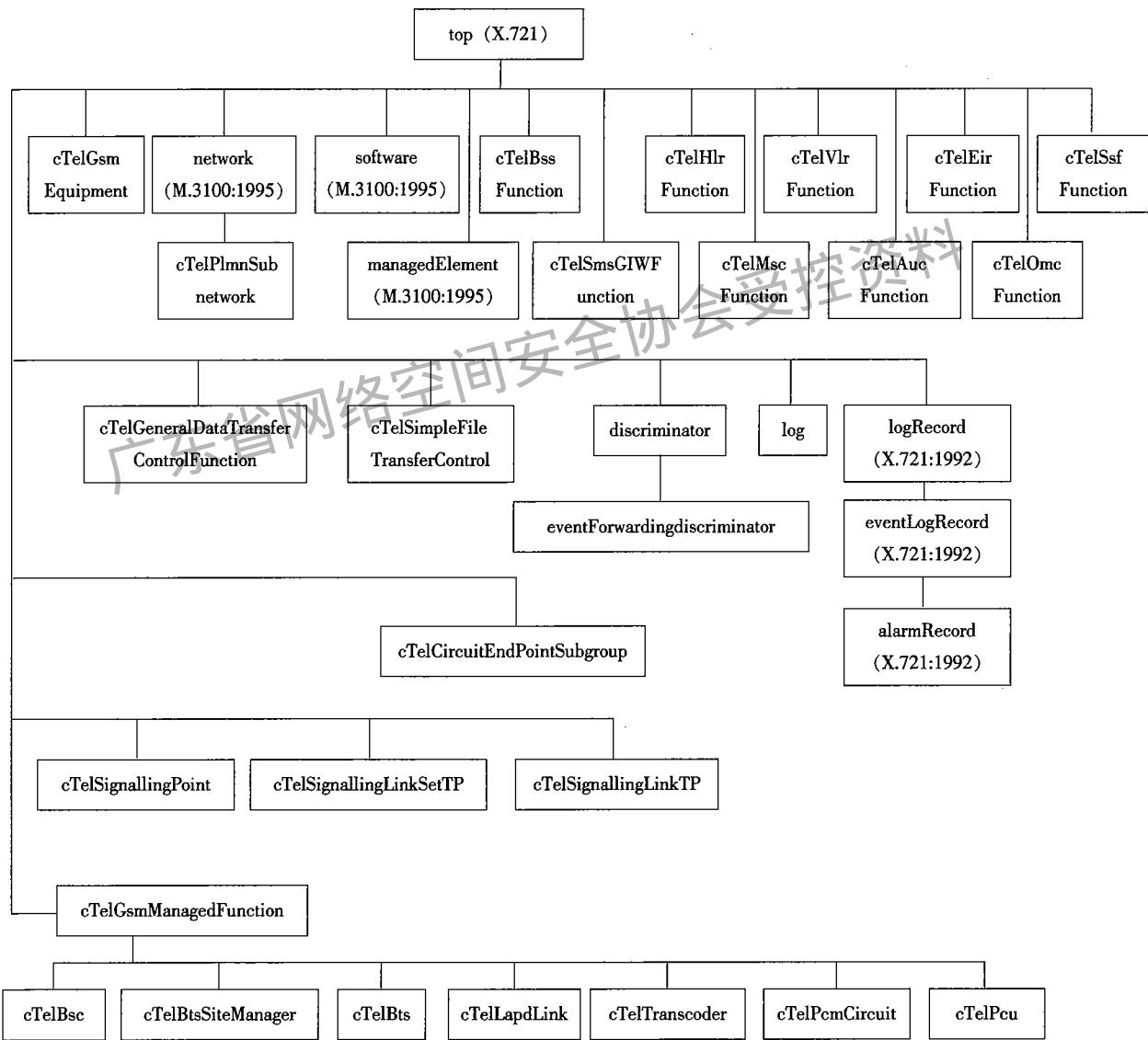
图 B.1 故障管理对象继承树

B.1.2 故障管理部分的管理对象包含树

故障管理对象包含树如图 B.2 所示。
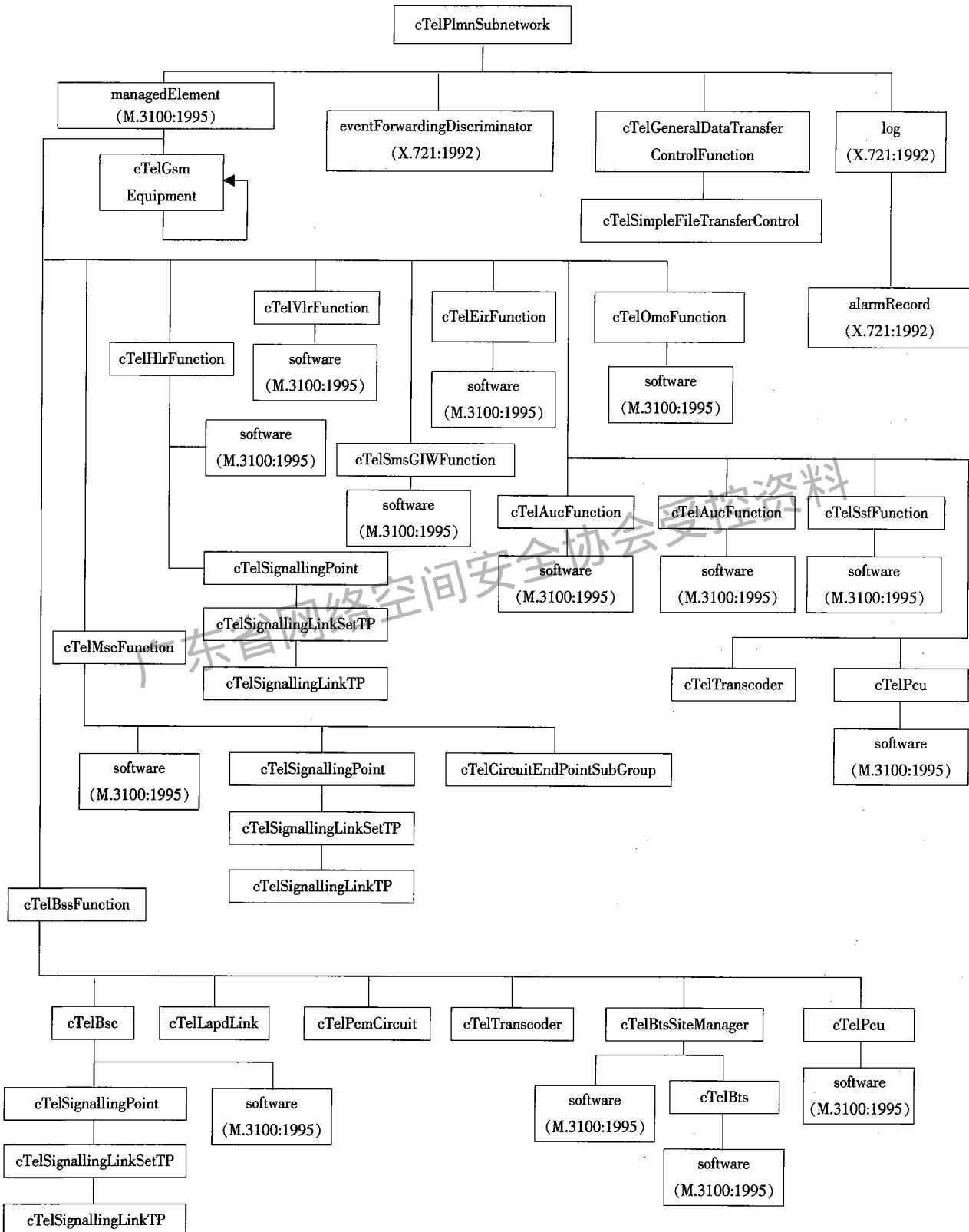
图 B.2 故障管理对象包含树

B.2 故障管理部分信息模型定义

该接口规范从 ITU-T 建议 X.721 中引入了故障管理的信息模型。详细内容请参照下面的 ITU-T 建议中的定义：

— ITU-T X.721 (1992)；

— ITU-T M.3100 (1995)。

对于图 B.1 和图 B.2 中与故障管理相关的特有的配置管理对象类的定义，请参见本标准附录 C 配置管理部分信息模型。

在本接口中，GSM 系统的告警可能原因的 ASN.1 文法定义如下：

FM-GSM-ASN1Module ｛ ccitt (0) identified-organisation (4) chinaTeleCom (8) mobileDomain (0) gsm-Operation-Maintenance (3) version2 (2) nmc-omc-standard-fm (1) informationModel (0) asn1Model (2) typeDefinitions (1) ｝

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

IMPORTS

    cTel-gsm-nmc-com

FROM ChinaTeleCom-GSM-DomainDefinitions ｛ ccitt (0) identified-organisation (4) chinaTeleCom (8) mobileDomain (0) gsm-Operation-Maintenance (3) version2 (2) nmc-omc-standard-com (0) informationModel (0) asn1Model (2) oM-DomainDefinitions (0) ｝

    ProbableCause, PerceivedSeverity, ObservedValue, AdditionalText,

    AdditionalInformation, NotificationIdentifier, CorrelatedNotifications

FROM Attribute-ASN1Module ｛joint-iso-ccitt ms (9) smi (3) part2 (2) asn1Module (2) 1｝

    AttributeId, ObjectInstance, ObjectClass

FROM CMIP-1 ｛ joint-iso-ccitt ms (9) cmip (1) modules (0) protocol (3) ｝

;

--- EXPORTS Everything

--- Object Identifiers

--- Information Model Related Identifiers

gsmFmInformationModel OBJECT IDENTIFIER ::=

    ｛ cTel-gsm-nmc-com informationModel (0)｝

gsmFmObjectClass OBJECT IDENTIFIER ::=

    ｛gsmFmInformationModel managedObjectClass (3)｝

gsmFmPackage OBJECT IDENTIFIER ::=

    ｛gsmFmInformationModel package (4)｝

gsmFmAttribute OBJECT IDENTIFIER ::=

    ｛gsmFmInformationModel attribute (7)｝

gsmFmNotification OBJECT IDENTIFIER ::=

    ｛gsmFmInformationModel notification (10)｝

--- Probable cause value assignments

gsmFmProbableCause OBJECT IDENTIFIER ::=

｛gsmFmInformationModel standardSpecificExtension (0) probableCause (0)｝

gsmA-BisToBTSInterfaceFailure ProbableCause ::=

```
        globalValue : {gsmFmProbableCause 1}
gsmA-BisToTRXInterfaceFailure ProbableCause ::=
        globalValue : {gsmFmProbableCause 2}
gsmAntennaProblem ProbableCause ::=
        globalValue : {gsmFmProbableCause 3}
gsmBatteryBreakdown ProbableCause ::=
        globalValue : {gsmFmProbableCause 4}
gsmBatteryChargingFault ProbableCause ::=
        globalValue : {gsmFmProbableCause 5}
gsmClockSynchronisationProblem ProbableCause ::=
        globalValue : {gsmFmProbableCause 6}
gsmCombinerProblem ProbableCause ::=
        globalValue : {gsmFmProbableCause 7}
gsmDiskProblem ProbableCause ::=
        globalValue : {gsmFmProbableCause 8}
---gsmEquipmentFailure ProbableCause ::=
        ---globalValue : {gsmFmProbableCause 9}
gsmExcessiveReceiverTemperature ProbableCause ::=
        globalValue : {gsmFmProbableCause 10}
gsmExcessiveTransmitterOutputPower ProbableCause ::=
        globalValue : {gsmFmProbableCause 11}
gsmExcessiveTransmitterTemperature ProbableCause ::=
        globalValue : {gsmFmProbableCause 12}
gsmFrequencyHoppingDegraded ProbableCause ::=
        globalValue : {gsmFmProbableCause 13}
gsmFrequencyHoppingFailure ProbableCause ::=
        globalValue : {gsmFmProbableCause 14}
gsmFrequencyRedefinitionFailed ProbableCause ::=
        globalValue : {gsmFmProbableCause 15}
gsmLineInterfaceFailure ProbableCause ::=
        globalValue : {gsmFmProbableCause 16}
gsmLinkFailure ProbableCause ::=
        globalValue : {gsmFmProbableCause 17}
gsmLossOfSynchronisation ProbableCause ::=
        globalValue : {gsmFmProbableCause 18}
gsmLostRedundancy ProbableCause ::=
        globalValue : {gsmFmProbableCause 19}
gsmMainsBreakdownWithBatteryBackUp ProbableCause ::=
        globalValue : {gsmFmProbableCause 20}
gsmMainsBreakdownWithoutBatteryBackUp ProbableCause ::=
        globalValue : {gsmFmProbableCause 21}
gsmPowerSupplyFailure ProbableCause ::=
        globalValue : {gsmFmProbableCause 22}
gsmReceiverAntennaFault ProbableCause ::=
```

globalValue : {gsmFmProbableCause 23}

———gsmReceiverFailure ProbableCause ::=

———globalValue : {gsmFmProbableCause 24}

gsmReceiverMulticouplerFailure ProbableCause ::=

globalValue : {gsmFmProbableCause 25}

gsmReducedTransmitterOutputPower ProbableCause ::=

globalValue : {gsmFmProbableCause 26}

gsmSignalQualityEvaluationFault ProbableCause ::=

globalValue : {gsmFmProbableCause 27}

gsmTimeslotHardwareFailure ProbableCause ::=

globalValue : {gsmFmProbableCause 28}

gsmTransceiverProblem ProbableCause ::=

globalValue : {gsmFmProbableCause 29}

gsmTranscoderProblem ProbableCause ::=

globalValue : {gsmFmProbableCause 30}

gsmTranscoderOrRateAdapterProblem ProbableCause ::=

globalValue : {gsmFmProbableCause 31}

gsmTransmitterAntennaFailure ProbableCause ::=

globalValue : {gsmFmProbableCause 32}

gsmTransmitterAntennaNotAdjusted ProbableCause ::=

globalValue : {gsmFmProbableCause 33}

———gsmTransmitterFailure ProbableCause ::=

———globalValue : {gsmFmProbableCause 34}

gsmTransmitterLowVoltageOrCurrent ProbableCause ::=

globalValue : {gsmFmProbableCause 35}

gsmTransmitterOffFrequency ProbableCause ::=

globalValue : {gsmFmProbableCause 36}

gsmDatabaseInconsistency ProbableCause ::=

globalValue : {gsmFmProbableCause 37}

gsmFileSystemcallUnsuccessful ProbableCause ::=

globalValue : {gsmFmProbableCause 38}

gsmInputParameterOutOfRange ProbableCause ::=

globalValue : {gsmFmProbableCause 39}

gsmInvalidParameter ProbableCause ::=

globalValue : {gsmFmProbableCause 40}

gsmInvalidPointer ProbableCause ::=

globalValue : {gsmFmProbableCause 41}

gsmMessageNotExpected ProbableCause ::=

globalValue : {gsmFmProbableCause 42}

gsmMessageNotinitialized ProbableCause ::=

globalValue : {gsmFmProbableCause 43}

gsmMessageOutOfSequence ProbableCause ::=

globalValue : {gsmFmProbableCause 44}

gsmSystemCallUnsuccessful ProbableCause ::=

globalValue : {gsmFmProbableCause 45}
gsmTimeoutExpired ProbableCause ::=
    globalValue : {gsmFmProbableCause 46}
gsmVariableOutOfRange ProbableCause ::=
    globalValue : {gsmFmProbableCause 47}
gsmWatchDogTimerExpired ProbableCause ::=
    globalValue : {gsmFmProbableCause 48}
gsmCoolingSystemFailure ProbableCause ::=
    globalValue : {gsmFmProbableCause 49}
gsmExternalEquipmentFailure ProbableCause ::=
    globalValue : {gsmFmProbableCause 50}
gsmExternalPowerSupplyFailure ProbableCause ::=
    globalValue : {gsmFmProbableCause 51}
gsmExternalTransmissionDeviceFailure ProbableCause ::=
    globalValue : {gsmFmProbableCause 52}
---gsmFanFailure ProbableCause ::=
    ---globalValue : {gsmFmProbableCause 53}
---gsmHighHumidity ProbableCause ::=
    ---globalValue : {gsmFmProbableCause 54}
---gsmHighTemperature ProbableCause ::=
    ---globalValue : {gsmFmProbableCause 55}
---gsmIntrusionDetected ProbableCause ::=
    ---globalValue : {gsmFmProbableCause 56}
---gsmLowHumidity ProbableCause ::=
    ---globalValue : {gsmFmProbableCause 57}
---gsmLowTemperature ProbableCause ::=
    ---globalValue : {gsmFmProbableCause 58}
---gsmSmokeDetected ProbableCause ::=
    ---globalValue : {gsmFmProbableCause 59}
gsmExcessiveErrorRate ProbableCause ::=
    globalValue : {gsmFmProbableCause 60}
gsmReducedAlarmReporting ProbableCause ::=
    globalValue : {gsmFmProbableCause 61}
gsmReducedEventReporting ProbableCause ::=
    globalValue : {gsmFmProbableCause 62}
gsmReducedLoggingCapability ProbableCause ::=
    globalValue : {gsmFmProbableCause 63}
gsmSystemResourcesOverload ProbableCause ::=
    globalValue : {gsmFmProbableCause 64}
gsmBroadcastChannelFailure ProbableCause ::=
    globalValue : {gsmFmProbableCause 65}
gsmConnectionEstablishmentError ProbableCause ::=
    globalValue : {gsmFmProbableCause 66}
gsmInvalidMessageReceived ProbableCause ::=

globalValue : {gsmFmProbableCause 67}

gsmInvalidMSUReceived ProbableCause ::=

    globalValue : {gsmFmProbableCause 68}

gsmLAPDLinkProtocolFailure ProbableCause ::=

    globalValue : {gsmFmProbableCause 69}

gsmLocalAlarmIndication ProbableCause ::=

    globalValue : {gsmFmProbableCause 70}

gsmRemoteAlarmIndication ProbableCause ::=

    globalValue : {gsmFmProbableCause 71}

gsmRoutingFailure ProbableCause ::=

    globalValue : {gsmFmProbableCause 72}

gsmSS7ProtocolFailure ProbableCause ::=

    globalValue : {gsmFmProbableCause 73}

gsmTransmissionError ProbableCause ::=

    globalValue : {gsmFmProbableCause 74}

gsmReceiverProblem ProbableCause ::=

    globalValue : {gsmFmProbableCause 75}

END

B.3 告警可能原因列表

B.3.1 M.3100 中定义的告警可能原因

可能用到的 M.3100 中定义的告警可能原因见表 B.1。

表 B.1 M.3100 中定义的告警可能原因

可能原因	告警类型
Indeterminate	所有类型
Alarm Indication Signal (AIS)	Communications
Call Setup Failure	Communications
Degraded Signal	Communications
Far End Receiver Failure (FERF)	Communications
Framing Error	Communications
Loss Of Frame (LOF)	Communications
Loss Of Pointer (LOP)	Communications
Loss Of Signal (LOS)	Communications
Payload Type Mismatch	Communications
Transmission Error	Communications
Remote Alarm Interface	Communications
Excessive Bit Error Rate (EBER)	Communications

表 B.1 （续）

可能原因	告警类型
Path Trace Mismatch	Communications
Unavailable	Communications
Signal Label Mismatch	Communications
Loss Of Multi Frame	Communications
Back Plane Failure	Equipment
Data Set Problem	Equipment
Equipment Identifier Duplication	Equipment
External IF Device Problem	Equipment
Line Card Problem	Equipment
Multiplexer Problem	Equipment
NE Identifier Duplication	Equipment
Power Problem	Equipment
Processor Problem	Equipment
Protection Path Failure	Equipment
Receiver Failure	Equipment
Replaceable Unit Missing	Equipment
Replaceable Unit Type Mismatch	Equipment
Synchronization Source Mismatch	Equipment
Terminal Problem	Equipment
Timing Problem	Equipment
Transmitter Failure	Equipment
Trunk Card Problem	Equipment
Replaceable Unit Problem	Equipment
Air Compressor Failure	Environmental
Air Conditioning Failure	Environmental
Air Dryer Failure	Environmental
Battery Discharging	Environmental
Battery Failure	Environmental
Commercial Power Failure	Environmental
Cooling Fan Failure	Environmental
Engine Failure	Environmental

表 B.1 （续）

可能原因	告警类型
Fire Detector Failure	Environmental
Fuse Failure	Environmental
Generator Failure	Environmental
Low Battery Threshold	Environmental
Pump Failure	Environmental
Rectifier Failure	Environmental
Rectifier High Voltage	Environmental
Rectifier Low F Voltage	Environmental
Ventilation System Failure	Environmental
Enclosure Door Open	Environmental
Explosive Gas	Environmental
Fire	Environmental
Flood	Environmental
High Humidity	Environmental
High Temperature	Environmental
High Wind	Environmental
Ice Build Up	Environmental
Intrusion Detection	Environmental
Low Fuel	Environmental
Low Humidity	Environmental
Low Cable Pressure	Environmental
Low Temperature	Environmental
Low Water	Environmental
Smoke	Environmental
Toxic Gas	Environmental
Storage Capacity Problem	Processing error
Memory Mismatch	Processing error
Corrupt Data	Processing error
Out Of CPU Cycles	Processing error
Software Environment Problem	Processing error
Software Download Failure	Processing error

B.3.2 X.721/X.733 中定义的告警可能原因定义

可能用到的 X.721 和 X.733 中定义的告警可能原因见表 B.2，其文法可以参考 ITU-T X.721 中的 ASN.1 定义，其语义（用法和含义）可以参考 X.733 中的描述。

表 B.2 X.721/X.733 中定义的告警可能原因

可能原因	告警类型	注 释
Loss of signal	Communications	与 M.3100 建议中的原因 'Loss of signal' 相同
Loss of frame	Communications	与 M.3100 建议中的原因 'Loss of frame' 相同
Framing error	Communications	与 M.3100 建议中的原因 'Framing error' 相同
Local node transmission error	Communications	
Remote node transmission error	Communications	
Call establishment error	Communications	与 M.3100 建议中的原因 'Call Setup Failure' 相同
Degraded signal	Communications	与 M.3100 建议中的原因 'Degraded signal' 相同
Communications subsystem failure	Communications	
Communications protocol error	Communications	
LAN error	Communications	
DTE-DCE interface error	Communications	
Temperature unacceptable	Environmental	
Humidity unacceptable	Environmental	
Heating/ventilation/cooling system problem	Environmental	
Fire detected	Environmental	与 M.3100 建议中的原因 'Fire' 相同
Flood detected	Environmental	与 M.3100 建议中的原因 'Flood' 相同
Toxic leak detected	Environmental	
Leak detected	Environmental	
Pressure unacceptable	Environmental	
Excessive vibration	Environmental	
Material supply exhausted	Environmental	
Pump failure	Environmental	与 M.3100 建议中的原因 'Pump failure' 相同
Enclosure door open	Environmental	与 M.3100 建议中的原因 'Enclosure door open' 相同
Power problem	Equipment	与 M.3100 建议中的原因 'Power problem' 相同
Timing problem	Equipment	与 M.3100 建议中的原因 'Timing problem' 相同
Processor problem	Equipment	与 M.3100 建议中的原因 'Processor problem' 相同
Dataset or modem error	Equipment	
Multiplexer problem	Equipment	与 M.3100 建议中的原因 'Multiplexer problem' 相同
Receiver failure	Equipment	与 M.3100 建议中的原因 'Receiver problem' 相同

表 B.2（续）

可能原因	告警类型	注 释
Transmitter failure	Equipment	与 M.3100 建议中的原因 'Transmitter problem' 相同
Receive failure	Equipment	
Transmit failure	Equipment	
Output device error	Equipment	
Input device error	Equipment	
I/O device error	Equipment	
Equipment malfunction	Equipment	
Adapter error	Equipment	
Storage capacity problem	Processing error	与 M.3100 建议中的原因 'Storage capacity problem' 相同
Version mismatch	Processing error	
Corrupt data	Processing error	与 M.3100 建议中的原因 'Corrupt data' 相同
CPU cycles limit exceeded	Processing error	
Software error	Processing error	
Software program error	Processing error	
Software program abnormally terminated	Processing error	
File error	Processing error	
Out of memory	Processing error	
Underlying resource unavailable	Processing error	
Application subsystem failure	Processing error	
Configuration or customization error	Processing error	
Response time excessive	Quality of service	
Queue size exceeded	Quality of service	
Bandwidth reduced	Quality of service	
Retransmission rate excessive	Quality of service	
Threshold crossed	Quality of service	
Performance degraded	Quality of service	
Congestion	Quality of service	
Resource at or nearing capacity	Quality of service	

B.3.3 GSM 中的告警可能原因

ETSI GSM12.11 中定义的 GSM 系统中的告警可能原因见表 B.3。

表 B.3 ETSI GSM 12.11 中定义的告警可能原因

可能原因	告警类型	注 释
Broadcast channel failure	Communications	
Connection establishment error	Communications	
Invalid message received	Communications	
Invalid MSU received	Communications	
LAPD link protocol failure	Communications	
Local alarm indication	Communications	
Remote alarm indication	Communications	
Routing failure	Communications	
SS7 protocol failure	Communications	
Transmission error	Communications	
Cooling system failure	Environmental	
External equipment failure	Environmental	
External power supply failure	Environmental	
External transmission device failure	Environmental	
Fan failure	Environmental	与 M.3100 建议中的原因 'Cooling fan failure' 相同
High humidity	Environmental	与 M.3100 建议中的原因 'High humidity' 相同
High temperature	Environmental	与 M.3100 建议中的原因 'High temperature' 相同
Intrusion detected	Environmental	与 M.3100 建议中的原因 'Intrusion detection' 相同
Low humidity	Environmental	与 M.3100 建议中的原因 'Low humidity' 相同
Low temperature	Environmental	与 M.3100 建议中的原因 'Low temperature' 相同
Smoke detected	Environmental	与 M.3100 建议中的原因 'Smoke' 相同
A-bis to BTS interface failure	Equipment	
A-bis to TRX interface failure	Equipment	
Antenna problem	Equipment	
Battery breakdown	Equipment	
Battery charging fault	Equipment	
Clock synchronization problem	Equipment	
Combiner problem	Equipment	
Disk problem	Equipment	

表 B.3（续）

可能原因	告警类型	注　释
Equipment failure	Equipment	与 X.721 建议中的原因 'Equipment malfunction' 相同
Excessive receiver temperature	Equipment	
Excessive transmitter output power	Equipment	
Excessive transmitter temperature	Equipment	
Frequency hopping degraded	Equipment	
Frequency hopping failure	Equipment	
Frequency redefinition failed	Equipment	
Line interface failure	Equipment	
Link failure	Equipment	
Loss of synchronization	Equipment	
Lost redundancy	Equipment	
Mains breakdown with battery back-up	Equipment	
Mains breakdown without battery back-up	Equipment	
Power supply failure	Equipment	
Receiver antenna fault	Equipment	
Receiver failure	Equipment	与 M.3100/X.721 建议中的原因 'Receiver failure' 相同
Receiver multicoupler failure	Equipment	
Receiver problem	Equipment	
Reduced transmitter output power	Equipment	
Signal quality evaluation fault	Equipment	
Timeslot hardware failure	Equipment	
Transceiver problem	Equipment	
Transcoder problem	Equipment	
Transcoder or rate adapter problem	Equipment	
Transmitter antenna failure	Equipment	
Transmitter antenna not adjusted	Equipment	
Transmitter failure	Equipment	与 M.3100/X.721 建议中的原因 'Transmitter failure' 相同
Transmitter low voltage or current	Equipment	
Transmitter off frequency	Equipment	

表 B.3（续）

可能原因	告警类型	注 释
Database inconsistency	Processing error	
File system call unsuccessful	Processing error	
Input parameter out of range	Processing error	
Invalid parameter	Processing error	
Invalid pointer	Processing error	
Message not expected	Processing error	
Message not initialised	Processing error	
Message out of sequence	Processing error	
System call unsuccessful	Processing error	
Timeout expired	Processing error	
Variable out of range	Processing error	
Watch dog timer expired	Processing error	
Excessive Error Rate	Quality of service	
Reduced alarm reporting	Quality of service	
Reduced event reporting	Quality of service	
Reduced logging capability	Quality of service	
System resources overload	Quality of service	

B.3.4 重复定义的告警可能原因

有些告警可能原因在不同建议中有不同的值定义。为了惟一标识某一种告警，应该为一种可能原因指定一个值。表 B.4 给出了这些情况。在表 B.4 中，'√'表示该行所对应的可能原因在本列所对应的建议中有定义；'*'表示该行所对应的可能原因将采用本列所对应的建议中的值定义，并在本接口的范围内用于惟一标识该可能原因。

表 B.4 对于重复定义的告警可能原因的采纳

可能原因	事件类型	ETSI 12.11	X.721	M.3100	所采用的建议
Call Establishment Failure (X.721/X.733) Call Setup Failure (M.3100)	Communications		√	* √	M.3100
Degraded Signal	Communications		√	* √	M.3100
Framing Error	Communications		√	* √	M.3100
Loss of Frame	Communications		√	* √	M.3100
Loss of Signal	Communications		√	* √	M.3100
Enclosure Door Open	Environmental		√	* √	M.3100

表 B.4 （续）

可能原因	事件类型	ETSI 12.11	X.721	M.3100	所采用的建议
Fan Failure (GSM 12.11) Cooling Fan Failure (M.3100)	Environmental	√		* √	M.3100
Fire Detected (X.721/X.733) Fire (M.3100)	Environmental		√	* √	M.3100
Flood Detected (X.721/X.733) Flood (M.3100)	Environmental		√	* √	M.3100
High Humidity	Environmental	√		* √	M.3100
High Temperature	Environmental	√		* √	M.3100
Low Humidity	Environmental	√		* √	M.3100
Low Temperature	Environmental	√		* √	M.3100
Intrusion Detected (GSM 12.11) Intrusion Detection (M.3100)	Environmental	√		* √	M.3100
Pump Failure	Environmental		√	* √	M.3100
Smoke Detected (GSM 12.11) Smoke (M.3100)	Environmental	√		* √	M.3100
Equipment Failure (GSM 12.11) Equipment Malfunction (X.721/X.733)	Equipment	√	* √		X.721
Multiplexer Problem	Equipment		√	* √	M.3100
Power Problem	Equipment		√	* √	M.3100
Processor Problem	Equipment		√	* √	M.3100
Receiver Failure	Equipment	√	√	* √	M.3100
Timing Problem	Equipment		√	* √	M.3100
Transmitter Failure	Equipment	√	√	* √	M.3100
Storage Capacity Problem	Processing error		√	* √	M.3100
Corrupt Data	Processing error		√	* √	M.3100

附录 C

（规范性附录）

配置管理信息模型

C.1 配置管理部分信息模型概览

C.1.1 配置管理部分的管理对象继承树

配置管理对象继承树如图 C.1 所示。
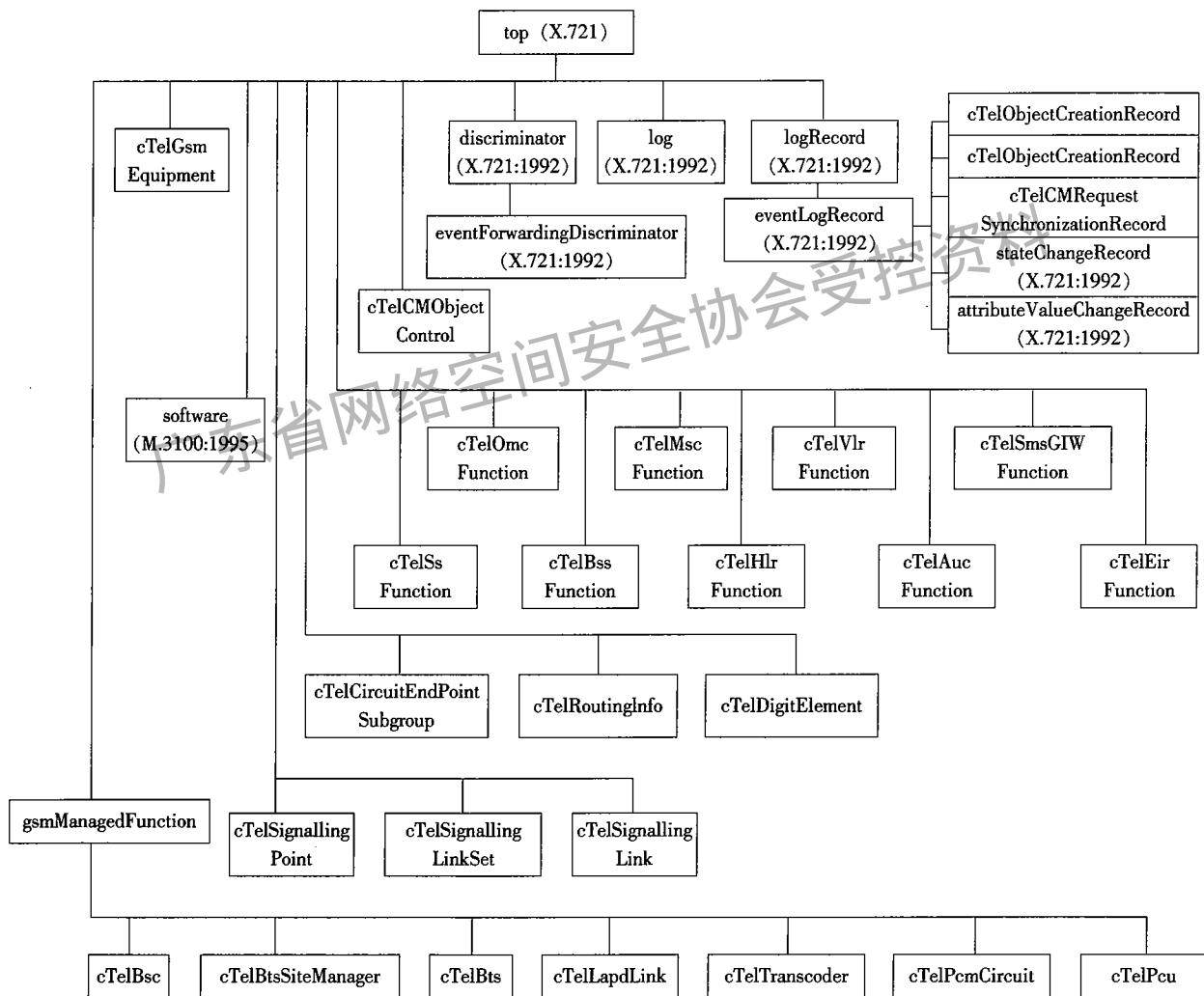
图 C.1 配置管理对象继承树

C.1.2 配置管理部分的对象包含树

配置管理对象包含树如图 C.2 所示。
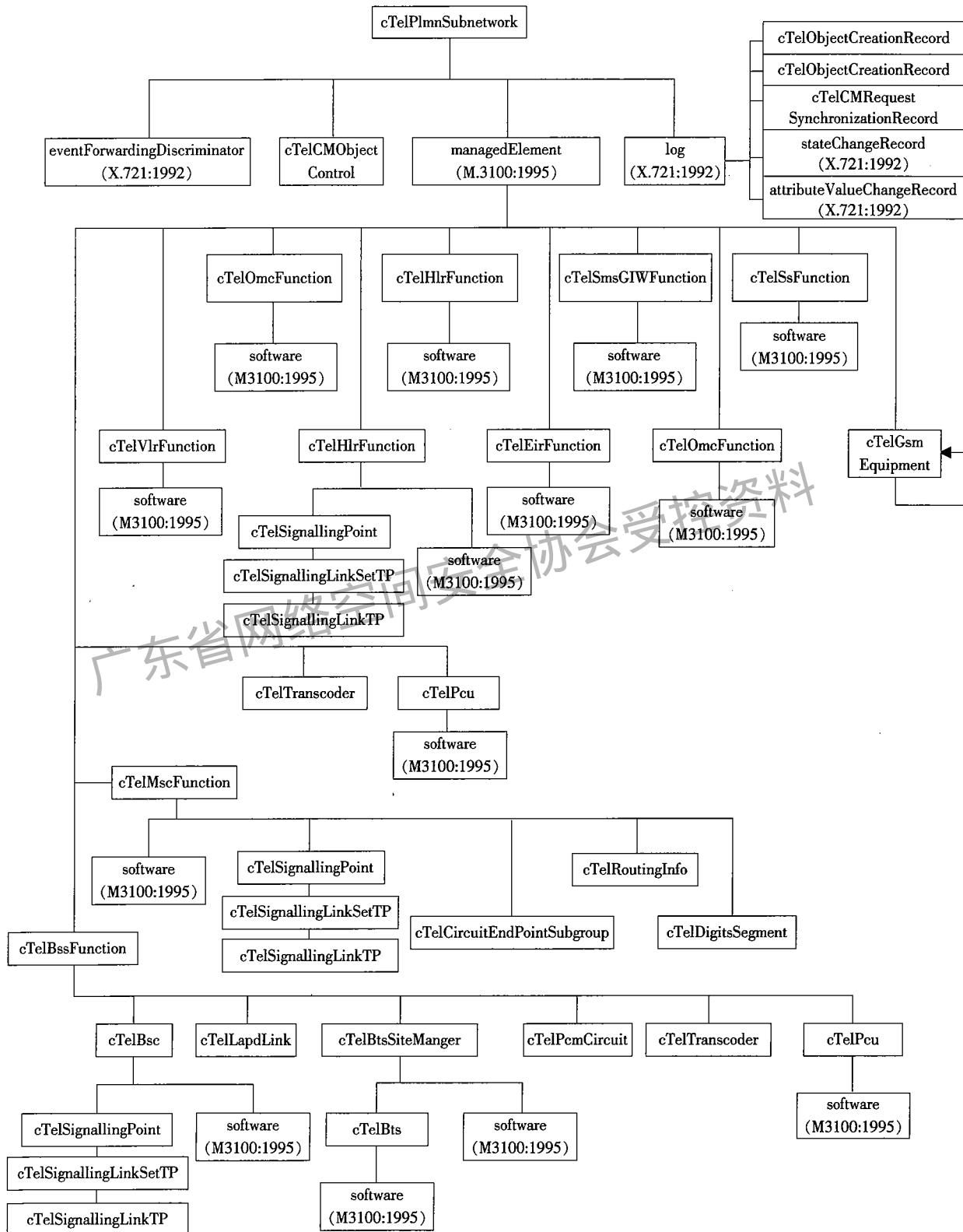
图 C.2 配置管理对象包含树

C.1.3 配置管理部分的对象实体关系

图 C.3、C.4、C.5 给出了对象实体间的包含关系和关联关系。包含关系是一种描述了命名的单向关系，从属对象由其上级对象来命名（即被上级对象类所包含）。图中描述了从属管理对象实例可以在包含树中出现的位置，以及某些情况下上级对象类中限制或需要的从属对象类实例的个数。图中箭头的方向由上级实例指向从属实例。例如图 C.3 中每个 bssFunction 实例下应包含一个 bsc 实例，或包含一个到多个 cTelBtsSiteManager 实例。

关联关系通过对象实体的关联属性来体现的，其值可以是一个对象实例的可识别名，或对象标识符（如果对象标识符的分配可以严格区分时）。也就是说，该属性可以只存在于其中一个关联对象的实例中。在图中，在关联虚线端点上的黑点表示关联属性所处的位置，旁边的数字描述了到该端点方向的该关联关系所限制/需要的对象的个数。被管系统应负责对对象实体间关联关系的维护，如当被管系统中删除了某一个对象类实例，则它将负责把与该对象实例相关的关联属性置为合适的值。
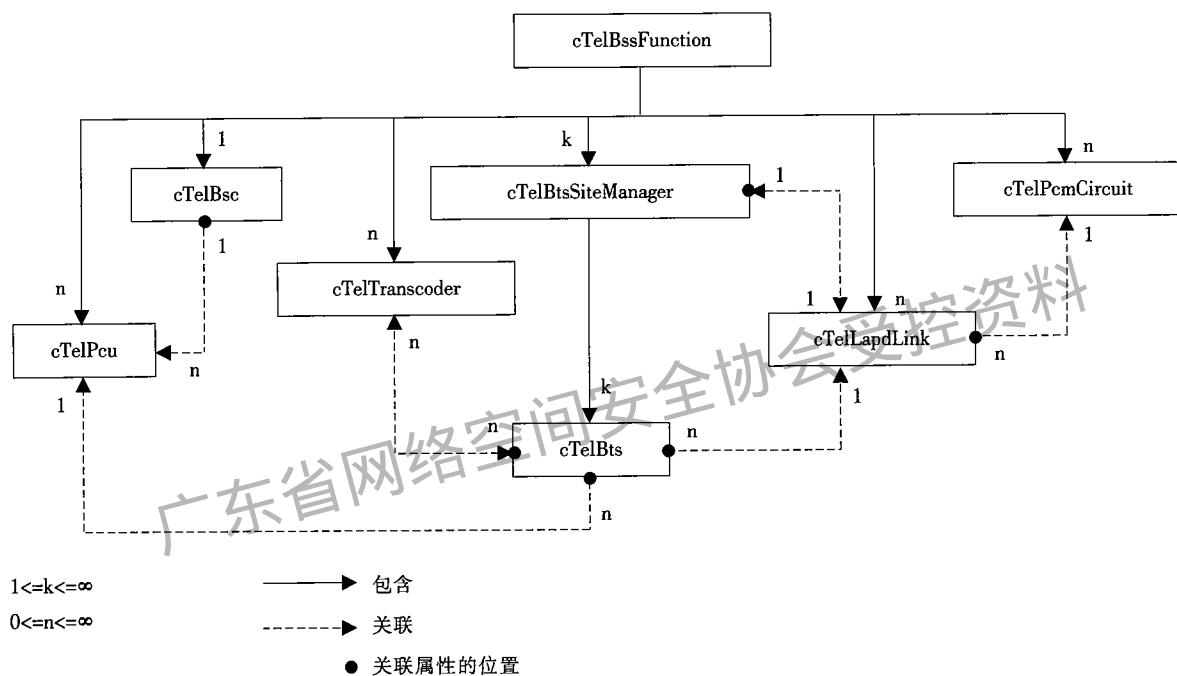
图 C.3 BSS 中管理对象实体关系
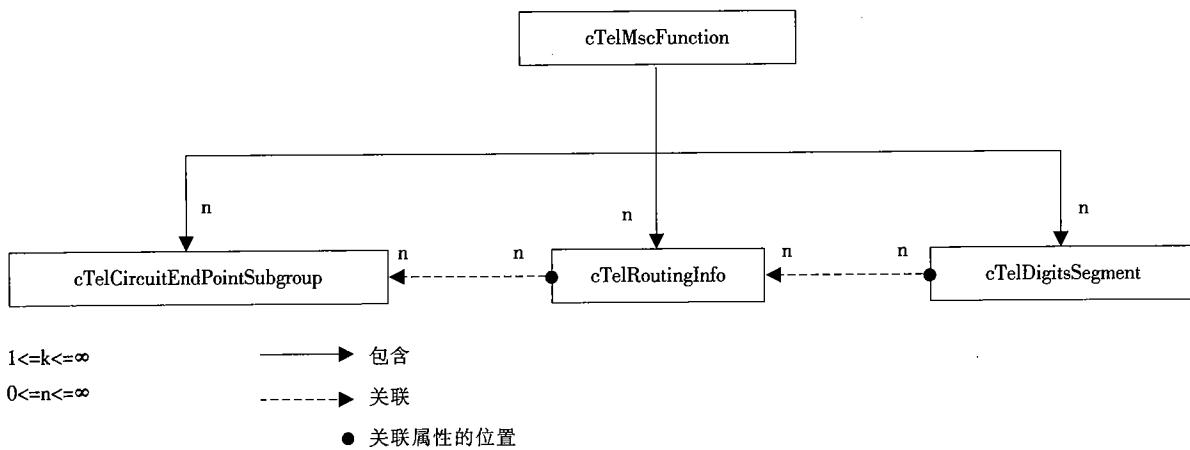
图 C.4 MSC 路由相关的功能实体关系
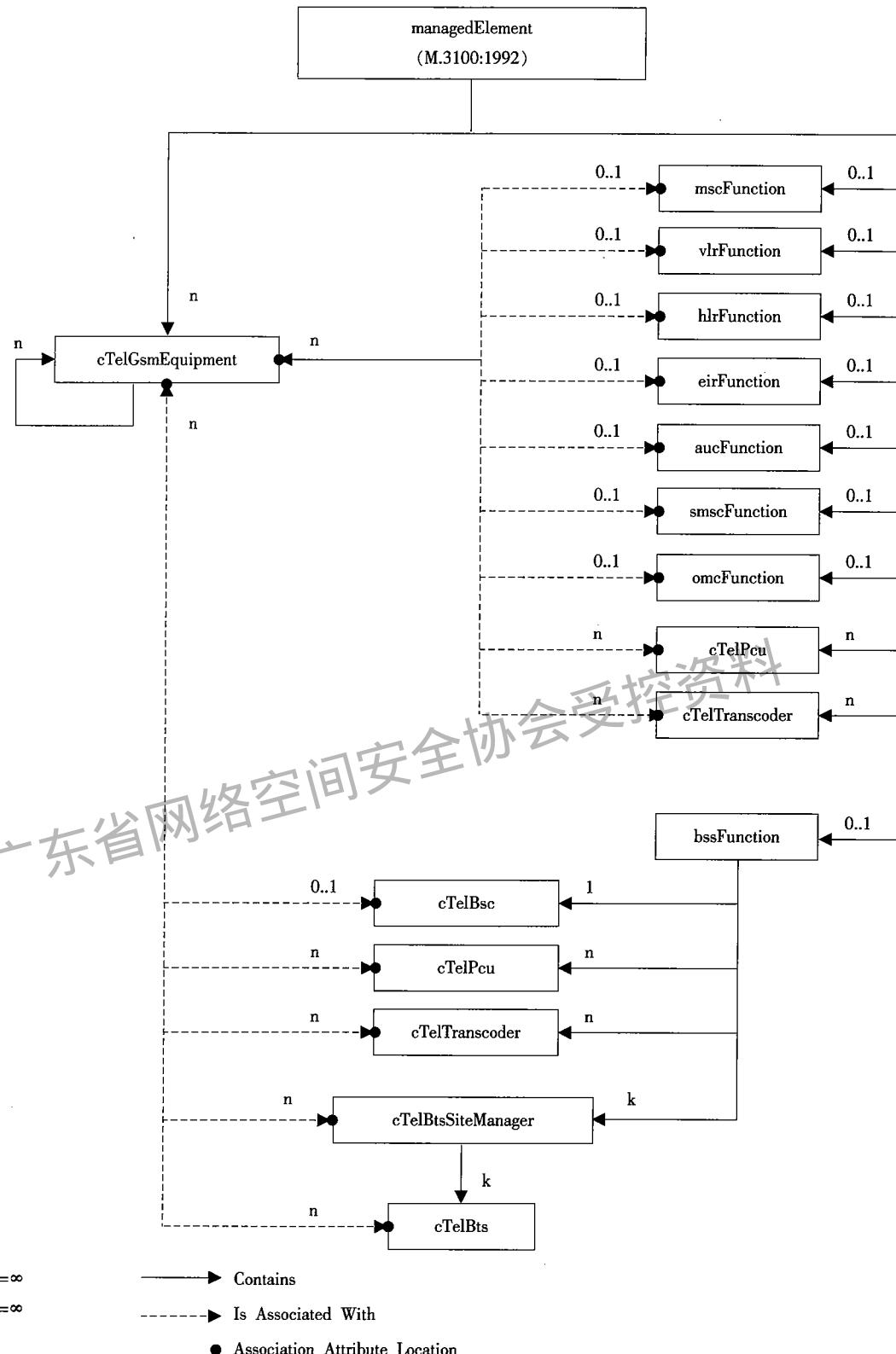
图 C.5 配置管理对象中设备与功能实体关系

C.2 配置信息描述

C.2.1 PLMN 子网信息

PLMN 子网信息由管理对象类 *cTelPlmnSubnetwork* 定义，见表 C.1。

表 C.1 cTelPlmnSubnetwork 的信息

属　　性	描　　述
networkId	cTelPlmnSubnetwork 的标识符，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定
mcc	移动国家代码
mnc	移动网络代码
setOfCc	国家代码集合
setOfNdc	网络目的码集合
listOfSupportedBS	所支持的基本服务列表
listOfSupportedSS	所支持的附加服务列表

C.2.2 OMC 信息

OMC 信息由管理对象类 *cTelOmcFunction*（见表 C.2）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息来定义。

表 C.2 cTelOmcFunction 的信息

属性名	描　　述
omcFunctionId	cTelOmcFunction 的标识符，是命名属性
omcType	OMC 的类型，可以是 omc、omc-r，或者 omc-s
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
relatedGSMEquipment	关联属性，指实现该功能的 GSM 物理设备

表 C.3 cTelGsmEquipment 的信息

属　　性	描　　述
equipmentId	设备标识，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定，作为其内部的设备标识
vendorName	厂商名称
version	设备版本号
locationName	位置名称，如指明该设备所处的具体房间
relatedGSMFunctionalObjects	关联属性，指该设备所实现的功能实体列表
administrativeState	管理状态
operationalState	运行状态
alarmStatus	告警状态
neCode	网元编码

表 C.4 software 的信息

属 性	描 述
softwareId	软件标识符，命名属性
administrativeState	管理状态
operationalState	运行状态
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 或 NR 的内部标识
vendorName	软件厂商名称
version	软件版本
currentProblemList	当前软件存在的问题列表

C.2.3 MSC 信息

MSC 信息内容包括：

—MSC 信息由管理对象类 cTelMscFunction（见表 C.5）以及相关的物理设备 cTelGsmEquipment（见表 C.3）和软件 software（见表 C.4）的信息来定义；

—MSC 信息包括本地信令点及相邻的信令点（如 HLR 和 BSCs 等）信息，这些信令配置信息由信令链路 cTelSignallingLinkTP（见表 C.6）、信令链路组 cTelSignallingLinkSetTP（见表 C.7）和信令点 cTelSignallingPoint（见表 C.8）管理对象类来定义；

—MSC 信息还包括电路群信息、路由信息和目的码信息，由电路群 cTelCircuitEndPointSubgroup（见表 C.9）、路由信息 cTelRouteingInfo（见表 C.10）、数字段 cTelDigitsSegement（见表 C.11）对象类来定义。

表 C.5 cTelMscFunction 的信息

属 性	描 述
mscFunctionId	cTelMscFunction 标识符
administrativeState	管理状态
operationalState	运行状态
mscId	MSC 的标识
mscNumber	该 mscFunction 代表的 MSC 的 ISDN 号码，用于通过信令来定位该 MSC
usageState	使用状态
userLabel	用户友好名，由 OMC 厂商自己指定，作为其内部的设备标识
maxMscBHCA	MSC BHCA 的最大设计值
mscCapacity	MSC 容量
maxNumOfCPUConfigurable	MSC 可配置 CPU 的最大数目
mscType	MSC 类型，可以是 TMSC1, TMSC2, GMSC 或 MSC/VLR
mscUpgradeIndicator	MSC 升级标志，是否升级为 SSP 或 POI
numOf2MPort	MSC 的 2M 端口数目
mscIWFDataBlockCapacity	MSC 互联功能数据块的容量（单位时间可处理的用户数）
numOfIWFDataBlock	MSC 互联功能数据块的数目
relatedGSMEquipment	关联属性，指实现该功能的 GSM 物理设备

表 C.6　cTelSignallingLinkTP 的信息

属　性	描　述
signallingLinkTPId	cTelSignallingLinkTP 标识符，是命名属性
slc	用于区分信令链路集中信令链路的信令链路代码
administrativeState	管理状态
operationalState	运行状态
usageState	使用状态
signallingLinkPriority	信令链路优先级
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
slsCodeNormalList	缺省分配给该 signalingLinkTP 的信令链路选择码（SLS）
slsCodeCurrentList	当前分配给该 signalingLinkTP 的信令链路选择码（SLS）

表 C.7　cTelSignallingLinkSetTP 的信息

属　性	描　述
signallingLinkSetTPId	signallingLinkSetTP 标识符，是命名属性
signallingLinkSetName	信令链路集名称
numberOfSignallingLinks	所包含的信令链路数目
adjacentSignallingInfo	相邻信令点编码和网络指示符
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识

表 C.8　cTelSignallingPoint 的信息

属　性	描　述
signallingPointId	signallingPoint 标识符，是命名属性
signallingInfo	信令信息，包括信令点编码和网络指示符
signallingPointType	信令点类型
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识

表 C.9　cTelCircuitEndPointSubgroup 的信息

属　性	描　述
circuitEndPointSubgroupId	cTelCircuitEndPointSubgroup 标识符，是命名属性
numberOfCircuits	电路群中的电路数目
circuitDirectionality	该电路群的方向
transmissionCharacteristics	该电路群所支持的传输特性，如光纤、同轴电缆、模拟微波、数字微波、卫星和混合组

表 C.9（续）

属　性	描　述
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
circuitType	电路类型
trunkGroupType	中继群类型，用于指明对端网元类型
administrativeState	管理状态
operationalState	运行状态
alarmStatus	告警状态
maxNumOfCircuitsConfigurable	指电路群的最大可配置电路数目
signallingInfoOfFarEnd	指该中继群的远端的信令信息
signallingPointOfFarEnd	是指向该中继群的远端信令点对象的指针

表 C.10　cTelRoutingInfo 的信息

属　性	描　述
routingInfoId	cTelRoutingInfo 标识符，是命名属性
firstChoiceRoute	第一选择路由和相关电路群的信息
firstCircuitousRoute	第一迂回路由和相关电路群的信息
secondCircuitousRoute	第二迂回路由和相关电路群的信息
thirdCircuitousRoute	第三迂回路由和相关电路群的信息

表 C.11　cTelDigitsSegement 的信息

属　性	描　述
digitsSegmentId	cTelDigitsSegment 标识
digitList	用于选择路由的数字序列
digitPartcipationIndicator	指明数字段是否是下列元素的一部分：IntermationalCode, NationalPSTNCode, NationalPLMNCode, toLocalMSC, toOwnMSC, LocalPSTNCode, LocalSPXCode, others 或 seeNextCode
labelOfFarEndExchange	远端交换机的用户友好名
relatedRouteInfo	关联属性，指向相关联的路由信息 routingInfo 对象实例

C.2.4　HLR 信息

HLR 信息包括：

——HLR 信息由管理对象类 *cTelHlrFunction*（见表 C.12）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息定义；

——HLR 信息包括本地信令点和相邻信令点（如 MCS）信息，这些信令信息由信令链路 *cTelSignallingLinkTP*（见表 C.6）、信令链路组 *cTelSignallingLinkSetTP*（见表 C.7）和信令点 *cTelSignallingPoint*（见表 C.8）。管理对象类来定义。

表 C.12 cTelHlrFunction 的信息

属 性	描 述
hlrFunctionId	cTelHlrFunction 标识符，是命名属性
administrativeState	管理状态
operationalState	运行状态
maxNumberOfLogicalHlr	指该 HLR 对象中可以包含的最大逻辑 HLR 的个数
currentNumberOfLogicalHlr	指该 HLR 对象中当前包含的逻辑 HLR 的个数
maxNumberOfImsiInHlr	指该 HLR 中所能包含的 IMSI 的最大个数
currentNumberOfImsiInHlr	指该 HLR 中当前所包含的 IMSI 的个数
maxNumberOfMsisdnInHlr	指该 HLR 中所能包含的 msisdnInHlr 对象的最大个数
currentNumberOfMsisdnInHlr	指该 HLR 中当前所包含的 msisdnInHlr 对象的个数
defaultPW	指要在 subscriberInHlr 对象中使用的缺省的口令
defaultAnnouncement	指要在 subscriberInHlr 对象中使用的缺省的声名
usageState	使用状态
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
relatedGSMEquipment	关联属性，指实现该功能的 GSM 设备
hlrNumber	该 hlrFunction 代表的 HLR 的 ISDN 号码，用于通过信令来定位该 HLR
supportGPRS	该 HLR 是否支持 GPRS 功能

C.2.5 VLR 信息

VLR 信息由管理对象类 *cTelVlrFunction*（见表 C.13）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息定义。

注：在一般情况下，cTelVlrFunction and cTelMscFunction 物理实现在同一设备上。

表 C.13 cTelVlrFunction 的信息

属 性	描 述
vlrFunctionId	cTelVlrFunction 标识符，是命名属性
administrativeState	管理状态
operationalState	运行状态
vlrId	指由 vlrFunction 所表示的 VLR 的标识
vlrNumber	该 vlrFunction 代表的 VLR 的 ISDN 号码，用于通过信令来定位该 VLR
maxNumberOfImsiInVlr	指该 VLR 可以存储的最大 IMSI 的最大数目
currentNumberOfImsiInVlr	指该 VLR 中当前存储的 IMSI 的数目
usageState	使用状态
userLabel	用户友好名，由 OMC 厂商自己指定，可以作为其内部的设备标识
relatedGSMEquipment	关联属性，指实现该功能的 GSM 物理设备

C.2.6 EIR 信息

EIR 信息由管理对象类 *cTelEirFunction*（见表 C.14）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息定义。

表 C.14 cTelEirFunction 的信息

属 性	描 述
eirFunctionId	cTelEirFunction 标识符，是命名属性
administrativeState	管理状态
operationalState	运行状态
eirId	指由该 cTelEirFunction 表示的 EIR 的标识符
eirNumber	该 eirFunction 代表的 EIR 的 ISDN 号码，用于通过信令来定位该 EIR
maxNumberOfWhiteListEntries	白名单的最大数目
maxNumberOfGreyListEntries	灰名单的最大数目
maxNumberOfBlackListEntries	黑名单的最大数目
currentNumberOfWhiteListEntries	白名单中的当前数目
currentNumberOfGreyListEntries	灰名单中的当前数目
currentNumberOfBlackListEntries	黑名单中的当前数目
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
relatedGSMEquipment	关联属性，指实现该功能的 GSM 设备

C.2.7 AUC 信息

AUC 信息由管理对象类 *cTelAucFunction*（见表 C.15）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息定义。

表 C.15 cTelAucFunction 的信息

属 性	描 述
aucFunctionId	cTelAucFunction 标识，是命名属性
administrativeState	管理状态
operationalState	运行状态
maxNumberOfLogicalAuc	指该 AUC 对象中可以包含的最大逻辑 AUC 的个数
currentNumberOfLogicalAuc	指该 AUC 对象中当前包含的逻辑 AUC 的个数
maxNumberOfImsiInAuc	指该 AUC 中所能包含的 IMSI 的最大个数
currentNumberOfImsiInAuc	指该 AUC 中当前所包含的 IMSI 的个数
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
relatedGSMEquipment	关联属性，指实现该功能的 GSM 设备

C.2.8 SMS_G_IW 信息

SMS_G_IW 信息由管理对象类 *cTelSmsGIWFunction*（见表 C.16）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息定义。

表 C.16 cTelSmsGIWFunction 的信息

属 性	描 述
smsGIWFunctionId	cTelSmsGIWFunction 标识，是命名属性
administrativeState	管理状态
operationalState	运行状态
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
relatedGSMEquipment	关联属性，指实现该功能的 GSM 设备

C.2.9 BSS 信息

BSS 信息包括：

—BSC 信息由管理对象类 *cTelBsc*（见表 C.17）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息定义，BSC 信息还包括本地信令点及相邻信令点（如 MSC）信息，这些信令信息由信令链路 *cTelSignallingLinkTP*（见表 C.6）、信令链路组 *cTelSignallingLinkSetTP*（见表 C.7）和信令点 *cTelSignallingPoint*（见表 C.8）管理对象类定义：

—PCU 信息由管理对象类 *cTelPcu*（见表 C.18）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息定义；

—BTS 信息由管理对象类 *cTelBtsSiteManager*（见表 C.19）、*cTelBts*（见表 C.20）以及相关的物理设备 *cTelGsmEquipment*（见表 C.3）和软件 *software*（见表 C.4）的信息定义；

—基站子系统包括的其他信息由 *cTelTranscoder*（见表 C.21）、*cTelLapdLink*（见表 C.22）、*cTelPcmCircuit*（见表 C.23）对象类。

表 C.17 cTelBsc 的信息

属 性	描 述
bscId	cTelBsc 标识符，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
locationName	位置名称，如指明该设备所处的具体房间
handoverReqParam	切换请求参数
relatedGSMEquipment	关联属性，指实现该功能的 GSM 物理设备
administrativeState	管理状态
alarmStatus	告警状态
operationalState	运行状态
usageState	使用状态
unknownStatus	未知状态
maxNumOfBscBHCA	BSC 中 BHCA 的最大设计值

表 C.17（续）

属 性	描 述
bscCapacity	BSC 的容量
trunkPortNumber	BSC 的中继端口数目
signallingPortNumber	BSC 的信令端口数目
enableInternalInterCellHandover	该属性提供管理系统允许或禁止由该 BSC 控制的小区内切换的能力
enableInternalIntraCellHandover	该属性提供管理系统允许或禁止由该 BSC 控制的小区间切换的能力
relatedPCU	关联属性，指与该 BSC 相关的 PCU 对象实例的指针
relatedSGSN	关联属性，指与该 BSC 相关的 SGSN 对象实例的指针，其取值为 neCode
bssNsEntityMappingTable	该属性是 BSS 侧的网络业务实体映射表
bssNsUserEntityMappingTable	该属性是 BSS 侧的网络业务用户实体映射表

表 C.18 cTelPcu 的信息

属 性	描 述
pcuId	cTelPcu 标识符，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
locationName	位置名称，应指明该设备所处的具体房间
relatedGSMEquipment	关联属性，指实现该功能的 GSM 设备
relatedSGSN	关联属性，是指向相关联的 SGSN 的指针，其取值为 SGSN 的网元编码
numOfPDCHSupported	PCU 所支持的 PDCH 的数目
administrativeState	管理状态
alarmStatus	告警状态
operationalState	运行状态
usageState	使用状态
unknownStatus	未知状态

表 C.19 cTelBtsSiteManager 的信息

属 性	描 述
btsSiteManagerId	cTelBtsSiteManager 标识符，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
locationName	位置名称，如指明该设备所处的具体房间
relatedGSMEquipment	关联属性，指实现该功能的 GSM 物理设备
relatedOAMLapdLink	关联属性，指相关的用于操作维护的 LAPD 链路

表 C.20 cTelBts 的信息

属 性	描 述
btsId	cTelBts 标识符，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
locationName	位置名称，应指明该设备所处的具体房间
bsIdentityCode	基站识别码（BSIC），该值将在 SCH 上发送来表示该 BTS，该码由网络色码（NCC）和基站色码（BCC）组成
cellAllocation	分配给小区的无线频率集
gsmdcsIndicator	指示该小区的类型：GSM 或 DCS1800
cellGlobalIdentity	小区全局标识，包括小区标识和位置区标识，位置区标识在一个 GSM PLMN 中是惟一的，小区标识在一个位置区中是惟一的
cellReselectHysteresis	小区重选滞后值
ny1	指小区切换过程中，在无线接口上重传"物理信息"（PHYSICAL INFORMATION）消息的最大次数
relatedGSMEquipment	关联属性，指实现该功能的 GSM 物理设备
periodCCCHLoadIndication	指 CCCH 负载指示信息上报给 BSC 的频率
plmnPermitted	标识允许接入该 BTS 的移动网手机手机，其取值为这些 PLMN 的网络色码（NCC），这些值将在手机接入该 BTS 时使用
rACHBusyThreshold	RACH 突发期间接收信号级别的阈值，超过该阈值的信号将被视为一个忙 RACH
rACHLoadAveragingSlots	RACH 测量期间 RACH 突发次数
radioLinkTimeout	检测出无线链路失败的定时器超时值
relatedOAMLapdLink	关联属性，指相关的用于操作维护的 LAPD 链路
relatedTranscoder	关联属性，指相关的码速适配器
rxLevAccessMin	移动台接入 BTS 系统是可允许的最小功率
thresholdCCCHLoadIndication	BTS 通知 BSC 关于 CCCH 负荷指示的门限值
administrativeState	管理状态
alarmStatus	告警状态
operationalState	运行状态
unknownStatus	未知状态
usageState	使用状态
maxNumberRetransmission	移动台可在 RACH 上执行的最大重传次数
mSTxPwrMaxCCH	移动台在接入小区时可在 CCCH 上使用的最大传输功率
numberOfSlotsSpreadTrans	移动台在发生随机接入冲突后，可以等待的最大 RACH 时隙数
noOfBlocksForAccessGrant	在 51 个 TDMA 帧（复帧）周期中，收到的含有 AGCH 的 TDMA 帧的数目
noOfMultiframesBetweenPaging	指在向同一个寻呼组发送同一条寻呼消息所应间隔的复帧（51 个 TDMA 帧）数

表 C.20（续）

属　性	描　述
allowIMSIAttachDetach	小区是否允许 IMSI 的附着/分离
callReestablishmentAllowed	小区是否允许呼叫重新建立
cellBarred	小区是否禁止移动台停留
dtxDownlink	BTS 的下行 DTX（非连续性发信）选项；如果允许的话，将由 MSC 来控制下行 DTX
dtxUplink	BTS 的上行 DTX 选项，由移动台使用
emergencyCallRestricted	是否允许所有的移动台或访问级别为 11~15 的移动台使用紧急呼叫
notAllowedAccessClasses	禁止访问该 BTS 的移动台类型
timerPeriodicUpdateMS	移动台位置更新的时间间隔
noOfTransceivers	基站收发信机（TRX）的数目
noOfRadioCarriers	无线载波数目
noOfSDCCH	SDCCH 数目
noOfTCH	TCH 数目
trxPower	TRX 的功率
maxQueueLength	指 BTS 中允许呼叫或切换请求排队的最大队列长度，其取值是该 BTS 中以所有工作 TCH 数目为基数的百分比。其中： 0：不使用队列； 100：最大队列长度等于可用的 TCH 数目。
msPriorityUsedInQueuing	指排队处理时是否考虑来自 MSC 的分配请求或切换请求消息的呼叫优先级
timeLimitCall	呼叫请求等待 TCH 可用的最大等待时长
timeLimitHandover	切换呼叫请求等待 TCH 可用的最大等待时长
hoMsmtProcessingMode	指切换控制算法的处理模式。切换控制算法的无线链路测量可以直接传送给 BSC，也只可以将处理结果和门限比较传给 BSC，该属性指明了 BTS 所采用的模式。其缺省值是采用前者
pcMsmtProcessingMode	指功率控制算法的处理模式。功率控制算法的无线链路测量由 BTS 来采集，其结果可以直接传送给 BSC 处理，也可以将在 BTS 本地进行处理和门限比较后的结果发送给 BSC，该属性指明了 BTS 所采用的模式。其缺省值是采用前者
cellReselectArithm	BTS 中 GPRS 的小区重选算法
rai	BTS 中 GPRS 的路由区标识
pBCCHIndicator	BTS 中是否配置了 PBCCH；该值为真表示配置了
pCCCHIndicator	BTS 中是否配置了 PCCCH；该值为真表示配置了
numOfSlotsForGPRS	用于 GPRS 的时隙数
numOfTrxForGPRS	用于 GPRS 的 TRX 数目
channelEncodeMode	BTS 的信道编码模式
mediaAccessControlMode	媒质访问控制模式
relatedPCU	关联属性，表示指示相关联的 PCU；如果该 BTS 没有相关的 PCU，则该属性可以为空

表 C.21　cTelTranscoder 的信息

属　性	描　述
transcoderId	cTelTranscoder 标识符，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
locationName	位置名称，如指明该设备所处的具体房间
relatedGSMEquipment	关联属性，指实现该功能的 GSM 物理设备
administrativeState	管理状态
alarmStatus	告警状态
operationalState	运行状态
unknownStatus	未知状态

表 C.22　cTelLapdLink 的信息

属　性	描　述
lapdLinkId	cTelLapdLink 标识符，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
abisSigChannel	标识在 Abis 接口上分配给 LAPD 链路的 PCM 时隙和可能的子时隙
sapi	指 lapdLink 对象的业务接入点标识
tei	指 lapdLink 对象的终端点标识
administrativeState	管理状态
alarmStatus	告警状态
operationalState	运行状态
unknownStatus	未知状态

表 C.23　cTelPcmCircuit 的信息

属　性	描　述
pcmCircuitId	cTelPcmCircuit 标识符，是命名属性
userLabel	用户友好名，由 OMC 厂商自己指定，作为 NE 和 NR 的内部标识
administrativeState	管理状态
alarmStatus	告警状态
operationalState	运行状态
unknownStatus	未知状态
usageState	使用状态

C.3 配置管理部分的信息模型定义

C.3.1 配置管理部分的 GDMO 定义

--DOCUMENT "cTelCM";

---- Managed object class definitions

---- General managed object classes

--- cTelPlmnSubNetwork

cTelPlmnSubnetwork MANAGED OBJECT CLASS

    DERIVED FROM

        "ITU-T Rec. M.3100:1995": network;

    CHARACTERIZED BY

        plmnSubnetworkPackage;

    CONDITIONAL PACKAGES

        "ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

            PRESENT IF "the objectCreation and objectDeletion notifications (as defined in ITU-T X. 721) are supported by this managed object",

        "ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

            PRESENT IF " the attributeValueChange notification (as defined in ITU -T X.721) is supported by this managed object",

        "ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

            PRESENT IF "the stateChange notification (as defined in ITU-T X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 10} ;

---managedElement

----see M.3100:1995 for details

---software

----see M.3100:1995 for details

---cTelGsmEquipment

cTelGsmEquipment MANAGED OBJECT CLASS

    DERIVED FROM "Rec. X.721 I ISO/IEC 10165-2 : 1992":top;

    CHARACTERIZED BY

        "ITU-T Rec. M.3100:1995":userLabelPackage,

        "ITU-T Rec. M.3100:1995":vendorNamePackage,

        "ITU-T Rec. M.3100:1995":versionPackage,

        "ITU-T Rec. M.3100:1995":locationNamePackage,

        gsmEquipmentPackage,

        cTelGsmEquipmentPackage;

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 20} ;

————cTelGsmManagedFunction

cTelGsmManagedFunction MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;

    CONDITIONAL PACKAGES

        "ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

           PRESENT IF "an instance supports it",

        "ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

           PRESENT IF "an instance supports it",

        "ITU-T Rec. M.3100:1995": userLabelPackage

           PRESENT IF "an instance supports it",

        "ITU-T Rec. M.3100:1995": locationNamePackage

           PRESENT IF "an instance supports it";

REGISTERED AS   {cTel-gsm-nmc-cm-objectClass 30} ;

————cTelSignallingLinkTP

cTelSignallingLinkTP MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top ;

    CHARACTERIZED BY

        signallingLinkTPPackage;

REGISTERED AS   {cTel-gsm-nmc-cm-objectClass 40} ;

————cTelSignallingLinkSetTP

cTelSignallingLinkSetTP MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top ;

    CHARACTERIZED BY

        signallingLinkSetTPPackage;

REGISTERED AS   {cTel-gsm-nmc-cm-objectClass 50} ;

————cTelSignallingPoint

cTelSignallingPoint MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top ;

    CHARACTERIZED BY

        signallingPointPackage;

REGISTERED AS   {cTel-gsm-nmc-cm-objectClass 60} ;

————cTelOmcFunction

cTelOmcFunction MANAGED OBJECT CLASS

    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;

    CHARACTERIZED BY

        omcFunctionPackage,

functionalRelatedAlarmPackage;

CONDITIONAL PACKAGES

    "ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

        PRESENT IF "the objectCreation and objectDeletion notifications (as defined in CCITT X. 721) are supported by this managed object",

    "ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

        PRESENT IF " the attributeValueChange notification (as defined in CCITT X.721) is supported by this managed object",

    "ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

        PRESENT IF "the stateChange notification (as defined in CCITT X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 70} ;

--MOCs from GSM 12.00 series

--- MOCs of NSS.

---cTelAucFunction

cTelAucFunction MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;

    CHARACTERIZED BY

        aucFunctionPackageCommon,

        aucFunctionPackage,

        cTelAucFunctionPackage;

    CONDITIONAL PACKAGES

        "ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

            PRESENT IF "the objectCreation and objectDeletion notifications (as defined in CCITT X. 721) are supported by this managed object",

        "ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

            PRESENT IF " the attributeValueChange notification (as defined in CCITT X.721) is supported by this managed object",

        "ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

            PRESENT IF "the stateChange notification (as defined in CCITT X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 80} ;

--- cTelEirFunction

cTelEirFunction MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;

    CHARACTERIZED BY

        eirFunctionPackageCommon,

        eirFunctionPackage,

        cTelEirFunctionPackage;

    CONDITIONAL PACKAGES

"ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

PRESENT IF "the objectCreation and objectDeletion notifications (as defined in CCITT X. 721) are supported by this managed object",

"ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

PRESENT IF " the attributeValueChange notification (as defined in CCITT X.721) is supported by this managed object",

"ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

PRESENT IF "the stateChange notification (as defined in CCITT X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 90} ;

--- cTelHlrFunction

cTelHlrFunction MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;

    CHARACTERIZED BY

        hlrFunctionPackageCommon,

        hlrFunctionPackage,

        cTelHlrFunctionPackage;

    CONDITIONAL PACKAGES

        cTelHlrFunctionGPRSRelatedPackage

PRESENT IF "the object instance of hlrFunction supports the GPRS functionalities.",

"ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

PRESENT IF "the objectCreation and objectDeletion notifications (as defined in CCITT X. 721) are supported by this managed object",

"ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

PRESENT IF " the attributeValueChange notification (as defined in CCITT X.721) is supported by this managed object",

"ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

PRESENT IF "the stateChange notification (as defined in CCITT X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 100} ;

--- cTelSmsGIWFunction

cTelSmsGIWFunction MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;

    CHARACTERIZED BY

        smsGIWFunctionPackageCommon,

        cTelSmsGIWFunctionPackage;

    CONDITIONAL PACKAGES

        "ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

PRESENT IF "the objectCreation and objectDeletion notifications (as defined in CCITT X. 721) are supported by this managed object",

"ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

PRESENT IF " the attributeValueChange notification (as defined in CCITT X.721) is supported by this managed object",

"ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

PRESENT IF "the stateChange notification (as defined in CCITT X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 110} ;

---cTelVlrFunction

cTelVlrFunction MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;

    CHARACTERIZED BY

        vlrFunctionPackageCommon,

        vlrFunctionPackage,

        cTelVlrFunctionPackage;

    CONDITIONAL PACKAGES

        "ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

PRESENT IF "the objectCreation and objectDeletion notifications (as defined in CCITT X. 721) are supported by this managed object",

        "ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

PRESENT IF " the attributeValueChange notification (as defined in CCITT X.721) is supported by this managed object",

        "ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

PRESENT IF "the stateChange notification (as defined in CCITT X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 120} ;

----cTelSsFunction

cTelSsFunction MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;

    CHARACTERIZED BY

        cTelSsFunctionPackage;

    CONDITIONAL PACKAGES

        "ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

PRESENT IF "the objectCreation and objectDeletion notifications (as defined in CCITT X. 721) are supported by this managed object",

        "ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

PRESENT IF " the attributeValueChange notification (as defined in CCITT X.721) is supported by this managed object",

        "ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

PRESENT IF "the stateChange notification (as defined in CCITT X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 125} ;

--- MSC related MOCs

--- cTelMscFunction

cTelMscFunction MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":top;

    CHARACTERIZED BY

        mscFunctionPackageCommon,

        cTelMscFunctionAdditonalPackage;

    CONDITIONAL PACKAGES

        "ITU-T Rec. M.3100:1995": createDeleteNotificationsPackage

            PRESENT IF "the objectCreation and objectDeletion notifications (as defined in CCITT X. 721) are supported by this managed object",

        "ITU-T Rec. M.3100:1995": attributeValueChangeNotificationPackage

            PRESENT IF " the attributeValueChange notification (as defined in CCITT X.721) is supported by this managed object",

        "ITU-T Rec. M.3100:1995": stateChangeNotificationPackage

            PRESENT IF "the stateChange notification (as defined in CCITT X.721) is supported by this managed object";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 130} ;

---cTelCircuitEndPointSubgroup

cTelCircuitEndPointSubgroup MANAGED OBJECT CLASS

    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":top;

    CHARACTERIZED BY

        circuitEndPointSubgroupPackage;

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 140} ;

---cTelDigitsSegment

cTelDigitsSegment MANAGED OBJECT CLASS

    DERIVED FROM

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":top;

    CHARACTERIZED BY

        cTelDigitsSegmentPackage;

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 150} ;

---cTelRoutingInfo

cTelRoutingInfo MANAGED OBJECT CLASS

    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":top;

        CHARACTERIZED BY

            routingInfoPackage;

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 160} ;

---BSS related MOCs

cTelBssFunction MANAGED OBJECT CLASS
    DERIVED FROM
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": top;
    CHARACTERIZED BY
        bssFunctionPackage,
        cTelBssFunctionPackage;
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 170} ;

cTelBsc MANAGED OBJECT CLASS
    DERIVED FROM
        cTelGsmManagedFunction;
    CHARACTERIZED BY
        bscBasicPackage,
        cTelBscPackage,
        functionalRelatedAlarmPackage,
        "ITU-T Rec. M.3100:1995": stateChangeNotificationPackage;
    CONDITIONAL PACKAGES
        equipmentRelatedAlarmPackage
            PRESENT IF "an instance supports it",
        internalIntraCellHandoverPackage
            PRESENT IF "an instance supports it",
        internalInterCellHandoverPackage
            PRESENT IF "an instance supports it",
        cTelBscGPRSAdditionalPackage
            PRESENT IF "the instance of this BSC supports GPRS functions.";
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 180} ;

cTelBtsSiteManager MANAGED OBJECT CLASS
    DERIVED FROM
        cTelGsmManagedFunction;
    CHARACTERIZED BY
        btsSiteManagerBasicPackage;
    CONDITIONAL PACKAGES
        equipmentRelatedAlarmPackage
            PRESENT IF "an instance supports it";
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 190} ;

cTelBts MANAGED OBJECT CLASS
    DERIVED FROM
        cTelGsmManagedFunction;
    CHARACTERIZED BY
        btsBasicPackage,
        btsCCCHConfigurationPackage,

btsOptionsPackage,

cTelBtsPackage,

functionalRelatedAlarmPackage,

"ITU-T Rec. M.3100:1995": stateChangeNotificationPackage;

CONDITIONAL PACKAGES

btsQueuingPackage

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",

cTelBtsGPRSAdditionalPackage

PRESENT IF "the BTS supports the GPRS functionality";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 200} ;

cTelLapdLink MANAGED OBJECT CLASS

DERIVED FROM

cTelGsmManagedFunction;

CHARACTERIZED BY

lapdLinkPackage,

functionalRelatedAlarmPackage,

"ITU-T Rec. M.3100:1995": stateChangeNotificationPackage ;

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 210} ;

cTelPcmCircuit MANAGED OBJECT CLASS

DERIVED FROM

cTelGsmManagedFunction;

CHARACTERIZED BY

pcmCircuitPackage,

functionalRelatedAlarmPackage,

"ITU-T Rec. M.3100:1995": stateChangeNotificationPackage;

CONDITIONAL PACKAGES

equipmentRelatedAlarmPackage

PRESENT IF "an instance supports it";

REGISTERED AS {cTel-gsm-nmc-cm-objectClass 220} ;

cTelPcu MANAGED OBJECT CLASS

DERIVED FROM

cTelGsmManagedFunction;

CHARACTERIZED BY

cTelPcuPackage,

functionalRelatedAlarmPackage,

"ITU-T Rec. M.3100:1995": stateChangeNotificationPackage;
    CONDITIONAL PACKAGES
        equipmentRelatedAlarmPackage
            PRESENT IF "an instance supports it";
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 230} ;

cTelTranscoder MANAGED OBJECT CLASS
    DERIVED FROM
        cTelGsmManagedFunction;
    CHARACTERIZED BY
        transcoderPackage,
        functionalRelatedAlarmPackage,
        "ITU-T Rec. M.3100:1995": stateChangeNotificationPackage;
    CONDITIONAL PACKAGES
        equipmentRelatedAlarmPackage
            PRESENT IF "an instance supports it";
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 240} ;

cTelCMObjectControl MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        cTelCMObjectControlPackage PACKAGE
    BEHAVIOUR cTelCMObjectControlBehaviour BEHAVIOUR
        DEFINED AS
"The cTelCMObjectControl MOC is used to send notifications of MOs when they are created or deleted, or part of the network information has changed a lot which make it necessary for NMC to synchronize the information. In this specification, except the logRecord and xxxHistoryData MO instances, all the other MO instances, when created, shall trigger cTelCMObjectControl to send one of the notifications defined in this package. And when they are deleted, the cTelObjectDeletion notification shall be sent to NMC, unless their superior MO instance is also deleted."; ;
    ATTRIBUTES
        cTelCMObjectControlId GET;
    NOTIFICATIONS
        cTelRequestCMSynchronization,
        cTelObjectCreation,
        cTelObjectDeletion; ; ;
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 250} ;

cTelRequestCMSynchronizationRecord MANAGED OBJECT CLASS
    DERIVED FROM
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": eventLogRecord;
        -- The identifier values for the eventType attribute inherited
        -- from eventLogRecord shall be transferUpReady
    CHARACTERIZED BY

cTelRequestCMSynchronizationArgPackage PACKAGE
>BEHAVIOUR cTelRequestCMSynchronizationArgPackageBehaviour BEHAVIOUR
>>DEFINED AS
"This package provides the attributes for storing the contents of cTelRequestCMSynchronization notifications on the log as eventLogRecords.";;
>>ATTRIBUTES
>>>objectSelection GET;;;
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 260} ;

cTelObjectCreationRecord MANAGED OBJECT CLASS
>DERIVED FROM
>>"Rec. X.721 | ISO/IEC 10165-2 : 1992": eventLogRecord;
>>--- The identifier values for the eventType attribute inherited
>>--- from eventLogRecord shall be cTelObjectCreation
>CHARACTERIZED BY
>>cTelObjectCreationArgPackage PACKAGE
>>>BEHAVIOUR cTelObjectCreationArgPackageBehaviour BEHAVIOUR
>>>DEFINED AS
"This package provides the attributes for storing the contents of cTelObjectCreation notifications on the log as eventLogRecords.";;
>>>ATTRIBUTES
>>>>cTelObjectCreationArg GET;;;
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 270} ;

cTelObjectDeletionRecord MANAGED OBJECT CLASS
>DERIVED FROM
>>"Rec. X.721 | ISO/IEC 10165-2 : 1992": eventLogRecord;
>>--- The identifier values for the eventType attribute inherited
>>--- from eventLogRecord shall be cTelObjectDeletion
>CHARACTERIZED BY
>>cTelObjectDeletionArgPackage PACKAGE
>>>BEHAVIOUR cTelObjetDeleArgPackageBehaviour BEHAVIOUR
>>>DEFINED AS
"This package provides the attributes for storing the contents of cTelObjectDeletion notifications on the log as eventLogRecords.";;
>>>ATTRIBUTES
>>>>cTelObjectDeletionArg GET;;;
REGISTERED AS {cTel-gsm-nmc-cm-objectClass 280} ;

---Managed object class package definitions
---commonPackage

---administrativeOperationalStatesPackage
---see M.3100:1995 for details

———attributeValueChangeNotificationPackage

————see M.3100:1995 for details

———createDeleteNotificationsPackage

————see M.3100:1995 for details

———userLabelPackage

————see M.3100:1995 for details

———softwareProcessingErrorAlarmPackage

————see M.3100:1995 for details

———stateChangeNotificationPackage

————see M.3100:1995 for details

———D.3.26 vendorNamePackage

———see M.3100:1995 for details

———D.3.27 versionPackage

———see M.3100:1995 for details

———equipmentRelatedAlarmPackage

equipmentRelatedAlarmPackage PACKAGE

    BEHAVIOUR 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.";;

    NOTIFICATIONS

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": environmentalAlarm

            relatedGSMEquipCeaseParam relatedGSMEquipLabelParam

            relatedGSMEquipLocParam relatedGSMEquipNameParam

            relatedGSMEquipObjParam relatedGSMEquipTimeParam

            relatedGSMEquipTypeParam relatedGSMEquipVersParam,

            ——— additionalInformation is not needed

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": equipmentAlarm

            relatedGSMEquipCeaseParam relatedGSMEquipLabelParam

            relatedGSMEquipLocParam relatedGSMEquipNameParam

            relatedGSMEquipObjParam relatedGSMEquipTimeParam

relatedGSMEquipTypeParam relatedGSMEquipVersParam;
-- additionalInformation is not needed
REGISTERED AS {cTel-gsm-nmc-cm-package 20} ;

---functionalRelatedAlarmPackage
functionalRelatedAlarmPackage PACKAGE
    BEHAVIOUR 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.";;
    NOTIFICATIONS
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": communicationsAlarm,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": processingErrorAlarm,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": qualityofServiceAlarm ;
REGISTERED AS {cTel-gsm-nmc-cm-package 30} ;

---cTelPlmnSubnetwork MOC related packages
plmnSubnetworkPackage PACKAGE
    BEHAVIOUR plmnSubnetworkPackageBehaviour BEHAVIOUR
        DEFINED AS
"The cTelPlmnSubnetwork managed object models a subnetwork of a PLMN, which is controlled by one OMC. ";;
    ATTRIBUTES
        mcc   GET-REPLACE, --only GET is needed
        mnc   GET-REPLACE, --only GET is needed
        setOfCc   GET-REPLACE, --only GET is needed
        setOfNdc   GET-REPLACE, --only GET is needed
        listOfSupportedBS   GET-REPLACE
                                ADD-REMOVE, --only GET is needed
        listOfSupportedSS   GET-REPLACE
                                ADD-REMOVE; --only GET is needed
REGISTERED AS {cTel-gsm-nmc-cm-package 40} ;

---cTelGsmEquipment related packages
gsmEquipmentPackage PACKAGE
    BEHAVIOUR gsmEquipmentBehaviour BEHAVIOUR
        DEFINED AS
"The cTelGsmEquipment object class is a class of managed objects that represents physical components of a managed element, including replaceable components. An instance of this object class is present in a single geographic location. An gsmEquipment may be nested within another gsmEquipment, thereby creating a containment relationship.
This MOC is provided for direct use in a GSM system. This class adds an attribute which allows the identification of related functional object class instances (which listed in figure 5: Equipment-Functional Relationships For CM Managed Objects) 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 represents the physical components of a GSM PLMN.";;

    ATTRIBUTES

        "ITU-T Rec. M.3100:1995":equipmentId GET,

        relatedGSMFunctionalObjects GET,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":administrativeState GET-REPLACE, --only GET is needed

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":operationalState GET,

        "ITU-T Rec. M.3100:1995":alarmStatus GET;

    NOTIFICATIONS

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":attributeValueChange,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":communicationsAlarm,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":environmentalAlarm,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":equipmentAlarm,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":objectCreation,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":objectDeletion,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":processingErrorAlarm,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":stateChange ;

REGISTERED AS {cTel-gsm-nmc-cm-package 50} ;

cTelGsmEquipmentPackage PACKAGE

    BEHAVIOUR cTelGsmEquipmentBehaviour BEHAVIOUR

        DEFINED AS "This package contains some China specific attributes for cTelGsmEquipment.";;

    ATTRIBUTES

        neCode GET;

REGISTERED AS {cTel-gsm-nmc-cm-package 60} ;

---cTelSingallingLinkTP related packages

signallingLinkTPPackage PACKAGE

    BEHAVIOUR signallingLinkTPBehaviour BEHAVIOUR

        DEFINED AS

"A MTP signalling links provides the OSI layer 2 functionality for connection of the node (NSS node or BSS) to another network node. There may be more than one signalling link in a signalling link set. In this model, the signallingLinkTP is the termination point of a signallingLink.";;

    ATTRIBUTES

        signallingLinkTPId GET,

        slc GET,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState

            GET cTelStandardSpecificErrorInfo,

        signallingLinkPriority GET,

"ITU-T Rec. M.3100:1995": userLabel GET-REPLACE, -- only GET is needed,

slsCodeNormalList GET,

slsCodeCurrentList GET;

NOTIFICATIONS

"Rec. X.721 | ISO/IEC 10165-2 : 1992":attributeValueChange,

"Rec. X.721 | ISO/IEC 10165-2 : 1992":objectCreation,

"Rec. X.721 | ISO/IEC 10165-2 : 1992":objectDeletion,

"Rec. X.721 | ISO/IEC 10165-2 : 1992":stateChange,

"Rec. X.721 | ISO/IEC 10165-2 : 1992":communicationsAlarm,

"Rec. X.721 | ISO/IEC 10165-2 : 1992":processingErrorAlarm;

REGISTERED AS {cTel-gsm-nmc-cm-package 70} ;

---cTelSingallingLinkSetTP related packages

signallingLinkSetTPPackage PACKAGE

BEHAVIOUR signallingLinkSetTPBehaviour BEHAVIOUR

DEFINED AS

"The SignallingLinkSetTP object class is a class of managed objects representing the Termination Point of a set of MTP signalling links between two signalling points. There may be more than one signalling link set in a NSS node. However, only one MTP signalling link set is contained in a BSC object instance." ;;

ATTRIBUTES

signallingLinkSetTPId GET,

signallingLinkSetName GET,

numberOfSignallingLinks GET,

adjacentSignallingInfo GET,

"ITU-T Rec. M.3100:1995": userLabel GET-REPLACE; --only GET is needed

NOTIFICATIONS

"Rec. X.721 | ISO/IEC 10165-2 : 1992":attributeValueChange,

"Rec. X.721 | ISO/IEC 10165-2 : 1992":objectCreation,

"Rec. X.721 | ISO/IEC 10165-2 : 1992":objectDeletion;

REGISTERED AS {cTel-gsm-nmc-cm-package 80} ;

---cTelSingallingPoint related packages

signallingPointPackage PACKAGE

BEHAVIOUR signallingPointBehaviour BEHAVIOUR

DEFINED AS

"The signallingPoint object class is a class of managed objects representing one MTP functionality. Only one signalling point is implemented in the BSC as stated in GSM 08.06 (unlike a given NSS node which has the capability to contain one, two or three Signalling Point Codes attached respectively to the international, national, local MTPs) . Therefore a given BSC object instance contains one signalling point object instance." ;;

ATTRIBUTES

signallingPointId GET,

signallingInfo GET,

signallingPointType GET,

"ITU-T Rec. M.3100:1995": userLabel GET-REPLACE; --ony GET is needed,
NOTIFICATIONS
"Rec. X.721 | ISO/IEC 10165-2 : 1992":attributeValueChange,
"Rec. X.721 | ISO/IEC 10165-2 : 1992":objectCreation,
"Rec. X.721 | ISO/IEC 10165-2 : 1992":objectDeletion;
REGISTERED AS {cTel-gsm-nmc-cm-package 90} ;

---cTelOmcFunction related packages
omcFunctionPackage PACKAGE
BEHAVIOUR omcFunctionBehaviour BEHAVIOUR
DEFINED AS
"The cTelOmcFunction object class is that class of managed objects which models the functionality of the OMC (OMC-R or OMC-S) . When the event buffer is overflow, a processingErrorAlarm will be sent to NMC, indicating some event has been lost. Then NMC will invoke some synchronization operation to make the data consistence.";;
ATTRIBUTES
omcFunctionId GET,
omcType   GET,
"ITU-T Rec. M.3100:1995": userLabel GET-REPLACE, --ony GET is needed,
relatedGSMEquipment   GET;
NOTIFICATIONS
"Rec. X.721 | ISO/IEC 10165-2 : 1992": processingErrorAlarm;
REGISTERED AS {cTel-gsm-nmc-cm-package 100} ;

---cTelAucFunction related packages
aucFunctionPackageCommon PACKAGE
BEHAVIOUR aucFunctionPackageCommonBehaviour BEHAVIOUR
DEFINED AS
"The aucFunction is contained as a functional managed object class by managedElement. The aucFunction comprises all functions necessary to implement an AUC in a managedElement. This package contains the common attributes required by all sub-functions";;
ATTRIBUTES
aucFunctionId GET,
"Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState GET-REPLACE,
"Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 110} ;

aucFunctionPackage   PACKAGE
BEHAVIOUR aucFunctionPackageBehaviour BEHAVIOUR
DEFINED AS "see GSM 12.02 annex B";;
ATTRIBUTES
maxNumberOfLogicalAuc GET-REPLACE,
currentNumberOfLogicalAuc GET,
maxNumberOfImsiInAuc GET-REPLACE,

currentNumberOfImsiInAuc GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 120} ;

cTelAucFunctionPackage PACKAGE
    BEHAVIOUR cTelAucFunctionPackageBehaviour BEHAVIOUR
        DEFINED AS "This package contains some China specific attributes for aucFunction.";;
    ATTRIBUTES
        "ITU-T Rec. M.3100:1995": userLabel GET-REPLACE, --noly GET is needed
        relatedGSMEquipment GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 130} ;

---cTelEirFunction related packages:
eirFunctionPackageCommon PACKAGE
    BEHAVIOUR eirFunctionPackageCommonBehaviour BEHAVIOUR
        DEFINED AS
"The eirFunction comprises all functions necessary to implement an EIR in a managedElement. This package contains the common attributes required by all sub-functions";;
    ATTRIBUTES
        eirFunctionId GET,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState GET-REPLACE,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState GET,
        eirId GET-REPLACE,
        eirNumber GET-REPLACE;
REGISTERED AS {cTel-gsm-nmc-cm-package 140} ;

eirFunctionPackage PACKAGE
    BEHAVIOUR eirFunctionPackageBehaviour BEHAVIOUR
        DEFINED AS "see GSM12.02 annex B";;
    ATTRIBUTES
        maxNumberOfWhiteListEntries GET,
        maxNumberOfGreyListEntries GET,
        maxNumberOfBlackListEntries GET,
        currentNumberOfWhiteListEntries GET,
        currentNumberOfGreyListEntries GET,
        currentNumberOfBlackListEntries GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 150} ;

cTelEirFunctionPackage PACKAGE
    BEHAVIOUR cTelEirFunctionPackageBehaviour BEHAVIOUR
        DEFINED AS "This package contains some China specific attributes for eirFunction";;
    ATTRIBUTES
        "ITU-T Rec. M.3100:1995": userLabel GET-REPLACE, --only GET is needed
        relatedGSMEquipment GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 160} ;

————cTelHlrFunction related packages

hlrFunctionPackageCommon PACKAGE
        BEHAVIOUR hlrFunctionPackageCommonBehaviour BEHAVIOUR
                DEFINED AS
" The hlrFunction comprises all functions necessary to implement an HLR in a managedElement. This package contains the common attributes required by all sub-functions";;
        ATTRIBUTES
                hlrFunctionId GET,
                "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState GET-REPLACE,
                "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 170} ;

hlrFunctionPackage PACKAGE
        BEHAVIOUR hlrFunctionPackageBehaviour BEHAVIOUR
                DEFINED AS "see GSM 12.02 annex B";;
        ATTRIBUTES
                maxNumberOfLogicalHlr GET-REPLACE,
                currentNumberOfLogicalHlr GET,
                maxNumberOfImsiInHlr GET-REPLACE,
                currentNumberOfImsiInHlr GET,
                maxNumberOfMsisdnInHlr GET-REPLACE,
                currentNumberOfMsisdnInHlr GET,
                defaultPW GET-REPLACE,
                defaultAnnouncement GET-REPLACE,
                listOfValidCUGInterlockCodes GET-REPLACE ADD-REMOVE;
REGISTERED AS {cTel-gsm-nmc-cm-package 180} ;

cTelHlrFunctionPackage PACKAGE
        BEHAVIOUR cTelHlrFunctionPackageBehaviour BEHAVIOUR
                DEFINED AS "This package contains some China specific attributes for hlrFunction";;
        ATTRIBUTES
                "Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState GET,
                "ITU-T Rec. M.3100:1995": userLabel GET-REPLACE, --ony GET is needed
                relatedGSMEquipment GET,
                hlrNumber   GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 190} ;

cTelHlrFunctionGPRSRelatedPackage PACKAGE
        BEHAVIOUR hlrFunctionGPRSRelatedPackageBehaviour BEHAVIOUR
                DEFINED AS
"This package provides the attributes of hlrFunction which are related with the GPRS functionality.";;
        ATTRIBUTES
                supportGPRS GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 200} ;

———smsGIWFunction related packages

smsGIWFunctionPackageCommon PACKAGE

    BEHAVIOUR smsGIWFunctionPackageCommonBehaviour BEHAVIOUR

        DEFINED AS

"The smsGIWFunction managed object class represents the ability of a PLMN to receive from and/or send to a Short Message Service Centre, short messages.";;

    ATTRIBUTES

        smsGIWFunctionId GET,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState GET-REPLACE,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState GET;

REGISTERED AS {cTel-gsm-nmc-cm-package 210} ;

cTelSmsGIWFunctionPackage PACKAGE

    BEHAVIOUR cTelSmsGIWFunctionPackageBehaviour BEHAVIOUR

        DEFINED AS "This package contains the China specific attribute for smsGIWFunction";;

    ATTRIBUTES

        "ITU-T Rec. M.3100:1995": userLabel GET-REPLACE, —— only GET is needed

        relatedGSMEquipment GET;

REGISTERED AS {cTel-gsm-nmc-cm-package 220} ;

———cTelVlrFunction related packages

vlrFunctionPackageCommon PACKAGE

    BEHAVIOUR vlrFunctionPackageCommonBehaviour BEHAVIOUR

        DEFINED AS

" The vlrFunction comprises all functions necessary to implement a VLR in a managedElement. This package contains the common attributes required by all sub-functions";;

    ATTRIBUTES

        vlrFunctionId GET,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState GET-REPLACE, —— only GET is needed

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState GET, —— only GET is needed

        vlrId GET-REPLACE, —— only GET is needed

        vlrNumber GET-REPLACE; —— only GET is needed

REGISTERED AS {cTel-gsm-nmc-cm-package 230} ;

vlrFunctionPackage PACKAGE

    BEHAVIOUR vlrFunctionPackageBehaviour BEHAVIOUR

        DEFINED AS "see GSM 12.02 annex B";;

    ATTRIBUTES

        maxNumberOfImsiInVlr GET-REPLACE,

        currentNumberOfImsiInVlr GET-REPLACE ;

REGISTERED AS {cTel-gsm-nmc-cm-package 240} ;

cTelVlrFunctionPackage PACKAGE

BEHAVIOUR cTelVlrFunctionPackageCommonBehaviour BEHAVIOUR

    DEFINED AS "This package contains the China specific attributes for vlrFunction";;

ATTRIBUTES

    "ITU-T Rec. M.3100:1995": userLabel   GET-REPLACE, --only GET is needed

    relatedGSMEquipment GET,

    "Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState   GET;

REGISTERED AS {cTel-gsm-nmc-cm-package 250} ;

cTelSsFunctionPackage PACKAGE

    BEHAVIOUR cTelSsFunctionPackageBehaviour BEHAVIOUR

    DEFINED AS

"The cTelSsFunciton is the object which represents the Service Switching Funciton (SSF) , which is a block updated for MSC to processing CAMEL related calls.";;

    ATTRIBUTES

        ssFunctionId GET,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState GET-REPLACE, -- only GET is

needed

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState GET, -- only GET is needed

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState   GET,

        "ITU-T Rec. M.3100:1995": userLabel GET-REPLACE, --only GET is needed

        relatedGSMEquipment GET;

REGISTERED AS {cTel-gsm-nmc-cm-package 255} ;

--- cTelMscFunction related

mscFunctionPackageCommon PACKAGE

    BEHAVIOUR mscFunctionPackageCommonBehaviour BEHAVIOUR

    DEFINED AS

"The mscFunction comprises all functions necessary to implement an MSC in a managedElement. This package contains the common attributes required by all sub-functions";;

    ATTRIBUTES

        mscFunctionId GET,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState GET-REPLACE,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState GET,

        mscId GET-REPLACE,

        mscNumber GET-REPLACE;

REGISTERED AS {cTel-gsm-nmc-cm-package 260} ;

cTelMscFunctionAdditonalPackage PACKAGE

    BEHAVIOUR cTelMscAdditonalPackageBehaviour BEHAVIOUR

    DEFINED AS "This package provides the cTel additional attributes relted MSC.";;

    ATTRIBUTES

        "ITU-T Rec. M.3100:1995": userLabel GET-REPLACE, -- only GET is needed

        relatedGSMEquipment GET,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState   GET,

maxMscBHCA   GET,

mscCapacity GET,

maxNumOfCPUConfigurable GET,

mscType GET,

mscUpgradeIndicator GET,

numOf2MPort GET,

mscIWFDataBlockCapacity GET,

numOfIWFDataBlock   GET;

REGISTERED AS   {cTel-gsm-nmc-cm-package 270} ;

---circuitEndPointSubgroup related packages

circuitEndPointSubgroupPackage PACKAGE

    BEHAVIOUR circuitSubgroupBehaviour BEHAVIOUR

        DEFINED AS

"A set of circuit end points that directly interconnects one exchange with another, having common values for the attributes listed in this package. Note that the term exchange includes PBX where applicable.";;

    ATTRIBUTES

        "ITU-T Rec. M.3100:1995":circuitEndPointSubgroupId GET,

        "ITU-T Rec. M.3100:1995":numberOfCircuits GET,

        circuitDirectionality GET,

        transmissionCharacteristics GET,

        "ITU-T Rec. M.3100:1995":userLabel GET-REPLACE, --only GET is needed

        circuitType GET,

        trunkGroupType GET,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":administrativeState GET-REPLACE, --only GET is needed

        "Rec. X.721 | ISO/IEC 10165-2 : 1992":operationalState GET,

        "ITU-T Rec. M.3100:1995":alarmStatus GET,

        maxNumOfCircuitsConfigurable   GET,

        signallingInfoOfFarEnd GET,

        signallingPointOfFarEnd GET;

    NOTIFICATIONS

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": attributeValueChange,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectCreation,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectDeletion,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": stateChange,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": communicationsAlarm,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": processingErrorAlarm;

REGISTERED AS   {cTel-gsm-nmc-cm-package 280} ;

--- digitsSegment related package:

cTelDigitsSegmentPackage PACKAGE

    BEHAVIOUR digitsSegmentBehaviour BEHAVIOUR

        DEFINED AS

"The cTelDigitsSegment is made up of a couple of digits which indicates the corresponding routingInfo.";;
    ATTRIBUTES
        digitsSegmentId GET,
        digitList GET,
        digitParticipationIndicator GET,
        "ITU-T Rec. M.3100:1995":labelOfFarEndExchange GET,
        relatedRouteInfo GET;
    NOTIFICATIONS
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": attributeValueChange,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectCreation,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectDeletion;
REGISTERED AS {cTel-gsm-nmc-cm-package 290} ;

---routingInfo related pckage
routingInfoPackage PACKAGE
    BEHAVIOUR routingInfoBehaviour BEHAVIOUR
        DEFINED AS
"The routingInfo managed object models the route information. One instance of the routingInfo represents a route block (maybe different vender has different meaning, for example, using name of route block to indicate S1240 and using DEST to indicate EWSD) and lists all of the trunk groups (circuitEndPointSubgroup) which related to first choice route, first circuitous route, second circuitous route and third circuitous route." ;;
    ATTRIBUTES
        routingInfoId GET,
        firstChoiceRoute GET,
        firstCircuitousRoute GET,
        secondCircuitousRoute GET,
        thirdCircuitousRoute GET;
    NOTIFICATIONS
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": attributeValueChange,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectCreation,
        "Rec. X.721 | ISO/IEC 10165-2 : 1992": objectDeletion;
REGISTERED AS {cTel-gsm-nmc-cm-package 300} ;

---cTelBssFunction related packages
bssFunctionPackage PACKAGE
    BEHAVIOUR bssFunctionBehaviour BEHAVIOUR
        DEFINED AS
"The bssFunction object class is that class of managed objects which models the functionality of the GSM Network Element BSS. Its purpose is containment, allowing the association of various functionalities that make up an instance of this Network Element.";;
    ATTRIBUTES
        bssFunctionId GET;
REGISTERED AS {cTel-gsm-nmc-cm-package 310} ;

cTelBssFunctionPackage PACKAGE

    BEHAVIOUR cTelBssFunctionBehaviour BEHAVIOUR

        DEFINED AS

"The bssFunction object class is that class of managed objects which models the functionality of the GSM Network Element BSS. Its purpose is containment, allowing the association of various functionalities that make up an instance of this Network Element.";;

    ATTRIBUTES

        "ITU–T Rec. M.3100:1995": userLabel GET–REPLACE; ––only GET is needed

REGISTERED AS {cTel–gsm–nmc–cm–package 320} ;

––cTelBsc related packages

bscBasicPackage PACKAGE

    BEHAVIOUR 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. 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 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 M–SET command changing the administrative state shall not change any other attributes.";;

    ATTRIBUTES

        bscId GET,

        handoverReqParam GET–REPLACE, ––only GET is needed

        relatedGSMEquipment GET–REPLACE, ––only GET is needed

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState

            GET–REPLACE cTelStandardSpecificErrorInfo, ––only GET is needed

        "ITU–T Rec. M.3100:1995": alarmStatus

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": unknownStatus

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState

            GET cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel–gsm–nmc–cm–package 330} ;

cTelBscPackage PACKAGE

    BEHAVIOUR cTelBscPackageBehaviour BEHAVIOUR

        DEFINED AS "This package contains some China specific attributes for BSC.";;

    ATTRIBUTES

        maxNumOfBscBHCA GET,

bscCapacity GET,

trunkPortNumber GET,

signallingPortNumber   GET;

REGISTERED AS   {cTel-gsm-nmc-cm-package 340} ;

---internalIntraCellHandoverPackage

internalIntraCellHandoverPackage PACKAGE

BEHAVIOUR 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.";;

ATTRIBUTES

enableInternalIntraCellHandover GET-REPLACE; --only GET is needed

REGISTERED AS   {cTel-gsm-nmc-cm-package 350} ;

---internalInterCellHandoverPackage

internalInterCellHandoverPackage PACKAGE

BEHAVIOUR 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.";;

ATTRIBUTES

enableInternalInterCellHandover GET-REPLACE; --only GET is needed

REGISTERED AS   {cTel-gsm-nmc-cm-package 360} ;

cTelBscGPRSAdditionalPackage PACKAGE

BEHAVIOUR cTelBscGPRSAdditionalPackageBehaviour BEHAVIOUR

DEFINED AS

"This package contains some GPRS additional attributes for BSC.";;

ATTRIBUTES

relatedPCU GET,

relatedSGSN GET,

bssNsEntityMappingTable GET,

bssNsUserEntityMappingTable GET;

REGISTERED AS   {cTel-gsm-nmc-cm-package 365} ;

---cTelBtsSiteManager related packages

btsSiteManagerBasicPackage PACKAGE

BEHAVIOUR 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. ";;

    ATTRIBUTES

        btsSiteManagerId GET,

        relatedGSMEquipment GET-REPLACE,

        relatedOAMLapdLink GET-REPLACE;

REGISTERED AS   {cTel-gsm-nmc-cm-package 370} ;

---cTelBts related packages

btsBasicPackage PACKAGE

    BEHAVIOUR 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 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 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 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) .";;

ATTRIBUTES

bsIdentityCode GET-REPLACE,	--only GET is needed
btsId GET,	
cellAllocation GET-REPLACE,	--only GET is needed
gsmdcsIndicator GET-REPLACE,	--only GET is needed
cellGlobalIdentity GET-REPLACE,	--only GET is needed
cellReselectHysteresis GET-REPLACE,	--only GET is needed
ny1 GET-REPLACE,	--only GET is needed
relatedGSMEquipment GET-REPLACE,	--only GET is needed
periodCCCHLoadIndication GET-REPLACE,	--only GET is needed
plmnPermitted GET-REPLACE,	--only GET is needed
rACHBusyThreshold GET-REPLACE,	--only GET is needed
rACHLoadAveragingSlots GET-REPLACE,	--only GET is needed
radioLinkTimeout GET-REPLACE,	--only GET is needed
relatedOAMLapdLink GET-REPLACE,	--only GET is needed
relatedTranscoder GET-REPLACE,	--only GET is needed
rxLevAccessMin GET-REPLACE,	--only GET is needed
thresholdCCCHLoadIndication GET-REPLACE, --only GET is needed	

"Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState

GET-REPLACE cTelStandardSpecificErrorInfo, --only GET is needed

"ITU-T Rec. M.3100:1995": alarmStatus

GET cTelStandardSpecificErrorInfo,

"Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState

GET cTelStandardSpecificErrorInfo,

"Rec. X.721 | ISO/IEC 10165-2 : 1992": unknownStatus

GET cTelStandardSpecificErrorInfo,

"Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState

GET cTelStandardSpecificErrorInfo;

REGISTERED AS   {cTel-gsm-nmc-cm-package 390} ;

btsCCCHConfigurationPackage PACKAGE

BEHAVIOUR 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.";;

ATTRIBUTES

maxNumberRetransmission GET-REPLACE,	--only GET is needed
mSTxPwrMaxCCH GET-REPLACE,	--only GET is needed
numberOfSlotsSpreadTrans GET-REPLACE,	--only GET is needed
noOfBlocksForAccessGrant GET-REPLACE,	--only GET is needed

noOfMultiframesBetweenPaging GET-REPLACE;   --only GET is needed

REGISTERED AS {cTel-gsm-nmc-cm-package 400} ;

btsOptionsPackage PACKAGE

    BEHAVIOUR 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.";;

    ATTRIBUTES

        allowIMSIAttachDetach GET-REPLACE,   --only GET is needed

        callReestablishmentAllowed GET-REPLACE,   --only GET is needed

        cellBarred GET-REPLACE,   --only GET is needed

        dtxDownlink GET-REPLACE,   --only GET is needed

        dtxUplink GET-REPLACE,   --only GET is needed

        emergencyCallRestricted GET-REPLACE,   --only GET is needed

        notAllowedAccessClasses GET-REPLACE,   --only GET is needed

        timerPeriodicUpdateMS GET-REPLACE;   --only GET is needed

REGISTERED AS   {cTel-gsm-nmc-cm-package 410} ;

cTelBtsPackage PACKAGE

    BEHAVIOUR cTelBtsBehaviour BEHAVIOUR

        DEFINED AS

"This package contains four attributes to indicate the number of transceiver, radioCarrier, SDCCH and TCH.";;

    ATTRIBUTES

        noOfTransceivers GET,

        noOfRadioCarriers GET,

        noOfSDCCH GET,

        noOfTCH GET,

        trxPower GET,

        adjacentCellList GET;

REGISTERED AS {cTel-gsm-nmc-cm-package 420} ;

btsQueuingPackage PACKAGE

    BEHAVIOUR btsQueuingBehaviour BEHAVIOUR

        DEFINED AS

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

    ATTRIBUTES

        maxQueueLength GET-REPLACE,   --only GET is needed

        msPriorityUsedInQueuing GET-REPLACE,   --only GET is needed

        timeLimitCall GET-REPLACE,   --only GET is needed

        timeLimitHandover GET-REPLACE;   --only GET is needed

REGISTERED AS {cTel-gsm-nmc-cm-package 440} ;

hoMsmtProcessingModePackage PACKAGE
BEHAVIOUR 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.";;
ATTRIBUTES
hoMsmtProcessingMode GET-REPLACE; --only GET is needed
REGISTERED AS {cTel-gsm-nmc-cm-package 450} ;

pcMsmtProcessingModePackage PACKAGE
BEHAVIOUR 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. ";;
ATTRIBUTES
pcMsmtProcessingMode GET-REPLACE; --only GET is needed
REGISTERED AS {cTel-gsm-nmc-cm-package 460} ;

cTelBtsGPRSAdditionalPackage PACKAGE
BEHAVIOUR cTelBtsGPRSAdditionalPackageBehaviour BEHAVIOUR
DEFINED AS
"This package contains the GPRS related attributes in BTS.";;
ATTRIBUTES
cellReselectArithm GET,
rai GET,
pBCCHIndicator GET,
pCCCHIndicator GET,
numOfSlotsForGPRS GET,
numOfTrxForGPRS GET,

channelEncodeMode GET,

mediaAccessControlMode GET,

relatedPCU GET;

REGISTERED AS {cTel-gsm-nmc-cm-package 470} ;

---cTelLapdLink

lapdLinkPackage PACKAGE

    BEHAVIOUR 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.

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 except administrativeState, alarmStatus, and operationalState. Attributes that are subject to the stateChange notification are administrativeState and operationalState.

The values locked and unlocked of the administrative state and all values of the operational state are supported.";;

    ATTRIBUTES

        abisSigChannel GET,

        lapdLinkId GET,

        sapi GET,

        tei GET-REPLACE, --only GET is needed by cTel-gsm-nmc-cm

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState

            GET-REPLACE cTelStandardSpecificErrorInfo, --only GET is needed

        "ITU-T Rec. M.3100:1995": alarmStatus

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165-2 : 1992": unknownStatus

            GET cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-package 480} ;

---cTelPcmCircuit related package

pcmCircuitPackage PACKAGE

    BEHAVIOUR 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.

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

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

        ATTRIBUTES

            pcmCircuitId GET,

            "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState

                GET−REPLACE cTelStandardSpecificErrorInfo, −−only GET is needed

            "ITU−T Rec. M.3100:1995": alarmStatus

                GET cTelStandardSpecificErrorInfo,

            "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState

                GET cTelStandardSpecificErrorInfo,

            "Rec. X.721 | ISO/IEC 10165-2 : 1992": unknownStatus

                GET cTelStandardSpecificErrorInfo,

            "Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState

                GET cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel−gsm−nmc−cm−package 490} ;

−−−−cTelPcu related package

cTelPcuPackage PACKAGE

        BEHAVIOUR cTelPcuPackageBehaviour   BEHAVIOUR

        DEFINED AS

"The cTelPcu managed object models a Package Control Unit, which is associatied with a BSC and a SGSN.";;

        ATTRIBUTES

            pcuId GET,

            relatedGSMEquipment GET,

            relatedSGSN GET,

            numOfPDCHSupported GET,

            "Rec. X.721 | ISO/IEC 10165-2 : 1992": administrativeState

                GET cTelStandardSpecificErrorInfo,

            "ITU−T Rec. M.3100:1995": alarmStatus

                GET cTelStandardSpecificErrorInfo,

            "Rec. X.721 | ISO/IEC 10165-2 : 1992": operationalState

                GET cTelStandardSpecificErrorInfo,

            "Rec. X.721 | ISO/IEC 10165-2 : 1992": usageState

                GET cTelStandardSpecificErrorInfo,

            "Rec. X.721 | ISO/IEC 10165-2 : 1992": unknownStatus

                GET cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel−gsm−nmc−cm−package 500} ;

———cTelTranscoder related packages:

transcoderPackage PACKAGE

    BEHAVIOUR 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.

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 except administrativeState, alarmStatus, and operationalState. Attributes that are subject to the stateChange notification are administrativeState and operationalState.

The values locked and unlocked of the administrative state and all values of the operational state are supported.";;

    ATTRIBUTES

        transcoderId GET,

        relatedGSMEquipment GET–REPLACE, ––only GET is needed

        "Rec. X.721 | ISO/IEC 10165–2 : 1992": administrativeState

            GET–REPLACE cTelStandardSpecificErrorInfo, ––only GET is needed

        "ITU–T Rec. M.3100:1995": alarmStatus

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165–2 : 1992": operationalState

            GET cTelStandardSpecificErrorInfo,

        "Rec. X.721 | ISO/IEC 10165–2 : 1992": unknownStatus

            GET cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel–gsm–nmc–cm–package 510} ;

———Managed object class action definitions

———There are no specific actions defind in the CM part.

———Managed object class notification definitions

———All the attributes used by the four notifications (attributeValueChange, objectCreation, objectDeletion, stateChange) are defined in Recommendation X.721 : 1992.

———Attribute value change

———The semantics of the attributeValueChange notification type are specified in CCITT Rec. X.730 | ISO/IEC 10164–1.

———D.5.2 Object creation

———The semantics of the objectCreation notification type are specified in CCITT Rec. X.730 | ISO/IEC 10164–1.

———D.5.3 Object deletion

----The semantics of the objectDeletion notification type are specified in CCITT Rec. X.730 | ISO/IEC 10164-1.

----D.5.4 State change

----The semantics of the stateChange notification type are specified in CCITT Rec. X.731 | ISO/IEC 10164-2.

----D.5.5 Others

----Other notifications for Fault management such as environmentalAlarm, equipmentAlarm,

----processingErrorAlarm, communicationsAlarm are defined in Common and Fault Part.

cTelRequestCMSynchronization NOTIFICATION

      BEHAVIOUR cTelRequestCMSynchronizationBehaviour BEHAVIOUR

        DEFINED AS

"This notification type is used to notify NMC that part or whole of the CM information needs to be synchonized. In this notification, OMC may specify the objects that are to be synchronized. For example, when OMC has added a new managedElemet which contains a lot of MOs, it may just send this notificaiton specifying the root object of a subtree in the MIT, and NMC may then trigger a requestFileTransferUp ACTION on the cTelSimpleFileTransferControl object, to get the requested CM information";;

      WITH INFORMATION SYNTAX CM-TMN-ASN1Module.ObjectSelection;

REGISTERED AS { cTel-gsm-nmc-cm-notification 10} ;

cTelObjectCreation   NOTIFICATION

      BEHAVIOUR objectCreationBehaviour BEHAVIOUR

        DEFINED AS

"This notification type is used to report the creation of one managed object to another open system. The notification with detailed object information shall be send to NMC in the case that limited amount of managed entities are created.

    But if a lot of managed objects are created or network information is mostly changed, notification *cTelRequestCMSynchronization* (not *cTelObjectCreation*) should be send for notifying NMC to synchronize CM information through *requestTransferUp* Action.";;

      WITH INFORMATION SYNTAX CM-TMN-ASN1Module.CTelObjectCreationArg;

REGISTERED AS { cTel-gsm-nmc-cm-notification 20} ;

cTelObjectDeletion NOTIFICATION

      BEHAVIOUR objectDeletionBehaviour BEHAVIOUR

        DEFINED AS

"This notification type is used to report the deletion of one managed object or one subtree to another open system, in the cases that the number of the deleted objects is small. When the whole subtree of a managed object is deleted, only the root managed obejct is required to be reported.

    But if a lot of managed objects are deleted or network information is mostly changed, notification *cTelRequestCMSynchronization* (not *cTelObjectDeletion*) should be send for notifying NMC to synchronize CM information through *requestTransferUp* Action.";;

WITH INFORMATION SYNTAX   CM-TMN-ASN1Module.CTelObjectDeletionArg;

REGISTERED AS { cTel-gsm-nmc-cm-notification 30} ;

---D.6 Managed object class parameter definitions

cTelStandardCreateErrorInfo PARAMETER

    CONTEXT SPECIFIC-ERROR ;

    WITH SYNTAX CM-TMN-ASN1Module.StandardCreateErrorInfo ;

    BEHAVIOUR cTelStandardCreateErrorInfoBehaviour 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 C MIP 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.";;

REGISTERED AS   {cTel-gsm-nmc-cm-parameter 10} ;

cTelStandardDeleteErrorInfo PARAMETER

    CONTEXT SPECIFIC-ERROR ;

    WITH SYNTAX CM-TMN-ASN1Module.StandardDeleteErrorInfo ;

    BEHAVIOUR standardDeleteErrorInfoBehaviour 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 ind icates the applicable GSM 12.20 defined error code.";;

REGISTERED AS   {cTel-gsm-nmc-cm-parameter 20} ;

cTelStandardSpecificErrorInfo PARAMETER

    CONTEXT SPECIFIC-ERROR ;

    WITH SYNTAX CM-TMN-ASN1Module.StandardSpecificErrorInfo ;

BEHAVIOUR cTelStandardSpecificErrorInfoBehaviour 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 30} ;

relatedGSMEquipCeaseParam PARAMETER
    CONTEXT Notification-ASN1Module.AlarmInfo.additionalInformation;
    WITH SYNTAX CM-TMN-ASN1Module.EquipmentCease;
    BEHAVIOUR 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 50} ;

relatedGSMEquipLabelParam PARAMETER
    CONTEXT Notification-ASN1Module.AlarmInfo.additionalInformation;
    WITH SYNTAX CM-TMN-ASN1Module.EquipmentLabel;
    BEHAVIOUR 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 60} ;

relatedGSMEquipLocParam PARAMETER

    CONTEXT Notification-ASN1Module.AlarmInfo.additionalInformation;

    WITH SYNTAX CM-TMN-ASN1Module.EquipmentLoc;

    BEHAVIOUR 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 70} ;

relatedGSMEquipNameParam PARAMETER

    CONTEXT Notification-ASN1Module.AlarmInfo.additionalInformation;

    WITH SYNTAX CM-TMN-ASN1Module.EquipmentName;

    BEHAVIOUR 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 80} ;

relatedGSMEquipObjParam PARAMETER

    CONTEXT Notification-ASN1Module.AlarmInfo.additionalInformation;

    WITH SYNTAX CM-TMN-ASN1Module.EquipmentObj;

    BEHAVIOUR 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 90} ;

relatedGSMEquipTimeParam PARAMETER

    CONTEXT Notification-ASN1Module.AlarmInfo.additionalInformation;

    WITH SYNTAX CM-TMN-ASN1Module.EquipmentTime;

    BEHAVIOUR 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 100} ;

relatedGSMEquipTypeParam PARAMETER

  CONTEXT Notification-ASN1Module.AlarmInfo.additionalInformation;

  WITH SYNTAX CM-TMN-ASN1Module.EquipmentType;

   BEHAVIOUR 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 110} ;

relatedGSMEquipVersParam PARAMETER

  CONTEXT Notification-ASN1Module.AlarmInfo.additionalInformation;

  WITH SYNTAX CM-TMN-ASN1Module.EquipmentVers;

  BEHAVIOUR 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.";;

REGISTERED AS {cTel-gsm-nmc-cm-parameter 120} ;

----D.7 Managed object class attribute definitions

---common attributes for CM

---administrativeState
---see "Rec. X.721 | ISO/IEC 10165-2 : 1992" for details.

---operationalState
---see "Rec. X.721 | ISO/IEC 10165-2 : 1992" for details.

---unknown status
---see "Rec. X.721 | ISO/IEC 10165-2 : 1992" for details.

---usageState
---see "Rec. X.721 | ISO/IEC 10165-2 : 1992" for details.

---alarmStatus
---see "ITU-T Rec. M.3100:1995" for details.

---locationName
---see "ITU-T Rec. M.3100:1995" for details.

---vendorName
---see "ITU-T Rec. M.3100:1995" for details.

---version
---see "ITU-T Rec. M.3100:1995" for details.

---userLabel
---see "ITU-T Rec. M.3100:1995" for details.
userLabelBehaviour BEHAVIOUR
      DEFINED AS
"The userLabel is used as a user friednly name, which is assigned by OMC vendor for local identification
of NEs or NRs.";

relatedGSMEquipment ATTRIBUTE
      WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RelatedGSMObjectList;
      MATCHES FOR EQUALITY;
      BEHAVIOUR relatedGSMEquipmentBehaviour BEHAVIOUR
            DEFINED AS
"This attribute represents the relationship between the GSM functionality and the required equipment which
supports that functionality.";;
      PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS   {cTel-gsm-nmc-cm-attribute 10} ;

---plmnSubnetowrk related attributes:

mcc ATTRIBUTE

    WITH ATTRIBUTE SYNTAX   CM-TMN-ASN1Module.Mcc;

    MATCHES FOR EQUALITY;

    BEHAVIOUR mccBehaviour BEHAVIOUR

        DEFINED AS "This attribute contains the Mobile Country Code of the network as defined in GSMTS 03.08. It may be used within the hlrFunction to store an IMSI without MCC and MNC or to distinguish between own subscribers and roaming subscribers.";;

REGISTERED AS　{cTel-gsm-nmc-cm-attribute 15} ;

mnc ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Mnc;

    MATCHES FOR EQUALITY;

    BEHAVIOUR mncBehaviour BEHAVIOUR

        DEFINED AS

"This attribute contains the Mobile Network Code of the network as defined in GSM TS 03.08. It may be used within the hlrFunction to store an IMSI without MCC and MNC or to distinguish between own subscribers and roaming subscribers.";;

REGISTERED AS　{cTel-gsm-nmc-cm-attribute 20} ;

setOfCc ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SetOfCc;

    MATCHES FOR EQUALITY;

    BEHAVIOUR setOfCcBehaviour BEHAVIOUR

        DEFINED AS

"This attribute contains the country codes (more than one may be assigned to one network) of the PLMN, as defined in GSM TS 03.08. It may be used to insert the CC and NDC when sending out the MSISDN as an international number";;

REGISTERED AS　{cTel-gsm-nmc-cm-attribute 25} ;

setOfNdc ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SetOfNdc;

    MATCHES FOR EQUALITY;

    BEHAVIOUR setOfNdcBehaviour BEHAVIOUR

        DEFINED AS

"This attribute contains the Network Destination Codes of the network as definedin GSM TS 03.08. More than one NDC may be assigned to one PLMN. They may be used to insert the CC and NDC when sending out the MSISDN as an international number.";;

REGISTERED AS　{cTel-gsm-nmc-cm-attribute 30} ;

listOfSupportedBS ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.ListOfSupportedBS;

    MATCHES FOR EQUALITY, SET-INTERSECTION, SET-COMPARISON;

    BEHAVIOUR listOfSupportedBSBehaviour BEHAVIOUR

        DEFINED AS

"This attribute contains a list of the basic services supported within this network. It may be used for error checking with the creation of basicServiceInHlr (see GSM TS 12.02) objects or for subscription checking within the VLR.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 35} ;

listOfSupportedSS ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.ListOfSupportedSS;

 MATCHES FOR EQUALITY, SET-INTERSECTION, SET-COMPARISON;

 BEHAVIOUR listOfSupportedSSBehaviour BEHAVIOUR

  DEFINED AS

"This attribute contains a list of the supplementary services supported within this network. It may be used for error checking with the creation of supplementaryServiceInHlr (see GSM TS 12.02) objects or for subscription checking within theVLR.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 37} ;

---cTelGsmEquipment related attributes:

relatedGSMFunctionalObjects ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RelatedGSMObjectList;

 MATCHES FOR EQUALITY;

 BEHAVIOUR relatedGSMFunctionalObjectsBehaviour BEHAVIOUR

  DEFINED AS

"This attribute represents the relationship between the GSM equipment and the functions that are supported by it (see Figure 5: Equipment-Functional Relationships For CM Managed Objects) . 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.";;

 PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 40} ;

neCode ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NECode;

 MATCHES FOR EQUALITY;

 BEHAVIOUR neCodeBehaviour BEHAVIOUR

  DEFINED AS "This attribute specifies NE Code which is given by the operator to distinguish diffirent NEs.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 80} ;

---cTelSignallingLinkTP related attributes:

---signallingLinkTPId

signallingLinkTPId ATTRIBUTE

 WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;

 MATCHES FOR EQUALITY;

 BEHAVIOUR signallingLinkTPIdBehaviour BEHAVIOUR

  DEFINED AS

"The signallingLinkTPId attribute whose distinguished value can be used as a Relative Distinguished Name

(RDN) when naming an instance of the Signalling Link Termination Point object class.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 90} ;

slc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Slc;
    MATCHES FOR EQUALITY;
    BEHAVIOUR signallingLinkCodeBehaviour BEHAVIOUR
        DEFINED AS
"The signallingLinkCode attribute is used to identify the Signalling Link Code (SLC) as defined in Q.704. the SLC is used to discriminate a signalling link within a signalling link set." ;;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 100} ;

signallingLinkPriority ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SignallingLinkPriority;
    MATCHES FOR EQUALITY;
    BEHAVIOUR   signallingLinkPriorityBehaviour BEHAVIOUR
        DEFINED AS
"Thie attribute specifies the priority of the associated signallingLink.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 110} ;

slsCodeNormalList ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SLSCodeList;
    MATCHES FOR SET-INTERSECTION;
    BEHAVIOUR slsCodeNormalListBehaviour BEHAVIOUR
        DEFINED AS
"This attribute indicates which SLSs are administratively assigned to this signallingLinkTP for the case of normal operation.";;
REGISTERED AS { cTel-gsm-nmc-cm-attribute 112 } ;

slsCodeCurrentList ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SLSCodeList;
    MATCHES FOR SET-INTERSECTION;
    BEHAVIOUR slsCodeCurrentListBehaviour BEHAVIOUR
        DEFINED AS
"This attribute indicates which SLSs are currently assigned to this signalingLinkTP. It has to be ensured that all SLSs are covered and no SLS exists more than one time within the slsCodeCurrentList attributes of the signallingLinkTP instances contained within one signallingLinkSetTP. This attribute can be changed from system inside.";;
REGISTERED AS { cTel-gsm-nmc-cm-attribute 114 } ;

----cTelSignallingLinkSetTP related attributes
signallingLinkSetTPId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
    MATCHES FOR EQUALITY;

BEHAVIOUR signallingLinkSetTPIdBehaviour BEHAVIOUR
        DEFINED AS
"The signallingLinkSetTPId attribute whose distinguished value can be used as a Relative Distinguished
Name (RDN) when naming an instance of the Signalling Link Set Termination Point object class.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 120} ;

signallingLinkSetName ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Name;
        MATCHES FOR EQUALITY;
        BEHAVIOUR signallingLinkSetNameBehaviour BEHAVIOUR
        DEFINED AS
"The signallingLinkSetName attribute specifies the name of the signallingLinkSet in this signallingPoint.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 130} ;

numberOfSignallingLinks ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NumberOfSignallingLinks;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR numberOfSignallingLinksBehaviour BEHAVIOUR
                DEFINED AS "The number of signalling links in a signallingLinkSet.";;
REGISTERED AS { cTel-gsm-nmc-cm-attribute 150} ;

adjacentSignallingInfo ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SignallingInfo;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR adjacentSignallingInfoBehaviour BEHAVIOUR
        DEFINED AS
"This attribute is used to identify the remote signalling point code and the network indicator which is
associated to a MTP link set.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 160} ;

---signallingPoint related attributes
signallingPointId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR signallingPointIdBehaviour BEHAVIOUR
        DEFINED AS
"The signallingPointId attribute whose distinguished value can be used as a Relative Distinguished Name
(RDN) when naming an instance of the SignallingPoint object class.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 180} ;

signallingInfo ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SignallingListInfo;
        MATCHES FOR EQUALITY;
        BEHAVIOUR signallingInfoBehaviour BEHAVIOUR

DEFINED AS

"The signallingInfo attribute is used to identify the signalling pointcode and the network indicator which is associated to a MTP." ;;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 190} ;

signallingPointType ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SignallingPointType;

    MATCHES FOR EQUALITY;

    BEHAVIOUR signallingPointTypeBehaviour BEHAVIOUR

    DEFINED AS

"The signallingPointType attribute indicates whether the mode acts as a SignallingTransfer Point (STP) or not in the MTP which is identified by the network indicator.It is always 'noSTP'";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 200} ;

———omcFunction related atributes

omcFunctionId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.OmcFunctionId;

    MATCHES FOR EQUALITY;

    BEHAVIOUR omcFunctionIdBehaviour BEHAVIOUR

        DEFINED AS

"This attribute contains the identification of the OMC represented by this instance of omcFunction.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 210} ;

omcType ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.OmcType;

    MATCHES FOR EQUALITY;

    BEHAVIOUR   omcTypeBehaviour BEHAVIOUR

        DEFINED AS

"Thie attribute specifies the type of the associated OMC; it maybe omc, omc-r, or omc-s; where 'omc' indicate an OMC which cotains the functionality of both omc-r and omc-s.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 220} ;

——aucFunction related packages

aucFunctionId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.AucFunctionId;

    MATCHES FOR EQUALITY;

    BEHAVIOUR aucFunctionIdBehaviour BEHAVIOUR

        DEFINED AS

"This attribute names an aucFunction object instance. Its value must be unique within the parent PLMN.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 230} ;

maxNumberOfLogicalAuc ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxNumberOfLogicalAuc;

    MATCHES FOR EQUALITY;

BEHAVIOUR maxNumberOfLogicalAucBhv BEHAVIOUR
    DEFINED AS "see GSM 12.02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 240 } ;

currentNumberOfLogicalAuc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CurrentNumberOfLogicalAuc;
    MATCHES FOR EQUALITY;
    BEHAVIOUR currentNumberOfLogicalAucBhv BEHAVIOUR
    DEFINED AS "see GSM 12.02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 250 } ;

maxNumberOfImsiInAuc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxNumberOfImsiInAuc;
    MATCHES FOR EQUALITY;
    BEHAVIOUR maxNumberOfImsiInAucBhv BEHAVIOUR
    DEFINED AS "see GSM 12.02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 260 } ;

currentNumberOfImsiInAuc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CurrentNumberOfImsiInAuc;
    MATCHES FOR EQUALITY;
    BEHAVIOUR currentNumberOfImsiInAucBhv BEHAVIOUR
    DEFINED AS "see GSM 12.02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 270 } ;

---cTelEirFunction related attributes
eirFunctionId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.EirFunctionId;
    MATCHES FOR EQUALITY;
    BEHAVIOUR eirFunctionIdBehaviour BEHAVIOUR
    DEFINED AS
"This attribute names a eirFunction object instance. Its value must be unique within the parent PLMN.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 280} ;

eirId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.EirId;
    MATCHES FOR EQUALITY;
    BEHAVIOUR eirIdBehaviour BEHAVIOUR
    DEFINED AS
"This attribute contains the identification of the EIR represented by this eirFunction instance";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 290} ;

eirNumber ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.EirNumber;

MATCHES FOR EQUALITY;
BEHAVIOUR eirNumberBehaviour BEHAVIOUR
DEFINED AS
"This attribute contains the ISDN–Number of the EIR represented by this eirFunction instance. It is used to address the EIR via signaling";;
REGISTERED AS {cTel–gsm–nmc–cm–attribute 300} ;

maxNumberOfWhiteListEntries ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module.MaxNumberOfWhiteListEntries;
MATCHES FOR EQUALITY;
BEHAVIOUR maxNumberOfWhiteListEntriesBhv BEHAVIOUR
DEFINED AS "see GSM 12–02 annex B";;
REGISTERED AS {cTel–gsm–nmc–cm–attribute 310} ;

maxNumberOfGreyListEntries ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module. MaxNumberOfGreyListEntries;
MATCHES FOR EQUALITY;
BEHAVIOUR maxNumberOfGreyListEntriesBhv BEHAVIOUR
DEFINED AS "see GSM 12–02 annex B";;
REGISTERED AS {cTel–gsm–nmc–cm–attribute 320 } ;

maxNumberOfBlackListEntries ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module. MaxNumberOfBlackListEntries;
MATCHES FOR EQUALITY;
BEHAVIOUR maxNumberOfBlackListEntriesBhv BEHAVIOUR
DEFINED AS "see GSM 12–02 annex B";;
REGISTERED AS {cTel–gsm–nmc–cm–attribute 330 } ;

currentNumberOfWhiteListEntries ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module. CurrentNumberOfWhiteListEntries;
MATCHES FOR EQUALITY;
BEHAVIOUR currentNumberOfWhiteListEntriesBhv BEHAVIOUR
DEFINED AS "see GSM 12–02 annex B";;
REGISTERED AS {cTel–gsm–nmc–cm–attribute 340 } ;

currentNumberOfGreyListEntries ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module.CurrentNumberOfGreyListEntries;
MATCHES FOR EQUALITY;
BEHAVIOUR currentNumberOfGreyListEntriesBhv BEHAVIOUR
DEFINED AS "see GSM 12–02 annex B";;
REGISTERED AS {cTel–gsm–nmc–cm–attribute 350 } ;

currentNumberOfBlackListEntries ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module.CurrentNumberOfBlackListEntries;

MATCHES FOR EQUALITY;
BEHAVIOUR currentNumberOfBlackListEntriesBhv BEHAVIOUR
DEFINED AS "see GSM 12-02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 360 } ;

----cTelHlrFunction related attribute
hlrFunctionId ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.HlrFunctionId;
MATCHES FOR EQUALITY;
BEHAVIOUR hlrFunctionIdBehaviour BEHAVIOUR
DEFINED AS
"This attribute names an hlrFunction object instance. Its value must be unique within the parent PLMN.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 370 } ;

maxNumberOfLogicalHlr ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxNumberOfLogicalHlr;
MATCHES FOR EQUALITY;
BEHAVIOUR maxNumberOfLogicalHlrBhv BEHAVIOUR
DEFINED AS "see GSM 12.02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 380 } ;

currentNumberOfLogicalHlr ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CurrentNumberOfLogicalHlr;
MATCHES FOR EQUALITY;
BEHAVIOUR currentNumberOfLogicalHlrBhv BEHAVIOUR
DEFINED AS "see GSM 12.02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 390 } ;

maxNumberOfImsiInHlr ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxNumberOfImsiInHlr;
MATCHES FOR EQUALITY;
BEHAVIOUR maxNumberOfImsiInHlrBhv BEHAVIOUR
DEFINED AS "see GSM 12.02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 400 } ;

currentNumberOfImsiInHlr ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CurrentNumberOfImsiInHlr;
MATCHES FOR EQUALITY;
BEHAVIOUR currentNumberOfImsiInHlrBhv BEHAVIOUR
DEFINED AS "see GSM 12.02 annex B";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 410 } ;

maxNumberOfMsisdnInHlr ATTRIBUTE
WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxNumberOfMsisdnInHlr ;

MATCHES FOR EQUALITY;

BEHAVIOUR maxNumberOfMsisdnInHlrBhv BEHAVIOUR

DEFINED AS "see GSM 12.02 annex B";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 420 } ;

currentNumberOfMsisdnInHlr ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CurrentNumberOfMsisdnInHlr;

MATCHES FOR EQUALITY;

BEHAVIOUR currentNumberOfMsisdnInHlrBhv BEHAVIOUR

DEFINED AS "see GSM 12.02 annex B";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 430 } ;

defaultPW ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Password;

MATCHES FOR EQUALITY;

BEHAVIOUR defaultPWBhv BEHAVIOUR

DEFINED AS "see GSM 12.02 annex B";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 440 } ;

defaultAnnouncement ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.ISDN-AddressString;

MATCHES FOR EQUALITY;

BEHAVIOUR defaultAnnouncementBhv BEHAVIOUR

DEFINED AS "see GSM 12.02 annex B";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 450 } ;

listOfValidCUGInterlockCodes ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.ListOfValidCUGInterlockCodes;

MATCHES FOR EQUALITY;

BEHAVIOUR listOfValidCUGInterlockCodesBhv BEHAVIOUR

DEFINED AS "see GSM 12.02 annex B";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 460 } ;

hlrNumber ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.HlrNumber;

MATCHES FOR EQUALITY;

BEHAVIOUR hlrNumberBehaviour BEHAVIOUR

DEFINED AS

"This attribute contains the ISDN-Number of the HLR represented by this hlrFunction instance. It is used to address the HLR via signaling.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 470 } ;

supportGPRS ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SupportGPRS;

MATCHES FOR EQUALITY;

BEHAVIOUR supportGPRSBehaviour BEHAVIOUR

DEFINED AS

"This attribute indicates whether this HLR supports GPRS or not, if supports, the value shall be true, else it shall be false.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 480 } ;

---cTelSmsGIWFunction related attributes

smsGIWFunctionId ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SmsGIWFunctionId;

MATCHES FOR EQUALITY;

BEHAVIOUR smsGIWFunctionIdBehaviour BEHAVIOUR

DEFINED AS

" This attribute names a smsGIWFunction object instance. Its value must be unique within the parent PLMN.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 520 } ;

---cTelVlrFunction related attributes

vlrFunctionId ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.VlrFunctionId;

MATCHES FOR EQUALITY;

BEHAVIOUR vlrFunctionIdBehaviour BEHAVIOUR

DEFINED AS

" This attribute names a cTelVlrFunction object instance. Its value must be unique within the parent PLMN.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 530 } ;

vlrId ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.VlrId;

MATCHES FOR EQUALITY;

BEHAVIOUR vlrIdBehaviour BEHAVIOUR

DEFINED AS

"This attribute contains the identification of the VLR represented by this instance of vlrFunction.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 540 } ;

vlrNumber ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.VlrNumber;

MATCHES FOR EQUALITY;

BEHAVIOUR vlrNumberBehaviour BEHAVIOUR

DEFINED AS

"This attribut contains ISDN-Number of the VLR represented by this instance of vlrFunction. It is used to address the VLR via signaling.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 550 } ;

maxNumberOfImsiInVlr ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxNumberOfImsiInVlr;

    MATCHES FOR EQUALITY;

    BEHAVIOUR maxNumberOfImsiInVlrBhv BEHAVIOUR

        DEFINED AS "see GSM 12.02 annes B";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 560 } ;

currentNumberOfImsiInVlr ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CurrentNumberOfImsiInVlr;

    MATCHES FOR EQUALITY;

    BEHAVIOUR currentNumberOfImsiInVlrBhv BEHAVIOUR

        DEFINED AS "see GSM 12.02 annes B";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 570 } ;

---cTelSsFunction related attributes

ssFunctionId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SsFunctionId;

    MATCHES FOR EQUALITY;

    BEHAVIOUR ssFunctionIdBehaviour BEHAVIOUR

        DEFINED AS

" This attribute names a cTelSsFunction object instance. Its value must be unique within the parent PLMN.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 575 } ;

---cTelMscFunction related attributes

mscFunctionId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MscFunctionId;

    MATCHES FOR EQUALITY;

    BEHAVIOUR mscFunctionIdBehaviour BEHAVIOUR

        DEFINED AS

" This attribute names a cTelMscFunction object instance. Its value must be unique within the parent PLMN.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 580 } ;

mscId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MscId;

    MATCHES FOR EQUALITY;

    BEHAVIOUR mscIdBehaviour BEHAVIOUR

        DEFINED AS

"This attribute contains the identification of the MSC represented by this mscFunction instance.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 590 } ;

mscNumber ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MscNumber;

MATCHES FOR EQUALITY;

BEHAVIOUR mscNumberBehaviour BEHAVIOUR

DEFINED AS

"This attribute contains the ISDN-Number of the MSC represented by this mscFunction instance. It is used to address the MSC via signaling.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 600 } ;

maxMscBHCA ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxMscBHCA;

MATCHES FOR EQUALITY;

BEHAVIOUR maxMscBHCABehaviour BEHAVIOUR

DEFINED AS "This attribute specifies designed max value of MSC BHCA.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 610 } ;

mscCapacity ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MscCapacity;

MATCHES FOR EQUALITY;

BEHAVIOUR mscCapacityBehaviour BEHAVIOUR

DEFINED AS "This attribute specifies MSC capacity.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 620 } ;

maxNumOfCPUConfigurable ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NumberType;

MATCHES FOR EQUALITY;

BEHAVIOUR maxNumOfCPUConfigurableBehaviour BEHAVIOUR

DEFINED AS

"This attribute specifies the max number of configurable CPU of the MSC.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 630 } ;

mscType ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MscType;

MATCHES FOR EQUALITY;

BEHAVIOUR mscTypeBehaviour BEHAVIOUR

DEFINED AS

"This attribute specifies the type of the MSC, it may be TMSC1, TMSC2, GMSC and MSCVLR.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 640 } ;

mscUpgradeIndicator ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MscUpgradeIndicator;

MATCHES FOR EQUALITY;

BEHAVIOUR mscUpgradeIndicatorBehaviour BEHAVIOUR

DEFINED AS

"This attribute indicate whether the MSC, it may be TMSC1, TMSC2, GMSC and MSC.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 650 } ;

mscIWFDataBlockCapacity ATTRIBUTE
     WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MscIWFDataBlockCapacity;
     MATCHES FOR EQUALITY;
     BEHAVIOUR mscIWFDataBlockCapacityBehaviour BEHAVIOUR
          DEFINED AS
"This attribute indicate the capacity of the MSC Interworking function data block";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 660 } ;

numOfIWFDataBlock ATTRIBUTE
     WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NumberType;
     MATCHES FOR EQUALITY;
     BEHAVIOUR mscIWFDataBlockBehaviour BEHAVIOUR
          DEFINED AS
"This attribute specifies the number of the MSC Interworking f unction data block";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 670 } ;

numOf2MPort ATTRIBUTE
     WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NumberType;
     MATCHES FOR EQUALITY;
     BEHAVIOUR numOf2MPortBehaviour BEHAVIOUR
          DEFINED AS
"This attribute specifies the number of the 2M Ports in this MSC";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 680 } ;

———cTelCircuitEndPointSubgroup related attributes

———circuitEndPointSubgroupId
———see "ITU-T Rec. M.3100:1995" for details.

———numberOfCircuits
———see "ITU-T Rec. M.3100:1995" for details.

———labelOfFarEndExchange
———see "ITU-T Rec. M.3100:1995" for details

circuitDirectionality ATTRIBUTE
     WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CircuitDirectionality;
     MATCHES FOR EQUALITY;
     BEHAVIOUR circuitDirectionalityBehaviour BEHAVIOUR
          DEFINED AS
"The attribute type specifies the directionality of the circuits in the circuit subgroup.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 690 } ;

transmissionCharacteristics ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.TransmissionCharacteristics;

    MATCHES FOR EQUALITY;

    BEHAVIOUR transmissionCharacteristicsBehaviour BEHAVIOUR

    DEFINED AS

″ The attribute type specifies the different transmission characteristics such as satellite, echo control supported or not supported by the circuit subgroup. The bit positions are set to indicate if a particular characteristic is supported.″;;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 700} ;

circuitType ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CircuitType;

    MATCHES FOR EQUALITY;

    BEHAVIOUR circuitTypeBehaviour BEHAVIOUR

        DEFINED AS ″ This attribute indicates the type of the circuit.″;;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 710} ;

trunkGroupType ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.TrunkGroupType;

    MATCHES FOR EQUALITY;

    BEHAVIOUR trunkGroupTypeBehaviour BEHAVIOUR

    DEFINED AS ″The attribute type specifies the different trunk group type.″;;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 720} ;

maxNumOfCircuitsConfigurable ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NumberType;

    MATCHES FOR EQUALITY;

    BEHAVIOUR   maxNumOfCircuitsConfigurableModeBehaviour BEHAVIOUR

        DEFINED AS

″ This attribute specifies the max number of the confifurable circuits in the circuitEndSubgroup object instance″;;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 730} ;

signallingInfoOfFarEnd ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SignallingInfo;

    MATCHES FOR EQUALITY;

    BEHAVIOUR   signallingInfoOfFarEndBehaviour BEHAVIOUR

        DEFINED AS

″This attribute specifies the signalling information of the far end exchange of this circuitEndPointSubgroup″;;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 740} ;

signallingPointOfFarEnd ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CMIP-1.ObjectInstance;

    MATCHES FOR EQUALITY;

BEHAVIOUR   signallingPointOfFarEndBehaviour BEHAVIOUR
        DEFINED AS
"This attribute is the pointer to the far end signallingPoint object of this circuitEndPointSubgroup";;
REGISTERED AS   {cTel–gsm–nmc–cm–attribute 750} ;

———cTelDigitsSegment related attributes
digitsSegmentId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR digitsSegmentIdBehaviour BEHAVIOUR
            DEFINED AS
"This attribute names a cTelDigitsSegment object instance.";;
REGISTERED AS   {cTel–gsm–nmc–cm–attribute 760} ;

digitList ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module.DigitList;
        MATCHES FOR EQUALITY;
        BEHAVIOUR digitListBehaviour BEHAVIOUR
            DEFINED AS
"This attribute represents a list of digits, which can determine a routingInfo.";;
REGISTERED AS   {cTel–gsm–nmc–cm–attribute 765} ;

digitParticipationIndicator ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module.DigitParticipationIndicator;
        MATCHES FOR EQUALITY;
        BEHAVIOUR digitParticipationIndicatorBehaviour BEHAVIOUR
            DEFINED AS
"This attribute identifies whether the digit element is part of the IntermationalCode, NationalPSTNCode, NationalPLMNCode, toLocalMSC, toOwnMSC, LocalPSTNCode, LocalSPXCode, AnlogPLMNCode, others or seeNextCode.";;
REGISTERED AS   {cTel–gsm–nmc–cm–attribute 770} ;

relatedRouteInfo ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM–TMN–ASN1Module.RelatedRouteInfo;
        MATCHES FOR EQUALITY ;
        BEHAVIOUR relatedRouteInfoBehaviour BEHAVIOUR
            DEFINED AS
"The attribute identifies the object instances of the cTelRoutingInfo MO class which are selected by the digital segement (or combined with the source number) . ";;
REGISTERED AS   {cTel–gsm–nmc–cm–attribute 780} ;

———cTelRoutingInfo related attributes
routingInfoId ATTRIBUTE
        WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType ;

MATCHES FOR EQUALITY ;

BEHAVIOUR routingInfoIdBehaviour BEHAVIOUR

DEFINED AS "This attribute names a routingInfo object instance.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 790} ;

firstChoiceRoute ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Route;

MATCHES FOR EQUALITY;

BEHAVIOUR firstChoiceRouteBehaviour BEHAVIOUR

DEFINED AS

"This attribute lists the name of the first choice route and all the names and priorities of the instances of circuitEndPointSubgrout (trunk groups) related to the first choice route.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 800} ;

firstCircuitousRoute ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Route;

MATCHES FOR EQUALITY;

BEHAVIOUR firstCircuitousRouteBehaviour BEHAVIOUR

DEFINED AS

"This attribute lists the name of the first circuitous route and all the names and priorities of the instances of circuitEndPointSubgroup (trunk groups) related to the first circuitous route.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 810} ;

secondCircuitousRoute ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Route;

MATCHES FOR EQUALITY;

BEHAVIOUR secondCircuitousRouteBehaviour BEHAVIOUR

DEFINED AS

"This attribute lists the name of the second circuitous route and all the names and priorities of the instances of circuitEndPointSubgrout (trunk groups) related to the second circuitous route.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 820} ;

thirdCircuitousRoute ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Route;

MATCHES FOR EQUALITY;

BEHAVIOUR thirdCircuitousRouteBehaviour BEHAVIOUR

DEFINED AS

"This attribute lists the name of the third circuitous route and all the names and priorities of the instances of circuitEndPointSubgrout (trunk groups) related to the third circuitous route." ;;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 830} ;

----cTelBssFunction related attributes

bssFunctionId ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BssFunctionId;

MATCHES FOR EQUALITY, ORDERING;

BEHAVIOUR bssFunctionIdBehaviour BEHAVIOUR

DEFINED AS

"This attribute names a bssFunction object instance. Its value must be unique within the parent PLMN.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 840} ;

———cTelBsc related attributes

bscId ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.GsmGeneralObjectId;

MATCHES FOR EQUALITY, ORDERING ;

BEHAVIOUR bscIDBehaviour BEHAVIOUR

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

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 850} ;

handoverReqParam ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NoOfPrefCells;

MATCHES FOR EQUALITY;

BEHAVIOUR 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 targ et cells 'n' that are to be transferred in the handover required message.";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 860} ;

maxNumOfBscBHCA ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxNumOfBscBHCA;

MATCHES FOR EQUALITY;

BEHAVIOUR maxNumOfBscBHCABehaviour BEHAVIOUR

DEFINED AS "This attribute specifies the designed Max BHCA value of the BSC";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 880} ;

bscCapacity ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BscCapacity;

MATCHES FOR EQUALITY;

BEHAVIOUR bscCapacityBehaviour BEHAVIOUR

DEFINED AS "This attribute specifies the Capacity of the BSC";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 890} ;

trunkPortNumber ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.TrunkPortNumber;

MATCHES FOR EQUALITY;

BEHAVIOUR trunkPortNumberBehaviour BEHAVIOUR

DEFINED AS "This attribute specifies the Capacity of the BSC";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 900} ;

signallingPortNumber ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SignallingPortNumber;
    MATCHES FOR EQUALITY;
    BEHAVIOUR signallingPortNumberBehaviour BEHAVIOUR
        DEFINED AS
"This attribute specifies the number of signalling Port in the BSC";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 910} ;

enableInternalIntraCellHandover ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;
    MATCHES FOR EQUALITY ;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 920} ;

enableInternalInterCellHandover ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;
    MATCHES FOR EQUALITY ;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 930} ;

relatedPCU ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RelatedGSMObjectList;
    MATCHES FOR EQUALITY;
    BEHAVIOUR relatedPCUBehaviour BEHAVIOUR
        DEFINED AS
"This attribute is the pointer to the related PCU, if the BSC/BTS has no PCU related, this pointre maybe null";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 935} ;

relatedSGSN ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NECode;
    MATCHES FOR EQUALITY;
    BEHAVIOUR relatedSGSNBehaviour BEHAVIOUR
        DEFINED AS
"This attribute is a pointer to the related SGSN object instance. If the BSC/PCU has no SGSN related, it maybe null.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 940} ;

bssNsEntityMappingTable ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BssNsEntityMappingTable;
    MATCHES FOR EQUALITY;
    BEHAVIOUR bssNsEntityMappingTableBehaviour BEHAVIOUR
        DEFINED AS
"This attribute specifies the the mapping table of NS entity in BSS side.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 945} ;

bssNsUserEntityMappingTable ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BssNsUserEntityMappingTable;
    MATCHES FOR EQUALITY;
    BEHAVIOUR bssNsUserEntityMappingTableBehaviour BEHAVIOUR
        DEFINED AS
"This attribute specifies the mapping table of NS entity in BSS side. The items include the userEntity, bvci and nsei. The userEntity specifies the identity of network service entity, The nsei can distinguish different bss. The bvci attribute specifies the virtual link indentity of BSSGP";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 950} ;

---cTelBtsSiteManager related attributes
btsSiteManagerId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.GsmGeneralObjectId;
    MATCHES FOR EQUALITY, ORDERING ;
    BEHAVIOUR btsSiteManagerIDBehaviour BEHAVIOUR
        DEFINED AS
"This attribute names a btsSiteManager object. Its value is an integral number, wh ich must be unique within the superior bssFunction.";;
        PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 960} ;

relatedOAMLapdLink ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RelatedGSMObject;
    MATCHES FOR EQUALITY ;
    BEHAVIOUR 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. ";;

    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 970} ;

----cTelBts related attributes

bsIdentityCode ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BSIdentityCode ;
    MATCHES FOR EQUALITY ;
    BEHAVIOUR 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.";;

    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 980} ;

btsId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.GsmGeneralObjectId;
    MATCHES FOR EQUALITY, ORDERING ;
    BEHAVIOUR btsIdBehaviour BEHAVIOUR
        DEFINED AS

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

    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 990} ;

cellAllocation ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CellAllocation ;
    MATCHES FOR EQUALITY;
    BEHAVIOUR 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.";;

    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1000} ;

gsmdcsIndicator ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.GsmdcsIndicator ;
    MATCHES FOR EQUALITY, ORDERING ;

BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1010} ;

cellGlobalIdentity ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CellGlobalIdentity ;
    MATCHES FOR EQUALITY;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1020} ;

cellReselectHysteresis ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CellReselectHysteresis ;
    MATCHES FOR EQUALITY, ORDERING ;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1030} ;

ny1 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.Ny1;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1040} ;

periodCCCHLoadIndication ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module. PeriodCCCHLoadIndication ;

MATCHES FOR EQUALITY ;

BEHAVIOUR 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`";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1050} ;

plmnPermitted ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.PlmnPermitted;

MATCHES FOR EQUALITY ;

BEHAVIOUR 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) .";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1060} ;

rACHBusyThreshold ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RxLev ;

MATCHES FOR EQUALITY;

BEHAVIOUR 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.";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1070} ;

rACHLoadAveragingSlots ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RachLoadAveragingSlots ;

MATCHES FOR EQUALITY;

BEHAVIOUR 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.";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1080} ;

radioLinkTimeout ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RadioLinkTimeout;

MATCHES FOR EQUALITY ;

BEHAVIOUR 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.";;
   PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1090} ;

relatedTranscoder ATTRIBUTE   \
   WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RelatedGSMObjectList;
   MATCHES FOR EQUALITY ;
   BEHAVIOUR 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.";;
   PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1100} ;

rxLevAccessMin ATTRIBUTE
   WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RxLev;
   MATCHES FOR EQUALITY, ORDERING;
   BEHAVIOUR 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) .";;
   PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1110} ;
thresholdCCCHLoadIndication ATTRIBUTE
   WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.ThresholdCCCHLoadIndication ;
   MATCHES FOR EQUALITY ;
   BEHAVIOUR 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'";;
   PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1120} ;

maxNumberRetransmission ATTRIBUTE
   WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxRetrans;
   MATCHES FOR EQUALITY ;
   BEHAVIOUR 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) .";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1130} ;

mSTxPwrMaxCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.TxPower;
    MATCHES FOR EQUALITY, ORDERING ;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1140} ;

numberOfSlotsSpreadTrans ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.TxInteger;
    MATCHES FOR EQUALITY ;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1150} ;

noOfBlocksForAccessGrant ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NoOfBlocksForAccessGrant;
    MATCHES FOR EQUALITY, ORDERING ;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1160} ;

noOfMultiframesBetweenPaging ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NoOfMultiframesBetweenPaging;
    MATCHES FOR EQUALITY, ORDERING ;

BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1170} ;

allowIMSIAttachDetach ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1180} ;

callReestablishmentAllowed ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1190} ;

cellBarred ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;
    MATCHES FOR EQUALITY ;
    BEHAVIOUR 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) .";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1200} ;

dtxDownlink ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;
    MATCHES FOR EQUALITY ;
    BEHAVIOUR 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";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1210} ;

dtxUplink ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.DtxUplink;

MATCHES FOR EQUALITY;

BEHAVIOUR 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) ";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1220} ;

emergencyCallRestricted ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;

MATCHES FOR EQUALITY ;

BEHAVIOUR 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.";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1230} ;

notAllowedAccessClasses ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.AccessControlClassSet;

MATCHES FOR EQUALITY;

BEHAVIOUR 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.";;

PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1240} ;

timerPeriodicUpdateMS ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.TimerPeriodicUpdateMS;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR 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.";;
        PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1250} ;

noOfTransceivers ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NoOfTransceivers;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR noOfTransceiversBehaviour BEHAVIOUR
            DEFINED AS "This attribute indicates the number of tranceivers.";;
REGISTERED AS { cTel-gsm-nmc-cm-attribute 1260} ;

noOfRadioCarriers ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NoOfRadioCarriers;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR noOfRadioCarriersBehaviour BEHAVIOUR
            DEFINED AS "This attribute indicates the number of radioCarriers.";;
REGISTERED AS { cTel-gsm-nmc-cm-attribute 1270} ;

noOfSDCCH ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NoOfSDCCH;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR noOfSDCCHBehaviour BEHAVIOUR
            DEFINED AS "This attribute indicates the number of SDCCH.";;
REGISTERED AS { cTel-gsm-nmc-cm-attribute 1280} ;

noOfTCH ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NoOfTCH;
        MATCHES FOR EQUALITY, ORDERING;
        BEHAVIOUR noOfTCHBehaviour BEHAVIOUR
            DEFINED AS "This attribute indicates the number of TCH.";;
REGISTERED AS { cTel-gsm-nmc-cm-attribute 1290} ;

trxPower ATTRIBUTE
        WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.TrxPower;

MATCHES FOR EQUALITY;

BEHAVIOUR trxPowerBehaviour BEHAVIOUR

DEFINED AS "This attribute specifies power of the Transceivers in the BTS.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1300} ;

adjacentCellList ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.ObjectList;

MATCHES FOR EQUALITY;

BEHAVIOUR adjacentCellListBehaviour BEHAVIOUR

DEFINED AS

"This attribute specifies the object instances of cTelBts which are adjacent with the specified cTelBts.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1335} ;

maxQueueLength ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MaxQueueLength;

MATCHES FOR EQUALITY, ORDERING ;

BEHAVIOUR 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.";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1390} ;

msPriorityUsedInQueuing ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;

MATCHES FOR EQUALITY ;

BEHAVIOUR 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.";;

PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1400} ;

timeLimitCall ATTRIBUTE

WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.QueueTimeLimit ;

MATCHES FOR EQUALITY, ORDERING ;

BEHAVIOUR 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.";;

PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1410} ;

timeLimitHandover ATTRIBUTE
  WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.QueueTimeLimit ;
  MATCHES FOR EQUALITY, ORDERING ;
  BEHAVIOUR 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.";;
  PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1420} ;

hoMsmtProcessingMode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MsmtProcessingMode;
  MATCHES FOR EQUALITY;
  BEHAVIOUR 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.";;
  PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1430} ;

pcMsmtProcessingMode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MsmtProcessingMode;
  MATCHES FOR EQUALITY;
  BEHAVIOUR 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.";;
  PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1440} ;

cellReselectArithm ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CellReselectArithmListType;

 MATCHES FOR EQUALITY;

 BEHAVIOUR cellReselectionModeBehaviour BEHAVIOUR

  DEFINED AS

"This attribute is used to describe which arithmetic of cell reselection is chosen.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1450} ;

rai ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.RoutingAreaId;

 MATCHES FOR EQUALITY;

 BEHAVIOUR raiBehaviour BEHAVIOUR

  DEFINED AS

"Ths attribute specifies the identity of routing area.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1460} ;

pBCCHIndicator ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;

 MATCHES FOR EQUALITY;

 BEHAVIOUR pBCCHIndicatorBehaviour   BEHAVIOUR

  DEFINED AS

" This attribute controls whether the PBCCH is configured. The value true means the PBCCH is configured.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1470} ;

pCCCHIndicator ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.BooleanType;

 MATCHES FOR EQUALITY;

 BEHAVIOUR pCCCHIndicatorBehaviour BEHAVIOUR

  DEFINED AS

" This attribute controls whether the PCCCH is configured. The value true means the PCCCH is configured.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1480} ;

numOfSlotsForGPRS ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NumberType;

 MATCHES FOR EQUALITY;

 BEHAVIOUR numOfSlotsForGPRSBehaviour BEHAVIOUR

  DEFINED AS

"This attribute specifies the number of time slots used for GPRS.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1495} ;

numOfTrxForGPRS ATTRIBUTE

 WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NumberType;

MATCHES FOR EQUALITY;
    BEHAVIOUR numOfTrxForGPRSBehaviour BEHAVIOUR
        DEFINED AS
"This attribute specifies the number of transceivers used for GPRS.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1500} ;

channelEncodeMode   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.ChannelEncodeModeListType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR channelEncodeModeBehaviour BEHAVIOUR
        DEFINED AS
"This attribute specifies which mode of channel encode is used.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1510} ;

mediaAccessControlMode ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.MediaAccessControlMode;
    MATCHES FOR EQUALITY;
    BEHAVIOUR   mediaAccessControlModeBehaviour BEHAVIOUR
        DEFINED AS
"This attribute specifies which mode for media access control is used.";;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1520} ;

---cTelLapdLink related attributes
abisSigChannel ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.AbisChannel;
    MATCHES FOR EQUALITY;
    BEHAVIOUR abisSigChannelBehaviour BEHAVIOUR
    DEFINED AS
"The abisSigChannel attribute identifies the PCM time slot and optional subslot allocated for a LapD link at the Abis interface.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1525} ;

lapdLinkId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.GsmGeneralObjectId;
    MATCHES FOR EQUALITY ;
    BEHAVIOUR 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.";;
    PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1530} ;

sapi ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.SAPI ;

    MATCHES FOR EQUALITY ;

    BEHAVIOUR 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.";;

    PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1540} ;

tei ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.TEI ;

    MATCHES FOR EQUALITY ;

    BEHAVIOUR 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.";;

    PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1550} ;

————cTelPcmCircuit related attributes

pcmCircuitId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.PCMCircuitID;

    MATCHES FOR EQUALITY, ORDERING ;

    BEHAVIOUR pcmCircuitIDBehaviour BEHAVIOUR

        DEFINED AS

"This attribute names a 2 Mbps PCM circuit and is referenced by lapdLink objects.";;

    PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1560} ;

————cTelPcu related attributes

pcuId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.GsmGeneralObjectId;

    MATCHES FOR EQUALITY;

    BEHAVIOUR pcuIdBehaviour BEHAVIOUR

        DEFINED AS "The attribute names a cTelPcu object instance.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1570} ;

numOfPDCHSupported ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.NumberType;

    MATCHES FOR EQUALITY;

    BEHAVIOUR pdchNbrSupportedBehaviour BEHAVIOUR

        DEFINED AS

"The number of PDCH supported by PCU.";;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1575} ;

----cTelTranscoder related attributes

transcoderId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.GsmGeneralObjectId;

    MATCHES FOR EQUALITY ;

    BEHAVIOUR transcoderIdBehaviour BEHAVIOUR

        DEFINED AS "This attribute names an instance of a cTelTranscoder";;

    PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1580} ;

----cTelCMObjectControl related attributes

cTelCMObjectControlId ATTRIBUTE

    WITH ATTRIBUTE SYNTAX Attribute-ASN1Module.SimpleNameType;

    MATCHES FOR EQUALITY ;

    BEHAVIOUR cTelCMObjectControlIdBehaviour BEHAVIOUR

        DEFINED AS "This attribute names an instance of a cTelCMObjectControl";;

    PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1590} ;

----cTelRequestCMSynchronizationRecord related atributes

objectSelection ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.ObjectSelection;

    MATCHES FOR EQUALITY;

    BEHAVIOUR objectSelectionBehaviour BEHAVIOUR

        DEFINED AS

"This attribute specifies the object selection argument used in cTelRequestCMSynchronization notificaiton";;

    PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1600} ;

----cTelObjectCreationRecord related atributes

cTelObjectCreationArg ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CTelObjectCreationArg;

    MATCHES FOR EQUALITY;

    BEHAVIOUR cTelObjectCreationArgBehaviour BEHAVIOUR

        DEFINED AS

"This attribute specifies the object creation argument used in cTelObjectCreation notificaiton";;

    PARAMETERS cTelStandardSpecificErrorInfo;

REGISTERED AS {cTel-gsm-nmc-cm-attribute 1610} ;

----cTelObjectDeletionRecord related atributes

cTelObjectDeletionArg ATTRIBUTE

    WITH ATTRIBUTE SYNTAX CM-TMN-ASN1Module.CTelObjectDeletionArg;

    MATCHES FOR EQUALITY;

BEHAVIOUR cTelObjectDeletionArgBehaviour BEHAVIOUR
DEFINED AS
"This attribute specifies the object deletion argument used in cTelObjectDeletion notificaiton";;
PARAMETERS cTelStandardSpecificErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-attribute 1620} ;

---Managed object class name binding definitions
---General name bindings

cTelPlmnSubnetwok-root NAME BINDING
SUBORDINATE OBJECT CLASS cTelPlmnSubnetwork;
NAMED BY
SUPERIOR OBJECT CLASS "ITU-T Rec. X660:1997":root;
WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":networkId;
BEHAVIOUR cTelPlmnSubnetwok-rootBehaviour BEHAVIOUR
DEFINED AS "";;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 10} ;

managedElement-cTelPlmnSubnetwork NAME BINDING
SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
NAMED BY
SUPERIOR OBJECT CLASS cTelPlmnSubnetwork;
WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":managedElementId;
BEHAVIOUR managedElement-cTelPlmnSubnetworkBehaviour BEHAVIOUR
DEFINED AS "";;
CREATE;
DELETE;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 20} ;

---cTelGsmEquipment relate nameBindings
cTelGsmEquipment-managedElement NAME BINDING
SUBORDINATE OBJECT CLASS cTelGsmEquipment;
NAMED BY
SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":equipmentId;
CREATE
WITH-REFERENCE-OBJECT,
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 30} ;

cTelGsmEquipment-cTelGsmEquipment NAME BINDING
SUBORDINATE OBJECT CLASS cTelGsmEquipment;

NAMED BY
    SUPERIOR OBJECT CLASS cTelGsmEquipment;
WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":equipmentId;
CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
    ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 40} ;

----cTelSignallingLinkTP, signallingLinkSetTP, singallingPoint related name bindings
cTelSignallingLinkTP-cTelSignallingLinkSetTP NAME BINDING
    SUBORDINATE OBJECT CLASS cTelSignallingLinkTP;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelSignallingLinkSetTP;
    WITH ATTRIBUTE signallingLinkTPId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 50} ;

signallingLinkSetTP-signallingPoint NAME BINDING
    SUBORDINATE OBJECT CLASS cTelSignallingLinkSetTP;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelSignallingPoint;
    WITH ATTRIBUTE signallingLinkSetTPId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 60} ;

cTelSignallingPoint-cTelBsc NAME BINDING
    SUBORDINATE OBJECT CLASS
    cTelSignallingPoint;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBsc;
    WITH ATTRIBUTE signallingPointId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 70} ;

cTelSignallingPoint-cTelHlrFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelSignallingPoint;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelHlrFunction;
    WITH ATTRIBUTE signallingPointId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 80} ;

cTelSignallingPoint-cTelMscFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelSignallingPoint;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelMscFunction;
    WITH ATTRIBUTE signallingPointId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 90} ;

---NSS related nameBindings
cTelOmcFunction-managedElement NAME BINDING
    SUBORDINATE OBJECT CLASS cTelOmcFunction;
    NAMED BY SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
    WITH ATTRIBUTE omcFunctionId;
    CREATE;
    DELETE;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 100} ;

cTelAucFunction-managedElement NAME BINDING
    SUBORDINATE OBJECT CLASS cTelAucFunction;
    NAMED BY
    SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
    WITH ATTRIBUTE aucFunctionId;
    BEHAVIOUR cTelAucFunction-managedElementBehaviour BEHAVIOUR
        DEFINED AS "";;
    CREATE;
    DELETE;
    REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 110} ;

cTelBssFunction-managedElement NAME BINDING
    SUBORDINATE OBJECT CLASS cTelBssFunction;

NAMED BY
  SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
WITH ATTRIBUTE bssFunctionId;
BEHAVIOUR cTelBssFunction-managedElementBehaviour BEHAVIOUR
  DEFINED AS "";;
CREATE;
DELETE;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 120} ;

cTelEirFunction-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS cTelEirFunction;
  NAMED BY
    SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
  WITH ATTRIBUTE eirFunctionId;
  BEHAVIOUR cTelEirFunction-managedElementBehaviour BEHAVIOUR
    DEFINED AS "";;
  CREATE;
  DELETE;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 130} ;

cTelHlrFunction-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS cTelHlrFunction;
  NAMED BY
    SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
  WITH ATTRIBUTE hlrFunctionId;
  BEHAVIOUR cTelHlrFunction-managedElementBehaviour BEHAVIOUR
    DEFINED AS "";;
  CREATE;
  DELETE;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 140} ;

cTelMscFunction-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS cTelMscFunction;
  NAMED BY
    SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
  WITH ATTRIBUTE mscFunctionId;
  BEHAVIOUR cTelMscFunction-managedElementBehaviour BEHAVIOUR
    DEFINED AS "";;
  CREATE;
  DELETE;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 150} ;

cTelSmsGIWFunction-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS cTelSmsGIWFunction;

NAMED BY

SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;

WITH ATTRIBUTE smsGIWFunctionId;

BEHAVIOUR cTelSmsGIWFunction-managedElementBehaviour BEHAVIOUR

DEFINED AS "";;

CREATE;

DELETE;

REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 160} ;

cTelVlrFunction-managedElement NAME BINDING

SUBORDINATE OBJECT CLASS cTelVlrFunction;

NAMED BY

SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;

WITH ATTRIBUTE vlrFunctionId;

BEHAVIOUR cTelVlrFunction-managedElementBehaviour BEHAVIOUR

DEFINED AS "";;

CREATE;

DELETE;

REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 170} ;

cTelSsFunction-managedElement NAME BINDING

SUBORDINATE OBJECT CLASS cTelSsFunction;

NAMED BY

SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;

WITH ATTRIBUTE ssFunctionId;

BEHAVIOUR cTelSsFunction-managedElementBehaviour BEHAVIOUR

DEFINED AS "";;

CREATE;

DELETE;

REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 175} ;

---MSC related name bindings

cTelDigitsSegment-cTelMscFunction NAME BINDING

SUBORDINATE OBJECT CLASS cTelDigitsSegment;

NAMED BY

SUPERIOR OBJECT CLASS cTelMscFunction;

WITH ATTRIBUTE digitsSegmentId;

CREATE

WITH-REFERENCE-OBJECT;

DELETE

ONLY-IF-NO-CONTAINED-OBJECTS;

REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 190} ;

cTelCircuitEndPointSubgroup-cTelMscFunction NAME BINDING
    SUBORDINATE OBJECT CLASS
    cTelCircuitEndPointSubgroup;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelMscFunction;
    WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":circuitEndPointSubgroupId;
    CREATE;
    DELETE;
REGISTERED AS　{ cTel-gsm-nmc-cm-nameBinding 200} ;

cTelRoutingInfo-cTelMscFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelRoutingInfo;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelMscFunction;
    WITH ATTRIBUTE routingInfoId;
    CREATE;
    DELETE;
REGISTERED AS　{ cTel-gsm-nmc-cm-nameBinding 210} ;

--- BSS related name bindings

---D.8.2 BSS related name bindings
cTelBsc-cTelBssFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelBsc;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBssFunction ;
    WITH ATTRIBUTE bscId ;
    BEHAVIOUR cTelBsc-cTelBssFunctionBehaviour BEHAVIOUR
        DEFINED AS "The maximum number of instances of bsc in a bssFunction is 1.";;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING cTelStandardCreateErrorInfo;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS　{cTel-gsm-nmc-cm-nameBinding 220} ;

cTelBtsSiteManager-cTelBssFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelBtsSiteManager;
    NAMED BY SUPERIOR OBJECT CLASS cTelBssFunction;
    WITH ATTRIBUTE btsSiteManagerId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        DELETES-CONTAINED-OBJECTS cTelStandardDeleteErrorInfo;
REGISTERED AS　{cTel-gsm-nmc-cm-nameBinding 230} ;

cTelLapdLink-cTelBssFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelLapdLink;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBssFunction;
    WITH ATTRIBUTE lapdLinkId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 240} ;

cTelPcmCircuit-cTelBssFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelPcmCircuit;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBssFunction;
    WITH ATTRIBUTE pcmCircuitId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 250} ;

cTelTranscoder-cTelBssFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelTranscoder;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBssFunction;
    WITH ATTRIBUTE transcoderId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 260} ;

cTelTranscoder-managedElement NAME BINDING
    SUBORDINATE OBJECT CLASS cTelTranscoder;
    NAMED BY
        SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
    WITH ATTRIBUTE transcoderId;
    BEHAVIOUR cTelTranscoder-managedElementBehaviour BEHAVIOUR
        DEFINED AS
"The naming binding specifies the case that the Transcoder is placed on the MSC side instead of on the
BSS side, which can be shared by more than one BSS";;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;

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DELETE
cTelStandardDeleteErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 265} ;

cTelPcu-cTelBssFunction NAME BINDING
SUBORDINATE OBJECT CLASS cTelPcu;
NAMED BY
SUPERIOR OBJECT CLASS cTelBssFunction;
WITH ATTRIBUTE   pcuId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 270} ;

cTelPcu-managedElement NAME BINDING
SUBORDINATE OBJECT CLASS cTelPcu;
NAMED BY
SUPERIOR OBJECT CLASS "ITU-T Rec. M.3100:1995":managedElement;
WITH ATTRIBUTE   pcuId;
BEHAVIOUR cTelPcu-managedElementBehaviour BEHAVIOUR
DEFINED AS
"The naming binding specifies the case that the PCU is placed outside of one specific BSS, and can be shared by more than one BSS";;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 275} ;

cTelBts-cTelBtsSiteManager NAME BINDING
SUBORDINATE OBJECT CLASS cTelBts;
NAMED BY
SUPERIOR OBJECT CLASS cTelBtsSiteManager;
WITH ATTRIBUTE btsId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
DELETES-CONTAINED-OBJECTS
cTelStandardDeleteErrorInfo;
REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 280} ;

---software related Name Binding
software-cTelAucFunction NAME BINDING

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SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
NAMED BY
    SUPERIOR OBJECT CLASS cTelAucFunction;
WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
    cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 290} ;

software-cTelHlrFunction NAME BINDING
SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
NAMED BY
    SUPERIOR OBJECT CLASS cTelHlrFunction;
WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
    cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 300} ;

software-cTelMscFunction NAME BINDING
SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
NAMED BY
    SUPERIOR OBJECT CLASS cTelMscFunction;
WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
    cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 310} ;

software-cTelOmcFunction NAME BINDING
SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
NAMED BY
    SUPERIOR OBJECT CLASS cTelOmcFunction;
WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING ;
DELETE
    cTelStandardDeleteErrorInfo;
REGISTERED AS { cTel-gsm-nmc-cm-nameBinding 320} ;

software-cTelSmsGIWFunction NAME BINDING
    SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelSmsGIWFunction;
    WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
    CREATE WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE cTelStandardDeleteErrorInfo;
REGISTERED AS   { cTel-gsm-nmc-cm-nameBinding 330} ;

software-cTelVlrFunction NAME BINDING
    SUBORDINATE OBJECT CLASS
    "ITU-T Rec. M.3100:1995":software;
    NAMED BY SUPERIOR OBJECT CLASS cTelVlrFunction;
    WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING ;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS   { cTel-gsm-nmc-cm-nameBinding 340} ;

software-cTelBts NAME BINDING
    SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBts;
    WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
    CREATE WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE cTelStandardDeleteErrorInfo;
REGISTERED AS   { cTel-gsm-nmc-cm-nameBinding 350} ;

software-cTelEirFunction NAME BINDING
    SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelEirFunction;
    WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS   { cTel-gsm-nmc-cm-nameBinding 360} ;

software-cTelBsc NAME BINDING
    SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBsc;

WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
    cTelStandardDeleteErrorInfo;
REGISTERED AS   { cTel-gsm-nmc-cm-nameBinding 370} ;

software-cTelBtsSiteManager NAME BINDING
    SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBtsSiteManager;
    WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS   { cTel-gsm-nmc-cm-nameBinding 380} ;

software-cTelPcu NAME BINDING
    SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelPcu;
    WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS   { cTel-gsm-nmc-cm-nameBinding 390} ;

software-cTelSsFunction NAME BINDING
    SUBORDINATE OBJECT CLASS "ITU-T Rec. M.3100:1995":software;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelSsFunction;
    WITH ATTRIBUTE "ITU-T Rec. M.3100:1995":softwareId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE
        cTelStandardDeleteErrorInfo;
REGISTERED AS   { cTel-gsm-nmc-cm-nameBinding 400} ;

cTelCMObjectControl-cTelPlmnSubnetwork NAME BINDING
    SUBORDINATE OBJECT CLASS cTelCMObjectControl;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelPlmnSubnetwork;

WITH ATTRIBUTE cTelCMObjectControlId;

CREATE;

DELETE;

REGISTERED AS {cTel-gsm-nmc-cm-nameBinding 410} ;

C.3.2 配置管理部分的 ASN.1 定义

CM-TMN-ASN1Module { ccitt (0) identified-organisation (4) chinaTeleCom (8) mobileDomain (0) gsm-Operation-Maintenance (3) version2 (2) nmc-omc-standard-cm (2) informationModel (0) asn1Model (2) typeDefinitions (1)}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

IMPORTS

  ObjectClass, ModifyOperator, Attribute, AttributeId, ObjectInstance, GetArgument

    FROM

CMIP-1 {joint-iso-ccitt ms (9) cmip (1) modules (0) protocol (3)}

  AdministrativeState, AttributeList

    FROM

Attribute-ASN1Module {joint-iso-ccitt 9 smi (3) part2 (2) asn1Module (2) 1}

  ObjectInfo

    FROM

Notification-ASN1Module {joint-iso-ccitt 9 smi (3) part2 (2) asn1Module (2) 2}

  cTel-gsm-nmc-cm

    FROM

ChinaTeleCom-GSM-DomainDefinitions {ccitt (0) identified-organisation (4) chinaTeleCom (8) mobileDomain (0) gsm -Operation -Maintenance (3) version2 (2) nmc -omc -standard -com (0) informationModel (0) asn1Model (2) oM-DomainDefinitions (0)} ;

cTel-gsm-nmc-cm-informationModel OBJECT IDENTIFIER ::= { cTel-gsm-nmc-cm informationModel (0)}

cTel -gsm -nmc -cm -objectClass OBJECT IDENTIFIER :: = { cTel -gsm -nmc -cm -informationModel managedObjectCalss (3)}

cTel-gsm-nmc-cm-package OBJECT IDENTIFIER ::= {cTel-gsm-nmc-cm-informationModel package (4)}

cTel -gsm -nmc -cm -parameter OBJECT IDENTIFIER :: = { cTel -gsm -nmc -cm -informationModel parameter (5)}

cTel -gsm -nmc -cm -nameBinding OBJECT IDENTIFIER :: = { cTel -gsm -nmc -cm -informationModel nameBinding (6)}

cTel-gsm-nmc-cm-attribute OBJECT IDENTIFIER ::= {cTel-gsm-nmc-cm-informationModel attribute (7)}

cTel-gsm-nmc-cm-action OBJECT IDENTIFIER ::= {cTel-gsm-nmc-cm-informationModel action (9)}

cTel-gsm-nmc-cm-notification OBJECT IDENTIFIER ::= {cTel-gsm-nmc-cm-informationModel notification (10)}

CircuitDirectionality ::= ENUMERATED

{

  onewayOut (1) ,

  onewayIn (2) ,

```
        twoway (3)
}
CircuitType ::= ENUMERATED { lowCallLoss (1) , highEfficiencyDirect (2)}
DigitParticipationIndicator ::= INTEGER {
        seeNextCode (0) ,
        intermationalCode (1) ,
        nationalPSTNCode (2) ,
        nationalPLMNCode (3) ,
        toLocalMSC (4) ,
        toOwnMSC (5) ,
        localPSTNCode (6) ,
        localSPXCode (7) ,
        anlogPLMNCode (9) ,
        others (10)
}
Name ::= GraphicString
NetworkIndicator ::=INTEGER
{
        international (0) ,
        spare (1) ,
        national (2) ,
        reservedNationalUse (3)
}
NoOfRadioCarriers ::= INTEGER
NoOfSDCCH ::= INTEGER
NoOfTCH ::= INTEGER
NoOfTransceivers ::= INTEGER
NumberOfSignallingLinks ::= INTEGER
OmcFunctionId ::= GraphicString
RelatedObjectList ::= CHOICE
{
        notAvailable NULL,
        relatedObject SET OF ObjectInstance
}


RelatedTrunkGroupTP ::= SEQUENCE {
        priority INTEGER,
        trunkGroupTP ObjectInstance
}
Route ::= SEQUENCE {
        nameOfRoute Name,
        trunkGroupTPList SET OF RelatedTrunkGroupTP -- should be corrected to SEQUENCE OF
}
```

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SignallingPointLength   ::= ENUMERATED
{
    bits-24 (0) ,
    bits-14 (1)
}

SignallingListInfo ::= SET OF SignallingInfo
SignallingInfo ::= SEQUENCE
{
    signallingPointLength   SignallingPointLength,
    signallpc SignallingPointCode,
    netwind NetworkIndicator
}
SignallingPointCode ::=INTEGER
SignallingPointType ::=INTEGER
{
    noSTP (0) ,
    sTP (1)
}
Slc ::= INTEGER (0..15)
TransmissionCharacteristics ::= BIT STRING
{
    opticalFiberCable (1) ,
    coaxialCable (2) ,
    analogMicrowave (3) ,
    digitMicrowave (4) ,
    satellite (5) ,
    mixedGroup (6) ,
    others (7)
}
TrunkGroupType ::= ENUMERATED
{
    toInternationalToll (1) ,
    toNationalToll (2) ,
    toLocalTandem (3) ,
    toLocalEnd (4) ,
    toAnalogMobileTransit (5) ,
    toGSMFirstTransit (7) ,
    toGSMSecongTransit (8) ,
    toGSMMSC (9) ,
    toBSC (10) ,
    toVoiceMailbox (11) ,
    toOthers (12)
}

DigitElement ::= GraphicString
(FROM ("1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9" | "0" | "A" | "B" | " C" | "D" | "E" | "F" | "*" | "#")
| SIZE (1))

DigitList ::= SEQUENCE OF DigitElement

OmcType ::= ENUMERATED {
    omc (0) ,
    omc-r (1) ,
    omc-s (2)
}

SignallingLinkPriority ::= INTEGER

NECode ::= GraphicString

NECodeList ::= SEQUENCE OF NECode

MaxNumOfBscBHCA ::= INTEGER

BscCapacity ::= INTEGER

SignallingPortNumber ::= INTEGER

TrunkPortNumber ::= INTEGER

NumberType ::= INTEGER

TrxPower ::= INTEGER

RoutingAreaId ::= INTEGER

ChannelEncodeMode ::= ENUMERATED
{
    cs1 (0) ,
    cs2 (1) ,
    cs3 (2) ,
    cs4 (3)
}
ChannelEncodeModeListType ::= SET OF ChannelEncodeMode

MediaAccessControlMode ::= ENUMERATED
{
    dynamicAllocation (0) ,

```
        extendedDynamicAllocation (1) ,
        fixedAllocation (2)
}
CellReselectArithm ::= ENUMERATED
{
        c1 (0) ,
        c2 (1) ,
        c31 (2) ,
        c32 (3)
}
CellReselectArithmListType ::= SET OF CellReselectArithm


SupportGPRS ::= BOOLEAN


HlrNumber ::= ISDN-AddressString


MaxMscBHCA ::= INTEGER


MscCapacity ::= INTEGER


MscType ::= ENUMERATED
{
        mscTypeTMSC1 (0) ,
        mscTypeTMSC2 (1) ,
        mscTypeGMSC (2) ,
        mscTypeMSCVLR (3)
}


MscUpgradeIndicator ::= SEQUENCE
{
        upgradeToSSP BOOLEAN,
        upgradeToPOI BOOLEAN
}


MscIWFDataBlockCapacity ::= INTEGER


ObjectList ::= SET OF ObjectInstance


--- Type Definitions from GSM 12.00
AucFunctionId ::= INTEGER
BssFunctionId ::= INTEGER
Cc ::= GraphicString
SetOfCc ::= SET OF Cc
EirFunctionId ::= INTEGER
```

EirId ::= GraphicString

EirNumber ::= GraphicString

HlrFunctionId ::= INTEGER

ListOfSupportedBS ::= SET OF BasicServiceId

ListOfSupportedSS ::= SET OF SsId

Mcc ::= GraphicString

Mnc ::= GraphicString

MscFunctionId ::= INTEGER

MscId ::= GraphicString

MscNumber ::= ISDN-AddressString

Ndc ::= GraphicString

SetOfNdc ::= SET OF Ndc

SmsGIWFunctionId ::= INTEGER

VlrFunctionId ::= INTEGER

VlrId ::= GraphicString

VlrNumber ::= ISDN-AddressString

SsFunctionId ::= INTEGER

--- from GSM 09.02

ISDN-AddressString ::= AddressString (SIZE (1..maxISDN-AddressLength))

AddressString ::= OCTET STRING (SIZE (1..maxAddressLength))

maxAddressLength INTEGER ::= 20

maxISDN-AddressLength INTEGER ::= 9

Password ::= NumericString (FROM ("0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9"))   (SIZE (4))

CUG-Interlock ::= OCTET STRING (SIZE (4))

--- Types from GSM1202.asn1

BasicServiceId ::= GraphicString

--- The following services are valid for GSM Phase 2:

--- TS 11, TS 21, TS 22,

--- TS 61, TS 62,

--- BS 21, BS 22, BS 23, BS 24, BS 25, BS 26,

--- BS 31, BS 32, BS 33, BS 34,

--- BS 41, BS 42, BS 43, BS 44, BS 45, BS 46,

--- BS 51, BS 52, BS 53,

--- BS 61A, BS 61S, BS 71, BS 81A, BS 81S

--- Values see GSM12.02 Annex B

CurrentNumberOfImsiInAuc ::= INTEGER

CurrentNumberOfImsiInHlr ::= INTEGER

CurrentNumberOfImsiInVlr ::= INTEGER

CurrentNumberOfImsiInLogicalAuc ::= INTEGER

CurrentNumberOfImsiInLogicalHlr ::= INTEGER

CurrentNumberOfLogicalAuc ::= INTEGER

CurrentNumberOfLogicalHlr ::= INTEGER

CurrentNumberOfMsisdnInHlr ::= INTEGER

CurrentNumberOfMsisdnInLogicalHlr ::= INTEGER

EncryptionType ::= INTEGER (0..100)

HlrId ::= GraphicString

HlrImsi ::= GraphicString

--- maybe only part of IMSI

HlrMsisdn ::= GraphicString

--- maybe only part of MSISDN

ImsiDetachFlag ::= BOOLEAN

--- TRUE = IMSI Detached Flag set

--- FALSE = IMSI Detached Flag not set

ListOfValidCUGInterlockCodes ::= SET OF CUG-Interlock

LocAreaId ::= OCTET STRING (SIZE (2..5))

LocInfoConfInHlrIndicator ::= BOOLEAN

MaxNumberExceeded ::= INTEGER

MaxNumberOfImsiInAuc ::= INTEGER

MaxNumberOfImsiInHlr ::= INTEGER

MaxNumberOfImsiInLogicalAuc ::= INTEGER

MaxNumberOfImsiInLogicalHlr ::= INTEGER

MaxNumberOfImsiInVlr ::= INTEGER

MaxNumberOfLogicalAuc ::= INTEGER

MaxNumberOfLogicalHlr ::= INTEGER

MaxNumberOfMsisdnInHlr ::= INTEGER

MaxNumberOfMsisdnInLogicalHlr ::= INTEGER

SsId ::= GraphicString

--- Syntax of Eir object Attributes and Parameters --

CurrentNumberOfBlackListEntries ::= INTEGER

CurrentNumberOfGreyListEntries ::= INTEGER

CurrentNumberOfWhiteListEntries ::= INTEGER

MaxNumberOfBlackListEntries ::= INTEGER

MaxNumberOfGreyListEntries ::= INTEGER

MaxNumberOfWhiteListEntries ::= INTEGER

--- Types from GSM 12.20

--- Initial Value Definitions

initialAdministrativeState AdministrativeState ::= locked

initialRelatedGSMEquipment RelatedGSMObject ::= notAvailable : 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
BooleanType  ::=  BOOLEAN
BSIdentityCode  ::=  SEQUENCE
{
        ncc  NetworkColourCode,
        bcc  BTSColourCode
}
BTSColourCode  ::=  INTEGER  (0..7)
CellAllocation  ::=  SEQUENCE SIZE  (1..64)  OF AbsoluteRFChannelNo
CellGlobalIdentity  ::=  SEQUENCE
{
        lai  LocationAreaIdentity,
        ci  CellIdentity
}
CellIdentity  ::=  INTEGER  (0..65535)
CellReselectHysteresis  ::=  INTEGER  (0..7)  —  times 2 dB
ClassNumber  ::=  INTEGER  (0..15)
Direction  ::=  ENUMERATED
{
        forwards  (0) ,
        backwards  (1)
}
DtxUplink  ::=  INTEGER
{—  DTX  =  Discontinuous Transmission
        msMayUseDTx  (0) ,
        msShallUseDTx  (1) ,
        msShallNotUseDTx  (2)
}
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


GSMErrorCode  ::=  CHOICE
{
        unknown  NULL,
```

```
        defined Code  INTEGER
}
---- The following error codes are defined for various GSM 12.20 identified errors
needLock GSMErrorCode ::= definedCode : 1 -- This error indicates that the operation will
--- not be accepted unless the object instance
--- is locked.
clearRelation GSMErrorCode ::= 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) ,
    multiband (3)        -- which can support gsm and dcs1800
}
GsmGeneralObjectId ::= INTEGER
LocationAreaCode ::= INTEGER (0..65535) -- LAC, Ref. GSM 04.08
LocationAreaIdentity ::= SEQUENCE
{
    mcc MobileCountryCode,
    mnc MobileNetworkCode,
    lac LocationAreaCode
}
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
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)
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")
Ny1 ::= INTEGER


PCMCircuitID ::= INTEGER (0..2047)
PCMTimeslot ::= SEQUENCE
{
    pcm PCMCircuitID,
    tsl TimeslotNumber
}
PeriodCCCHLoadIndication ::= TimerData
PlmnPermitted ::= SET SIZE (0..8) OF NetworkColourCode


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

StandardCreateErrorInfo ::= INTEGER

StandardDeleteErrorInfo ::= GSMErrorCode

StandardSpecificErrorInfo ::= CHOICE

{

    errorCode GSMErrorCode,

    errorString GraphicString

}

Subslot ::= INTEGER (0..3) --?? (?)

---HERE

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)

ThresholdCCCHLoadIndication ::= INTEGER

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
TxInteger ::= INTEGER (0..15) -- see GSM 04.08
TxPower ::= INTEGER


BssNsUserEntityMappingTable::= SET OF SEQUENCE
{
        userEntity      GraphicString,
        bvci        INTEGER,
        nsei        INTEGER
}
BssNsEntityMappingTable::= SET OF SEQUENCE
{
        nsei                INTEGER,
        bvci                INTEGER,
        nsvci                   INTEGER,
        dlci                INTEGER,
        bearerChannel       INTEGER,
        loadShareMechanism      REAL
}


SLS ::= INTEGER (0..15)
SLSCodeList ::= SET SIZE (0..16) OF SLS


SourceNumber ::= CHOICE
{
        notUsed NULL,
        number SEQUENCE OF DigitElement
}


RelatedRouteInfo ::= SET OF SEQUENCE
{
        sourceNumber SourceNumber,
        routeInfo RelatedGSMObject
}


CTelObjectCreationArg ::= SEQUENCE
```

```
{
    createdMOC    ObjectClass,
    createdMOI    ObjectInstance,
    creationTime  GeneralizedTime OPTIONAL,
    attributeList AttributeList
}

CTelObjectDeletionArg ::= SEQUENCE
{
    deletedMOC    ObjectClass,
    deletedMOI    ObjectInstance,
    deletionTime  GeneralizedTime OPTIONAL
}

ObjectSelection ::= GetArgument

END
```

附录 D

（规范性附录）

性能管理信息模型

D.1 性能管理部分信息模型概览

### D.1.1 性能管理部分的管理对象继承树

性能管理对象继承树如图 D.1 所示。
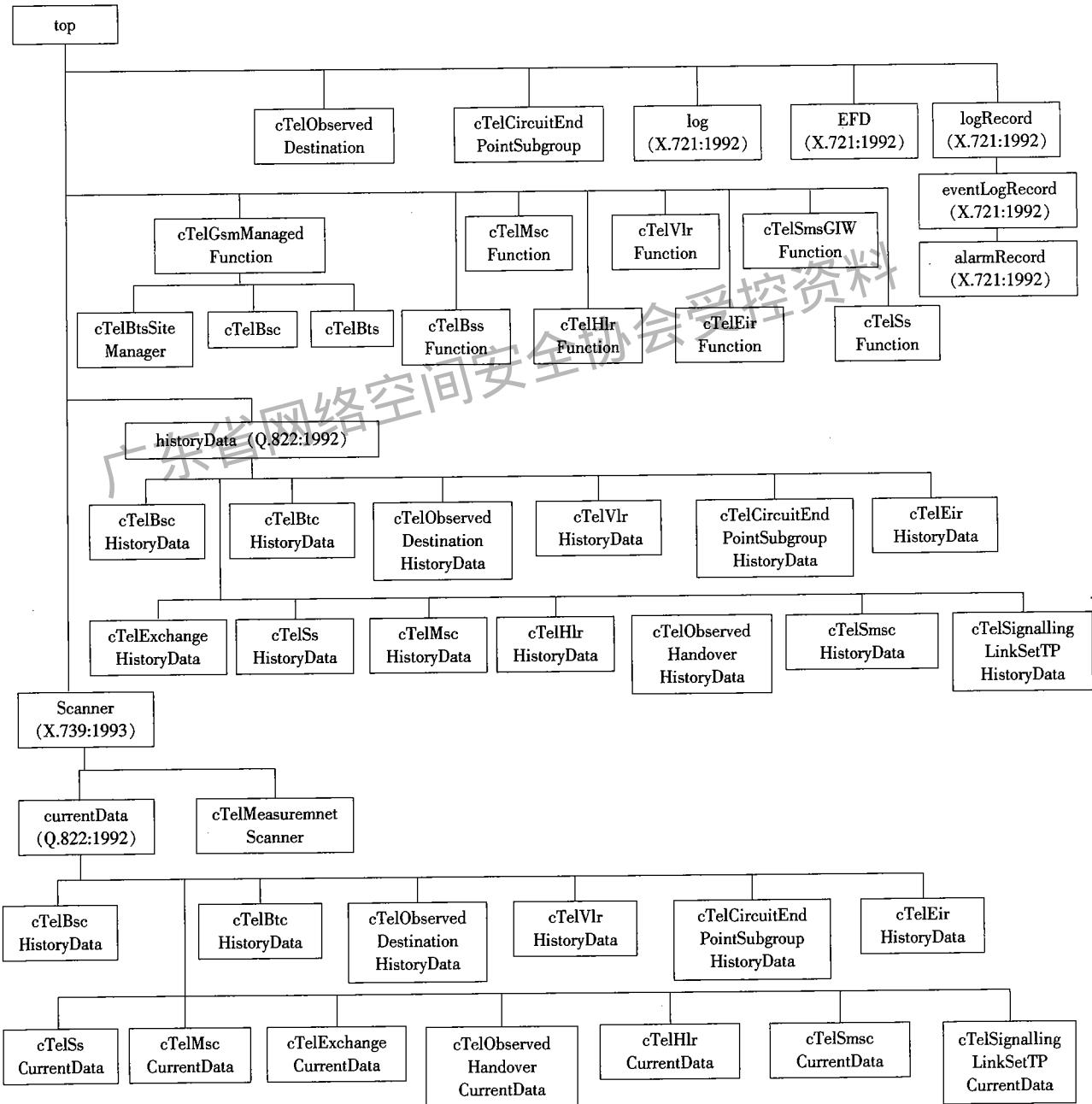
图 D.1 性能管理对象继承树

D.1.2 性能管理部分的管理对象包含树

性能管理对象包含树如图 D.2 所示。
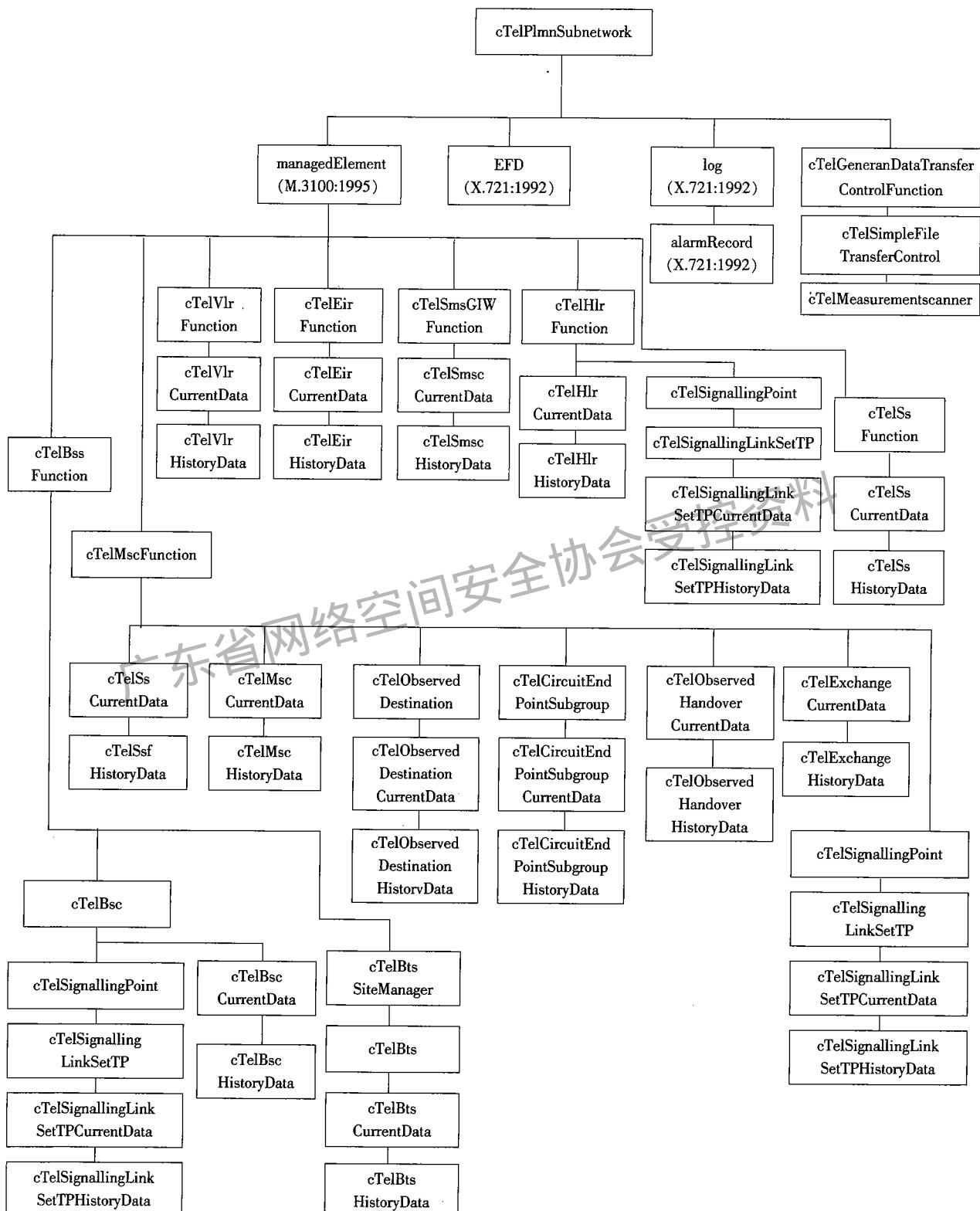
图 D.2 性能管理对象包含树

D.2 性能测量参数描述

D.2.1 MSC 性能测量参数

由 *cTelMscCurrentData* 的对象实例提供和 MSC 相关的性能数据，包括以下的统计数据：

—— HLR 查询；

—— 小区切换统计；

—— 服务质量；

—— MSC 处理器的使用率。

a）MSC 性能统计

cTelMscCurrentData 的 MSC 性能统计的测量属性见表 D.1。

表 D.1　cTelMscCurrentData 的 MSC 性能统计的测量属性

属性名	说　明	触发点	类　型
因入呼路由选择的 HLR 查询尝试次数（attInterrogationOfHLRsForRouting）	指 MSC 为入呼叫选择路由而对 HLR 进行查询的尝试次数	发送"MAP_SEND_ROUTING_INFORMATION"服务请求（GSM 09.02）	GSMMeasurementType1
因获得 MSRN 的 HLR 查询成功次数（succInterrogationOfHLRsMSRNObtained）	指获得 MSRN 的 HLR 查询成功次数	收到含有"MSRN"参数值的"MAP_SEND_ROUTING_INFORMATION"服务确认（GSM 09.02）	GSMMeasurementType1
因呼叫转移的 HLR 查询成功次数（succInterrogationOfHLRsCallForwarding）	指由于呼叫转移的 HLR 查询成功次数	收到包含"Forwarding Data"参数值的"MAP_SEND_ROUTING_INFORMATION"服务证实（GSM 09.02）	GSMMeasurementType1
切入本 MSC 小区的 MSC 间切换尝试次数（attIncomingInterMSCHDOs）	指在不同的 MSC 之间，所有从另一个 MSC 控制的小区切入到该 MSC 所控制的小区的切换尝试次数	收到"MAP_PREPARE_HANDOVER"服务指示，其中参数里的目的小区标识符为被观测小区（GSM 09.02）	GSMMeasurementType1
切入本 MSC 小区的 MSC 间切换成功次数（succIncomingInterMSCHDOs）	指在不同的 MSC 之间，所有从另一个 MSC 控制的小区切入到该 MSC 所控制的小区的切换成功次数	收到"MAP_SEND_END_SIGNAL"服务确认（GSM 09.02）	GSMMeasurementType1
切出本 MSC 小区的 MSC 间切换尝试次数（attOutgoingInterMSCHDOs）	指在不同的 MSC 之间，所有从该 MSC 所控制的小区切出到另一个 MSC 控制的小区的切换尝试次数	发送"MAP_PREPARE_HANDOVER"服务请求（GSM 09.02）	GSMMeasurementType1
切出本 MSC 小区的 MSC 间切换成功次数（succOutgoingInterMSCHDOs）	指在不同的 MSC 之间，所有从该 MSC 所控制的小区切出到另一个 MSC 控制的小区的切换成功次数	发送"MAP_SEND_END_SIGNAL"服务响应（GSM 09.02）	GSMMeasurementType1
后继为 MSCa 的 MSC 间小区切换尝试次数（attSubsequentInterMSCHDOsMSCa）	指后继为 MSCaMSC 间小区切换的尝试次数，其中通话又切换回源 MSC（MSCa）。如，首先由 MSCa 切换到 MSCb，然后又由于某些原因要切换回 MSCa	收到"MAP_PREPARE_SUBSEQUENT_HANDOVER"服务指示，其中参数里的目的 MSC 标识为 MSCa（GSM 09.02）	GSMMeasurementType1

表 D.1 （续）

属性名	说　明	触发点	类　型
后继为 MSCa 的 MSC 间小区切换成功次数 succSubsequentInterMSCHDOsMSCa	指后继为 MSCa 的 MSC 间小区切换的成功次数，其中通话又切换回源 MSC（MSCa）。如，首先由 MSCa 切换到 MSCb，然后又由于某些原因要切换回 MSCa	对于后继为 MSCa 的 MSC 间小区切换，发送"MAP_SEND_END_SIGNAL"服务响应	GSMMeasurementType1
后继为 MSCc 的 MSC 间小区切换尝试次数（attSubsequentInterMSCHDOsMSCc）	指后继为 MSCc 的 MSC 间小区切换的尝试次数，其中通话切换到了 MSCc。如，首先由 MSCa 切换到 MSCb，然后又由 MSCb 切换到 MSCc	收到"MAP_PREPARE_SUBSEQUENT_HANDOVER"服务指示，其中参数里的目的 MSC 标识为 MSCc（GSM 09.02）	GSMMeasurementType1
后继为 MSCc 的 MSC 间小区切换成功次数（succSubsequentInterMSCHDOsMSCc）	指后继为 MSCc 的 MSC 间小区切换的成功次数，其中通话切换到了 MSCc。如，首先由 MSCa 切换到 MSCb，然后又由 MSCb 切换到 MSCc	对于后继为 MSCc 的 MSC 间小区切换，发送"MAP_SEND_END_SIGNAL"服务响应（切换到 MSCc，GSM 09.02）	GSMMeasurementType1
MSC 控制的小区间切换的尝试总次数（externalHDOs）	指所有的由该 MSC 控制的小区间切换的尝试总次数	收到"HANDOVER REQUIRED"消息（GSM 08.08）	GSMMeasurementType1
MSC 控制的小区间切换各原因统计的尝试总次数（externalHDOsPerCause）	指按照每种原因来统计的 MSC 由该 MSC 控制的小区切换的尝试总次数	收到含不同原因的"HANDOVER REQUIRED"消息（GSM 08.08）	GSMMeasurementType3
MSC 内切换不成功但未掉话的切换次数（unsuccExternHDOsWithReconnectionPerMSC）	指 MSC 中所有切换不成功，但又返回原信道（TCH 和 SDCCH）通话的切换次数	对所请求的切换收到"HANDOVER FAILURE"消息（GSM08.08）	GSMMeasurementType1
MSC 内切换不成功而掉话的切换次数（unsuccExternHDOsWithLossOfConnectionPerMSC）	指 MSC 中所有切换不成功而造成掉话的切换次数	对所请求的切换收到"CLEAR REQUEST"消息（GSM08.08）	GSMMeasurementType1
系统寻呼总次数（attSystemPaging）	指在测量周期中，该 MSC 系统中所有寻呼请求的尝试次数		GSMMeasurementType1
交换设备出现故障总次数（numOfMSCFault）	指测量周期中，该 MSC 所发生故障的次数	无	GSMMeasurementType1
交换设备出现故障总时长（falutTimeOfMSC）	指测量周期中，MSC 设备所发生故障的累计总时间（单位：s）	无	GSMMeasurementType1
结束码按各种原因的出现次数（numOfEndCode）	指在测量周期中，根据不同的结束码原因统计的结束码出现次数。必要的结束码包括：久叫不应，被叫忙，号码不全，空号，超时释放，设备拥塞，电路拥塞，寻呼无响应		GSMMeasurementType7
IMSI 的分离次数（imsiDetachProcs）	指 IMSI 的分离次数	从 MS 收到"IMSI DETACH INDICATION"消息	GSMMeasurementType1
IMSI 的附着次数（imsiAttachProcs）	指 IMSI 的附着次数	从 MS 收到"LOCATION UPDATING REQUEST"消息	GSMMeasurementType1

b）MSC 服务质量

cTelMscCurrentData 的服务质量的测量属性见表 D.2。

表 D.2　cTelMscCurrentData 的服务质量的测量属性

属性名	说　明	触发点	类　型
平均呼叫建立时长（meanTimeToCallSetupService）	指对 MS 请求的呼叫服务的建立时间的算术平均值（单位：s）	累计在一个测量周期中，从"建立"（"SETUP"）到相应的"振铃"（"ALERTING"）消息之间的时间间隔。将这段时间除以所观察到的呼叫建立次数，即得该算术平均值（GSM 04.08，GSM 08.08）	GSMMeasurementType2
平均位置更新时长（meanTimeToLocationUpdate Service）	指对于 MS 改变地理位置所需的位置更新服务时间的算术平均值（单位：s）	累计在一个测量周期中，从"位置更新请求"（"LOCATION UPDATE REQUEST"）到相应的"位置更新接受"（"LOCATION UPDATING AC-CEPT"）消息之间的时间间隔。将这段时间除以位置更新请求次数，即得该算术平均值（GSM 04.08，GSM 08.08）	GSMMeasurementType2
平均通话时长（meanCallDuration）	指平均通话时长（单位：s）	累计在一个测量周期内，从"连接"（"CONNECT"）到相应的呼叫清除之间的时间间隔，将这段时间除以所观察到的呼叫应答次数，即得该算术平均值	GSMMeasurementType2
平均中继占用时长（meanTrunkSeizureDuration）	指中继线的平均占用时长（单位：s）	累计在一个测量周期内，从"地址完成消息"（"Address Complete Message"）到相应的呼叫清除之间的时间间隔，将这段时间除以所观察到的呼叫建立次数，即得该算术平均值	GSMMeasurementType2

c）MSC 处理器负载

cTelMscCurrentData 的处理器负载的测量属性见表 D.3。

表 D.3　cTelMscCurrentData 的处理器负载的测量属性

属性名	说　明	触发点	类　型
平均占用率（meanUsage）	指测量周期中，主处理器的平均使用率	无	GSMMeasurementType2
峰值占用率（peakUsage）	指测量周期中，主处理器的峰值使用率	无	GSMMeasurementType2
峰值出现时刻（peakTime）	指测量周期中，主处理器峰值出现的最后时刻	无	PeakTimeType
峰值时长（peakDuration）	主处理器处于峰值期间的持续时间（单位为 s，且缺省的 CPU 峰值使用率的门限值为 80%）	无	GSMMeasurementType1

D.2.2 智能业务性能测量

该任务由 *cTelSsfCurerntData* 的对象实例进行采集，收集与智能业务性能统计相关的信息。

cTelSsfCurerntData 的智能业务话务量的测量属性见表 D.4。

表 D.4 cTelSsfCurrentData 的智能业务话务量的测量属性

属性名	说 明	触发点	类 型
入 SSF 的智能呼叫次数（attIncomingCamelCallsToSSF）	指在一个测量周期中，SSF 接收到的智能呼叫次数	本地 MSC 从 BSC/GMSC/其他 MSC/ISDN/PSTN 收到"SETUP/IAM/I-AI"消息，且号码分析的结果表明主叫方或被叫方为 CAMEL 用户	GSMMeasurementType1
出 SSF 的智能呼叫次数（attOutgoingCamelCallsFromSSF）	指在一个测量周期中，SSF 提交给 SCF 的智能呼叫次数	从本 SSF 发送"InitialDP"消息给 SCF（DP2+DP12），其中主叫或被叫为 CAMEL 用户	GSMMeasurementType1
移动智能业务用户呼叫移动智能业务用户次数（attCamelToCamelCalls）	指在一个测量周期中，SSF 接收到的移动智能业务用户呼叫移动智能业务用户的试呼次数	本地 MSC 从 BSC/GMSC/其他 MSC/PSTN 收到"SETUP/IAM/IAI"，其中主叫和被叫均为 CAMEL 用户	GSMMeasurementType1
移动智能业务用户呼叫移动智能业务用户应答次数（answeredCamelToCamelCalls）	指在一个测量周期中，SSF 接收到的移动智能业务用户呼叫移动智能业务用户的呼叫中应答的次数	从 BSC/GMSC/其他 MSC/PSTN 收到"ANC/ANM/CON"消息，其中主叫和被叫均为 CAMEL 用户	GSMMeasurementType1
由于系统原因而不成功的智能呼叫次数（unsuccCamelCallsForSystemReason）	指在一个测量周期中，在提交给 SCF 的智能呼叫中，由于系统的原因，例如智能业务逻辑操作超时、被 SCF 丢弃，而引起智能呼叫处理失败的智能呼叫次数。	在 CAMEL 呼叫的建立阶段，业务逻辑操作超时，或从 SSF 收到由于系统原因的"ReleaseCall"消息	GSMMeasurementType1
由于用户原因而不成功的智能呼叫次数（unsuccCamelCallsForSubscriberReason）	指在一个测量周期中，在提交给 SCF 的智能呼叫中，由于用户的原因，例如用户输入非法、用户输入超时、用户输入错误、用户资费不够等，而引起智能呼叫处理失败的智能呼叫次数	在 CAMEL 呼叫建立阶段，从 SCF 收到"ReleaseCall"消息，其中的用户原因为不成功呼叫	GSMMeasurementType1
主叫话务量（camelOriginatingTrafficVolume）	指在一个测量周期中，由于移动智能业务用户作主叫而引起的应答话务量	累计在一个测量周期中，从"ANC/ANM/CON"到相应的呼叫清除之间的时间间隔，其中主叫为 CAMEL 用户。单位：Erl/s	GSMMeasurementType2
被叫话务量（camelTerminatingTrafficVolume）	指在一个测量周期中，由于移动智能业务用户作被叫而引起的应答话务量	累计在一个测量周期中，从"ANC/ANM/CON"到相应的呼叫清除的时间间隔，其中被叫为 CAMEL 用户。单位：Erl/s	GSMMeasurementType2
主叫通话平均时长（meanDurationOfCamelOriginatingCalls）	指在一个测量周期中，主叫为移动智能业务用户的通话的平均时长（单位：s）	累计在一个测量周期中，从"ANC/ANM/CON"到相应的呼叫清除的时间间隔，其中主叫为 CAMEL 用户。再将这段时间的最终结果除以应答的 CAMEL 始发呼叫的次数，得到呼叫平均时长	GSMMeasurementType2

表 D.4 （续）

属性名	说　明	触发点	类　型
被叫通话平均时长（meanDurationOfCamel TerminatingCalls）	指在一个测量周期中，被叫为移动智能业务用户的通话的平均时长（单位：s）	累计在一个测量周期中，从"ANC/ANM/CON"到相应的呼叫清除的时间间隔，其中被叫为CAMEL用户。再将这段时间的最终结果除以应答的CAMEL终结呼叫的次数，得到呼叫平均时长	GSMMeasurementType2
主叫试呼次数（attCamelOriginatingCalls）	指在一个测量周期中，主叫为移动智能业务用户的试呼次数	本地 MSC 从 BSC/GMSC/其他 MSC/PSTN（MO）收到"SETUP/I-AM/IAI"消息，其中主叫为CAMEL用户	GSMMeasurementType1
主叫占用次数（seizuredCamelOriginatingCalls）	指在一个测量周期中，主叫为移动智能业务用户的占用次数	本地 MSC 向 BSC（局内呼叫）/GMSC/其他 MSC/PSTN（MT）发送"SETUP/IAI/IAM"消息，其中主叫为 CAMEL 用户	GSMMeasurementType1
主叫接通次数（connectedCamelOriginatingCalls）	指在一个测量周期中，主叫为移动智能业务用户的接通次数	本地 MSC 从 BSC（局内呼叫）/GMSC/其他 MSC/PSTN（MT）收到"Alerting/ACM"消息，其中主叫为 CAMEL 用户	GSMMeasurementType1
主叫应答次数（answeredCamel OrigiantingCalls）	指在一个测量周期中，主叫为移动智能业务用户的应答次数	收到"ANC/ANM/CON"消息，其中主叫为 CAMEL 用户	GSMMeasurementType1
被叫试呼次数（attCamelTerminatingCalls）	指在一个测量周期中，被叫为移动智能业务用户的试呼次数	本地 MSC 从 BSC/GMSC/other MSC/PSTN（MO）收到"SETUP/IAM/IAI"消息，其中被叫为 CAMEL 用户	GSMMeasurementType1
被叫占用次数（seizuredCamelTerminatingCalls）	指在一个测量周期中，被叫为移动智能业务用户的占用次数	本地 MSC 向 BSC（局内呼叫）/GMSC/其他 MSC/PSTN（MT）发送"SETUP/IAI/IAM"消息，其中被叫为 CAMEL 用户	GSMMeasurementType1
被叫接通次数（connectedCamelTerminatingCalls）	指在一个测量周期中，被叫为移动智能业务用户的接通次数	本地 MSC 从 BSC（局内呼叫）/GMSC/其他 MSC/PSTN（MT）收到"Alerting/ACM"消息，其中被叫为 CAMEL 用户	GSMMeasurementType1
被叫应答次数（answeredCamel TerminatingCalls）	指在一个测量周期中，被叫为移动智能业务用户的应答次数	收到"ANC/ANM/CON"消息，其中被叫为 CAMEL 用户	GSMMeasurementType1
智能呼叫的占用次数（seizuredCamelCalls）	指在一个测量周期中，移动智能呼叫的占用次数（当主被叫均为移动智能业务用户时按一次占用次数计算）	本地 MSC 向 BSC/GMSC/其他 MSC/PSTN 发送"SETUP/IAI/ IAM"，其中主叫或被叫为 CAMEL 用户（seizuredCamelCalls = seizuredCamel OriginatingCalls + seizuredCamel TerminatingCalls 主叫和被叫均为 CAMEL 用户的呼叫占用次数）	GSMMeasurementType1

表 D.4 （续）

属性名	说　明	触发点	类　　型
智能呼叫的接通次数 （connectedCamelCalls）	指在一个测量周期中，移动智能呼叫的接通次数（当主被叫均为移动智能业务用户时按一次接通次数计算）	本地 MSC 从 BSC/GMSC/其他 MSC/PSTN 收到"Alerting/ACM"消息，其中主叫或被叫为 CAMEL 用户（ connectedCamelCalls = connectedCamelOriginatingCalls + connectedCamelTerminatingCalls 主叫和被叫均为 CAMEL 用户的呼叫接通次数）	GSMMeasurementType1
智能呼叫的应答次数 （answeredCamelCalls）	指在一个测量周期中，移动智能呼叫的应答次数（当主被叫均为移动智能业务用户时按一次应答次数计算）	收到"ANC/ANM/CON"消息，其中主叫或被叫为 CAMEL 用户（answeredCamelCalls = answered-CamelOriginatingCalls + answered-CamelTerminatingCalls 主叫和被叫均为 CAMEL 用户的呼叫应答次数）	GSMMeasurementType1
智能呼叫的应答话务量 （answeredCamelCallsTraffic Volume）	指在一个测量周期中，移动智能呼叫的应答话务量	累计在一个测量周期中，从"ANC/ANM/CON"到相应的呼叫清除的时间间隔，其中主叫或被叫为 CAMEL 用户。单位：Erl/s	GSMMeasurementType2
智能呼叫的接通话务量 （connectedCamelCallsTraffic Volume）	指在一个测量周期中，移动智能呼叫的接通话务量	累计在一个测量周期中，从"Alerting/ACM"到相应的呼叫清除的时间间隔，其中主叫或被叫为 CAMEL 用户。单位：Erl/s	GSMMeasurementType2
智能呼叫的占用话务量 （seizuredCamelCallsTraffic Volume）	指在一个测量周期中，移动智能呼叫的占用话务量	累计在一个测量周期中，从"SETUP/IAI/ IAM"到相应的呼叫清除的时间间隔，其中主叫或被叫为 CAMEL 用户。单位：Erl/s	GSMMeasurementType2
智能呼叫的用户早释次数 （callingPartyEarlyRelease CamelCalls）	指在一个测量周期中，移动智能呼叫的主叫用户早释次数	在呼叫建立阶段，在被叫振铃之前就从主叫方收到"Clear Request/ Clear Forward/REL"消息，其中主叫或被叫为 CAMEL 用户。当主叫和被叫均为 CAMEL 用户时，该计数器只能统计一次	GSMMeasurementType1
智能呼叫的振铃早释次数 （callingPartyRingingRelease CamelCalls）	指在一个测量周期中，移动智能呼叫的被叫振铃早释次数	在呼叫建立阶段，在被叫振铃之后而且是应答之前，就从主叫方收到"Clear Request /Clear Forward/ REL"消息，其中主叫或被叫为 CAMEL 用户。当主叫和被叫均为 CAMEL 用户时，该计数器只能统计一次	GSMMeasurementType1

表 D.4（续）

属性名	说　明	触发点	类　型
智能呼叫的被叫忙次数（calledPartyBusyCamelCalls）	指在一个测量周期中，智能呼叫的被叫忙次数	DP5+DP13-（DP5&DP13）（注：DP5&DP13 表示在一次呼叫中 DP5 和 DP13 同时计数的情况，即被叫忙，且主叫和被叫均为 CAMEL 用户）	GSMMeasurementType1
智能呼叫的久叫不应次数（calledPartyNoAnswerCamelCalls）	指在一个测量周期中，移动智能呼叫的被叫久叫不应次数	DP6+DP14-（DP6&DP14）（注：DP6&DP14 表示在一次计数中 DP6 和 DP14 同时计数的情况，即，被叫久叫不应，且主叫和被叫均为 CAMEL 用户）	GSMMeasurementType1
DP2 检测点的统计次数（dp2）	指"收集_信息"（Collected_Info）事件的出现次数		GSMMeasurementType1
DP4 检测点的统计次数（dp4）	指"路由_选择_故障"（Route_select_Failure）事件的出现次数		GSMMeasurementType1
DP5 检测点的统计次数（dp5）	指"发端_遇忙"（O_Busy）事件的出现次数		GSMMeasurementType1
DP6 检测点的统计次数（dp6）	指"发端_无应答"（O_No_Answer）事件的出现次数		GSMMeasurementType1
DP7 检测点的统计次数（dp7）	指"发端_应答"（O_Answer）事件的出现次数		GSMMeasurementType1
DP9 检测点的统计次数（dp9）	指"发端_拆线"（O_Disconnect）事件的出现次数		GSMMeasurementType1
DP10 检测点的统计次数（dp10）	指"发端_放弃"（O_Abandon）事件的出现次数		GSMMeasurementType1
DP12 检测点的统计次数（dp12）	指"终端_试呼_鉴权"（Terminiating_Attempting_Authorised）事件的出现次数		GSMMeasurementType1
DP13 检测点的统计次数（dp13）	指"终端_遇忙"（T_Busy）事件的出现次数		GSMMeasurementType1
DP14 检测点的统计次数（dp14）	指"终端_无应答"（T_No_Answer）事件的出现次数		GSMMeasurementType1
DP15 检测点的统计次数（dp15）	指"终端_应答"（T_Answer）事件的出现次数		GSMMeasurementType1
DP17 检测点的统计次数（dp17）	指"终端_拆线"（T_Disconnect）事件的出现次数		GSMMeasurementType1
DP18 检测点的统计次数（dp18）	指"终端_放弃"（T_Abandon）事件的出现次数		GSMMeasurementType1

D.2.3 交换性能测量参数

交换性能测量由 *cTelExchangeCurrentData* 的对象实例完成采集任务。该对象收集某个交换机的全部业务量性能数据。根据基于 ITU-T E.502 建议中的图 4/E.502，可得本标准的交换机话务量测量所采用移动话务流量图，如图 D.3 所示。

A 源话务	E 源出局话务	
B 终接话务	F 内部话务量	
C 出局话务	G 入局终接话务	
D 入局话务	H 转接话务	
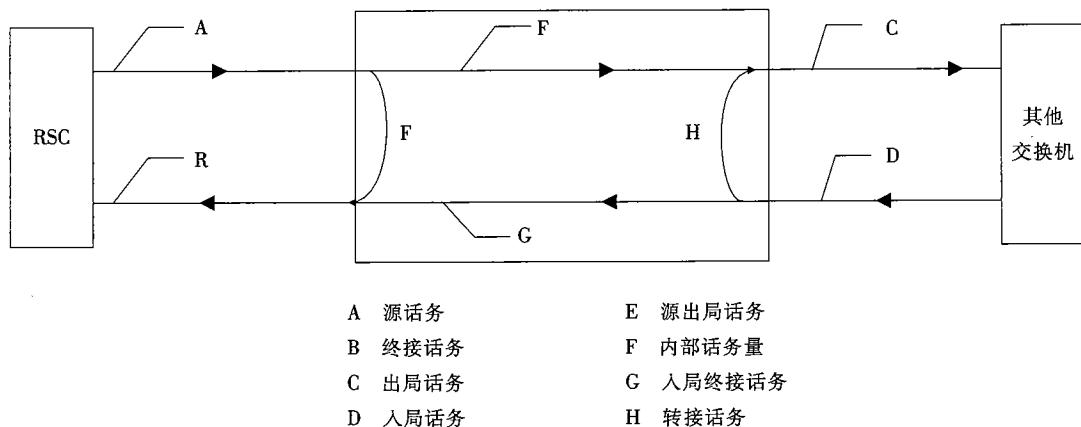
图 D.3 移动话务量流量图

在图 D.3 中，各方向话务流量应有下面的关系：

$$A = E + F + z1 \qquad B = F + G - d1$$
$$D = G + H + z2 \qquad C = E + H - d2$$

其中，$z1$ 和 $z2$ 表示未完成的呼叫或含有非法拨号信息的呼叫所产生的话务量，$d1$ 和 $d2$ 表示由于以下原因导致在交换机中呼叫失败而产生的话务量：

— 所有的电路均处于忙状态或不可用；

— 交换机内部阻塞；

— 拨号不完整；

— 非法的目的码；

— 服务被禁用或/和阻塞。

在该采集任务中，将监视 A~H 类型的话务量、交换机内部阻塞以及由于所有电路均忙而产生的阻塞。*cTelExchangeCurrentData* 的话务量性能统计的测量属性见表 D.5。

表 D.5 cTelExchangeCurrentData 的话务量性能统计的测量属性

属性名		描 述	触发点	类 型
始发呼叫	始发试呼次数 (attMobileOriginatingCalls)	指交换机中始发呼叫的试呼次数	从 BSC 收到 "SETUP" 消息	GSMMeasurementType1
	始发呼通次数 (succMobileOriginatingCalls)	指交换机中成功的始发呼叫次数	向 BSC (MO) 发送 "ALERTING" 消息	GSMMeasurementType1
	始发应答数 (ansMobileOriginatingCalls)	指有应答的交换机始发呼叫次数	向 BSC (MO) 发送 "CONNECT" 消息	GSMMeasurementType1
	始发呼叫各失败原因统计次数 (failReasonForMobile OriginatingCalls)	指由各种原因分别产生的始发呼叫失败次数[a]		GSMMeasurementType5

表 D.5（续）

属性名		描　述	触发点	类　型
始发呼叫	始发试呼话务量（seizureTraffic VolumeForMobileOriginatingCalls）	指交换机始发试呼所产生的话务量	累计在一个测量周期中，统计从收到 MO 的 "SETUP" 消息到呼叫清除的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08）	GSMMeasurementType2
	始发呼通话务量（succTraffic VolumeForMobileOriginatingCalls）	指交换机始发呼叫成功所产生的话务量	累计在一测量周期中，统计从向 MO 发送 "ALERTING" 消息到呼叫释放的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08）	GSMMeasurementType2
	始发应答话务量 ansTrafficVolume ForMobileOriginatingCalls	指由应答交换机始发呼叫所产生的话务量	累计在一个测量周期中，统计从向 MO 发送 "CONNECT" 到呼叫释放的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08）	GSMMeasurementType2
内部呼叫	本 MSC 试呼次数（attLocalCalls）	指交换机内部呼叫的试呼次数	从 BSC 收到 "SETUP" 消息后，在向 HLR 取路由信息后判定该呼叫为本 MSC 局内呼叫	GSMMeasurementType1
	本 MSC 呼通次数（succLocalCalls）	指交换机内部呼叫的成功次数	当呼叫为本 MSC 局内呼叫时，向 BSC（MO）发送 "ALTERING" 消息	GSMMeasurementType1
	本 MSC 应答次数（ansLocalCalls）	指交换机内部呼叫的中有应答的次数	当呼叫为本 MSC 局内呼叫时，向 BSC（MO）发送 "CONNECT" 消息	GSMMeasurementType1
	本 MSC 呼叫各失败原因统计次数（failReasonForLocalCalls）	指由各种原因分别产生的内部呼叫失败次数[注 a]		GSMMeasurementType5
	本 MSC 试呼话务量（seizureTrafficVolumeForLocal Calls）	指交换机内部试呼所产生的话务量	累计在一个测量周期中，对于本 MSC 的局内呼叫，从收到 MO 的 "SETUP" 消息到呼叫释放的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08）	GSMMeasurementType2
	本 MSC 呼通话务量（succTrafficVolumeForLocalCalls）	指交换机内部呼叫成功所产生的话务量	累计在一个测量周期中，对于本 MSC 的局内呼叫，从向 MO 发送 "ALERTING" 消息到呼叫释放的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08）	GSMMeasurementType2
	本 MSC 应答话务量（ansTraffic VolumeForLocalCalls）	指由应答交换机内部呼叫所产生的话务量	累计在一个测量周期中，对于本 MSC 的局内呼叫，从向 MO 发送 "CONNECT" 到呼叫释放的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08）	GSMMeasurementType2

表 D.5（续）

属性名		描　述	触发点	类　型
终接呼叫	终接试呼次数（attMobileTerminatingCalls）	指交换机中终接呼叫的试呼次数	向 BSC（MT）发送"SETUP"消息	GSMMeasurementType1
	终接呼通次数（succMobileTerminatingCalls）	指交换机中终接呼叫的成功次数	从 BSC（MT）收到"ALERTING"消息	GSMMeasurementType1
	终接应答次数（ansMobileTerminatingCalls）	指交换机中终接呼叫的应答次数	从 BSC（MT）收到"CONNECT"消息	GSMMeasurementType1
	终接呼叫各失败原因统计次数（failReasonForMobileTerminatingCalls）	指由各种原因分别产生的终接呼叫失败次数[注a]		GSMMeasurementType5
	终接试呼话务量（seizureTrafficVolumeForMobileTerminatingCalls）	指交换机终接试呼所产生的话务量	累计在一个测量周期中，从"向 MT 发送"SETUP"到呼叫释放的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08）	GSMMeasurementType2
	终接呼通话务量（succTrafficVolumeForMobileTerminatingCalls）	指交换机终接呼叫成功所产生的话务量	累计在一个测量周期中，从 MT 接收"ALERTING"消息到呼叫释放的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08）	GSMMeasurementType2
	终接应答话务量（ansTrafficVolumeForMobileTerminatingCalls）	指由应答交换机终接呼叫所产生的话务量	累计在一个测量周期中，从 MT 收到"CONNECT"消息到呼叫释放的时间间隔。单位：Erl/s（GSM 04.08, GSM 08.08 ）	GSMMeasurementType2
入局呼叫	入局试呼次数（attIncomingCalls）	指交换机的入局试呼次数	从始发局（或转接局）收到 IAI 或 IAM 消息	GSMMeasurementType1
	入局呼通次数（succIncomingCalls）	指交换机的入局呼叫成功次数	向始发局发送 ACM 消息	GSMMeasurementType1
	入局应答次数（ansIncomingCalls）	指有应答的交换机入局呼叫次数	向始发局发送应答信号（ANM/ANC/ANN）	GSMMeasurementType1
	入局呼叫各失败原因统计次数（failReasonForIncomingCalls）	指由各种原因分别产生的入局呼叫失败次数[注a]		GSMMeasurementType5
	入局试呼话务量（seizureTrafficVolumeForIncomingCalls）	指交换机入局试呼所产生的话务量	累计在一个测量周期中，从收到 IAI/IAM 消息到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2
	入局呼通话务量（succTrafficVolumeForIncomingCalls）	指交换机入局呼叫成功所产生的话务量	累计在一个测量周期中，从发送 ACM 消息到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2
	入局应答话务量（ansTrafficVolumeForIncomingCalls）	指由应答交换机入局呼叫所产生的话务量	累计在一个测量周期中，从发送应答信号到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2

表 D.5（续）

属性名		描 述	触发点	类 型
出局呼叫	出局试呼次数（attOutgoingCalls）	指交换机的出局试呼次数	发送 IAI 或 IAM 消息	GSMMeasurementType1
	出局呼通次数（succOutgoingCalls）	指交换机的出局呼叫成功次数	收到 ACM 消息	GSMMeasurementType1
	出局应答次数（ansOutgoingCalls）	指有应答的交换机出局呼叫次数	收到应答信号（ANM/ANC/ANN）	GSMMeasurementType1
	出局呼叫各失败原因统计次数（failReasonForOutgoingCalls）	指由各种原因分别产生的出局呼叫失败次数^{注 a}		GSMMeasurementType5
	出局试呼话务量（seizureTrafficVolumeForOutgoingCalls）	指交换机出局试呼所产生的话务量	累计在一个测量周期中，从发送 IAI/IAM 到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2
	出局呼通话务量（succTrafficVolumeForOutgoingCalls）	指交换机出局呼叫成功所产生的话务量	累计在一个测量周期中，从收到 ACM 到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2
	出局应答话务量（ansTrafficVolumeForOutgoingCalls）	指由应答交换机出局呼叫所产生的话务量	累计在一个测量周期中，从收到应答信号到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2
转接呼叫	转接试呼次数（attTransitCalls）	指交换机中的转接呼叫的试呼次数	在收到 IAI/IAM 入局试呼消息中，经号码分析后为转接呼叫	GSMMeasurementType1
	转接呼通次数（succTransitCalls）	指交换机中的转接呼叫的成功次数（成功占用）	MSC 收到落地局的 ACM 消息后，向始发局转发 ACM 消息	GSMMeasurementType1
	转接应答次数（ansTransitCalls）	指有应答的交换机中转移呼叫的次数	MSC 收到落地局的应答信号后，向始发局转发应答消息	GSMMeasurementType1
	转接呼叫各失败原因统计次数（failReasonForTransitCalls）	指由各种原因分别产生的转接呼叫失败次数^{注 a}		GSMMeasurementType5
	转接试呼话务量（seizureTrafficVolumeForTransitCalls）	指交换机转接试呼所产生的话务量		GSMMeasurementType2
	转接呼通话务量（succTrafficVolumeForTransitCalls）	指交换机转接呼叫成功所产生的话务量		GSMMeasurementType2
	转接应答话务量（ansTrafficVolumeForTransitCalls）	指由应答交换机转接呼叫所产生的话务量		GSMMeasurementType2
始发出局呼叫	始发出局试呼次数（attOriginatingOutgoingCalls）	指交换机中的始发出局呼叫的试呼次数	从 MO 收到 SETUP 消息后，在向 HLR 取路由信息后判定该呼叫为出局呼叫	GSMMeasurementType1
	始发出局呼通次数（succOriginatingOutgoingCalls）	指交换机中的始发出局呼叫的成功次数（成功占用）	当呼叫为始发出局呼叫时，向 BSC（MO）发送 "ALTERING" 消息	GSMMeasurementType1
	始发出局应答次数（ansOriginatingOutgoingCalls）	指有应答的交换机中始发出局呼叫的次数	当呼叫为始发出局呼叫时，向 BSC（MO）发送 "CONNECT" 消息	GSMMeasurementType1

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表 D.5（续）

	属性名	描 述	触发点	类 型
始发出局呼叫	始发出局各失败原因统计次数（failReasonForOriginatingOutgoingCalls）	指由各种原因分别产生的始发出局呼叫失败次数[a]		GSMMeasurementType5
	始发出局试呼话务量（seizureTrafficVolumeForOriginatingOutgoingCalls）	指交换机始发出局试呼所产生的话务量	累计在一个测量周期中，从 MO 收到 SETUP 消息到呼叫清除的时间间隔。单位：Erl/s	GSMMeasurementType2
	始发出局呼通话务量（succTrafficVolumeForOriginatingOutgoingCalls）	指交换机始发出局呼叫成功所产生的话务量	累计在一个测量周期中，从向 MO 发送 ALTERING 消息到呼叫清除的时间间隔。单位：Erl/s	GSMMeasurementType2
	始发出局应答话务量（ansTrafficVolumeForOriginatingOutgoingCalls）	指由应答交换机始发出局呼叫所产生的话务量	累计在一个测量周期中，从向 MO 发送 CONNECT 到呼叫清除的时间间隔。单位：Erl/s	GSMMeasurementType2
终接入局呼叫	终接入局试呼次数（attIncomingTerminatingCalls）	指交换机中的终接入局呼叫的试呼次数	MSC 收到 IAL/IAM 消息，做被叫号码分析后，确定为终接呼叫	GSMMeasurementType1
	终接入局呼通次数（succIncomingTerminatingCalls）	指交换机中的终接入局呼叫的成功次数（成功占用）	（当呼叫为终结入局呼叫时）向始发局发送 ACM 消息	GSMMeasurementType1
	终接入局应答次数（ansIncomingTerminatingCalls）	指有应答的交换机中终接入局呼叫的次数	（当呼叫为终结入局呼叫时）向始发局发送应答信号（ANM/ANC/ANN）	GSMMeasurementType1
	终接入局各失败原因统计次数（failReasonForIncomingTerminatingCalls）	指由各种原因分别产生的终接入局呼叫失败次数[a]		GSMMeasurementType5
	终接入局试呼话务量（seizureTrafficVolumeForIncomingTerminatingCalls）	指交换机终接入局试呼所产生的话务量	累计在一个测量周期中，从接收到 IAL/IAM 消息到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2
	终接入局呼通话务量（succTrafficVolumeForIncomingTerminatingCalls）	指交换机终接入局呼叫成功所产生的话务量	累计在一个测量周期中，从发送 ACM 消息到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2
	终接入局应答话务量（ansTrafficVolumeForIncomingTerminatingCalls）	指由应答交换机终接入局呼叫所产生的话务量	累计在一个测量周期中，从发送应答信号到呼叫释放的时间间隔。单位：Erl/s	GSMMeasurementType2
	内部保护阻塞次数（callsBlockedByLoadShedding）	统计由于交换机内部保护机制而阻塞的试呼次数		GSMMeasurementType1
	内部阻塞话务量（internalCongestionTrafficVolume）	由于交换机内部拥塞而阻塞呼叫所产生的话务量		GSMMeasurementType2
	中继阻塞话务量（blockedTrafficVolumeBecauseOfTrunkBusy）	由出局电路忙而阻塞的呼叫所产生的话务量		GSMMeasurementType2

注 a：必须计算由以下原因引起的失败呼叫：（被叫应答前）
　　—无中继线所引起的呼叫阻塞；
　　—交换机内部阻塞引起的呼叫阻塞；
　　—异常释放。

D.2.4 被观测小区切换性能测量参数

由 *cTelObservedHandoverCurrentData* 的对象实例对每一个被观测的小区收集到另一个相邻的源小区或目的小区的切换消息。在测量任务初始化时，需给出被观测的小区和源小区（或目的小区）的标识。

cTelObservedHandoverCurrentData 被观测小区切换测量的属性见表 D.6。

表 D.6 cTelObservedHandoverCurrentData 被观测小区切换测量的属性

属性名	说　明	触发点	类　型
MSC 内从指定相邻小区切换到被观测小区的尝试次数（attIncomingExternalIntraMSCHDOsPerOriginatingCell）	指在同一 MSC 范围内，由该 MSC 控制的某个指定相邻小区切换到被观测小区的尝试次数	向 BSC 发送切换请求 "HANDOVER REQUEST" 消息（GSM 08.08）	GSMMeasurementType1
MSC 内从指定相邻小区切换到被观测小区的成功次数（succIncomingExternalIntraMSCHDOsPerOriginatingCell）	指在同一 MSC 范围内，由该 MSC 控制的某个指定相邻小区切换到被观测小区的成功次数	从 BSC 收到切换完成 "HANDOVER COMPLETE" 消息（GSM 08.08）	GSMMeasurementType1
MSC 内从被观测小区切换到指定相邻小区的尝试次数（attOutgoingExternalIntraMSCHDOsPerTargetCell）	指在同一 MSC 范围内，从被观测小区切换到由该 MSC 控制的某个指定相邻小区的尝试次数	从 BSC 收到 "HANDOVER REQUIRED" 消息（GSM 08.08）	GSMMeasurementType1
MSC 内从被观测小区切换到指定相邻小区的成功次数（succOutgoingExternalIntraMSCHDOsPerTargetCell）	指在同一 MSC 范围内，从被观测小区切换到由该 MSC 控制的某个指定相邻小区的成功次数。详细的信息可以参考 GSM 04.08、08.08 和 08.58	完成对所涉及信道的释放过程	GSMMeasurementType1
MSC 间从指定相邻小区切换到被观测小区的尝试次数（attIncomingInterMSCHDOsPerOriginatingCell）	指在不同的 MSC 之间，由另一个 MSC 控制的某个指定相邻小区切换到被观测小区的尝试次数	收到 "MAP_PREPARE_HANDOVER" 服务指示，其中的目的小区标识符为被观测的小区（GSM 09.02）	GSMMeasurementType1
MSC 间从指定相邻小区切换到被观测小区的尝试次数（succIncomingInterMSCHDOsPerOriginatingCell）	指在不同的 MSC 之间，由另一个 MSC 控制的某个指定相邻小区切换到被观测小区的成功次数	收到 "MAP_SEND_END_SIGNAL" 服务确认（GSM 09.02）	GSMMeasurementType1
MSC 间从指定相邻小区切换到被观测小区的尝试次数（attOutgoingInterMSCHDOsPerTargetCell）	指在不同的 MSC 之间，从被观测小区切换到由另一个 MSC 控制的某个指定相邻小区的尝试次数	发送 "MAP_PREPARE_HANDOVER") 服务请求（GSM 09.02）	GSMMeasurementType1
MSC 间从指定相邻小区切换到被观测小区的尝试次数（succOutgoingInterMSCHDOsPerTargetCell）	指在不同的 MSC 之间，从被观测小区切换到由另一个 MSC 控制的某个指定相邻小区的成功次数	发送 "MAP_SEND_END_SIGNAL" 服务响应（GSM 09.02）	GSMMeasurementType1

D.2.5 目的码性能测量参数

由 *cTelObservedDestinationCurrentData* 的对象实例收集一个被观察目的地的业务量性能数据。

cTelObservedDestinationCurrentData 的性能测量属性见表 D.7。

表 D.7 cTelObservedDestinationCurrentData 的性能测量属性

属性名	描　述	触发点	类　型
去话试呼次数 （bids）	指对所观察目的码的试呼次数，受网络管理控制影响的呼叫不包括在内	收到 BSC 发来的 "SETUP" 消息	GSMMeasurementType1
去话占用次数 （outgoingSeizures）	指对所观测目的码的成功占用次数	向 BSC 发送 "ALERTING" 消息	GSMMeasurementType1
去话应答次数 （answeredOutgoingSeizures）	指在从本局到所观测目的码的占用中，收到应答信号的次数	向 BSC 发送 "CONNECT" 消息	GSMMeasurementType1
无可用电路次数 （noCircuitsAvailable）	指由于无空闲电路而导致被观察目的码不可达的不成功次数。比如，到目的地的最后一个电路子群溢出。一般来说，noCircuitsAvailable 的值小于等于 bids 减去 outgoingSeizures 的值	无	GSMMeasurementType1
占用话务量 （seizureTrafficVolume）	指对被观测地点的占用业务量	累计在一个测量周期段内，从发送 "ALERTING" 到相应的呼叫清除之间的时间间隔。单位：Erl/s （GSM 04.08, GSM 08.08）	GSMMeasurementType2
应答话务量 （answerTrafficVolume）	指对被观测地点的应答业务量	累计在一个测量周期段内，从发送 "CONNECT" 到相应的呼叫释放之间的时间间隔。单位：Erl/s （GSM 04.08, GSM 08.08）	GSMMeasurementType2

D.2.6 电路终端点子群性能测量参数

由 *cTelcircuitEndpointSubGroupCurrentData* 的对象实例收集被监测电路终端点子群的话务量测量数据。

cTelcircuitEndpointSubGroupCurrentData 性能测量属性见表 D.8。

表 D.8 cTelCircuitEndPointCurrentData 的性能测量属性

属性名	说　明	触发点	类　型
来话试呼次数 （incomingBids）	指对电路子群中电路的尝试占用次数，该值对于单向入或双向电路子群是有效的，它包括实施网络管理控制之前的试呼，被网络管理控制或类型控制所禁止的试呼不包括在内	接收到 IAI/IAM 消息	GSMMeasurementType1

表 D.8（续）

属性名	说　明	触发点	类　型
去话试呼次数 （outgoingBids）	指对电路子群中电路的尝试占用次数，该值对于单向出或双向电路子群有效，它包括实施网络管理控制之前的试呼，被网络管理控制或类型控制所禁止的试呼不包括在内。	发送 IAI/IAM 消息	GSMMeasurementType1
来话占用次数 （incomingSeizures）	指对电路子群的入局呼叫的成功占用次数，该值对于单向入和双向电路子群有效	发送 ACM 消息	GSMMeasurementType1
去话占用次数 （outgoingSeizures）	指对电路子群的出局呼叫的成功占用次数，该值对于单向出和双向电路子群有效	接收 ACM 消息	GSMMeasurementType1
去话应答次数 （answeredOutgoingSeizures）	指出局占用中收到应答信号的次数，该值对于单向出或双向电路子群有效	接收应答信号（ANM/ANC/ANN）	GSMMeasurementType1
来话应答次数 （answeredIncomingSeizures）	指入局占用中收到应答信号的次数，该值对于单向入或双向电路子群有效	发送应答信号（ANM/ANC/ANN）	GSMMeasurementType1
来话溢出次数 （incomingBidsOverflow）	指从该电路子群溢出的入局呼叫的次数，该值对于单向入或双向电路子群有效	无	GSMMeasurementType1
去话溢出次数 （outgoingBidsOverflow）	指从该电路子群溢出的出局呼叫的次数，该值对于单向出或双向电路子群有效	无	GSMMeasurementType1
来话总话务量 （incomingTrafficVolume）	以 Erl/s 为单位统计入局话务量，该值对于单向入或双向电路子群有效，一般通过采样方法获得	累计在一个测量周期内，从发送被叫应答消息到相应的呼叫释放之间的时间间隔。单位：Erl/s	GSMMeasurementType2
去话总话务量 （outgoingTrafficVolume）	以 Erl/s 为单位统计出局话务量，该值对于单向入或双向电路子群有效，一般通过采样方法获得	累计在一个测量周期内，从接收被叫应答消息到相应的呼叫释放之间的时间间隔。单位：Erl/s	GSMMeasurementType2
可用电路数 （numberOfAvailCircuits）	指可以承载话务的电路数，包括当前正在承载话务的电路。该值对于单向出、单向入或双向电路子群均有效，在实现时可以根据电路的频率改变快慢来决定采用快照法或平均值，两种方法是等效的	无	GSMMeasurementType1

D.2.7 信令链路组性能测量参数

由 *cTelSignallingLinkSetTPCurrentData* 的对象实例提供 signallingLinkSetTP 的性能数据，包括业务量统计。

cTelSignallingLinkSetTPCurrentData 的业务量的测量属性见表 D.9。

表 D.9 cTelSignallingLinkSetTPCurrentData 的业务量的测量属性

属性名	说 明	触发点	类 型
闭塞信令链路总数 (blockedSignallingLinks)	指不能用于业务流的信令链路数，在实现时可以根据电路的频率改变快慢来决定采用快照法或平均值，两种方法是等效的	无	GSMMeasurementType1
信令链路闭塞次数 (signallingLinkBlockedTimes)	指在测量周期内，该信令链路组中信令链路的阻塞次数		GSMMeasurementType1
信令链路总话务量 (signallingLinkSetTPTrafficVolume)	指信令链路组所承载的业务量		GSMMeasurementType2

D.2.8 VLR 性能测量参数

由 *cTelVlrCurrentData* 的对象实例提供和 VLR 相关的性能信息，包括对以下各项的统计数据：

— 寻呼；

— 鉴权；

— 位置更新；

— 用户数；

— 处理器负载。

a）VLR 性能统计

cTelVlrCurrentData 性能统计的测量属性见表 D.10。

表 D.10 cTelVlrCurrentData 的 VLR 性能统计的测量属性

属性名	说 明	触发点	类 型
向 PVLR 请求身份识别的尝试次数（attIdentificationReqToPVLRs）	指当用户重新在该 VLR 登记时向前一 VLR 请求身份识别信息的尝试次数	发送 "MAP 发送身份识别"（"MAP_SEND_IDENTIFICATION"）服务请求（GSM 09.02）	GSMMeasurementType1
向 PVLR 请求身份识别的成功次数（succIdentificationReqToPVLRs）	指当用户重新在该 VLR 登记时向前一 VLR 请求身份识别信息的成功次数	收到不含"用户错误"（"user error"）参数值的 "MAP 发送身份识别"（"MAP_SEND_IDENTIFICATION"）服务证实（GSM 09.02）	GSMMeasurementType1
寻呼请求尝试次数 (attPageReqs)	指寻呼请求的尝试次数	发送 "MAP 寻呼"（"MAP_PAGE"）服务请求（GSM 09.02）	GSMMeasurementType1
寻呼请求成功次数 (succPageReqs)	指寻呼请求的成功次数	收到不含 "用户错误"（"user error"）参数值的 "MAP 寻呼"（"MAP_PAGE"）服务证实（GSM 09.02）	GSMMeasurementType1

表 D.10（续）

属性名	说　明	触发点	类　型
每位置区的寻呼请求尝试次数（attPageReqsPerLocation Area）	Provides the number of page requests per Location Area（these are counted as attempts） 指按每个位置区所统计的寻呼请求的尝试次数	发送"MAP 寻呼"（"MAP_PAGE"）服务请求（GSM 09.02）	GSMMeasurementType6
每位置区的寻呼请求成功次数（succPageReqsPerLocation Area）	指按每个位置区所统计的寻呼请求的成功次数	收到不含"用户错误"（"user error"）参数值的"MAP 寻呼"（"MAP_PAGE"）服务证实（GSM 09.02 ）	GSMMeasurementType6
身份验证请求 VLR-HLR 的尝试次数（attReqForAuthSets SentToHLR）	指 VLR 发给 HLR 的鉴权集请求的尝试次数	发送 "MAP 发送鉴权信息"（"MAP_SEND_AUTHENTICATION_INFO"）服务请求，请求鉴权集。参数中含有"鉴权集种类"（"AuthenticationSetKind"，GSM 09.02）	GSMMeasurementType1
身份验证请求 VLR-HLR 的成功次数（succReceivedAuth SetsFromHLR）	指 VLR 的鉴权集请求得到 HLR 响应的成功次数	收到 "MAP 发送鉴权信息"（"MAP_SEND_AUTHENTICATION_INFO"）服务确认，其中含有所请求的鉴权集参数，包含"鉴权集列表"（"Authentication-SetList"，GSM 09.02）	GSMMeasurementType1
身份验证请求 VLR-HLR 的空响应次数（emptyResponses ForAuthFromHLR）	指 VLR 的鉴权集请求得到 HLR 空响应的次数（即 VLR 必须使用旧的鉴权集信息）	收到 "MAP 发送鉴权信息"（"MAP_SEND_AUTHENTICATION_INFO"）服务确认，其中不含鉴权集	GSMMeasurementType1
发给 MSC 的鉴权请求尝试次数（attAuthProcsInVLR）	指 VLR 发给 MSC 的鉴权请求的尝试次数	发送 "ＭＡＰ 鉴权"（"MAP_AUTHENTICATE"）服务请求（GSM 09.02）	GSMMeasurementType1
发给 MSC 的鉴权请求成功次数（succAuthProcsInVLR）	指 VLR 发给 MSC 的鉴权请求的成功次数	收到 "ＭＡＰ 鉴权"（"MAP_AUTHENTICATE"）服务确认，其中收到的 SRES 参数值和存贮在位置寄存器中的值一致（GSM 09.02）	GSMMeasurementType1
VLR 内的位置更新尝试次数（attIntraVLRLocationUpdates）	指在同一 VLR 范围内的不同位置区之间进行位置更新的尝试次数	收到"MAP 更新位置区"（"MAP_UPDATE_LOCATION_AREA"）服务指示，其中前一个位置区标识符参数所指位置区与现在的在同一个 VLR 中（GSM 09.02）	GSMMeasurementType1

表 D.10（续）

属性名	说　明	触发点	类　型
VLR 内的位置更新成功次数（succIntraVLRLocationUpdates）	指在同一 VLR 范围内的不同位置区之间进行位置更新的成功次数	对于 VLR 内部的位置更新尝试请求，发送不含"用户错误"（"user error"）参数值的"MAP更新位置区"（"MAP_UP-DATE_LOCATION_AREA"）服务响应（GSM 09.02）	GSMMeasurementType1
VLR 间的位置更新尝试次数（attInterVLRLocationUpdates）	指在不同的 VLR 范围内的位置区之间进行位置更新的尝试次数	收到"MAP 更新位置区"（"MAP_UPDATE_LOCATION_AREA"）服务指示，其中前一个位置区标识符参数所指位置区与现在的不在同一个 VLR 中（GSM 09.02）	GSMMeasurementType1
VLR 间的位置更新成功次数（succInterVLRLocationUpdates）	指在不同的 VLR 范围内的位置区之间进行位置更新的成功次数	对于 VLR 间的位置更新尝试请求，发送不含"用户错误"（"user error"）参数值的"MAP更新位置区"（"MAP_UPDATE_LOCATION_AREA"）服务响应（GSM 09.02）	GSMMeasurementType1
VLR 漫游用户总数（nbrOfVisitorsInVLR）	从其他地区漫游来的用户总数		GSMMeasurementType1
VLR 用户总数（nbrOfCurrentSubscriberInVLR）	指当前 VLR 中的用户数	无	GSMMeasurementType1
VLR 申请 MSRN 号码的次数（attReqsForMSRNFromHLR）	指来自 HLR 的请求 MSRN 的尝试次数	收到"MAP 提供漫游号码"（"MAP_PROVIDE_ROAMING_NUMBER"）服务请求（GSM 09.02）	GSMMeasurementType1
VLR 申请 MSRN 号码的失败次数（unsuccRepsForMSRNToHLR）	指向 HLR 发送的分配 MSRN 的不成功响应次数	发送含有"用户错误"（"user error"）参数值的"MAP 提供漫游号码"（"MAP_PROVIDE_ROAMING_NUMBER"）的业务确认（GSM 09.02）	GSMMeasurementType1
HLR 请求加入用户数据的次数（attInsertSubDataServiceFromHLR）	指从 HLR 发来的插入用户数据请求的尝试次数	收到"MAP 插入用户数据"（"MAP_INSERT_SUBSCRIBER_DATA"）服务请求（GSM 09.02）	GSMMeasurementType1
HLR 请求加入用户数据的失败次数（unsuccInsertSubDataServiceToHLR）	指从 HLR 发来的插入用户数据请求的不成功次数	发送含有"用户错误"（"user error"）参数值的"MAP 插入用户数据"（"MAP_INSERT_SUBSCRIBER_DATA"）服务指示（GSM 09.02）	GSMMeasurementType1

b）VLR 处理器负载

cTelVlrCurrentData 的 VLR 处理器负载的测量属性见表 D.1。

表 D.11　cTelVlrCurrentData 的 VLR 处理器负载的测量属性

属性名	说　明	触发点	类　型
平均占用率（meanUsage）	指测量周期中，主处理器的平均使用率	无	GSMMeasurementType2
峰值占用率（peakUsage）	指测量周期中，主处理器的峰值使用率	无	GSMMeasurementType2
峰值出现时刻（peakTime）	指测量周期中，主处理器峰值出现的最后时刻	无	PeakTimeType
峰值时长（peakDuration）	主处理器处于峰值期间的持续时间（单位为 s，且缺省的 CPU 峰值使用率的门限值为 80%）	无	GSMMeasurementType1

D.2.9　HLR 性能测量参数

由 *cTelHlrCurrentData* 的对象实例收集和 HLR 相关的性能数据，包括以下的统计数据：

— 漫游用户数；

— 鉴权；

— 位置更新；

— 附加业务处理；

— 对 MSC 的查询；

— 处理器负载。

a）HLR 性能统计

cTelHlrCurrentData 的 HLR 性能统计的测量属性见表 D.12。

表 D.12　cTelHlrCurrentData 的 HLR 性能统计的测量属性

属性名	说　明	触发点	类　型
发送警告尝试次数（attNbrOfSendAlerts）	指发送"发送警告"的尝试次数	发送"MAP 告警服务中心"（"MAP_ALERT_SERVICE_CENTRE"）服务请求（GSM 09.02）	GSMMeasurementType1
发送警告成功次数（succNbrOfSendAlerts）	指发送"发送警告"的成功次数	收到"MAP 告警服务中心"（"MAP_ALERT_SERVICE_CENTRE"）服务确认，其中不含有"用户错误"（"user error"）参数值（GSM 09.02）	GSMMeasurementType1
漫游出本 HLR 的用户数（nbrOfCurrentMSsRoamingOutsideHLR）	指漫游出本 HLR 的用户数		GSMMeasurementType1

表 D.12（续）

属性名	说　明	触发点	类　型
从 VLR 收到的身份验证请求的尝试次数（attReqForAuth SetsReceivedByHLRFromVLRs）	指 HLR 收到的从 VLR 发出的鉴权集请求的尝试次数	收到请求鉴权集的"MAP 发送鉴权信息"（"MAP_SEND_AUTHEN TICATION_INFO"）服务指示，其中含有参数"鉴权集种类"（"AuthenticationSetKind"，GSM 09.02）	GSMMeasurementType1
成功返回给 VLR 的身份验证请求次数（succReturned AuthSetsFromHLRToVLRs）	指从 HLR 发送给 VLR 的鉴权请求的成功返回次数	发送包含鉴权集信息的"MAP 发送鉴权信息"（"MAP_SEND_ AUTHENTICATION_INFO"）服务响应（其中含有参数"鉴权集列表"（"AuthenticationSetList"，GSM 09.02）	GSMMeasurementType1
对 VLR 的身份验证请求返回空响应的次数（empty ResponsesForAuthSetsFromH LRToVLRs）	指对 VLR 的鉴权集请求进行空响应的次数（即 VLR 仍需使用旧的鉴权集）	发送不含鉴权集信息的"MAP 发送鉴权信息"（"MAP_SEND_ AUTHENTICATION_INFO"）服务响应（GSM 09.02）	GSMMeasurementType1
向 VLR 发送插入用户请求的次数（attInsertSubData Service）	指向 VLR 发出插入用户数据请求的尝试次数	发送"MAP 插入用户数据"（"MAP_INSERT_SUBSCRIBER_ ATA"）服务请求（GSM 09.02）	GSMMeasurementType1
向 VLR 发送插入用户请求的成功次数（succInsertSub DataService）	指向 VLR 发出插入用户数据请求的成功次数	收到不含"用户错误"（"user error"）参数值的"MAP 插入用户数据"（"MAP_INSERT_SUB-SCRIBER_DATA"）服务响应（GSM 09.02）	GSMMeasurementType1
位置更新的尝试次数（attLocationUpdate）	指要由 HLR 执行的位置更新的尝试次数，如 VLR 发生变化	收到"MAP 更新位置"（"MAP_UPDATE_LOCATION"）服务指示（GSM 09.02）	GSMMeasurementType1
位置更新的成功次数（succLocationUpdate）	指由 HLR 执行的位置更新的成功次数，如 VLR 发生变化	发送不含"用户错误"（"user error"）参数值的"MAP 更新位置"（"MAP_UPDATE_LOCATION"）服务响应（GSM 09.02）	GSMMeasurementType1
与附加业务相关的操作尝试次数（attSSRelatedOperations InHLR）	指 HLR 中与附加业务相关的操作的尝试次数	收到 HLR 中下列操作的 MAP 服务指示：注册附加服务，删除附加服务，激活附加服务，去活附加服务，注册口令，查询附加服务，处理附加请求（registerSS，eraseSS，activateSS，deactivateSS，registerPassword，interrogateSS 或 processSSrequest，GSM 09.02）	GSMMeasurementType4

表 D.12（续）

属性名	说　明	触发点	类　型
与附加业务相关的操作成功次数（succSSRelatedOperations InHLR）	指 HLR 中与附加业务相关的操作的成功次数	发送参数值中不含"用户错误"（"user error"）的下列 MAP 服务操作的响应：注册附加服务，删除附加服务，激活附加服务，去活附加服务，注册口令，查询附加服务，处理附加请求（registerSS，eraseSS，activateSS，deactivateSS，registerPassword，interrogateSS 或 processSSrequest，GSM 09.02）	GSMMeasurementType4
向 VLR 发送 MSRN 请求的次数（attReqForMSRN）	指发送给 VLR 的请求 MSRN 的尝试次数	发送"MAP 提供漫游号码"（"MAP_PROVIDE_ROAMING_NUMBER"）服务请求（GSM 09.02）	GSMMeasurementType1
向 VLR 发送 MSRN 请求的成功次数（succReqForMSRN）	指从 VLR 收到的分配 MSRN 的成功响应次数	收到不含"用户错误"（"user error"）参数值的"MAP 提供漫游号码"（"MAP_PROVIDE_ROAMING_NUMBER"）的服务确认（GSM 09.02）	GSMMeasurementType1
同时申请 GSM 服务 GPRS 服务的用户数（numOfGSMGPRSUsers）	指既申请了 GSM 服务，又申请了 GPRS 服务的当前用户数	无	GSMMeasurementType1
仅仅申请 GPRS 服务的用户数（numOfGPRSOnlyUsers）	指仅申请了 GPRS 服务的当前用户数	无	GSMMeasurementType1
漫游的 GPRS 用户数（numOfRoamingGPRSUsers）	指漫游出本 HLR 的当前 GPRS 用户数	无	GSMMeasurementType1
GPRS 路由请求信息的尝试次数（attGPRSRoutingReqs InHLR）	指 GGSN 向 HLR 请求 GPRS 路由信息的尝试次数	从 GGSN 接收到"MAP 发送 GPRS 路由请求"（"MAP_SEND_ROUTING_INFO_FOR_GPRS"）服务请求	GSMMeasurementType1
GPRS 路由请求信息的成功次数（succGPRSRoutingReqs InHLR）	指 GGSN 向 HLR 请求 GPRS 路由信息的成功次数	发送不含"用户错误"（"user error"）的"MAP 发送 GPRS 路由请求"（"MAP_SEND_ROUTING_INFO_FOR_GPRS"）服务请求	GSMMeasurementType1

b）处理器负载

cTelHlrCurrentData 的处理器负载的测量属性见表 D.13。

表 D.13 cTelHlrCurrentData 的处理器负载的测量属性

属性名	说 明	触发点	类 型
平均占用率（meanUsage）	指测量周期中，主处理器的平均使用率	无	GSMMeasurementType2
峰值占用率（peakUsage）	指测量周期中，主处理器的峰值使用率	无	GSMMeasurementType2
峰值出现时刻（peakTime）	指测量周期中，主处理器峰值出现的最后时刻	无	PeakTimeType
峰值时长（peakDuration）	主处理器处于峰值期间的持续时间（单位为 s，且缺省的 CPU 峰值使用率的门限值为 80%）	无	GSMMeasurementType1

D.2.10 EIR 性能测量参数

由 *cTelEirCurrentData* 的对象实例收集 EIR 相关的性能数据，包括以下统计数据：

— IMEI 检查；

— 处理器负载。

a) EIR 性能统计

cTelEirCurrentData 的 IMET 检查测量的属性见表 D.14。

表 D.14 cTelEirCurrentData 的 IMEI 检查测量的属性

属性名	说 明	触发点	类 型
收到 IMEI 检查次数（nbrOfReceivedIMEICheckReqs）	指 EIR 收到的 IMEI 检查的请求次数	收到 "MAP 检查 IMEI"（"MAP_CHECK_IMEI"）服务指示	GSMMeasurementType1
发送白名单应答次数（nbrOfWhiteAnsInEIR）	指 EIR 发送的白名单应答的次数	发送 "MAP 检查 IMEI"（"MAP_CHECK_IMEI"）服务响应，其中包含的设备状态（"equipment status"）参数所指的是白名单中的设备（GSM 09.02 和 GSM 02.16）	GSMMeasurementType1
发送灰名单应答次数（nbrOfGreyAnsInEIR）	指 EIR 发送的灰名单应答的次数	发送 "MAP 检查 IMEI"（"MAP_CHECK_IMEI"）服务响应，其中包含的设备状态（"equipment status"）参数所指的是灰名单中的设备（GSM 09.02 和 GSM 02.16）	GSMMeasurementType1
发送黑名单应答次数（nbrOfBlackAnsInEIR）	指 EIR 发送的黑名单应答的次数	发送 "MAP 检查 IMEI"（"MAP_CHECK_IMEI"）服务响应，其中包含的设备状态（"equipment status"）参数所指的是黑名单中的设备（GSM 09.02 和 GSM 02.16）	GSMMeasurementType1
发送未知 IMEI 应答次数（nbrOfUnknownIMEIAnsInEIR）	指 EIR 发送的未知 IMEI 应答的次数	发送 "MAP 检查 IMEI"（"MAP_CHECK_IMEI"）服务响应，其中包含的设备状态（"equipment status"）参数所指的未知的设备（GSM 09.02 和 GSM 02.16）	GSMMeasurementType1

b）EIR 处理器负载测量

cTelEirCurrentData 的处理器负载测量的属性见表 D.15。

表 D.15 cTelEirCurrentData 的处理器负载测量的属性

属性名	说　明	触发点	类　型
平均占用率（meanUsage）	指测量周期中，主处理器的平均使用率	无	GSMMeasurementType2
峰值占用率（peakUsage）	指测量周期中，主处理器的峰值使用率	无	GSMMeasurementType2
峰值出现时刻（peakTime）	指测量周期中，主处理器峰值出现的最后时刻	无	PeakTimeType
峰值时长（peakDuration）	主处理器处于峰值期间的持续时间（单位为 s，且缺省的 CPU 峰值使用率的门限值为 80%）	无	GSMMeasurementType1

D.2.11　SMS 性能测量参数

由 *cTelSmscCurrentData* 的对象实例收集和 SMSC 相关的性能数据，包括：

— 短消息的转发；

— 处理器负载。

a）SMS 性能统计

cTelSmscCurrentData 的短消息转发的测量属性见表 D.16。

表 D.16 cTelSmscCurrentData 的短消息转发的测量属性

属性名	说　明	触发点	类　型
始发短消息尝试次数（attMobileOriginatingSMForwardings）	指从服务 MSC 向互操作网关 MSC 转发短消息的尝试次数	收到"MAP 转发短消息"（"MAP_FORWARD_SHORT_MESSAGE"）服务指示（GSM 09.02）	GSMMeasurementType1
始发短消息成功次数（succMobileOriginatingSMForwardings）	指从服务 MSC 向互操作 MSC 转发短消息的成功次数	发送不含"用户错误"（"user error"）参数值的"MAP 转发短消息"（"MAP_FORWARD_SHORT_MESSAGE"）服务响应（GSM 09.02）	GSMMeasurementType1
终接短消息尝试次数（attMobileTerminatingSMForwardings）	指从汇接 MSC 向服务 MSC 转发短消息的尝试次数	发送"MAP 转发短消息"（"MAP_FORWARD_SHORT_MESSAGE"）服务请求（GSM 09.02）	GSMMeasurementType1
终接短消息成功次数（succMobileTerminatingSMForwardings）	指从汇接 MSC 向服务 MSC 转发短消息的成功次数	收到不含"用户错误"（"user error"）参数值的"MAP 转发短消息"（"MAP_FORWARD_SHORT_MESSAGE"）服务响应（GSM 09.02）	GSMMeasurementType1

b）处理器负载

cTelSmscCurrentData 的处理器负载测量属性见表 D.17。

表 D.17　cTelSmscCurrentData 的处理器负载测量属性

属性名	说　明	触发点	类　型
平均占用率（meanUsage）	指测量周期中，主处理器的平均使用率	无	GSMMeasurementType2
峰值占用率（peakUsage）	指测量周期中，主处理器的峰值使用率	无	GSMMeasurementType2
峰值出现时刻（peakTime）	指测量周期中，主处理器峰值出现的最后时刻	无	PeakTimeType
峰值时长（peakDuration）	主处理器处于峰值期间的持续时间（单位为 s，且缺省的 CPU 峰值使用率的门限值为 80%）	无	GSMMeasurementType1

D.2.12　BSC 性能测量参数

由 *cTelBscCurrentData* 的对象实例收集和 BSC 相关的性能数据，包括以下的统计数据：

— 由该 BSC 所控制的小区切换；

— 话务量；

— BSC 处理器的使用率。

a）切换（HDO）统计

cTelBscCurrentData 切换统计的测量属性见表 D.18。

表 D.18　cTelBscCurrentData 切换统计的测量属性

属性名	说　明	触发点	类　型
BSC 小区内切换成功次数（succInternalHDOsIntraCellInBSC）	指在通话过程中，在 BSC 范围内同一个小区信道之间切换的成功次数。如果被观测的 BSC 包含多个小区，该属性值应当是该 BSC 中所有的小区内成功切换次数的总和	向 MSC 发送"切换已执行"（"HANDOVER PERFORMED"）消息（GSM 08.08）	GSMMeasurementType1
BSC 小区内切换失败次数（unsuccInternalHDOsIntraCellInBSC）	指在通话过程中，在 BSC 范围内同一个小区信道之间切换的成功次数。如果被观测的 BSC 包含多个小区，该属性值应当是该 BSC 中所有的小区内成功切换次数的总和	对于进行尝试的小区内切换，收到"分配失败"（"ASSIGNMENT FAILURE"）消息（GSM 04.08）	GSMMeasurementType1
BSC 小区间切换成功次数（succInternalHDOsInBSC）	指在指定的 BSC 范围内成功的小区间切换的总数	向 MSC 发送"切换已执行"（"HANDOVER PERFORMED"）消息（GSM 08.08）	GSMMeasurementType1

表 D.18（续）

属性名	说　明	触发点	类　型
BSC 小区间成功切换各原因统计次数（succInternalHDOsPerCause）	按照每种原因，来统计在指定的 BSC 范围内成功的小区间切换的次数，这些原因包括：上行链路质量，上行信号强度，下行链路质量，下行信号强度，距离，更好的小区，操作维护干涉，定向重试，响应 MSC 调用	按照不同的原因，向 MSC 发送"切换已执行"（"HANDOVER PERFORMED"）消息(GSM 08.08)	GSMMeasurementType3
BSC 小区切换不成功但未掉话次数（unsuccInternalHDOsWithReconnectionInBSC）	指在给定的 BSC 中，切换不成功，但仍回到原信道通话的次数	对于进行尝试的小区内切换，收到"切换失败"（"HANDOVER FAILURE"）消息（GSM 04.08）	GSMMeasurementType1
BSC 小区切换不成功而掉话次数（unsuccInternalHDOsWithLossOfConnectionInBSC）	指在给定的 BSC 中，切换不成功导致掉话的次数	小区间切换时，计时器 T3103 超时；小区内切换时，计时器 T3107 超时（GSM 04.08）	GSMMeasurementType1

b）话务量统计

cTelBscCurrentData 的话务量统计的测量属性见表 D.19。

表 D.19　cTelBscCurrentData 的话务量统计的测量属性列表

属性名	说　明	触发点	类　型
BSC 服务请求失败次数（unsuccReqsForService）	指 MS 发起的不成功的 BSC 业务请求次数 注：参数"拒绝原因"（"reject cause"）指明了业务请求被拒绝的原因。可能的原因包括 B 类用户忙、网络故障、协议错误等	向请求服务的手机发送"CM 服务拒绝"（"CM–SERVICE REJECT"）消息（GSM 04.08）	GSMMeasurementType1
寻呼信息的尝试发送次数（attTransOfPagingMessagesInBSC）	指 BSC 发送的寻呼消息的试呼次数	发送"寻呼"（"PAGING"）消息（GSM 04.08）	GSMMeasurementType1
寻呼信息的不成功发送次数（unsuccTransOfPagingMessagesInBSC）	指 BSC 发送的不成功的寻呼消息的次数	没有收到因"寻呼请求"（"PAGING REQUEST"）引起的"寻呼响应"（"PAGING RESPONSE"）消息，T3113 计时器超时（GSM04.08）	GSMMeasurementType1
BSC 立即分配尝试次数（attImmediateAssignProcsInBSC）	指 BSC 的立即分配过程的尝试次数	收到"信道请求"（"CHANNEL request"）消息。 注：建立的原因定义在 GSM 04.08 中，包括紧急呼叫，呼叫重建，寻呼响应，始发呼叫，位置更新，和其他过程。	GSMMeasurementType1

表 D.19 （续）

属性名	说　明	触发点	类　型
BSC 立即分配成功次数（succImmediateAssignProcsInBSC）	指 BSC 的立即分配过程的成功次数	发送"立即分配指令"（"IMMEDIATE ASSIGN COMMAND"）消息。该消息包含"立即分配"（"IMMEDIATE ASSIGNMENT"）消息或"扩展的立即分配"（"IMMEDIATE ASSIGNMENT EXTENDED"）消息其中之一。如果发送的是"扩展的立即分配"，由于消息中包含两个手机的分配信息，计数器的值应加 2（GSM 04.08）	GSMMeasurementType1
BSC 总话务量（bscTotalTrafficVolume）	指以 Erl/s 为单位的 BSC 所承载的总话务量，包含各种呼叫的成功和失败的时间段，该值通过采样方式获得		GSMMeasurementType2
分组信道接入请求发生的平均时间间隔（meanPSInterArrivalTime）	指移动台连续发起的分组信道接入请求消息间隔的算术平均值。将连续接收到 'PACKET CHANNEL REQUEST' 之间的时间长度累加，然后进行算术平均	在一个测量周期中，累计连续接收到"分组信道请求"（"PACKET CHANNEL REQUEST"）之间的时间间隔，然后进行算术平均	GSMMeasurementType2
接收到的 flush 请求消息（flushRequestReceived）	该测量值是从 SGSN 接收的 FLUSH 请求信息总数，该信息请求冲掉某指定小区的 PDU	从 SGSN 接收到"PDU 清空请求"（"PDU FLUSH REQUST"）消息	GSMMeasurementType1

c）处理器负载

cTelBscCurrentData 的处理器负载的测量属性见表 D.20。

表 D.20　cTelBscCurrentData 的处理器负载的测量属性

属性名	说　明	触发点	类　型
平均占用率（meanUsage）	指测量周期中，主处理器的平均使用率	无	GSMMeasurementType2
峰值占用率（peakUsage）	指测量周期中，主处理器的峰值使用率	无	GSMMeasurementType2
峰值出现时刻（peakTime）	指测量周期中，主处理器峰值出现的最后时刻	无	PeakTimeType
峰值时长（peakDuration）	主处理器处于峰值期间的持续时间（单位为 s，且缺省的 CPU 峰值使用率的门限值为 80%）	无	GSMMeasurementType1

d）GPRS 子层业务量

cTelBscCurrentData 的 GPRS 子层业务量的测量属性见表 D.21。

表 D.21　cTelBscCurrentData 的 GPRS 子层业务量的测量属性

	属性名	说　明	触发点	类　型
无线链路控制(RLC)子层	PCU 的 Um 口的上行负荷(nbrUmULBlock)	指 PCU 在 RLC 层的上行数据块数	在 RLC 子层上收到上行的数据块	GSMMeasurementType1
	PCU 的 Um 口的下行负荷(nbrUmDLBlock)	指 PCU 在 RLC 层的下行数据块数	在 RLC 子层上收到下行的数据块	GSMMeasurementType1
网络业务(NS)子层	NS 子层发送的字节数(nbrNsOctetSentBsc)	指 NS 子层成功发送到 Gb 接口上的 BSSGP 的数据量	在 NS 子层的 Gb 接口上发送 BSSGP，并最终累计总字节数	GPRSMeasurementType3
	NS 子层接收的字节数(nbrNsOctetRvdBsc)	指 NS 子层从对端接收到的 BSSGP 的数据量	在 NS 子层的 Gb 接口上接收到 BSSGP，并最终累计总字节数	GPRSMeasurementType3
	NS 子层发送的数据 PDU 数量(nbrNsPduSentBsc)	指 NS 子层成功发送到 Gb 接口上的 BSSGP 的 PDU 数量	在 NS 子层的 Gb 接口上发送 BSSGP PDU	GPRSMeasurementType3
	NS 子层接收的数据 PDU 数量(nbrNsPduRvdBsc)	指 NS 子层从对端接收到的 BSSGP 的 PDU 数量	在 NS 子层的 Gb 接口上接收到 BSSGP PDU	GPRSMeasurementType3
	NS 子层丢弃的数据 PDU 数量(nbrNsPduDiscardedBsc)	指 NS 没有成功发送到 Gb 接口的 BSSGP 的数据包的数目	在 NS 子层的 Gb 接口上丢弃 BSSGP PDU	GPRSMeasurementType3
	NS 子层向对端发送复位消息的数量（nbrNsResetMegSendBsc）	指 NS 为了复位 NS-VC 发送到对端的 NS-RESET 消息的数量	在 NS 子层向对端发送用于将 NS-VC 复位的"NS-RESET"消息	GPRSMeasurementType3
	接收到对端发送的复位消息的数量（nbrNsResetMegRvdBsc）	指 NS 接收到对端发送的 NS-RESET 消息的数量	在 NS 子层从对端接收到用于复位 NS-VC 的 "NS-RESET" 消息	GPRSMeasurementType3
	NS 子层向对端回应复位确认消息的数量（nbrNsResetAckMegSentBsc）	NS 子层向对端回应 RESET ACK 消息时统计	在 NS 子层向对端发送 "RESET ACK" 消息	GPRSMeasurementType3
	接收到对端回应复位确认消息的数量（nbrNsResetAckMegRvdBsc）	NS 子层收到对端回应 RESET ACK 消息时统计	在 NS 子层从对端接收到 "RESET ACK" 消息	GPRSMeasurementType3
	NS 子层向对端发送闭塞消息的数量（nbrNsBlockMegSentBsc）	指 NS 为了闭塞 NS-VC 发送到对端的 NS-BLOCK 消息的数量	在 NS 子层向对端发送用于将闭塞 NS-VC 的 "NS-BLOCK" 消息	GPRSMeasurementType3
	接收到对端闭塞消息的数量（nbrNsBlockMegRvdBsc）	指 NS 接收到对端发送的 NS-BLOCK 消息的数量	在 NS 子层从对端接收到用于闭塞 NS-VC 的 "NS-BLOCK" 消息	GPRSMeasurementType3
	NS 子层向对端发送解闭消息的数量（nbrNsUnblockMegSentBsc）	指 NS 为了解闭 NS-VC 发送到对端的 NS-UNBLOCK 消息的数量	在 NS 子层向对端发送用于 NS-VC 解闭的 "NS-UNBLOCK" 消息	GPRSMeasurementType3
	NS 子层向对端回应闭塞确认消息的数量（nbrNsBlockAckMegSentBsc）	NS 子层向对端回应的 BLOCK PDU ACK 消息的数量	在 NS 子层向对端发送 "BLOCK PDU ACK" 消息	GPRSMeasurementType3
	接收到对端回应的闭塞确认消息数量（nbrNsBlockAckMegRvdBsc）	NS 子层收到对端回应的 BLOCK PDU ACK 消息的数量	在 NS 子层从对端接收到 "BLOCK PDU ACK" 消息	GPRSMeasurementType3
	NS 子层向对端回应解闭确认消息的数量（nbrNsUnblockAckMegSentBsc）	NS 子层向对端回应的 UNBLOCK PDU ACK 消息的数量	在 NS 子层向对端发送 "UNBLOCK PDU ACK" 消息	GPRSMeasurementType3

表 D.21（续）

属性名		说　明	触发点	类　型
网络业务（NS）子层	接收到对端回应的解闭确认消息数量（nbrNsUnblockAckMegRvdBsc）	NS 子层收到对端回应的 UNBLOCK PDU ACK 消息的数量	在 NS 子层从对端接收到 "UNBLOCK PDU ACK" 消息	GPRSMeasurementType3
	接收到对端解闭消息的数量（nbrNsUnblockMegRvdBsc）	指 NS 接收到对端发送的 NS-UNBLOCK 消息的数量	在 NS 子层从对端接收到 "UNBLOCK PDU ACK" 消息	GPRSMeasurementType3

D.2.13　BTS 性能测量参数

由 *cTelBtsCurrentData* 的对象实例收集和 BTS 相关的性能数据，包括以下统计数据：

— BTS 话务；

— 功率电平；

— BTS 切换；

— BTS 位置更新。

a）BTS 话务量数据

cTelBtsCurrentData 的话务量数据的测量属性见表 D.22。

表 D.22　cTelBtsCurrentData 的话务量数据的测量属性

属性名	说　明	触发点	类　型
SDCCH 总数（totalNumberOfSDCCH）	指 BTS 中 SDCCH 的总数	无	GSMMeasurementType1
可用 SDCCH 数（availableSDCCH）	指 BTS 中可用的 SDCCH 数目（不包括目前正在使用的）	无	GSMMeasurementType1
SDCCH 试呼次数（attSDCCHSeizures）	指 SDCCH 的占用尝试次数	接收到 "信道请求"（"CHANNEL REQUEST"）消息	GSMMeasurementType1
SDCCH 溢出次数（blockedSDCCH）	指阻塞的 SDCCH 占用次数（即所有 SDCCH 忙时发生的占用）	发送 "立即分配拒绝"（"Immediate Assignment Reject"）消息（不包括由切换所引起的）	GSMMeasurementType1
SDCCH 掉话次数（droppedSDCCH）	指丢弃的 SDCCH 占用次数		GSMMeasurementType1
TCH 阻塞次数（blockedTCH）	指阻塞的 TCH 占用次数	发送 "分配失败"（"Assignment Failure"）消息，其原因为 "没有无线资源"	GSMMeasurementType1
TCH 试呼次数（attTCHSeizures）	指 TCH 的占用尝试次数	向 MS 发送 "分配指令" 消息（" ASSIGNMENT COMMAND"，GSM 04.08）	GSMMeasurementType1
TCH 成功占用次数（succTCHSeizures）	指成功的 TCH 占用次数	从 MS 接收到 "分配完成" 消息（"Assignment Complete", GSM 04.08）	GSMMeasurementType1
TCH 掉话次数（droppedTCH）	指丢弃的 TCH 占用次数	发送 "清除请求" 消息（"Clear Request"）	GSMMeasurementType1
SDCCH 总话务量（totalTrafficVolumeOfSDCCH）	指以 Erl/s 为单位的 SDCCH 所承载的总话务量。该值通过采样方式获得		GSMMeasurementType2

表 D.22（续）

属 性 名	说　明	触 发 点	类　型
SDCCH 射频掉话次数（droppedSDCCHOnRF）	指在无线载波上掉话的 SDCCH 占用次数		GSMMeasurementType1
SDCCH 平均占用时长（averageHoldTimeOfSDCCH）	指 SDCCH 占用的平均占用时长（单位：s）	无	GSMMeasurementType2
SDCCH 信道全忙时长（cellBusyTimeOfSDCCH）	指 BTS 中所有 SDCCH 全忙的时间段的累计合（单位：s）	无	GSMMeasurementType1
SDCCH 平均信道分配时长（averageTimeAssignOfSDCCH）	指 BTS 中 SDCCH 的平均分配时长（单位：s）		GSMMeasurementType2
可用 TCH 数（availableTCH）	可用的 TCH 数目（除去那些当前正在使用的）	无	GSMMeasurementType1
TCH 总话务量（totalTrafficVolumeOfTCH）	指以 Erl/s 为单位的 TCH 所承载的总话务量，该值通过采样方式获得		GSMMeasurementType2
TCH 分配成功未占用次数（numOfSuccAssignUnSeizure）	指 BTS 中成功分配 TCH 但未占用的次数		GSMMeasurementType1
TCH 射频掉话次数（droppedTCHOnRF）	指 TCH 的射频掉话次数		GSMMeasurementType1
TCH 平均占用时长（averageHoldTimeOfTCH）	指 TCH 的平均占用时长（单位：s）	无	GSMMeasurementType2
TCH 信道全忙时长（cellBusyTimeOfTCH）	指 BTS 中 TCH 全忙的时长（单位：s）	无	GSMMeasurementType1
TCH 平均信道分配时长（averageTimeAssignOfTCH）	指 BTS 中 TCH 的平均分配时长（单位：s）		GSMMeasurementType2
最大 TCH 占用数量（maxNumOfSeizuredTCH）	指在测量周期中，BTS 中同时占用的最大 TCH 数	无	GSMMeasurementType1
可用 PCH 数（availablePCH）	指可用的 PCH 数（除去那些正在使用的）	无	GSMMeasurementType1
寻呼试呼次数（attTransOf PagingMessagesThePCH）	指 BTS 中的寻呼的试呼次数	发送"寻呼"消息（"PAGING"，GSM 04.08）	GSMMeasurementType1
寻呼信息的不成功发送次数（ unsuccTransOfPagingMessages ThePCH）	指 BTS 中不成功的寻呼次数	没有收到与"寻呼请求"（"PAGING REQUEST"）相对应的"寻呼响应"消息（"PAGING RESPONSE"），定时器 T3113 超时（GSM 04.08）。注：当提供 PCCCH 时该属性只对电路方式有效	GSMMeasurementType1

表 D.22 （续）

属性名	说　明	触发点	类　型
立即信道分配的尝试次数（attImmediateAssignProcsInBTS）	指 BTS 的立即分配规程的试呼次数	收到"信道请求"（"CHANNEL request"）注：建立的原因定义在 GSM 04.08 中，包括紧急呼叫、呼叫重建、寻呼响应、始发呼叫、位置更新和其他过程	GSMMeasurementType1
立即信道分配的成功次数（succImmediateAssignProcsInBTS）	指 BTS 中成功的立即分配规程的次数	发送"立即分配指令"（"IMMEDIATE ASSIGN COMMAND"）消息。该消息包含"立即分配"（"IMMEDIATE ASSIGNMENT"）消息或"扩展的立即分配"（"IMMEDIATE ASSIGNMENT EXTENDED"）消息其中之一。如果发送的是"扩展的立即分配"，由于消息中包含两个手机的分配信息，计数器的值应加 2（GSM 04.08）	GSMMeasurementType1
可用载波数（numOfAvailRadioCarriers）	指 BTS 中当前可用的载波数	无	GSMMeasurementType1
可用收发信机数目（numOfAvailTrx）	指 BTS 中当前可用的收发信机的数目	无	GSMMeasurementType1
相干频带内的平均空闲时隙数（meanNbrOfIdleTCHsPerInterferenceBand）	指各相干频带内空闲时隙的算术平均值。空闲时隙是指那些可被分配给一个请求的时隙。空闲时隙根据测量到的干扰程度分为五类（GSM 05.01）	按照预先定义的时间间隔（系统定义）进行的各相干频带内空闲时隙数目的抽样值的算术平均（GSM 04.08）	GSMMeasurementType8
从 PCH 队列中丢弃的寻呼消息数（nbrOfPagesDiscardedFromPCHQueue）	该测量值是在传送之前被从 PCH 队列中删除的寻呼消息数目	寻呼消息可由于一些原因（例如队列溢出、优先插入导致的队列溢出或排队计数器超时等）从队列中被删除（在采用队列机制的情况下，GSM 04.08），该测量值在提供了 PCCCH 时只对电路方式有效	GSMMeasurementType1
成功的寻呼过程的平均时长（meanDurationOfSuccPagingProcs）	指一个成功寻呼过程持续时间的算术平均值，即一个粒度期间内有关时间（每次寻呼的持续时间）的加权的算术平均	在测量周期内，累计从向 MS 发送"寻呼请求"（"PAGING REQUEST"）到接收到 MS 的"寻呼响应"（"PAGING RESPONSE"）服务确认消息之间的时间，最后求出平均值（GSM 04.08）	GSMMeasurementType2
PCH-AGCH 平均队列长度（meanPCHAGCHQueueLength）	该测量值是在 PCH-AGCH 信道上等待传送的消息数目的算术平均值注：该测量值当提供了 PCCCH 信道的条件下只对电路方式有效	按照预先定义的间隔（系统定义）对 PCH-AGCH 队列的长度进行抽样，然后进行算术平均（GSM 04.08）	GSMMeasurementType2

b）功率电平测量

cTelBtsCurrentData 的基站功率电平测量的属性见表 D.23。

表 D.23   cTelBtsCurrentData 的基站功率电平测量的属性

属性名	说　明	触发点	类　型
平均移动终端功率（powerOfMobileStation）	指测量周期中，BTS 里所有的活跃的移动台功率的算术平均值（单位：dBM）	无	GSMMeasurementType1
平均 BTS 发射功率（powerOfBTS）	指测量周期中，BTS 功率的算术平均值（单位：dBM）	无	GSMMeasurementType1
平均上行信号强度（strengthOfUplink）	指测量周期中，BTS 里所有活跃的上行链路信号强度的算术平均值	无	GSMMeasurementType1
平均下行信号强度（strengthOfDownlink）	指测量周期中，BTS 里所有活跃的下行链路信号强度的算术平均值	无	GSMMeasurementType1
平均上行质量（qualityOfUplink）	指测量周期中，BTS 内所有活跃的上行链路信号质量的算术平均值	无	GSMMeasurementType1
平均下行质量（qualityOfDownlink）	指测量周期中，BTS 内所有活跃的下行链路信号质量的算术平均值	无	GSMMeasurementType1
平均呼叫记录（meanCallDistance）	指测量周期中，所有呼叫距离的算术平均值，即被观测的 BTS 与发起或接收呼叫的 MS 之间的距离（单位：m）	无	GSMMeasurementType1
从 MS 来的加大功率请求次数（attReqsForPowerIncreaseFromMS）	指在测量周期中，由 MS 发出的功率增加请求的尝试次数		GSMMeasurementType1
从 MS 来的减小功率请求次数（attReqsForPowerReduceFromMS）	指在测量周期中，由 MS 发出的功率减少请求的尝试次数		GSMMeasurementType1
从 BSS 来的增大功率指令数（attInstructionsForPowerIncreaseFromBSC）	指在测量周期中，由 BSC 发出的功率增加请求的尝试次数		GSMMeasurementType1
从 BSS 来的减小功率指令数（attInstructionsForPowerReduceFromBSC）	指在测量周期中，由 BSC 发出的功率增加请求的尝试次数		GSMMeasurementType1

c）切换测量

cTelBtsCurrentData 的小区切换测量的属性见表 D.24。

表 D.24　cTelBtsCurrentData 的小区切换测量的属性

属性名	说　明	触发点	类　型
小区内切换成功次数 (succInternalHDOsIntraCellInBTS)	指在通话过程中，在一个 BTS 的小区内的信道之间切换的成功次数		GSMMeasurementType1
小区内切换失败次数 (unsuccInternalHDOsIntraCellInBTS)	指在通话过程中，在一个 BTS 的小区内的信道之间切换的不成功次数		GSMMeasurementType1
无资源小区内切换失败次数 (unsucc InternalHDOsForNoCHsIntraCellInBTS)	指一个 BTS 的小区内切换因没有可用的信道而失败的次数		GSMMeasurementType1
占用新信道引起的小区内切换失败次数 (unsuccInternalHDOsForSeizingNew CHIntraCellInBTS)	指一个 BTS 中，因占用新信道引起的小区内切换失败次数		GSMMeasurementType1
切回老信道引起的小区内切换失败次数 (unsuccInternalHDOsWithReconnection IntraCellInBTS)	指一个 BTS 中，小区内切换不成功，但仍回到原信道通话的次数		GSMMeasurementType1
由 BSC 控制的切入小区的成功切换次数 (succIncomingInternalHDOsIntraBSCIn BTS)	指在同一个 BSC 范围内，切入该小区的成功切换次数		GSMMeasurementType1
由 BSC 控制的切入小区的不成功切换次数 (unsuccIncomingInternalHDOsIntra BSCInBTS)	指在同一个 BSC 范围内，切入该小区的不成功切换次数		GSMMeasurementType1
由于小区内没有信道而引起的切入 BSC 小区失败次数 (unsuccIncoming InternalHDOsForNoCHsIntraBSCInBTS)	指在同一个 BSC 范围内，由于小区内没有可用信道而引起的切入该小区的失败次数		GSMMeasurementType1
切出 BSC 小区的成功次数 (succOut goingInternalHDOsIntraBscInBTS)	指在同一个 BSC 范围内，切出该小区的成功次数		GSMMeasurementType1
切出 BSC 小区的不成功次数 (unsuccOutgoingInternalHDOsIntraBSCIn BTS)	指在同一个 BSC 范围内，切出该小区的不成功次数		GSMMeasurementType1
由于手机返回到老信道上而造成切出 BSC 小区失败 (unsuccOutgoingInternal HDOsWithReconnectionIntraBSCInBTS)	指在同一个 BSC 范围内，切出小区不成功，但仍回到原信道通话的次数		GSMMeasurementType1
切入 MSC 小区的成功次数 (succIncomingExternalHDOsIntraMSCIn BTS)	指在同一 MSC 范围内，切入该小区的成功次数（除去那些在同一 BSC 范围内的小区间切换）		GSMMeasurementType1
切入 MSC 小区的不成功次数 (unsuccIncomingExternalHDOsIntraMSCIn BTS)	指在同一 MSC 范围内，切入该小区的成功次数（除去那些在同一 BSC 范围内的小区间切换）		GSMMeasurementType1

表 D.24（续）

属性名	说　明	触发点	类　型
由于无信道而造成的切入 MSC 小区失败次数（unsuccIncomingExternalHDOsForNoCHsIntraMSCInBTS）	指在同一 MSC 范围内，因没有信道而引起的小区间切换失败次数（除去那些在同一 BSC 范围内的小区间切换）		GSMMeasurementType1
由于手机未能占上新的信道而造成的切入 MSC 小区的失败次数（unsuccIncomingHDOsForNotSeizingNewCHIntraMSCInBTS）	指在同一 MSC 范围内，因没有占用到新信道而引起的小区间切换失败次数（除去那些在同一 BSC 范围内的小区间切换）		GSMMeasurementType1
切出 MSC 小区的成功次数，即 MSC 控制的小区切换次数（succOutgoingExternalHDOsIntraMSCInBTS）	指在同一 MSC 范围内，切出该小区的成功切换次数（除去那些在同一 BSC 范围内的小区间切换）		GSMMeasurementType1
切出 MSC 小区的不成功次数（unsuccOutgoingExternalHDOsIntraMSCInBTS）	指在同一 MSC 范围内，切出该小区的不成功切换次数（除去那些在同一 BSC 范围内的小区间切换）		GSMMeasurementType1
由于手机返回到老信道而造成的切出 MSC 小区失败次数（unsuccOutgoingExternalHDOsWithReconnectionIntraMSCInBTS）	指在同一 MSC 范围内，切出该小区的不成功，但仍回到原信道通话的次数（除去那些在同一 BSC 范围内的小区间切换）		GSMMeasurementType1
由于上行链路质量不足引起的切换请求次数（attHDOReqsForLowUplinkQuality）	指由于上行链路质量不足引起的切换请求次数		GSMMeasurementType1
由于下行链路质量不足引起的切换请求次数（attHDOReqsForLowDownlinkQuality）	指由于下行链路质量不足引起的切换请求次数		GSMMeasurementType1
由上行链路功率电平过低引起的切换请求次数（attHDOReqsForLowUplinkPowerLevel）	指由于上行链路信号电平过低引起的切换请求次数		GSMMeasurementType1
由下行链路信号功率电平过低引起的切换请求次数（attHDOReqsForLowDownlinkPowerLevel）	指由于下行链路信号电平过低引起的切换请求次数		GSMMeasurementType1
由于手机距 BTS 过远而引起的切换请求次数（attHDOReqsForDistanceTooLongFromBTS）	指由于 MS 距 BTS 过远而引起的切换请求次数		GSMMeasurementType1
由 MSC 发出的切换请求（找到更好的小区）次数（attHDOReqsForBetterCellFromMSC）	指由 MSC 发出的，找到更好的小区的切换请求次数		GSMMeasurementType1
由于上行链路干扰而引起的小区内切换请求次数（attHDOReqsForUplinkDisturbance）	指由于上行链路干扰而引起的小区内切换请求次数		GSMMeasurementType1

表 D.24（续）

属性名	说　明	触发点	类　型
由于下行链路干扰而引起的小区内切换请求次数（attHDOReqsForDownlink Disturbance）	指由于下行链路干扰而引起的小区内切换请求次数		GSMMeasurementType1
由于功率算法选择更好的小区引起的切换请求次数（attHDOReqsForBetter PowerSelectedCell）	指由于功率算法选择更好的小区引起的切换请求次数		GSMMeasurementType1
由于切换到雨伞小区而造成的切换请求次数（attHDOReqsForUmbrellaCell）	由于切换到"雨伞"小区而造成的切换请求次数		GSMMeasurementType1
MSC 间切入尝试次数（attIncoming ExternalHDOsInterMSCInBTS）	指从不同的 MSC 小区切入该 MSC 小区的切换尝试次数		GSMMeasurementType1
MSC 间切入成功次数（succIncoming ExternalHDOsInterMSCInBTS）	指从不同的 MSC 小区切入该 MSC 小区的切换成功次数		GSMMeasurementType1
MSC 间切出尝试次数（attOutgoing ExternalHDOsInterMSCInBTS）	指从该 MSC 小区切出到不同的 MSC 小区的切换尝试次数		GSMMeasurementType1
MSC 间切出成功次数（succOutgoing ExternalHDOsInterMSCInBTS）	指从该 MSC 小区切出到不同的 MSC 小区的切换成功次数		GSMMeasurementType1
双频切换试呼总次数（attDoubleFrequencyHDOs）	指双频切换的尝试次数（在 900MHz 和 1800MHz 之间的切换）		GSMMeasurementType1
双频切换成功总次数（succDoubleFrequencyHDOs）	指双频切换的成功次数（在 900MHz 和 1800MHz 之间的切换）		GSMMeasurementType1

d）位置更新测量

cTelBtsCurrentData 的 BTS 位置更新测量的属性见表 D.25。

表 D.25　cTelBtsCurrentData 的 BTS 位置更新测量的属性

属性名	说　明	触发点	类　型
再次寻呼的次数（首次寻呼未应）（repagingReqsForMS）	指在 BTS 中，对 MS 的再次寻呼次数（首次寻呼未应）		GSMMeasurementType1
位置数据更新的次数（attLocationUpdateInBTS）	指 BTS 中地址位置数据更新的尝试次数		GSMMeasurementType1
位置数据更新失败次数（unsuccLocationUpdate）	指 BTS 中地址位置数据更新的成功次数		GSMMeasurementType1
周期性更新次数（periodicLocationUpdate）	指 BTS 中，位置数据的周期性更新次数		GSMMeasurementType1
IMSI 附着次数（iMSIAttachments）	指 BTS 中 IMSI 的附着次数		GSMMeasurementType1

e）GPRS 无线资源测量

cTelBtsCurrentData 的 GPRS 无线资源测量的属性见表 D.26。

表 D.26　cTelBtsCurrentData 的 GPRS 无线资源测量的属性

属性名	说　明	触发点	类　型
成功抢占的 PDTCH 数（succPDTCHSeizures）	指成功占用 PDTCH 的数目	收到 MS 从 PDTCH 发来的第一个 RLC 块（PDU）时计数（GSM 04.60）	GSMMeasurementType1
可用的 PDCH 的平均数目（meanNbrAvailablePDCH）	指一个测量时间内可用的 PDCH 数目（包括实际正在使用）的算术平均值	该测量项当 PDCH 可用时增加，当 PDCH 不可用时，该测量项减少	GSMMeasurementType1
可用的 PDCH 的最大数目（maxNbrAvailablePDCH）	指一个测量周期中可用的 PDCH 的最大数目（包括正在使用的），即一个测量时间内测量到的可用 PDCH 数目的最大值		GSMMeasurementType1
可用的 PDCH 的最小数目（minNbrAvailablePDCH）	该测量值是一个测量周期中可用的 PDCH 的最小数目（包括正在使用的），即一个测量时间内测量到的可用 PDCH 数目的最小值		GSMMeasurementType1
占用的 PDCH 的平均数目（meanNbrOfOccPDCH）	指一个测量周期中占用的 PDCH 的算术平均值（包括正在使用的），即该测量值是占用的 PDCH 的算术平均值	通过预定义（系统设计）的时间间隔，对承载分组业务的 PDCH 数进行取样，然后进行算术平均（GSM 04.60）	GSMMeasurementType1
占用的 PDCH 的最大数目（maxNbrOfOccPDCH）	指被占用的 PDCH 最高记录值，即抽样值的最大值	通过预定义（系统设计）的时间间隔，对承载分组业务的 PDCH 数进行取样，取最大值（GSM 04.60）	GSMMeasurementType1
占用的 PDCH 的最小数目（minNbrOfOccPDCH）	指被占用的 PDCH 最低记录值，即抽样值的最小值	通过预定义（系统设计）的时间间隔，对承载分组业务的 PDCH 数进行取样，取最小值（GSM 04.60）	GSMMeasurementType1
所有可用 PDCH 均被分配的时间（availablePDCHAllocated Time）	指在一个测量周期内所有可用 PDCH 均被分配的时间	该时间段从最后一个 PDCH 被分配的时刻到第一个 PDCH 被释放的时刻间的时间间隔来进行计算	GSMMeasurementType1
CS 业务抢占 PS 业务的次数（succPdchToTch）	指一个在性能采集周期内，PDCH 成功转换成 TCH 的次数	在一个测量周期中的，当一个 PDCH 成功转换成 TCH 时，该测量项加一	GSMMeasurementType1

f) GPRS 分组业务测量

cTelBtsCurrentData 的 GPRS 分组测量的属性见表 D.27。

表 D.27　cTelBtsCurrentData 的 GPRS 分组业务测量的属性

属性名	说　明	触发点	类　型
PCCCH 发送的分组寻呼消息数 (nbrPacketPagingMessages PCHOnPCCCH)	指在 PCCCH 上发送的分组寻呼消息的数目（尝试次数）	发送 "分组寻呼请求" ("PACKET PAGING REQUEST") 消息 (GSM 04.60)	GSMMeasurementType1
PCCCH 上的 平均 PPCH–PAGCH 队列长度 (meanPPCHPAGCHQueue LengthOnPCCCH)	指所有在 PCCCH 的 PPCH–PAGCH 子信道上等待传送的消息数的算术平均值	该测量值是通过按照一个预先定义的时间间隔（系统定义）对 PPCH–PAGCH 队列长度取样，然后计算其算术平均 (GSM 04.60)	GSMMeasurementType2
PCCCH 上的 PPCH 队列中丢弃的分组寻呼消息数 (nbrOfPSPagesDiscardedFrom PPCHQueueOnPCCCH)	指在 PCCCH 信道上发送前就从 PPCH 队列上被删除的分组寻呼消息数目	把寻呼消息从队列中删除有很多原因。包括队列溢出、优先插入导致的队列溢出和队列计数器计数终止等 (GSM 04.60)	GSMMeasurementType1
在各种原因下的分组信道指配请求的尝试次数 (attPCReqAssPerCause)	该测量值是每个原因的分组信道指配请求次数	在接收到 MS 从 PRACH 信道发送的 "分组信道请求" ("PACKET CHANNEL REQUEST") 消息或者是从 RACH 信道上发送来的 "信道请求" ("CHANNEL RE-QUEST") 消息 注：建立的原因包括信道请求 (GSM 04.08) 和分组信道请求 (GSM 04.60)	GSMMeasurementType3
在各种原因下的分组信道指配请求的成功次数 (succ PDTCHAssProcsPerCause)	该测量值是每个原因下成功的分组信道指配 注：一个分组信道指配成功是指 "PACKET UPLINK ASSIGNMENT" 消息或 "IMMEDIATE ASSIGN-MENT COMMAND" 消息被发送	在 AGCH 上发送 "立即分配请求" ("IMMEDIATE ASSIGN COMMAND") 消息，或在 PAGCH 上发送 "分组上行分配" ("PACKET UPLINK ASSIGNMENT") 消息 注：当消息中包含两个移动台的指配信息时，如果两个原因相同，则相应原因对应的计数器加 2；如果两个原因不同，则各自原因对应的计数器分别加 1	GSMMeasurementType3
PDTCH 的平均队列长度 (meanPacketQueueLength)	指所有在队列中等待从 PDTCH 上发送的消息个数的算术平均值	该值是按照预先定义的时间间隔（系统定义）对 PDTCH 队列长度进行抽样，然后计算算术平均	GSMMeasurementType2
服务升级＼降级的次数，即 CS1\CS2 转换次数 (nbrOfServiceChanges)	随着服务的升级和降级，使用的编码方式（CS1\CS2）会转换，该测量值计算每个小区升级＼降级的次数	相应对象进行升级或降级服务	GSMMeasurementType9

D.3 性能管理部分信息模型定义

D.3.1 性能管理部分信息模型的 GDMO 定义

----DOCUMENT "cTelPM";
----Formal object class definitions
----Definitions of object class

----Common
----cTelMeasurementScanner
cTelMeasurementScanner MANAGED OBJECT CLASS
DERIVED FROM
       "ITU-T Rec. X.739:1993":scanner;
CHARACTERIZED BY
    cTelMeasurementScannerPackage PACKAGE
       BEHAVIOUR cTelMeasurementScannerPackageBehaviour BEHAVIOUR
       DEFINED AS
"The cTelMeasurementScanner MOC is used to collect performance measuremnet data. The measurement results will be transferred using bulk data transfer mechanism. The cTelMeasurementScanner object periodically scans the historyData instances according to the ´granularityPeriod´ attribute within a specified schedule and produces an aggregated report in one or more file. The scan results, which are a set of GetResults of historyData, are then sent to cTelSimpleFileTransferControl object. The cTelSimpleFileTransferControl object will prepare the performance data file and issue a ´transferUpReady´ notification to NMC and NMC will get the performance files using FTP.";;;,
    "ITU-T Rec. X.738:1993": scopedSelectionPackage;
REGISTERED AS { cTel-gsm-nmc-pm-objectClass 10 } ;

cTelSignallingLinkSetTPCurrentData   MANAGED OBJECT CLASS
    DERIVED FROM
       "ITU-T Rec. Q.822:1992":currentData;
    CHARACTERIZED BY
      signallingLinkSetTPTrafficPackage;
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 20} ;

cTelSignallingLinkSetTPHistoryData MANAGED OBJECT CLASS
    DERIVED FROM
       "ITU-T Rec. Q.822:1992":historyData;
    CHARACTERIZED BY
      signallingLinkSetTPTrafficPackage;
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 30} ;

----BSS related currentData and historyData definitions
cTelBscCurrentData MANAGED OBJECT CLASS
    DERIVED FROM

"ITU-T Rec. Q.822:1992":currentData;
CHARACTERIZED BY
      requestForServicePackage,
      pagingMessageInBSCPackage,
      immediateAssignmentProceduresInBSCPackage,
      internalHandoversIntraCellInBSCPackage,
      internalHandoversInterCellInBSCPackage,
      internalHandoverFailuresInBSCPackage,
      internalHandoversPerCausePackage,
      processorLoadPackage ,
      bscTrafficPackage ;
CONDITIONAL PACKAGES
      bscPcuTrafficPackage
            PRESENT IF "The specified BSC support GPRS function.",
      bscGPRSRlcSubLayerPackage
            PRESENT IF "The specified BSC support GPRS function.",
      bscGPRSNsSubLayerPackage
            PRESENT IF "The specified BSC support GPRS function.";
REGISTERED AS   {cTel-gsm-nmc-pm-objectClass 40} ;

cTelBscHistoryData MANAGED OBJECT CLASS
      DERIVED FROM
            "ITU-T Rec. Q.822:1992":historyData;
      CHARACTERIZED BY
            requestForServicePackage,
            pagingMessageInBSCPackage,
            immediateAssignmentProceduresInBSCPackage,
            internalHandoversIntraCellInBSCPackage,
            internalHandoversInterCellInBSCPackage,
            internalHandoverFailuresInBSCPackage,
            internalHandoversPerCausePackage,
            processorLoadPackage,
            bscTrafficPackage;
      CONDITIONAL PACKAGES
            bscPcuTrafficPackage
                  PRESENT IF "The specified BSC support GPRS function",
            bscGPRSRlcSubLayerPackage
                  PRESENT IF "The specified BSC support GPRS function.",
            bscGPRSNsSubLayerPackage
                  PRESENT IF "The specified BSC support GPRS function.";
REGISTERED AS   {cTel-gsm-nmc-pm-objectClass 50} ;

cTelBtsCurrentData MANAGED OBJECT CLASS
      DERIVED FROM

"ITU-T Rec. Q.822:1992":currentData;

CHARACTERIZED BY

btsTrafficPackage,

powerLevelPackage,

btsHandoverPackage,

btsLocationUpdatePackage;

CONDITIONAL PACKAGES

btsGPRSRadioResourcePackage

PRESENT IF "The specified BTS support GPRS function",

btsGPRSPacketServicePackage

PRESENT IF "The specified BTS support GPRS function";

REGISTERED AS {cTel-gsm-nmc-pm-objectClass 60} ;

cTelBtsHistoryData MANAGED OBJECT CLASS

DERIVED FROM

"ITU-T Rec. Q.822:1992":historyData;

CHARACTERIZED BY

btsTrafficPackage,

powerLevelPackage,

btsHandoverPackage,

btsLocationUpdatePackage;

CONDITIONAL PACKAGES

btsGPRSRadioResourcePackage

PRESENT IF "The specified BTS support GPRS function",

btsGPRSPacketServicePackage

PRESENT IF "The specified BTS support GPRS function";

REGISTERED AS {cTel-gsm-nmc-pm-objectClass 70} ;

---MSC related currentData and historyData definitions

cTelCircuitEndPointSubgroupCurrentData MANAGED OBJECT CLASS

DERIVED FROM

"ITU-T Rec. Q.822:1992":currentData;

CHARACTERIZED BY

circuitEndPointSubgroupCurrentDataPackage;

CONDITIONAL PACKAGES

incomingCircuitEndPointSubgroupPackage

PRESENT IF "this circuit end point subgroup is used as incoming call trunk group or two-way trunk group",

outgoingCircuitEndPointSubgroupPackage

PRESENT IF "this circuit end point subgroup is used as outgoing call trunk group or two-way trunk group";

REGISTERED AS {cTel-gsm-nmc-pm-objectClass 80} ;

cTelCircuitEndPointSubgroupHistoryData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":historyData;
    CHARACTERIZED BY
        circuitEndPointSubgroupCurrentDataPackage;
    CONDITIONAL PACKAGES
        incomingCircuitEndPointSubgroupPackage
            PRESENT IF "this circuit end point subgroup is used as incoming call trunk group or two-way trunk group",
        outgoingCircuitEndPointSubgroupPackage
            PRESENT IF "this circuit end point subgroup is used as outoging call trunk group or two-way trunk group";
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 90} ;

cTelExchangeCurrentData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":currentData;
    CHARACTERIZED BY
        mobileOrignatingCallPackage,
        mobileTerminatingCallPackage,
        incomingCallPackage,
        outgoingCallPackage,
        localCallPackage,
        transitCallPackage,
        incomingTerminatingCallPackage,
        originatingOutgoingCallPackage,
        abnormalCallPackage;
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 100} ;

cTelExchangeHistoryData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":historyData;
    CHARACTERIZED BY
        mobileOrignatingCallPackage,
        mobileTerminatingCallPackage,
        incomingCallPackage,
        outgoingCallPackage,
        localCallPackage,
        transitCallPackage,
        incomingTerminatingCallPackage,
        originatingOutgoingCallPackage,
        abnormalCallPackage;
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 110} ;

cTelMscCurrentData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":currentData;
    CHARACTERIZED BY
        incomingInterMSCHandoversPackage,
        outgoingInterMSCHandoversPackage,
        subsequentInterMSCHandoversToMSCaPackage,
        subsequentInterMSCHandoversToMSCcPackage,
        externalHandoversPackage,
        externalHandoversPerCausePackage,
        externalHandoverFailurePerMSCPackage,
        gradeOfServicePackage,
        processorLoadPackage,
        mscPagingPackage,
        mscFaultPackage,
        mscEndCodePackage,
        mscIMSIAttachDetachPackage;
    CONDITIONAL PACKAGES
        interrogatingHLRPackage
            PRESENT IF "an instance supports it";
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 140} ;

cTelMscHistoryData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":historyData;
    CHARACTERIZED BY
        incomingInterMSCHandoversPackage,
        outgoingInterMSCHandoversPackage,
        subsequentInterMSCHandoversToMSCaPackage,
        subsequentInterMSCHandoversToMSCcPackage,
        externalHandoversPackage,
        externalHandoversPerCausePackage,
        externalHandoverFailurePerMSCPackage,
        gradeOfServicePackage,
        processorLoadPackage,
        mscPagingPackage,
        mscFaultPackage,
        mscEndCodePackage,
        mscIMSIAttachDetachPackage;
    CONDITIONAL PACKAGES
        interrogatingHLRPackage
            PRESENT IF "an instance supports it";
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 150} ;

cTelSsfCurrentData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":currentData;
    CHARACTERIZED BY
        ssfTrafficPackage;
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 153} ;

cTelSsfHistoryData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":historyData;
    CHARACTERIZED BY
        ssfTrafficPackage;
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 155} ;

cTelObservedDestination MANAGED OBJECT CLASS
    DERIVED FROM
        "Rec. X.721 | ISO/IEC 10165-2 : 1992":top;
    CHARACTERIZED BY
        "ITU-T Rec. M.3100:1995":objectManagementNotificationsPackage,
        observedDestinationPackage;
    CONDITIONAL PACKAGES
        destinationTypePackage
            PRESENT IF "destination type is required to unambiguously identify the destination code";
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 160} ;

cTelObservedDestinationCurrentData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":currentData;
    CHARACTERIZED BY
        observedDestinationCurrentDataPackage;
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 170} ;

cTelObservedDestinationHistoryData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":historyData;
    CHARACTERIZED BY
        observedDestinationCurrentDataPackage;
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 180} ;

cTelObservedHandoverCurrentData MANAGED OBJECT CLASS
    DERIVED FROM
        "ITU-T Rec. Q.822:1992":currentData;
    CHARACTERIZED BY
        externalHdoMeasurementFunctionPackage,

incomingExternalInterMSCHandoversPerCellPackage,

outgoingExternalInterMSCHandoversPerCellPackage;

CONDITIONAL PACKAGES

incomingExternalIntraMSCHandoversPerCellPackage

PRESENT IF "an instance supports it",

outgoingExternalIntraMSCHandoversPerCellPackage

PRESENT IF "an instance supports it";

REGISTERED AS {cTel-gsm-nmc-pm-objectClass 120} ;

cTelObservedHandoverHistoryData MANAGED OBJECT CLASS

DERIVED FROM

"ITU-T Rec. Q.822:1992":historyData;

CHARACTERIZED BY

externalHdoMeasurementFunctionPackage,

incomingExternalInterMSCHandoversPerCellPackage,

outgoingExternalInterMSCHandoversPerCellPackage;

CONDITIONAL PACKAGES

incomingExternalIntraMSCHandoversPerCellPackage

PRESENT IF "an instance supports it",

outgoingExternalIntraMSCHandoversPerCellPackage

PRESENT IF "an instance supports it";

REGISTERED AS {cTel-gsm-nmc-pm-objectClass 130} ;

--- NSS related currentData and historyData MOCs.

cTelEirCurrentData MANAGED OBJECT CLASS

DERIVED FROM

"ITU-T Rec. Q.822:1992":currentData;

CONDITIONAL PACKAGES

receivedIMEIcheckRequestPackage

PRESENT IF "an instance supports it",

whiteAnswersInEIRPackage

PRESENT IF "an instance supports it",

greyAnswersInEIRPackage

PRESENT IF "an instance supports it",

blackAnswersInEIRPackage

PRESENT IF "an instance supports it",

unknownIMEIAnswersInEIRPackage

PRESENT IF "an instance supports it";

REGISTERED AS {cTel-gsm-nmc-pm-objectClass 190} ;

cTelEirHistoryData MANAGED OBJECT CLASS

DERIVED FROM

"ITU-T Rec. Q.822:1992":historyData;

CHARACTERIZED BY

processorLoadPackage;
CONDITIONAL PACKAGES
receivedIMEIcheckRequestPackage
PRESENT IF "an instance supports it",
whiteAnswersInEIRPackage
PRESENT IF "an instance supports it",
greyAnswersInEIRPackage
PRESENT IF "an instance supports it",
blackAnswersInEIRPackage
PRESENT IF "an instance supports it",
unknownIMEIAnswersInEIRPackage
PRESENT IF "an instance supports it";
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 200} ;

cTelHlrCurrentData MANAGED OBJECT CLASS
DERIVED FROM
"ITU-T Rec. Q.822:1992":currentData;
CHARACTERIZED BY
sendAlertsPackage,
requestForMSRNPackage,
authenticationSetsHLRToVLRPackage,
insertSubscriberDataServicePackage,
msRoamingOutsideHLRPackage,
locationUpdatePackage,
processorLoadPackage;
CONDITIONAL PACKAGES
ssRelatedOperationsInHLRPackage
PRESENT IF "an instance supports it",
usersOfGPRSInHLRPackage
PRESENT IF "an instance supports GPRS function.",
gPRSRoutingReqsInHLRPackage
PRESENT IF "an instance supports GPRS function.";
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 210} ;

cTelHlrHistoryData MANAGED OBJECT CLASS
DERIVED FROM
"ITU-T Rec. Q.822:1992":historyData;
CHARACTERIZED BY
sendAlertsPackage,
requestForMSRNPackage,
authenticationSetsHLRToVLRPackage,
insertSubscriberDataServicePackage,
msRoamingOutsideHLRPackage,
locationUpdatePackage,

　　　　　processorLoadPackage;
　　　　CONDITIONAL PACKAGES
　　　　　　ssRelatedOperationsInHLRPackage
　　　　　　　　PRESENT IF "an instance supports it",
　　　　　　usersOfGPRSInHLRPackage
　　　　　　　　PRESENT IF "an instance supports GPRS function.",
　　　　　　gPRSRoutingReqsInHLRPackage
　　　　　　　　PRESENT IF "an instance supports GPRS function.";
REGISTERED AS　{cTel-gsm-nmc-pm-objectClass 220} ;

cTelSmscCurrentData MANAGED OBJECT CLASS
　　　DERIVED FROM
　　　　　"ITU-T Rec. Q.822:1992":currentData;
　　　CHARACTERIZED BY
　　　　　mobileOriginatingSMForwardingPackage ,
　　　　　mobileTerminatingSMForwardingPackage ,
　　　　　processorLoadPackage ;
REGISTERED AS　{cTel-gsm-nmc-pm-objectClass 230} ;

cTelSmscHistoryData MANAGED OBJECT CLASS
　　　DERIVED FROM
　　　　　"ITU-T Rec. Q.822:1992":historyData;
　　　CHARACTERIZED BY
　　　　　mobileOriginatingSMForwardingPackage,
　　　　　mobileTerminatingSMForwardingPackage,
　　　　　processorLoadPackage ;
REGISTERED AS　{cTel-gsm-nmc-pm-objectClass 240} ;

cTelVlrCurrentData MANAGED OBJECT CLASS
　　　DERIVED FROM
　　　　　"ITU-T Rec. Q.822:1992":currentData;
　　　CHARACTERIZED BY
　　　　　pageRequestPackage,
　　　　　pageRequestPerLocationAreaPackage,
　　　　　authenticationInVLRPackage,
　　　　　intraVLRLocationUpdatePackage,
　　　　　interVLRLocationUpdatePackage,
　　　　　currentSubscribersInVLRPackage,
　　　　　visitorsInVLRPackage,
　　　　　processorLoadPackage ,
　　　　　vlrRepuestForMSRNPackage,
　　　　　vlrInsertSubDataServicePackage;
　　　CONDITIONAL PACKAGES
　　　　　identificationRequestToPVLRPackage

PRESENT IF "an instance supports it",
authenticationSetsVLRToHLRPackage
PRESENT IF "an instance supports it";
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 250} ;

cTelVlrHistoryData MANAGED OBJECT CLASS
DERIVED FROM
"ITU-T Rec. Q.822:1992":historyData;
CHARACTERIZED BY
pageRequestPackage,
pageRequestPerLocationAreaPackage,
authenticationInVLRPackage,
intraVLRLocationUpdatePackage,
interVLRLocationUpdatePackage,
currentSubscribersInVLRPackage,
visitorsInVLRPackage,
processorLoadPackage,
vlrRepuestForMSRNPackage,
vlrInsertSubDataServicePackage;
CONDITIONAL PACKAGES
identificationRequestToPVLRPackage
PRESENT IF "an instance supports it",
authenticationSetsVLRToHLRPackage
PRESENT IF "an instance supports it";
REGISTERED AS {cTel-gsm-nmc-pm-objectClass 260} ;

---Definitions of packages
---Common Package
processorLoadPackage PACKAGE
BEHAVIOUR processorLoadPackageBehaviour BEHAVIOUR
DEFINED AS
"This package collects resource load for a specific gsm function";;
ATTRIBUTES
meanUsage GET,
peakUsage GET,
peakTime GET,
peakDuration GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 10} ;

signallingLinkSetTPTrafficPackage PACKAGE
BEHAVIOUR generalMeasurementPackageBehaviour;
ATTRIBUTES
blockedSignallingLinks GET,
signallingLinkBlockedTimes GET,

signallingLinkSetTPTrafficVolume GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 20} ;

---BSC Measurement Related Packages
requestForServicePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        unsuccReqsForService GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 30} ;

pagingMessageInBSCPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attTransOfPagingMessagesInBSC GET,
        unsuccTransOfPagingMessagesInBSC GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 40} ;

immediateAssignmentProceduresInBSCPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attImmediateAssignProcsInBSC GET,
        succImmediateAssignProcsInBSC GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 50} ;

internalHandoversIntraCellInBSCPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        succInternalHDOsIntraCellInBSC GET,
        unsuccInternalHDOsIntraCellInBSC GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 60} ;

internalHandoversInterCellInBSCPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        succInternalHDOsInBSC GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 70} ;

internalHandoversPerCausePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        succInternalHDOsPerCause GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 80} ;

internalHandoverFailuresInBSCPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        unsuccInternalHDOsWithReconnectionInBSC GET,
        unsuccInternalHDOsWithLossOfConnectionInBSC GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 90} ;

bscTrafficPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        bscTotalTrafficVolume GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 100} ;

bscPcuTrafficPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        meanPSInterArrivalTime GET,
        flushRequestReceived GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 105} ;

bscGPRSRlcSubLayerPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        nbrUmULBlock GET,
        nbrUmDLBlock GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 106} ;

bscGPRSNsSubLayerPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        nbrNsOctetSentBsc GET,
        nbrNsOctetRvdBsc GET,
        nbrNsPduSentBsc GET,
        nbrNsPduRvdBsc GET,
        nbrNsPduDiscardedBsc GET,
        nbrNsResetMegSentBsc GET,
        nbrNsResetMegRvdBsc GET,
        nbrNsResetAckMegSentBsc GET,
        nbrNsResetAckMegRvdBsc GET,
        nbrNsBlockMegSentBsc GET,
        nbrNsBlockMegRvdBsc GET,
        nbrNsBlockAckMegSentBsc GET,
        nbrNsBlockAckMegRvdBsc GET,
        nbrNsUnblockMegSentBsc GET,

nbrNsUnblockMegRvdBsc GET,

nbrNsUnblockAckMegSentBsc GET,

nbrNsUnblockAckMegRvdBsc GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 107} ;

---BTS Measurement Related Packages

btsTrafficPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        totalNumberOfSDCCH GET,

        availableSDCCH GET,

        attSDCCHSeizures GET,

        blockedSDCCH GET,

        droppedSDCCH GET,

        blockedTCH GET,

        attTCHSeizures GET,

        succTCHSeizures GET,

        droppedTCH GET,

        totalTrafficVolumeOfSDCCH GET,

        droppedSDCCHOnRF GET,

        averageHoldTimeOfSDCCH GET,

        cellBusyTimeOfSDCCH GET,

        averageTimeAssignOfSDCCH GET,

        availableTCH GET,

        totalTrafficVolumeOfTCH GET,

        numOfSuccAssignUnSeizure GET,

        droppedTCHOnRF GET,

        averageHoldTimeOfTCH GET,

        cellBusyTimeOfTCH GET,

        averageTimeAssignOfTCH GET,

        maxNumOfSeizuredTCH GET,

        availablePCH GET,

        attTransOfPagingMessagesThePCH GET,

        unsuccTransOfPagingMessagesThePCH GET,

        attImmediateAssignProcsInBTS GET,

        succImmediateAssignProcsInBTS GET,

        numOfAvailRadioCarriers GET,

        numOfAvailTrx GET,

        meanNbrOfIdleTCHsPerInterferenceBand GET,

        nbrOfPagesDiscardedFromPCHQueue GET,

        meanDurationOfSuccPagingProcs GET,

        meanPCHAGCHQueueLength GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 110} ;

powerLevelPackage PACKAGE

  BEHAVIOUR generalMeasurementPackageBehaviour;

  ATTRIBUTES

    powerOfMobileStation GET,

    powerOfBTS GET,

    strengthOfUplink GET,

    strengthOfDownlink GET,

    qualityOfUplink GET,

    qualityOfDownlink GET,

    meanCallDistance GET,

    attReqsForPowerIncreaseFromMS GET,

    attReqsForPowerReduceFromMS GET,

    attInstructionsForPowerIncreaseFromBSC GET,

    attInstructionsForPowerReduceFromBSC GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 120} ;

btsHandoverPackage PACKAGE

  BEHAVIOUR generalMeasurementPackageBehaviour;

  ATTRIBUTES

    succInternalHDOsIntraCellInBTS GET,

    unsuccInternalHDOsIntraCellInBTS GET,

    unsuccInternalHDOsForNoCHsIntraCellInBTS GET,

    unsuccInternalHDOsForSeizingNewCHIntraCellInBTS GET,

    unsuccInternalHDOsWithReconnectionIntraCellInBTS GET,

    succIncomingInternalHDOsIntraBSCInBTS GET,

    unsuccIncomingInternalHDOsIntraBSCInBTS GET,

    unsuccIncomingInternalHDOsForNoCHsIntraBSCInBTS GET,

    succOutgoingInternalHDOsIntraBscInBTS GET,

    unsuccOutgoingInternalHDOsIntraBSCInBTS GET,

    unsuccOutgoingInternalHDOsWithReconnectionIntraBSCInBTS GET,

    succIncomingExternalHDOsIntraMSCInBTS GET,

    unsuccIncomingExternalHDOsIntraMSCInBTS GET,

    unsuccIncomingExternalHDOsForNoCHsIntraMSCInBTS GET,

    unsuccIncomingHDOsForNotSeizingNewCHIntraMSCInBTS GET,

    succOutgoingExternalHDOsIntraMSCInBTS GET,

    unsuccOutgoingExternalHDOsIntraMSCInBTS GET,

    unsuccOutgoingExternalHDOsWithReconnectionIntraMSCInBTS GET,

    attHDOReqsForLowUplinkQuality GET,

    attHDOReqsForLowDownlinkQuality GET,

    attHDOReqsForLowUplinkPowerLevel GET,

    attHDOReqsForLowDownlinkPowerLevel GET,

    attHDOReqsForDistanceTooLongFromBTS GET,

    attHDOReqsForBetterCellFromMSC GET,

    attHDOReqsForUplinkDisturbance GET,

          attHDOReqsForDownlinkDisturbance GET,

          attHDOReqsForBetterPowerSelectedCell GET,

          attHDOReqsForUmbrellaCell GET,

          attIncomingExternalHDOsInterMSCInBTS GET,

          succIncomingExternalHDOsInterMSCInBTS GET,

          attOutgoingExternalHDOsInterMSCInBTS GET,

          succOutgoingExternalHDOsInterMSCInBTS GET,

          attDoubleFrequencyHDOs GET,

          succDoubleFrequencyHDOs GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 130} ;

btsLocationUpdatePackage   PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

          repagingReqsForMS GET,

          attLocationUpdateInBTS GET,

          unsuccLocationUpdate GET,

          periodicLocationUpdate GET,

          iMSIAttachments GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 140} ;

btsGPRSRadioResourcePackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

          succPDTCHSeizures GET,

          meanNbrAvailablePDCH GET,

          maxNbrAvailablePDCH GET,

          minNbrAvailablePDCH GET,

          meanNbrOfOccPDCH GET,

          maxNbrOfOccPDCH GET,

          minNbrOfOccPDCH GET,

          availablePDCHAllocatedTime GET,

          succPdchToTch GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 142} ;

btsGPRSPacketServicePackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

          nbrPacketPagingMessagesPCHOnPCCCH GET,

          meanPPCHPAGCHQueueLengthOnPCCCH GET,

          nbrOfPSPagesDiscardedFromPPCHQueueOnPCCCH GET,

          attPCReqAssPerCause GET,

          succPDTCHAssProcsPerCause GET,

          meanPacketQueueLength GET,

nbrOfServiceChanges GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 145} ;

----MSC Measuremnet related package
circuitEndPointSubgroupCurrentDataPackage PACKAGE
    BEHAVIOUR circuitEndPointSubgroupCurrentDataBehaviour BEHAVIOUR
    DEFINED AS
"The circuit subgroup current data is a subclass of the currentData object class. It is used for monitoring circuit subgroup related performance data as defined in Recommendation E.502. The performance monitoring attributes for the circuit subgroup are based on the circuit subgroup directionality characteristic, which can be one-way-out, one-way-in or two-way.";;
    ATTRIBUTES
        numberOfAvailCircuits INITIAL VALUE Q823-TM-ASN1Module.initialGauge;
REGISTERED AS {cTel-gsm-nmc-pm-package 150} ;

incomingCircuitEndPointSubgroupPackage PACKAGE
    ATTRIBUTES
        incomingBids INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        incomingSeizures INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        answeredIncomingSeizures INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        incomingBidsOverflow INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        incomingTrafficVolume INITIAL VALUE PM-TMN-ASN1Module.initialReal GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 160} ;

outgoingCircuitEndPointSubgroupPackage PACKAGE
    ATTRIBUTES
        outgoingBids INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        outgoingSeizures INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        answeredOutgoingSeizures INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        outgoingBidsOverflow INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        outgoingTrafficVolume INITIAL VALUE PM-TMN-ASN1Module.initialReal GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 170} ;

----C.3.3.6 Exchange Measurement Related Packages
mobileOrignatingCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attMobileOriginatingCalls GET,
        succMobileOriginatingCalls GET,
        ansMobileOriginatingCalls GET,
        failReasonForMobileOriginatingCalls GET,
        seizureTrafficVolumeForMobileOriginatingCalls GET,
        succTrafficVolumeForMobileOriginatingCalls GET,
        ansTrafficVolumeForMobileOriginatingCalls GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 180} ;

mobileTerminatingCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attMobileTerminatingCalls GET,
        succMobileTerminatingCalls GET,
        ansMobileTerminatingCalls GET,
        failReasonForMobileTerminatingCalls GET,
        seizureTrafficVolumeForMobileTerminatingCalls GET,
        succTrafficVolumeForMobileTerminatingCalls GET,
        ansTrafficVolumeForMobileTerminatingCalls GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 190} ;

incomingCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attIncomingCalls GET,
        succIncomingCalls GET,
        ansIncomingCalls GET,
        failReasonForIncomingCalls GET,
        seizureTrafficVolumeForIncomingCalls GET,
        succTrafficVolumeForIncomingCalls GET,
        ansTrafficVolumeForIncomingCalls GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 200} ;

outgoingCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attOutgoingCalls GET,
        succOutgoingCalls GET,
        ansOutgoingCalls GET,
        failReasonForOutgoingCalls GET,
        seizureTrafficVolumeForOutgoingCalls GET,
        succTrafficVolumeForOutgoingCalls GET,
        ansTrafficVolumeForOutgoingCalls GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 210} ;

localCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attLocalCalls GET,
        succLocalCalls GET,
        ansLocalCalls GET,

```
        failReasonForLocalCalls GET,
        seizureTrafficVolumeForLocalCalls GET,
        succTrafficVolumeForLocalCalls GET,
        ansTrafficVolumeForLocalCalls GET;
REGISTERED AS  {cTel-gsm-nmc-pm-package 220} ;


transitCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attTransitCalls GET,
        succTransitCalls GET,
        ansTransitCalls GET,
        failReasonForTransitCalls GET,
        seizureTrafficVolumeForTransitCalls GET,
        succTrafficVolumeForTransitCalls GET,
        ansTrafficVolumeForTransitCalls GET;
REGISTERED AS  {cTel-gsm-nmc-pm-package 230} ;


incomingTerminatingCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attIncomingTerminatingCalls GET,
        succIncomingTerminatingCalls GET,
        ansIncomingTerminatingCalls GET,
        failReasonForIncomingTerminatingCalls GET,
        seizureTrafficVolumeForIncomingTerminatingCalls GET,
        succTrafficVolumeForIncomingTerminatingCalls GET,
        ansTrafficVolumeForIncomingTerminatingCalls GET;
REGISTERED AS  {cTel-gsm-nmc-pm-package 240} ;


originatingOutgoingCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attOriginatingOutgoingCalls GET,
        succOriginatingOutgoingCalls GET,
        ansOriginatingOutgoingCalls GET,
        failReasonForOriginatingOutgoingCalls GET,
        seizureTrafficVolumeForOriginatingOutgoingCalls GET,
        succTrafficVolumeForOriginatingOutgoingCalls GET,
        ansTrafficVolumeForOriginatingOutgoingCalls GET;
REGISTERED AS  {cTel-gsm-nmc-pm-package 250} ;


abnormalCallPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
```

    ATTRIBUTES

        callsBlockedByLoadShedding GET,

        internalCongestionTrafficVolume GET,

        blockedTrafficVolumeBecauseOfTrunkBusy GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 260} ;

---Msc Measurement Related Packages

incomingInterMSCHandoversPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attIncomingInterMSCHDOs GET,

        succIncomingInterMSCHDOs GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 330} ;

outgoingInterMSCHandoversPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attOutgoingInterMSCHDOs GET,

        succOutgoingInterMSCHDOs GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 340} ;

subsequentInterMSCHandoversToMSCaPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attSubsequentInterMSCHDOsMSCa GET,

        succSubsequentInterMSCHDOsMSCa GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 350} ;

subsequentInterMSCHandoversToMSCcPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attSubsequentInterMSCHDOsMSCc GET,

        succSubsequentInterMSCHDOsMSCc GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 360} ;

externalHandoversPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        externalHDOs GET;

REGISTERED AS { cTel-gsm-nmc-pm-package 370} ;

externalHandoversPerCausePackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        externalHDOsPerCause GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 380} ;

externalHandoverFailurePerMSCPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        unsuccExternHDOsWithReconnectionPerMSC GET,
        unsuccExternHDOsWithLossOfConnectionPerMSC GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 390} ;

gradeOfServicePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        meanTimeToCallSetupService GET,
        meanTimeToLocationUpdateService GET,
        meanCallDuration GET,
        meanTrunkSeizureDuration GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 400} ;

mscPagingPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attSystemPaging   GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 410} ;

mscFaultPackage   PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        numOfMSCFault   GET,
        faultTimeOfMSC   GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 420} ;

mscEndCodePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        numOfEndCode   GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 425} ;

mscIMSIAttachDetachPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        imsiAttachProcs GET,
        imsiDetachProcs GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 427} ;

interrogatingHLRPackage PACKAGE

    BEHAVIOUR

        generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attInterrogationOfHLRsForRouting GET,

        succInterrogationOfHLRsMSRNObtained GET,

        succInterrogationOfHLRsCallForwarding GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 430} ;

---SSF related packages

ssfTrafficPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attIncomingCamelCallsToSSF GET,

        attOutgoingCamelCallsFromSSF GET,

        attCamelToCamelCalls GET,

        answeredCamelToCamelCalls GET,

        unsuccCamelCallsForSystemReason GET,

        unsuccCamelCallsForSubscriberReason GET,

        camelOriginatingTrafficVolume GET,

        camelTerminatingTrafficVolume GET,

        meanDurationOfCamelOriginatingCalls GET,

        meanDurationOfCamelTerminatingCalls GET,

        attCamelOriginatingCalls GET,

        seizuredCamelOriginatingCalls GET,

        connectedCamelOriginatingCalls GET,

        answeredCamelOrigiantingCalls GET,

        attCamelTerminatingCalls GET,

        seizuredCamelTerminatingCalls GET,

        connectedCamelTerminatingCalls GET,

        answeredCamelTerminatingCalls GET,

        seizuredCamelCalls GET,

        connectedCamelCalls GET,

        answeredCamelCalls GET,

        answeredCamelCallsTrafficVolume GET,

        connectedCamelCallsTrafficVolume GET,

        seizuredCamelCallsTrafficVolume GET,

        callingPartyEarlyReleaseCamelCalls GET,

        callingPartyRingingReleaseCamelCalls GET,

        calledPartyBusyCamelCalls GET,

        calledPartyNoAnswerCamelCalls GET,

        dp2 GET,

        dp4 GET,

        dp5 GET,

```
        dp6   GET,
        dp7   GET,
        dp9   GET,
        dp10  GET,
        dp12  GET,
        dp13  GET,
        dp14  GET,
        dp15  GET,
        dp17  GET,
        dp18  GET;
REGISTERED AS  { cTel-gsm-nmc-pm-package 470} ;
```

---Destination Related Packages
observedDestinationPackage PACKAGE
    BEHAVIOUR observedDestinationPackageBehaviour BEHAVIOUR
        DEFINED AS "This package specifies the destination to be observed in a MSC";;
    ATTRIBUTES
        observedDestinationId GET,
        destinationCode GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 480} ;

destinationTypePackage PACKAGE
    BEHAVIOUR destinationTypePackageBehaviour BEHAVIOUR
        DEFINED AS
"identifies the type of destination. It is either the nature of address in a seven bit string according to CCITT Recommendation Q.763, or the type of destination as an enumerated list.";;
    ATTRIBUTES
        destinationType GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 490} ;

observedDestinationCurrentDataPackage PACKAGE
    BEHAVIOUR observedDestinationCurrentDataBehaviour BEHAVIOUR
        DEFINED AS
"The Observed Destination current data is a subclass of the currentData object class. It is used for monitoring destination related performance data as defined in Recommendation E.502.";;
    ATTRIBUTES
        bids INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        outgoingSeizures INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        answeredOutgoingSeizures INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        noCircuitsAvailable INITIAL VALUE Q823-TM-ASN1Module.initialCount GET,
        seizureTrafficVolume INITIAL VALUE PM-TMN-ASN1Module.initialReal GET,
        answerTrafficVolume INITIAL VALUE PM-TMN-ASN1Module.initialReal GET ;
REGISTERED AS {cTel-gsm-nmc-pm-package 500} ;

———ObservedHandover Measurement Related Packages

externalHdoMeasurementFunctionPackage PACKAGE

    BEHAVIOUR observedHandoverPackageBehaviour BEHAVIOUR

        DEFINED AS

"This object is defined to contain the various optional measurement packages and will exist in multiple instances. It can only be instantiated if the cell attribute belongs to the msc area which is served by the msc function that contain the external HDO measurement function. The scanner may scan attributes of the object class in various combinations and permutations of packages, and further may scan simultaneously as many times as necessary within the processing limits of the network.";;

    ATTRIBUTES

        observedCell GET,

        adjacentCell GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 510} ;

incomingExternalInterMSCHandoversPerCellPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attIncomingInterMSCHDOsPerOriginatingCell GET,

        succIncomingInterMSCHDOsPerOriginatingCell GET;

REGISTERED AS { cTel-gsm-nmc-pm-package 520} ;

outgoingExternalInterMSCHandoversPerCellPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attOutgoingInterMSCHDOsPerTargetCell GET,

        succOutgoingInterMSCHDOsPerTargetCell GET;

REGISTERED AS { cTel-gsm-nmc-pm-package 530} ;

incomingExternalIntraMSCHandoversPerCellPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attIncomingExternalIntraMSCHDOsPerOriginatingCell GET,

        succIncomingExternalIntraMSCHDOsPerOriginatingCell GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 540} ;

outgoingExternalIntraMSCHandoversPerCellPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attOutgoingExternalIntraMSCHDOsPerTargetCell GET,

        succOutgoingExternalIntraMSCHDOsPerTargetCell GET;

REGISTERED AS { cTel-gsm-nmc-pm-package 550} ;

———EIR Measurement Related Packages

receivedIMEIcheckRequestPackage PACKAGE

        BEHAVIOUR generalMeasurementPackageBehaviour;
        ATTRIBUTES
            nbrOfReceivedIMEICheckReqs GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 560} ;

whiteAnswersInEIRPackage PACKAGE
        BEHAVIOUR generalMeasurementPackageBehaviour;
        ATTRIBUTES
            nbrOfWhiteAnsInEIR GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 570} ;

greyAnswersInEIRPackage PACKAGE
        BEHAVIOUR generalMeasurementPackageBehaviour;
        ATTRIBUTES
            nbrOfGreyAnsInEIR GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 580} ;

blackAnswersInEIRPackage PACKAGE
        BEHAVIOUR generalMeasurementPackageBehaviour;
        ATTRIBUTES
            nbrOfBlackAnsInEIR GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 590} ;

unknownIMEIAnswersInEIRPackage PACKAGE
        BEHAVIOUR generalMeasurementPackageBehaviour;
        ATTRIBUTES
            nbrOfUnknownIMEIAnsInEIR GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 600} ;

---HLR Measurement Related Packages
sendAlertsPackage PACKAGE
        BEHAVIOUR generalMeasurementPackageBehaviour;
        ATTRIBUTES
            attNbrOfSendAlerts GET,
            succNbrOfSendAlerts GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 610} ;

requestForMSRNPackage PACKAGE
        BEHAVIOUR generalMeasurementPackageBehaviour;
        ATTRIBUTES
            attReqForMSRN GET,
            succReqForMSRN GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 620} ;

authenticationSetsHLRToVLRPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attReqForAuthSetsReceivedByHLRFromVLRs GET,
        succReturnedAuthSetsFromHLRToVLRs GET,
        emptyResponsesForAuthSetsFromHLRToVLRs GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 630} ;

insertSubscriberDataServicePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attInsertSubDataService GET,
        succInsertSubDataService GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 640} ;

msRoamingOutsideHLRPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        nbrOfCurrentMSsRoamingOutsideHLR GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 650} ;

locationUpdatePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attLocationUpdate GET,
        succLocationUpdate GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 660} ;

ssRelatedOperationsInHLRPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attSSRelatedOperationsInHLR GET,
        succSSRelatedOperationsInHLR GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 670} ;

usersOfGPRSInHLRPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        numOfGSMGPRSUsers GET,
        numOfGPRSOnlyUsers GET,
        numOfRoamingGPRSUsers GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 675} ;

gPRSRoutingReqsInHLRPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attGPRSRoutingReqsInHLR GET,
        succGPRSRoutingReqsInHLR GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 677} ;

---SMSC Measurement Related Packages
mobileOriginatingSMForwardingPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attMobileOriginatingSMForwardings GET,
        succMobileOriginatingSMForwardings GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 680} ;

mobileTerminatingSMForwardingPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attMobileTerminatingSMForwardings GET,
        succMobileTerminatingSMForwardings GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 690} ;

---VLR Measurement Related Packages
pageRequestPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attPageReqs GET,
        succPageReqs GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 700} ;

pageRequestPerLocationAreaPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attPageReqsPerLocationArea GET,
        succPageReqsPerLocationArea GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 705} ;

authenticationInVLRPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attAuthProcsInVLR GET,
        succAuthProcsInVLR GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 710} ;

intraVLRLocationUpdatePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attIntraVLRLocationUpdates GET,
        succIntraVLRLocationUpdates GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 720} ;

interVLRLocationUpdatePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attInterVLRLocationUpdates GET,
        succInterVLRLocationUpdates GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 730} ;

currentSubscribersInVLRPackage PACKAGE
    BEHAVIOUR currentSubscribersInVLRPackageBechaviour BEHAVIOUR
        DEFINED AS
"This package provides counter to record runtime subscribers in this VLR, roaming subscribers included.";;
    ATTRIBUTES
        nbrOfCurrentSubscriberInVLR GET;
REGISTERED AS {cTel-gsm-nmc-pm-package 740} ;

visitorsInVLRPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        nbrOfVisitorsInVLR GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 750} ;

vlrRepuestForMSRNPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attReqsForMSRNFromHLR GET,
        unsuccRepsForMSRNToHLR GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 760} ;

vlrInsertSubDataServicePackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;
    ATTRIBUTES
        attInsertSubDataServiceFromHLR GET,
        unsuccInsertSubDataServiceToHLR GET;
REGISTERED AS { cTel-gsm-nmc-pm-package 770} ;

identificationRequestToPVLRPackage PACKAGE
    BEHAVIOUR generalMeasurementPackageBehaviour;

ATTRIBUTES

        attIdentificationReqToPVLRs GET,

        succIdentificationReqToPVLRs GET;

REGISTERED AS {cTel-gsm-nmc-pm-package 780} ;

authenticationSetsVLRToHLRPackage PACKAGE

    BEHAVIOUR generalMeasurementPackageBehaviour;

    ATTRIBUTES

        attReqForAuthSetsSentToHLR GET,

        succReceivedAuthSetsFromHLR GET,

        emptyResponsesForAuthFromHLR GET;

REGISTERED AS { cTel-gsm-nmc-pm-package 790} ;

----Definitions of attributes

----Common Package related Attributes

answer ATTRIBUTE

    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":counter;

    MATCHES FOR EQUALITY;

    BEHAVIOUR answerBehaviour BEHAVIOUR

        DEFINED AS

"information sent in the backward direction indication that the call is answered. This term is defined in Annex A E.410" ;;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 10} ;

seizure ATTRIBUTE

    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":counter;

    BEHAVIOUR seizureBehaviour BEHAVIOUR

        DEFINED AS

"a bid for a circuit in a circuit subgroup which succeeds in obtaining a circuit in that circuit subgroup.";;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 20} ;

meanUsage ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;

    BEHAVIOUR meanUsageBehaviour BEHAVIOUR

        DEFINED AS

"This attribute indiccates the average utilized portion of resources allocated for the function or equipment and average using time of the resources so far.";;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 30} ;

peakUsage ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;

    BEHAVIOUR peakUsageBehaviour BEHAVIOUR

        DEFINED AS

"This attribute indicates the peak utilized portion of resources allocated for the function or equipment and

peak using time of the resources so far.";;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 40} ;

peakTime ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.PeakTime;

    BEHAVIOUR peakTimeBehaviour BEHAVIOUR

        DEFINED AS

"This attribute indicates when the utilization of the portion of resources allocated for the function or equipment reaches its peak so far.";;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 50} ;

peakDuration ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR peakDurationBehaviour BEHAVIOUR

        DEFINED AS

"This attribute indicates how long the peak utilized portion of resources allocated for the function or equipment lasts. Curently the default peak utilized portion is 90%";;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 60} ;

---cTelSignallingLinkSetTP Measurement Related Attributes

blockedSignallingLinks ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 70} ;

signallingLinkBlockedTimes ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 80} ;

signallingLinkSetTPTrafficVolume ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 90} ;

---Bsc Measurement Related Attributes

unsuccReqsForService ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 100} ;

attTransOfPagingMessagesInBSC ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 110} ;

unsuccTransOfPagingMessagesInBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 120} ;

attImmediateAssignProcsInBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 130} ;

succImmediateAssignProcsInBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 140} ;

succInternalHDOsIntraCellInBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 150} ;

unsuccInternalHDOsIntraCellInBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 160} ;

succInternalHDOsInBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 170} ;

succInternalHDOsPerCause ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 180} ;

unsuccInternalHDOsWithReconnectionInBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 185} ;

unsuccInternalHDOsWithLossOfConnectionInBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 190} ;

bscTotalTrafficVolume ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 195} ;

meanPSInterArrivalTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 196} ;

flushRequestReceived ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 197} ;

nbrUmULBlock ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4010} ;

nbrUmDLBlock ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4020} ;

nbrNsOctetSentBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4030} ;

nbrNsOctetRvdBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4040} ;

nbrNsPduSentBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4050} ;

nbrNsPduRvdBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4060} ;

nbrNsPduDiscardedBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4070} ;

nbrNsResetMegSentBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4080} ;

nbrNsResetMegRvdBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4090} ;

nbrNsResetAckMegSentBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    EHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4100} ;

nbrNsResetAckMegRvdBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4110} ;

nbrNsBlockMegSentBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4120} ;

nbrNsBlockMegRvdBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4130} ;

nbrNsBlockAckMegSentBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 4140} ;

nbrNsBlockAckMegRvdBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4150} ;

nbrNsUnblockMegSentBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4160} ;

nbrNsUnblockMegRvdBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4170} ;

nbrNsUnblockAckMegSentBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4180} ;

nbrNsUnblockAckMegRvdBsc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GPRSMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4190} ;

---C.3.4.3 Bts Measurement Related Attributes
totalNumberOfSDCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 200} ;

availableSDCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 210} ;

attSDCCHSeizures ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 220} ;

blockedSDCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 230} ;

droppedSDCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 240} ;

blockedTCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 250} ;

attTCHSeizures ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 255} ;

succTCHSeizures ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 260} ;

droppedTCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 270} ;

powerOfMobileStation ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 280} ;

powerOfBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 290} ;

strengthOfUplink ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 300} ;

strengthOfDownlink ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 310} ;

qualityOfUplink ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 320} ;

qualityOfDownlink ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 330} ;

meanCallDistance ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 340} ;

totalTrafficVolumeOfSDCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 350} ;

droppedSDCCHOnRF ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 360} ;

averageHoldTimeOfSDCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 370} ;

cellBusyTimeOfSDCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 380} ;

averageTimeAssignOfSDCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 390} ;

availableTCH ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 400} ;

totalTrafficVolumeOfTCH ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 410} ;

numOfSuccAssignUnSeizure ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 420} ;

droppedTCHOnRF ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 430} ;

averageHoldTimeOfTCH ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 440} ;

cellBusyTimeOfTCH ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 450} ;

averageTimeAssignOfTCH ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 460} ;

maxNumOfSeizuredTCH ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 470} ;

availablePCH ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 480} ;

attTransOfPagingMessagesThePCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 490} ;

unsuccTransOfPagingMessagesThePCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 500} ;

attImmediateAssignProcsInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 510} ;

succImmediateAssignProcsInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 520} ;

numOfAvailRadioCarriers ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 530} ;

numOfAvailTrx ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR numOfAvailTransceiversBehaviour BEHAVIOUR
        DEFINED AS
"This attribute specifies the number of available transceivers in the BTS.";;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 532} ;

meanNbrOfIdleTCHsPerInterferenceBand ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType8;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 534} ;

nbrOfPagesDiscardedFromPCHQueue ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 535} ;

meanDurationOfSuccPagingProcs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;

BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 536} ;

meanPCHAGCHQueueLength ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 537} ;

attReqsForPowerIncreaseFromMS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 540} ;

attReqsForPowerReduceFromMS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 550} ;

attInstructionsForPowerIncreaseFromBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 560} ;

attInstructionsForPowerReduceFromBSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 570} ;

---the follwoing attributes for the BTS Handover
succInternalHDOsIntraCellInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 580} ;

unsuccInternalHDOsIntraCellInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 590} ;

unsuccInternalHDOsForNoCHsIntraCellInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 600} ;

unsuccInternalHDOsForSeizingNewCHIntraCellInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 610} ;

unsuccInternalHDOsWithReconnectionIntraCellInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 620} ;

succIncomingInternalHDOsIntraBSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 630} ;

unsuccIncomingInternalHDOsIntraBSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 640} ;

unsuccIncomingInternalHDOsForNoCHsIntraBSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 650} ;

succOutgoingInternalHDOsIntraBscInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 660} ;

unsuccOutgoingInternalHDOsIntraBSCInBTSATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 670} ;

unsuccOutgoingInternalHDOsWithReconnectionIntraBSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 680} ;

succIncomingExternalHDOsIntraMSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 690} ;

unsuccIncomingExternalHDOsIntraMSCInBTS   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 700} ;

unsuccIncomingExternalHDOsForNoCHsIntraMSCInBTS   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 710} ;

unsuccIncomingHDOsForNotSeizingNewCHIntraMSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 720} ;

succOutgoingExternalHDOsIntraMSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 730} ;

unsuccOutgoingExternalHDOsIntraMSCInBTS   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 740} ;

unsuccOutgoingExternalHDOsWithReconnectionIntraMSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 750} ;

attHDOReqsForLowUplinkQuality ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 760} ;

attHDOReqsForLowDownlinkQuality   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 770} ;

attHDOReqsForLowUplinkPowerLevel ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 780} ;

attHDOReqsForLowDownlinkPowerLevel   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 790} ;

attHDOReqsForDistanceTooLongFromBTS   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 800} ;

attHDOReqsForBetterCellFromMSC   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 900} ;

attHDOReqsForUplinkDisturbance ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 910} ;

attHDOReqsForDownlinkDisturbance   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 920} ;

attHDOReqsForBetterPowerSelectedCell   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 930} ;

attHDOReqsForUmbrellaCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 940} ;

attIncomingExternalHDOsInterMSCInBTS   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 950} ;

succIncomingExternalHDOsInterMSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 955} ;

attOutgoingExternalHDOsInterMSCInBTS   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 960} ;

succOutgoingExternalHDOsInterMSCInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 970} ;

attDoubleFrequencyHDOs   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 980} ;

succDoubleFrequencyHDOs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 990} ;

---attribute for BTS location update
repagingReqsForMSATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1020} ;

attLocationUpdateInBTS ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1030} ;

unsuccLocationUpdate   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1040} ;

periodicLocationUpdate ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1050} ;

iMSIAttachments   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 1060} ;

succPDTCHSeizures ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4310} ;

meanNbrAvailablePDCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4320} ;

maxNbrAvailablePDCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4330} ;

minNbrAvailablePDCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4340} ;

meanNbrOfOccPDCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4350} ;

maxNbrOfOccPDCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4360} ;

minNbrOfOccPDCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4370} ;

availablePDCHAllocatedTime ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4380} ;

succPdchToTch ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4390} ;

nbrPacketPagingMessagesPCHOnPCCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4400} ;

meanPPCHPAGCHQueueLengthOnPCCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4410} ;

nbrOfPSPagesDiscardedFromPPCHQueueOnPCCCH ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4420} ;

attPCReqAssPerCause ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4430} ;

succPDTCHAssProcsPerCause ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4440} ;

meanPacketQueueLength ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4450} ;

nbrOfServiceChanges ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType9;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 4460} ;

---circuitEndPointSubgroup Measurement Related Attributes
numberOfAvailCircuits ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":gauge;
    BEHAVIOUR numberOfAvailCircuitsBehaviour BEHAVIOUR
        DEFINED AS
"identifies the number of circuits that can carry traffic including the ones currently carrying traffic. Whether

this value is provided as snapshot or as a mean value is left to the implementation as due to the normally high frequency of changes to the circuits, both methods are equivalent.";;
REGISTERED AS   {cTel-gsm-nmc-pm-attribute 1070} ;

incomingBids ATTRIBUTE
    DERIVED FROM bids;
    BEHAVIOUR incomingBidsBehaviour BEHAVIOUR
        DEFINED AS
"identifies the number of successful or unsuccessful attempts to seize a circuit in the circuit subgroup";;
REGISTERED AS   {cTel-gsm-nmc-pm-attribute 1080} ;

incomingSeizures ATTRIBUTE
    DERIVED FROM seizure;
    BEHAVIOUR incomingSeizuresBehaviour BEHAVIOUR
        DEFINED AS
"identifies the number of incoming seizures on the circuit subgroup.";;
REGISTERED AS   {cTel-gsm-nmc-pm-attribute 1090} ;

answeredIncomingSeizures ATTRIBUTE
    DERIVED FROM answer;
    BEHAVIOUR answeredIncomingSeizuresBehaviour BEHAVIOUR
        DEFINED AS
"identifies the number of incoming seizures where an answer signal was transmitted back to the preceding exchange.";;
REGISTERED AS   {cTel-gsm-nmc-pm-attribute 1100} ;

incomingBidsOverflow ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":counter;
    BEHAVIOUR incomingBidsOverflowBehaviour BEHAVIOUR
        DEFINED AS
"identifies the number of incoming bids overflowing from this circuit subgroup.";;
REGISTERED AS   {cTel-gsm-nmc-pm-attribute 1110} ;

incomingTrafficVolume ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR incomingTrafficVolumeBehaviour BEHAVIOUR
        DEFINED AS
"identifies the incoming traffic carried in erlang sec. Typically, this is provided via the sampling method.";;
REGISTERED AS   {cTel-gsm-nmc-pm-attribute 1120} ;

outgoingBids ATTRIBUTE
    DERIVED FROM bids;
    BEHAVIOUR outgoingBidsBehaviour BEHAVIOUR
        DEFINED AS

"identifies the number of successful or unsuccessful attempts to seize a circuit in the circuit subgroup";;
REGISTERED AS   {cTel–gsm–nmc–pm–attribute 1130} ;

outgoingSeizures ATTRIBUTE
        DERIVED FROM seizure;
        BEHAVIOUR outgoingSeizuresBehaviour BEHAVIOUR
            DEFINED AS
"identifies the number of outgoing bids which succeeded in obtaining a circuit within a circuit subgroup.";;
REGISTERED AS   {cTel–gsm–nmc–pm–attribute 1140} ;

outgoingBidsOverflow ATTRIBUTE
        DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":counter;
        BEHAVIOUR outgoingBidsOverflowBehaviour BEHAVIOUR
            DEFINED AS
"identifies the number of outgoing bids overflowing from this circuit subgroup.";;
REGISTERED AS   {cTel–gsm–nmc–pm–attribute 1145} ;

answeredOutgoingSeizures ATTRIBUTE
        DERIVED FROM answer;
        BEHAVIOUR answeredOutgoingSeizuresBehaviour BEHAVIOUR
            DEFINED AS
"identifies the number of outgoing seizures where an answer signal was received.";;
REGISTERED AS   {cTel–gsm–nmc–pm–attribute 1150} ;

outgoingTrafficVolume ATTRIBUTE
        WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType2;
        BEHAVIOUR outgoingTrafficVolumeBehaviour BEHAVIOUR
            DEFINED AS
"identifies the outgoing traffic carried in erlang sec. Typically, this is provided via the sampling method.";;
REGISTERED AS   {cTel–gsm–nmc–pm–attribute 1160} ;

----Exchange Measurement Related Attributes
attMobileOriginatingCalls ATTRIBUTE
        DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":counter;
        BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS   {cTel–gsm–nmc–pm–attribute 1170} ;

succMobileOriginatingCalls ATTRIBUTE
        WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType1;
        BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS   {cTel–gsm–nmc–pm–attribute 1180} ;

ansMobileOriginatingCalls ATTRIBUTE
        WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType1;

BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1190} ;

failReasonForMobileOriginatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType5;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1200} ;

seizureTrafficVolumeForMobileOriginatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1210} ;

succTrafficVolumeForMobileOriginatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1220} ;

ansTrafficVolumeForMobileOriginatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1230} ;

attMobileTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1240} ;

succMobileTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1250} ;

ansMobileTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1260} ;

failReasonForMobileTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType5;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1270} ;

seizureTrafficVolumeForMobileTerminatingCalls ATTRIBUTE

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    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1280} ;


succTrafficVolumeForMobileTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1290} ;


ansTrafficVolumeForMobileTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1300} ;


attIncomingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1310} ;


succIncomingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1320} ;


ansIncomingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1330} ;


failReasonForIncomingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType5;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1340} ;


seizureTrafficVolumeForIncomingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1350} ;


succTrafficVolumeForIncomingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS  {cTel-gsm-nmc-pm-attribute 1360} ;
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ansTrafficVolumeForIncomingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1370} ;

attOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1380} ;

succOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1390} ;

ansOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1400} ;

failReasonForOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType5;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1410} ;

seizureTrafficVolumeForOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1420} ;

succTrafficVolumeForOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1430} ;

ansTrafficVolumeForOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1440} ;

attLocalCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1450} ;

succLocalCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1460} ;

ansLocalCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1470} ;

failReasonForLocalCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType5;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1480} ;

seizureTrafficVolumeForLocalCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1490} ;

succTrafficVolumeForLocalCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1500} ;

ansTrafficVolumeForLocalCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1510} ;

attTransitCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1520} ;

succTransitCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1530} ;

ansTransitCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1540} ;

failReasonForTransitCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType5;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1550} ;

seizureTrafficVolumeForTransitCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1560} ;

succTrafficVolumeForTransitCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1570} ;

ansTrafficVolumeForTransitCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1580} ;

attIncomingTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1590} ;

succIncomingTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1600} ;

ansIncomingTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1610} ;

failReasonForIncomingTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType5;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1620} ;

seizureTrafficVolumeForIncomingTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM–TMN–ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel–gsm–nmc–pm–attribute 1630} ;

succTrafficVolumeForIncomingTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1640} ;

ansTrafficVolumeForIncomingTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1650} ;

attOriginatingOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1660} ;

succOriginatingOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1670} ;

ansOriginatingOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1680} ;

failReasonForOriginatingOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType5;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1690} ;

seizureTrafficVolumeForOriginatingOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1700} ;

succTrafficVolumeForOriginatingOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1710} ;

ansTrafficVolumeForOriginatingOutgoingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1720} ;

callsBlockedByLoadShedding ATTRIBUTE
      DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992":counter;
      BEHAVIOUR callsBlockedByLoadSheddingBehaviour BEHAVIOUR
          DEFINED AS
"identifies the number of calls which cannot be handled due to application of an exchange internal over-load protection mechanism.";;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1730} ;

internalCongestionTrafficVolume ATTRIBUTE
      WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
      BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1740} ;

blockedTrafficVolumeBecauseOfTrunkBusy ATTRIBUTE
      WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
      BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1750} ;

---MSC Measurement related attributes
attIncomingInterMSCHDOs ATTRIBUTE
      WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
      BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1940} ;

succIncomingInterMSCHDOs ATTRIBUTE
      WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
      BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1950} ;

attOutgoingInterMSCHDOs ATTRIBUTE
      WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
      BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1960} ;

succOutgoingInterMSCHDOs ATTRIBUTE
      WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
      BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1970} ;

attSubsequentInterMSCHDOsMSCa ATTRIBUTE
      WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
      BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1980} ;

succSubsequentInterMSCHDOsMSCa ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 1990} ;

attSubsequentInterMSCHDOsMSCc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2000} ;

succSubsequentInterMSCHDOsMSCc ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2010} ;

externalHDOs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2020} ;

externalHDOsPerCause ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType3;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2030} ;

unsuccExternHDOsWithReconnectionPerMSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2040} ;

unsuccExternHDOsWithLossOfConnectionPerMSC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2050} ;

meanTimeToCallSetupService ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2060} ;

meanTimeToLocationUpdateService ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2070} ;

meanCallDuration ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2080} ;

meanTrunkSeizureDuration ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2090} ;

attSystemPaging   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2100} ;

numOfMSCFault   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2110} ;

faultTimeOfMSC   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2120} ;

numOfEndCode   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType7;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2125} ;

imsiAttachProcs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2126} ;

imsiDetachProcs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2127} ;

attInterrogationOfHLRsForRouting ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2130} ;

succInterrogationOfHLRsMSRNObtained ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2140} ;

succInterrogationOfHLRsCallForwarding ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2150} ;

--- the following attributes for SSF Measuremnet.
attIncomingCamelCallsToSSF ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2220} ;

attOutgoingCamelCallsFromSSF   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2230} ;

attCamelToCamelCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2240} ;

answeredCamelToCamelCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2250} ;

unsuccCamelCallsForSystemReason   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2260} ;

unsuccCamelCallsForSubscriberReason ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2270} ;

camelOriginatingTrafficVolume   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS { cTel-gsm-nmc-pm-attribute 2280} ;

camelTerminatingTrafficVolume   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2290} ;

meanDurationOfCamelOriginatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2300} ;

meanDurationOfCamelTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2310} ;

attCamelOriginatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2320} ;

seizuredCamelOriginatingCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2330} ;

connectedCamelOriginatingCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2340} ;

answeredCamelOrigiantingCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2350} ;

attCamelTerminatingCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2360} ;

seizuredCamelTerminatingCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2370} ;

connectedCamelTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2380} ;

answeredCamelTerminatingCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2390} ;

seizuredCamelCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2400} ;

connectedCamelCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2410} ;

answeredCamelCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2420} ;

answeredCamelCallsTrafficVolume ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2430} ;

connectedCamelCallsTrafficVolume ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2440} ;

seizuredCamelCallsTrafficVolume ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2450} ;

callingPartyEarlyReleaseCamelCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2460} ;

callingPartyRingingReleaseCamelCalls ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2470} ;

calledPartyBusyCamelCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2480} ;

calledPartyNoAnswerCamelCalls   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2490} ;

dp2 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2500} ;

dp4 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2510} ;

dp5 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2520} ;

dp6 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2530} ;

dp7 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2540} ;

dp9 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2550} ;

dp10 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2560} ;

dp12 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2570} ;

dp13 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2580} ;

dp14 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2590} ;

dp15 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2600} ;

dp17 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2610} ;

dp18 ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2620} ;

----Destination Related Attributes
observedDestinationId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
    MATCHES FOR EQUALITY;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2630} ;

destinationCode ATTRIBUTE
        WITH ATTRIBUTE SYNTAX Q823-TM-ASN1Module.DestinationCode;
        MATCHES FOR EQUALITY, SUBSTRINGS, ORDERING;
        BEHAVIOUR destinationCodeBehaviour BEHAVIOUR
                DEFINED AS
"Identifies the country code, or an area code, or an exchange code or another location number to which object instance applies";;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2640} ;

destinationType ATTRIBUTE
        WITH ATTRIBUTE SYNTAX Q823-TM-ASN1Module.DestinationType;
        MATCHES FOR EQUALITY;
        BEHAVIOUR destinationTypeBehaviour BEHAVIOUR
                DEFINED AS
"Identifies the type of destination. It is either the nature of address in a seven bit string according to Recommendation Q.763, or the type of destination as an enumerated list.";;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2650} ;

---Destination Observation Related Attributes
bids ATTRIBUTE
        DERIVED FROM "Rec. X.721 I ISO/IEC 10165-2 : 1992":counter;
        MATCHES FOR EQUALITY;
        BEHAVIOUR bidsBehaviour BEHAVIOUR
                DEFINED AS
"An attempt to obtain a circuit in a circuit subgroup or to a destination. A bid may be successful or unsuccessful in seizing a circuit in that circuit subgroup or to that destination. ";;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2660} ;

--answeredOutgoingSeizures ATTRIBUTE

noCircuitsAvailable ATTRIBUTE
        DERIVED FROM "Rec. X.721 I ISO/IEC 10165-2 : 1992":counter;
        BEHAVIOUR noCircuitsAvailableBehaviour BEHAVIOUR
                DEFINED AS
"identifies the number of bids resulting in unsuccessful call due to the fact that no free circuits leading to the observed destination was available; i.e. overflow resulting on the final circuit subgroup of that destination.";;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2670} ;

seizureTrafficVolume ATTRIBUTE
        WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
        BEHAVIOUR seizureTrafficVolumeBehaviour BEHAVIOUR
                DEFINED AS

"identifies the seizure traffic carried in erlang sec. Typically, this is provided via the sampling method.";;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2680} ;

answerTrafficVolume ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType2;
    BEHAVIOUR answeredTrafficVolumeBehaviour BEHAVIOUR
        DEFINED AS
"identifies the answer traffic carried in erlang sec. Typically, this is provided via the sampling method.";;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2690} ;

---Handover Observation Related Attributes
observedCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMCellName;
    BEHAVIOUR observedCellBehaviour BEHAVIOUR
        DEFINED AS
"This is the Cell that is to be observed for this measurement";;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2700} ;

adjacentCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMCellName;
    BEHAVIOUR adjacentCellBehaviour BEHAVIOUR
        DEFINED AS
"This is the Cell that is adjacent to the observed cell for this measurement";;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2710} ;

attIncomingInterMSCHDOsPerOriginatingCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS { cTel-gsm-nmc-pm-attribute 2720} ;

succIncomingInterMSCHDOsPerOriginatingCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2730} ;

attOutgoingInterMSCHDOsPerTargetCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2740} ;

succOutgoingInterMSCHDOsPerTargetCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2750} ;

attIncomingExternalIntraMSCHDOsPerOriginatingCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2760} ;

succIncomingExternalIntraMSCHDOsPerOriginatingCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2770} ;

attOutgoingExternalIntraMSCHDOsPerTargetCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2780} ;

succOutgoingExternalIntraMSCHDOsPerTargetCell ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2790} ;

---NSS Measurement Related Attributes
---EIR Measurement Related Attributes
nbrOfReceivedIMEICheckReqs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2800} ;

nbrOfWhiteAnsInEIR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2810} ;

nbrOfGreyAnsInEIR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2820} ;

nbrOfBlackAnsInEIR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2830} ;

nbrOfUnknownIMEIAnsInEIR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2840} ;

————C.3.4.8 HLR Measurement Related Attributes

attNbrOfSendAlerts ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS { cTel-gsm-nmc-pm-attribute 2850} ;

succNbrOfSendAlerts ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS { cTel-gsm-nmc-pm-attribute 2860} ;

attReqForMSRN ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2870} ;

succReqForMSRN ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2880} ;

attReqForAuthSetsReceivedByHLRFromVLRs ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2890} ;

succReturnedAuthSetsFromHLRToVLRs ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2900} ;

emptyResponsesForAuthSetsFromHLRToVLRs ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2910} ;

attInsertSubDataService ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2920} ;

succInsertSubDataService ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2930} ;

nbrOfCurrentMSsRoamingOutsideHLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2940} ;

attLocationUpdate ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2950} ;

succLocationUpdate ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2960} ;

attSSRelatedOperationsInHLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType4;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2970} ;

succSSRelatedOperationsInHLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType4;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2980} ;

numOfGSMGPRSUsers ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2982} ;

numOfGPRSOnlyUsers ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2984} ;

numOfRoamingGPRSUsers ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 2986} ;

attGPRSRoutingReqsInHLR ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2987} ;

succGPRSRoutingReqsInHLR ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2988} ;

---SMSC Measurement Related Attributes

attMobileOriginatingSMForwardings ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 2990} ;

succMobileOriginatingSMForwardings ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 3000} ;

attMobileTerminatingSMForwardings ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 3010} ;

succMobileTerminatingSMForwardings ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 3020} ;

---C.3.4.13 VLR Measurement Related Attributes

attPageReqs ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 3030} ;

succPageReqs ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;

    BEHAVIOUR generalMeasurementAttributeBehaviour;

REGISTERED AS {cTel-gsm-nmc-pm-attribute 3040} ;

attPageReqsPerLocationArea ATTRIBUTE

    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType6;

    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3043} ;

succPageReqsPerLocationArea ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType6;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3046} ;

attAuthProcsInVLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3050} ;

succAuthProcsInVLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3060} ;

attIntraVLRLocationUpdates ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3070} ;

succIntraVLRLocationUpdates ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3080} ;

attInterVLRLocationUpdates ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3090} ;

succInterVLRLocationUpdates ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3100} ;

nbrOfCurrentSubscriberInVLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    MATCHES FOR EQUALITY,ORDERING;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3110} ;

nbrOfVisitorsInVLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3120} ;

attReqsForMSRNFromHLR   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3130} ;

unsuccRepsForMSRNToHLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3140} ;

attInsertSubDataServiceFromHLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3150} ;

unsuccInsertSubDataServiceToHLR   ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3160} ;

attIdentificationReqToPVLRs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3170} ;

succIdentificationReqToPVLRs ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3180} ;

attReqForAuthSetsSentToHLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3190} ;

succReceivedAuthSetsFromHLR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3200} ;

emptyResponsesForAuthFromHLR ATTRIBUTE -
    WITH ATTRIBUTE SYNTAX PM-TMN-ASN1Module.GSMMeasurementType1;
    BEHAVIOUR generalMeasurementAttributeBehaviour;
REGISTERED AS {cTel-gsm-nmc-pm-attribute 3210} ;

---Definitions of actions
---There are no specific action in PM part
---Definitions of notifications

---There are no specific notification in PM part

---Definitions of behaviours
generalMeasurementPackageBehaviour BEHAVIOUR
    DEFINED AS
"Measurement packages are present in the currentData subclass (e.g. bscCurrentDaa) , if the network
Element Function (e.g. BSC) containing the currentData subclass supports the required number of instances
of the measurement included in the package according to the number of instances of the Measurement
Function. The simple scanner has been designed to read the values of the attributes according to a given
schedule." ;

generalMeasurementAttributeBehaviour BEHAVIOUR
    DEFINED AS
"The measurement that corresponds to this attribute, is described in NMC-OMC Interface Specification.
-Performance Management " ;

---Definition of name binding
cTelMeasurementScanner-cTelSimpleFileTransferControl NAME BINDING
    SUBORDINATE OBJECT CLASS cTelMeasurementScanner;
    NAMED BY
        SUPERIOR OBJECT CLASS "cTelCom": cTelSimpleFileTransferControl;
    WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
    CREATE;
    DELETE;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 10} ;

cTelSignallingLinkSetTPCurrentData-cTelSiganllingLinkSetTP NAME BINDING
    SUBORDINATE OBJECT CLASS cTelSignallingLinkSetTPCurrentData;
    NAMED BY
        SUPERIOR OBJECT CLASS "cTelCM": cTelSignallingLinkSetTP;
    WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE
        DELETES-CONTAINED-OBJECTS;

REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 20} ;

cTelSignallingLinkSetTPHistoryData-cTelSignallingLinkSetTPCurrentData NAME BINDING
 SUBORDINATE OBJECT CLASS cTelSignallingLinkSetTPHistoryData;
 NAMED BY
  SUPERIOR OBJECT CLASS cTelSignallingLinkSetTPCurrentData;
 WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
 CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
 DELETE;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 30} ;

cTelBscCurrentData-cTelBsc NAME BINDING
 SUBORDINATE OBJECT CLASS cTelBscCurrentData;
 NAMED BY
  SUPERIOR OBJECT CLASS "cTelCM": cTelBsc;
 WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
 CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
 DELETE
  DELETES-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 40} ;

cTelBscHistoryData-cTelBscCurrentData NAME BINDING
 SUBORDINATE OBJECT CLASS cTelBscHistoryData ;
 NAMED BY
  SUPERIOR OBJECT CLASS cTelBscCurrentData ;
 WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
 CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
 DELETE;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 50} ;

cTelBtsCurrentData-cTelBts NAME BINDING
 SUBORDINATE OBJECT CLASS cTelBtsCurrentData;
 NAMED BY
  SUPERIOR OBJECT CLASS "cTelCM": cTelBts;
 WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
 CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
 DELETE
  DELETES-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 60} ;

cTelBtsHistoryData–cTelBtsCurrentData NAME BINDING
    SUBORDINATE OBJECT CLASS cTelBtsHistoryData;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelBtsCurrentData;
    WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
    CREATE
        WITH–AUTOMATIC–INSTANCE–NAMING;
    DELETE;
REGISTERED AS {cTel–gsm–nmc–pm–nameBinding 70} ;

cTelCircuitEndPointSubgroupCurrentData–cTelCircuitEndPointSubgroup NAME BINDING
    SUBORDINATE OBJECT CLASS cTelCircuitEndPointSubgroupCurrentData;
    NAMED BY
        SUPERIOR OBJECT CLASS "cTelCM": cTelCircuitEndPointSubgroup;
    WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
    CREATE
        WITH–AUTOMATIC–INSTANCE–NAMING;
    DELETE
        DELETES–CONTAINED–OBJECTS;
REGISTERED AS {cTel–gsm–nmc–pm–nameBinding 210} ;

cTelCircuitEndPointSubgroupHistoryData–cTelCircuitEndPointSubgroupCurrentData NAME BINDING
    SUBORDINATE OBJECT CLASS cTelCircuitEndPointSubgroupHistoryData;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelCircuitEndPointSubgroupCurrentData;
    WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
    CREATE
        WITH–AUTOMATIC–INSTANCE–NAMING;
    DELETE
        DELETES–CONTAINED–OBJECTS;
REGISTERED AS {cTel–gsm–nmc–pm–nameBinding 220} ;

cTelExchangeCurrentData–cTelMscFunction NAME BINDING
    SUBORDINATE OBJECT CLASS cTelExchangeCurrentData ;
        NAMED BY
    SUPERIOR OBJECT CLASS "cTelCM": cTelMscFunction ;
    WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
    BEHAVIOUR cTelExchangeCurrentDataContainmentBehaviour BEHAVIOUR
        DEFINED AS
"only one instance of cTelExchangeCurrentData is allowed within managedElement instance of this class is inherently created by the NE";;
    CREATE
        WITH–AUTOMATIC–INSTANCE–NAMING;
    DELETE

DELETES-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 100} ;

cTelExchangeHistoryData-cTelExchangeCurrentData NAME BINDING
　　　SUBORDINATE OBJECT CLASS cTelExchangeHistoryData ;
　　　NAMED BY
　　　　　SUPERIOR OBJECT CLASS cTelExchangeCurrentData ;
　　　WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
　　　CREATE
　　　　　WITH-AUTOMATIC-INSTANCE-NAMING;
　　　DELETE;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 110} ;

cTelMscCurrentData-cTelMscFunction NAME BINDING
　　　SUBORDINATE OBJECT CLASS cTelMscCurrentData;
　　　NAMED BY
　　　　　SUPERIOR OBJECT CLASS "cTelCM": cTelMscFunction;
　　　WITH ATTRIBUTE "ITU-T Rec. X.739:1993" :scannerId;
　　　CREATE
　　　　　WITH-AUTOMATIC-INSTANCE-NAMING;
　　　DELETE
　　　　　DELETES-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 160} ;

cTelMscHistoryData-cTelMscCurrentData NAME BINDING
　　　SUBORDINATE OBJECT CLASS cTelMscHistoryData;
　　　NAMED BY
　　　　　SUPERIOR OBJECT CLASS cTelMscCurrentData ;
　　　WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
　　　CREATE
　　　　　WITH-AUTOMATIC-INSTANCE-NAMING;
　　　DELETE;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 170} ;

cTelObservedDestination-cTelMscFunction NAME BINDING
　　　SUBORDINATE OBJECT CLASS cTelObservedDestination;
　　　NAMED BY
　　　　　SUPERIOR OBJECT CLASS "cTelCM": cTelMscFunction;
　　　WITH ATTRIBUTE observedDestinationId;
　　　CREATE
　　　　　WITH-REFERENCE-OBJECT, WITH-AUTOMATIC-INSTANCE-NAMING;
　　　DELETE
　　　　　DELETES-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 180} ;

cTelObservedDestinationCurrentData–cTelObservedDestination NAME BINDING
  SUBORDINATE OBJECT CLASS cTelObservedDestinationCurrentData ;
  NAMED BY
    SUPERIOR OBJECT CLASS cTelObservedDestination ;
  WITH ATTRIBUTE "ITU–T Rec. X.739:1993": scannerId;
  CREATE
    WITH–AUTOMATIC–INSTANCE–NAMING;
  DELETE
    DELETES–CONTAINED–OBJECTS;
REGISTERED AS {cTel–gsm–nmc–pm–nameBinding 230} ;

cTelObservedDestinationHistoryData–cTelObservedDestinationCurrentData NAME BINDING
  SUBORDINATE OBJECT CLASS cTelObservedDestinationHistoryData;
  NAMED BY
    SUPERIOR OBJECT CLASS cTelObservedDestinationCurrentData;
  WITH ATTRIBUTE "ITU–T Rec. Q.822:1992": historyDataId;
  CREATE
    WITH–AUTOMATIC–INSTANCE–NAMING;
REGISTERED AS {cTel–gsm–nmc–pm–nameBinding 240} ;

cTelObservedHandoverCurrentData–cTelMscFunction NAME BINDING
  SUBORDINATE OBJECT CLASS cTelObservedHandoverCurrentData;
  NAMED BY
    SUPERIOR OBJECT CLASS "cTelCM": cTelMscFunction;
  WITH ATTRIBUTE "ITU–T Rec. X.739:1993": scannerId;
  CREATE
    WITH–AUTOMATIC–INSTANCE–NAMING;
  DELETE
    DELETES–CONTAINED–OBJECTS;
REGISTERED AS {cTel–gsm–nmc–pm–nameBinding 120} ;

cTelObservedHandoverHistoryData–cTelObservedHandoverCurrentData NAME BINDING
  SUBORDINATE OBJECT CLASS cTelObservedHandoverHistoryData;
  NAMED BY
    SUPERIOR OBJECT CLASS cTelObservedHandoverCurrentData ;
  WITH ATTRIBUTE "ITU–T Rec. Q.822:1992": historyDataId;
  CREATE
    WITH–AUTOMATIC–INSTANCE–NAMING;
  DELETE;
REGISTERED AS {cTel–gsm–nmc–pm–nameBinding 130} ;

––––NSS related name bindings
cTelEirCurrentData–cTelEirFunction NAME BINDING
  SUBORDINATE OBJECT CLASS cTelEirCurrentData;

NAMED BY
SUPERIOR OBJECT CLASS "cTelCM": cTelEirFunction;
WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
DELETES-CONTAINED-OBJECTS;
REGISTERED AS   {cTel-gsm-nmc-pm-nameBinding 80} ;

cTelEirHistoryData-cTelEirCurrentData NAME BINDING
SUBORDINATE OBJECT CLASS cTelEirHistoryData;
NAMED BY
SUPERIOR OBJECT CLASS cTelEirCurrentData ;
WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS   {cTel-gsm-nmc-pm-nameBinding 90} ;

cTelHlrCurrentData-cTelHlrFunction NAME BINDING
SUBORDINATE OBJECT CLASS cTelHlrCurrentData;
NAMED BY
SUPERIOR OBJECT CLASS "cTelCM": cTelHlrFunction;
WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
DELETES-CONTAINED-OBJECTS;
REGISTERED AS   {cTel-gsm-nmc-pm-nameBinding 140} ;

cTelHlrHistoryData-cTelHlrCurrentData NAME BINDING
SUBORDINATE OBJECT CLASS cTelHlrHistoryData;
NAMED BY
SUPERIOR OBJECT CLASS cTelHlrCurrentData;
WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS   {cTel-gsm-nmc-pm-nameBinding 150} ;

cTelSmscCurrentData-cTelSmsGIWFunction NAME BINDING
SUBORDINATE OBJECT CLASS cTelSmscCurrentData;
NAMED BY
SUPERIOR OBJECT CLASS "cTelCM": cTelSmsGIWFunction;

WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
CREATE
    WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 190} ;

cTelSmscHistoryData-cTelSmscCurrentData NAME BINDING
    SUBORDINATE OBJECT CLASS cTelSmscHistoryData;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelSmscCurrentData;
    WITH ATTRIBUTE "ITU-T Rec. Q.822:1992" :historyDataId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;DELETE;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 200} ;

cTelVlrCurrentData-cTelVlrFunction
    NAME BINDING
    SUBORDINATE OBJECT CLASS cTelVlrCurrentData;
    NAMED BY SUPERIOR OBJECT CLASS "cTelCM": cTelVlrFunction;
    WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
    CREATE WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE DELETES-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 250} ;

cTelVlrHistoryData-cTelVlrCurrentData NAME BINDING
    SUBORDINATE OBJECT CLASS cTelVlrHistoryData;
    NAMED BY
        SUPERIOR OBJECT CLASS cTelVlrCurrentData;
    WITH ATTRIBUTE "ITU-T Rec. Q.822:1992": historyDataId;
    CREATE
        WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 260} ;

cTelSsfCurrentData-cTelSsFunction
    NAME BINDING
    SUBORDINATE OBJECT CLASS cTelSsfCurrentData;
    NAMED BY SUPERIOR OBJECT CLASS "cTelCM": cTelSsFunction;
    WITH ATTRIBUTE "ITU-T Rec. X.739:1993": scannerId;
    CREATE WITH-AUTOMATIC-INSTANCE-NAMING;
    DELETE DELETES-CONTAINED-OBJECTS;
REGISTERED AS {cTel-gsm-nmc-pm-nameBinding 270} ;

cTelSsfHistoryData–cTelSsfCurrentData NAME BINDING
 SUBORDINATE OBJECT CLASS cTelSsfHistoryData;
 NAMED BY
  SUPERIOR OBJECT CLASS cTelSsfCurrentData;
 WITH ATTRIBUTE "ITU–T Rec. Q.822:1992": historyDataId;
 CREATE
  WITH–AUTOMATIC–INSTANCE–NAMING;
 DELETE;
REGISTERED AS {cTel–gsm–nmc–pm–nameBinding 280} ;

D.3.2 性能管理部分信息模型的 ASN.1 定义

PM–TMN–ASN1Module
{ ccitt (0) identified–organisation (4) chinaTeleCom (8) mobileDomain (0) gsm–Operation–Maintenance (3) version2 (2) nmc–omc–standard–pm (3) informationModel (0) asn1Model (2) typeDefinitions (1)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
IMPORTS
 cTel–gsm–nmc–pm
  FROM
ChinaTeleCom–GSM–DomainDefinitions {ccitt (0) identified–organisation (4) chinaTeleCom (8) mobileDomain (0) gsm–Operation–Maintenance (3) version2 (2) nmc–omc–standard–com (0) informationModel (0) asn1Model (2) oM–DomainDefinitions (0)} ;

cTel–gsm–nmc–pm–informationModel OBJECT IDENTIFIER ::= { cTel–gsm–nmc–pm informationModel (0)}
cTel–gsm–nmc–pm–objectClass OBJECT IDENTIFIER ::= { cTel–gsm–nmc–pm–informationModel managedObjectClass (3)}
cTel–gsm–nmc–pm–package OBJECT IDENTIFIER ::= {cTel–gsm–nmc–pm–informationModel package (4)}
cTel–gsm–nmc–pm–parameter OBJECT IDENTIFIER ::= { cTel–gsm–nmc–pm–informationModel parameter (5)}
cTel–gsm–nmc–pm–nameBinding OBJECT IDENTIFIER ::= { cTel–gsm–nmc–pm–informationModel nameBinding (6)}
cTel–gsm–nmc–pm–attribute OBJECT IDENTIFIER ::= {cTel–gsm–nmc–pm–informationModel attribute (7)}
cTel–gsm–nmc–pm–action OBJECT IDENTIFIER ::= {cTel–gsm–nmc–pm–informationModel action (9)}
cTel–gsm–nmc–pm–notification OBJECT IDENTIFIER ::= {cTel–gsm–nmc–pm–informationModel notification (10)}

GSMMeasurementType1 ::= INTEGER
GSMMeasurementType2 ::= REAL
GSMMeasurementType3 ::= SET OF SEQUENCE {
 cause Cause,
 value INTEGER
}

```
Cause ::= INTEGER
{
        ---Internal and External Handover causes   (GSM 08.08)
        uplinkQuality (24) ,
        uplinkStrength (25) ,
        downlinkQuality (26) ,
        downlinkStrength (27) ,
        distance (28) ,
        betterCell (29) ,
        operationAndMaintenanceIntervention (30) ,
        directedRetry (31) ,
        -- valid for external handovers only:
        responseToMscInvocation (32) ,


        -- Immediate assignment procedure causes   (GSM 04.08 [2]):
        emergencyCall (33) ,
        callReEstablishment (34) ,
        answerToPaging (35) ,
        originatingCall (36) ,
        locationUpdating (37) ,
        otherProcedures (38) ,
        reservedEstablishmentCause (39)
}
GSMMeasurementType4 ::= SET OF SEQUENCE
{
        ssOperation SSOperation,
        value INTEGER
}
---SS operation definitions  (GSM 09.02):
SSOperation ::= INTEGER {
        register (0) ,
        erase (1) ,
        activate (2) ,
        deactivate (3) ,
        registerPassword (4) ,
        interrogateSSOperation (5) ,
        processRequest (6)
}
GSMMeasurementType5 ::= SEQUENCE
{
        nbrOfCallLostBecauseOfTrunkUnavailable INTEGER,
        nbrOfCallLostBecauseOfExchangeCongested INTEGER,
        nbrOfAbnormalCalls INTEGER
```

```
}
GSMMeasurementType6 ::= SET OF SEQUENCE
{
    locationAreaCode LAC,
    value INTEGER
}
EndCode ::= ENUMERATED  {
    longCallNoAnswer (0) ,      --0 久叫不应
    calledPartyBusy (1) ,       --1 用户忙
    incompleteAddress (2) ,     --2 地址不全
    emptyNumber (3) ,           --3 空号
    timeoutRelease (4) ,        --4 超时释放
    equipmentCongestion (5) ,   --5 设备拥塞
    circuitCongestion (6) ,     --6 电路拥塞
    pagingNoResponse (7)        --7 寻呼无响应
}
GSMMeasurementType7 ::= SET OF SEQUENCE
{
    endCode EndCode,
    value INTEGER
}
GSMMeasurementType8 ::= SEQUENCE {
    channelsPerInterferenceBand1 REAL,
    channelsPerInterferenceBand2 REAL,
    channelsPerInterferenceBand3 REAL,
    channelsPerInterferenceBand4 REAL,
    channelsPerInterferenceBand5 REAL
}
GSMMeasurementType9 ::= SEQUENCE  {
    numOfUpgrades    INTEGER,
    numOfDowngrades INTEGER
}


PeakTime::=GeneralizedTime
LAC ::= INTEGER  (0..65535)
GSMCellName ::= SEQUENCE
{
    cellId INTEGER (0..65535) ,
    locationAreaCode LAC
}
initialReal REAL ::= 0


GPRSMeasurementType3 ::= SET OF SEQUENCE
```

```
{
    nsvci     INTEGER,
    value     INTEGER
}
END
```

附录 E

（规范性附录）

批量数据文件格式定义

E.1 说明

所有的性能测量任务的结果、配置的同步信息、事件同步信息以及批量获取的 Log 记录信息都要存储在一个或多个测量文件中。这些结果文件应通过 BER 来进行编码。

为了能描述所要传输文件的必要信息，本规范中对所传输文件的文件名定义了一套标准的命名规则。具体的命名格式如下：

> File_name := <OMC_name> <separator1> <file_type> <separator1> <transferId> <separator2> <generation_time> [<separator2> <suffix>]

其中：

— 参数 "OMC_name" 标识了产生该文件的 OMC 的名称，其中不允许含有字符 '_' 和 '.'；

— 参数 "separator1" 为字符 '_'；

— 参数 "file_type" 标识了所传输的文件的类型，可以是 "pm"、"cm"、"event" 和 "log"；

— 参数 "transferId" 标识了该文件所归属的文件传输任务，其值等于相应的文件准备就绪通知中的 "transferId"；

— 参数 "separator 2" 为 '.'；

— 参数 "generation_time" 的格式为 "MMDDYYYYHHmmss" 其中 2 位的 MM 代表月份，2 位的 DD 代表天，4 位的 YYYY 代表文件产生的年份，2 位的 HH 代表小时，2 位的 mm 代表分钟，2 位的 ss 代表秒，例如一个在 1998 年 11 月 10 日上午 8 时生成的文件的名字中参数 "generation_time" 应当是 "11101998080000"；

— 参数 "suffix" 用于一个结果存放在几个文件的情况，其顺序应当反映文件生成的先后顺序，参数的格式为数字型，例如一个测量任务返回两个结果文件，首先生成的文件的参数 "suffix" 的值为 1，另一个则为 2。

E.2 文件格式 ASN.1 定义

FileFormat –ASN1Module { ccitt（0）identified –organisation（4）chinaTeleCom（8）mobileDomain（0）gsm–Operation–Maintenance（3）version2（2）nmc–omc–standard–com（0）informationModel（0）asn1Model（2）fileFormatDefinitions（2）}

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

IMPORTS

GetResult, EventReportArgument

FROM CMIP-1 {joint–iso–ccitt 9 cmip （1） modules （0） protocol （3）} ;

ObjectDataFile ::= SEQUENCE

{

productionDateTime　[0]　GeneralizedTime,

objectData   [1]   IMPLICIT SEQUENCE OF ObjectInfo
}
ObjectInfo ::= GetResult

--- The LogFile type is used to save the log records in a file. The object info should be taken from the log records.
LogFile ::= ObjectDataFile

--- The CMFile type is used for CM syncronization. The object info is taken from the MO instances of the CM part.
CMDataFile ::= ObjectDataFile

--- The EventDataFile is used for event retransmission.
EventDataFile ::= SEQUENCE   {
    syncronizationTime   GeneralizedTime,
    eventInfoList   SET OF EventReportArgument
}

--- The PMFile is used to storre the PM part information, the object info should get from the hsitoryData object instances.
PMDataFile ::= ObjectDataFile

END

附录 F

（规范性附录）

管理信息模型总览

## F.1 管理信息模型中管理对象继承树

管理对象继承树如图 F.1 所示。
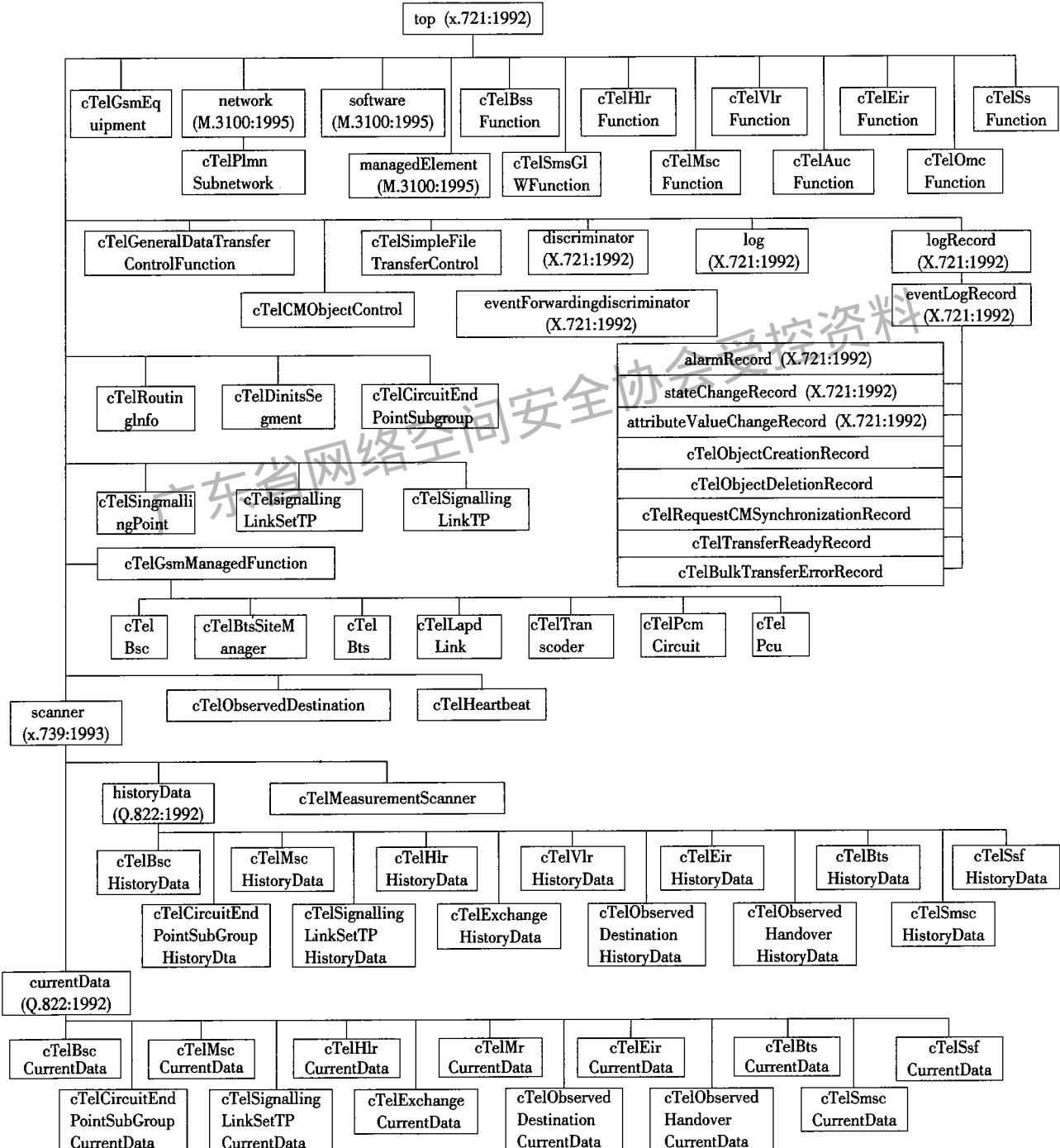
图 F.1 管理对象继承树

## F.2 管理信息模型中管理对象包含树

管理对象包含树如图 F.2 所示。
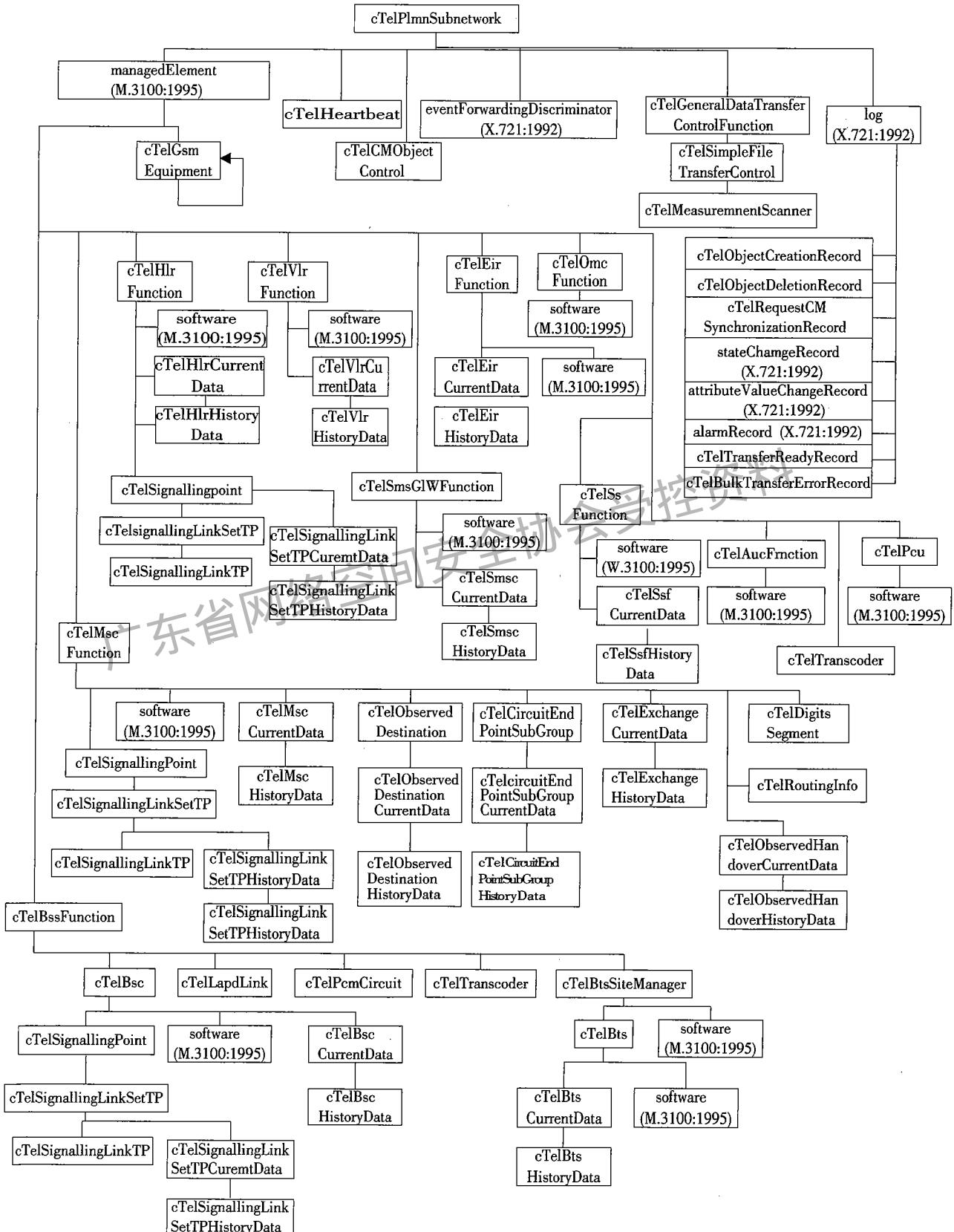
图 F.2 管理对象包含树

在图 F.2 的管理对象包含树中，cTelPlmnSubnetwork 在最高层，它代表被一个 OMC 管理的一个子网；managedElement 在第二层。一个 cTelPlmnSubnetwork 可以包含若干个 managedElement。

managedElement 的管理能力由厂商决定，其基本原则是以功能实体单元为基本单位，将实现在同一物理实体上的一个或多个功能实体归在同一个 managedElement 下进行管理。对于实现在一个物理实体上的多个功能实体，则在某个 ME 下应实例化该物理设备和相应的功能实体组，如将实现在一个设备上的 mscFunction、vlrFunciton 以及相应的 gsmEquipment 实例化在同一个 ME 下。

中 华 人 民 共 和 国
通 信 行 业 标 准

900/1800MHz TDMA 数字蜂窝移动通信网
网络管理接口技术要求——基于 CMIP 的接口定义
YD/T 1280-2003

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