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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocols and Switching (SPS), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

The present document is part 1 of a multi-part EN covering Telecommunications Management Network (TMN); Information models and protocols for the management and control of the Asynchronous Transfer Mode (ATM) switching network element, as identified below:

Part 1: "Q3 interface specification";

NOTE: Other parts will be defined later.

<table>
<thead>
<tr>
<th>Proposed national transposition dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of latest announcement of this EN (doa):</td>
</tr>
<tr>
<td>Date of latest publication of new National Standard or endorsement of this EN (dop/e):</td>
</tr>
<tr>
<td>Date of withdrawal of any conflicting National Standard (dow):</td>
</tr>
</tbody>
</table>
1 Scope

The present document specifies the Q3 interface between an Asynchronous Transfer Mode (ATM) switch and the Telecommunications Management Network (TMN) for the support of configuration, fault and performance management functions. The interface specified is that between TMN network elements or Q-adapters which interface to TMN Operations Systems (OSs) without mediation and between OSs and mediation devices, as defined in ITU-T Recommendation M.3010 [5]. Fault and performance management together include both passive monitoring of reports and active fault isolation.

The configuration by management of channels for signalling, including those for B-ISDN signalling, is within the scope of the present document. The management of broadband customer administration and the configuration for call routing including that for interworking with narrowband switches for both incoming and outgoing interfaces is also within the scope of the present document.

An ATM switch may include ATM crossconnect functionality, but this is specified by reference to ETS 300 820-1 [21] or the ITU-T Recommendation I.751 [4] and by importing the relevant classes of managed objects where appropriate.

Existing protocols are used where possible, and the focus of the work is on defining the object model. The definition of the functionality of TMN operations systems is outside the scope of the present document.

The management of ATM Adaptation Layers (AALs) which are only used in the user plane is outside the scope of the present document since the broadband switch management has no visibility of ATM adaptation for the user plane. Management of AAL5 and the Signalling ATM Adaptation Layer (SAAL) is within the scope since these are used in the control plane.

Security management is outside the scope of the present document.

2 References

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case the latest version applies.

A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

2.1 Normative references


ITU-T Recommendation Q.2110: "B-ISDN ATM adaptation layer - service specific connection oriented protocol (SSCOP)".

ITU-T Recommendation Q.2130: "B-ISDN signalling ATM adaptation layer - service specific coordination function for support of signalling at the user network interface (SSFC At UNI)".

ITU-T Recommendation Q.2140: "B-ISDN ATM Adaptation Layer - Service Specific Coordination Function for the Support of Signalling at the Network Node Interface (SSFC at NNI)".

ITU-T Recommendation Q.2761: "Broadband integrated services digital network (B-ISDN) - Functional description of the B-ISDN user part (B-ISUP) of signalling system No. 7".

ITU-T Recommendation Q.2762: "Broadband integrated services digital network (B-ISDN) - General functions of messages and signals of the B-ISDN user part (B-ISUP) of Signalling System No. 7".

ITU-T Recommendation Q.2763: "Broadband Integrated Services Digital Network (B-ISDN) - Signaling System No. 7 B-ISDN user part (B-ISUP) - formats and codes".

ITU-T Recommendation Q.2764: "Broadband Integrated Services Digital Network (B-ISDN) - Signalling system no. 7 B-ISDN user part (B-ISUP) - Basic call procedures".

ITU-T Recommendation Q.2931: "Broadband Integrated Services Digital Network (B-ISDN) - Digital subscriber signalling system no. 2 (DSS 2) - User-network interface (UNI) - Layer 3 specification for basic call/connection control".


ETS 300 469: "Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM); Management of the network element view [ITU-T Recommendation I.751 (1996)]".

ETS 300 820-1: "Asynchronous Transfer Mode (ATM); Configuration management information model for the X-type interface between Operation Systems (OSs) of a Virtual Path (VP)/Virtual Channel (VC) cross connected network; Part 1: Configuration management aspects".

### 2.2 Informative references

ITU-T Recommendation Q.811: "Lower layer protocol profiles for the Q3 X interfaces".

ITU-T Recommendation Q.812: "Upper layer protocol profiles for the Q3 and X interfaces".

ITU-T Recommendation G.773: "Protocol suites for Q-interfaces for management of transmission systems".

ITU-T Recommendation G.784: "Synchronous digital hierarchy (SDH) management".

ITU-T Recommendation Q.822 (1993): "Stage 1, stage 2 and stage 3 description for the Q3 interface - Performance Management".
3 Definitions and abbreviations

3.1 Definitions

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

**permanent VCC**: A VCC which is established by configuration management, not by on-demand call control.

**virtual channel trail**: Standard ATM terminology for VCC.

**virtual channel trail termination point**: The end point of a VCC, marking the extremity of an end-to-end F5 OAM flow.

**virtual channel connection termination point**: An intermediate point of a VCC, possibly marking the extremity of a segment F5 OAM flow.

**virtual path trail**: Standard ATM terminology for VPC.

**virtual path trail termination point**: Tnd point of a VPC, marking the extremity of an end-to-end F4 OAM flow.

**virtual path connection termination point**: An intermediate point of a VPC, possibly marking the extremity of a segment F4 OAM flow.

In addition, the terms below apply as defined in ITU-T Recommendations as follows:

**F4 OAM flow**: See ITU-T Recommendation I.610 [3].

**F5 OAM flow**: See ITU-T Recommendation I.610 [3].

**trail termination point**: See ITU-T Recommendation M.3100 [6].

**virtual channel**: See ITU-T Recommendation I.311 [1].

**virtual channel connection**: See ITU-T Recommendation I.311 [1].

**virtual path**: See ITU-T Recommendation I.311 [1].

**virtual path connection**: See ITU-T Recommendation I.311 [1].

3.2 Abbreviations

For the purpose of the present document the following abbreviations are used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AAL</td>
<td>ATM Adaptation Layer</td>
</tr>
<tr>
<td>AIS</td>
<td>Alarm Indication Signal</td>
</tr>
<tr>
<td>ASN.1</td>
<td>Abstract Syntax Notation 1</td>
</tr>
<tr>
<td>ATM</td>
<td>Asynchronous Transfer Mode</td>
</tr>
<tr>
<td>CMIP</td>
<td>Common Management Information Protocol</td>
</tr>
<tr>
<td>CRC</td>
<td>Cyclic Redundancy Check</td>
</tr>
<tr>
<td>GDMO</td>
<td>Guidelines for the Definition of Managed Objects</td>
</tr>
<tr>
<td>LOF</td>
<td>Loss of Frame</td>
</tr>
<tr>
<td>LOS</td>
<td>Loss Of Signal</td>
</tr>
<tr>
<td>OAM</td>
<td>Operations, Administration and Maintenance</td>
</tr>
<tr>
<td>OS</td>
<td>Operating System</td>
</tr>
<tr>
<td>NE</td>
<td>Network Element</td>
</tr>
<tr>
<td>NNI</td>
<td>Network Node Interface</td>
</tr>
<tr>
<td>PDU</td>
<td>Protocol Data Unit</td>
</tr>
<tr>
<td>PL</td>
<td>Physical Layer</td>
</tr>
</tbody>
</table>
4 Information model diagrams

The following information model diagrams have been drawn for the purpose of clarifying the relations between the different object classes of the model. There are three different types of diagrams:

1) entity relationship models showing the relations of the different managed objects;

2) inheritance hierarchy showing how managed objects are derived from each other (i.e. the different paths of inherited characteristics of the different managed objects);

3) naming hierarchy showing the derivation of names for managed objects (i.e. the different naming paths for instances of managed objects).

These three different types of diagram are only for clarification. The formal specification in terms of Guidelines for the Definition of Managed Objects (GDMO) templates and ASN.1 type definitions is the relevant information for the implementation of the present document.

4.1 Entity-relationship models

The following conventions are used in the diagrams:

- **is contained in**
- **is associated with**
- **'is-a' relation (inheritance)**
- **1 : 1**
- **1 : N**
- **unidirectional**
- **bidirectional**

**Figure 1: Conventions used in diagrams for entity relationship models**

Where the directionality of containment is not clear it can be identified by implication since the root class is unique.
4.1.1 ATM generic modelling

Modelling of ATM is restricted to bi-directional trails so that there is always a backwards channel for Operations and Maintenance (OAM) purposes.

The interfaces to the ATM switching network element are labelled by instances of the interface set of classes. These interfaces consist of User-Network Interfaces (UNIs), which are labelled by instances of the class uni, and of Network Node Interfaces (NNIs) which are labelled by instances of the class intraNNI if the interface is to the same network as the network element, or by instances of the class interNNI if the interface is to a different network. The managed objects which label the interfaces are contained in the instance of atmSwitch and point to an instance of tcAdaptorTTPBidirectional class which represents the adaptation of the ATM layer to the underlying physical infrastructure.

Instances of tcAdaptorTTPBidirectional are contained in the instance of atmSwitch. The adaptation to a physical infrastructure, represented by an instance of tcAdaptorTTPBidirectional, serves a number of virtual path trails which pass through the associated interface. The intermediate points on these trails which are served by the adaptation are represented by instances of vpCTPBidirectional class which are contained in the instance of tcAdaptorTTPBidirectional. The instance of tcAdaptorTTPBidirectional may also contain an instance of atmAccessProfile which characterizes the virtual paths.

An instance of atmAccessProfile may also be contained in an instance of vpTTPBidirectional, which represents the end point of virtual path trail, to characterize the virtual channels served by the virtual path trail. The intermediate points of the virtual channel trails are represented by instances of vcCTPBidirectional which are contained in the instance of vpTTPBidirectional. The end points of the virtual channel trails are represented by instances of vcTTPBidirectional. Instances of vpTTPBidirectional and of vcTTPBidirectional are contained in the instance of atmSwitch.

End points of virtual path trails (vpTTPBidirectional) shall be directly associated with intermediate points (vpCTPBidirectional) using reciprocal upstream and downstream pointers. These pointers shall also be used to associate the end points of virtual connections trails (vcTTPBidirectional) with their intermediate points (vcCTPBidirectional). A flexible cross-connection of two intermediate points at the same virtual level (either path or channel) is represented by an instance of atmCrossConnection. These instances are contained in an instance of atmFabric which represents the management of the cross-connection functionality and which is contained in the instance of atmSwitch. The upstream
and downstream pointers may be used to associate a CTP object with a TTP object, or to associate CTP objects in a cross-connection, but not both simultaneously.

Performance monitoring and continuity monitoring using OAM flows is modelled by instances of bidirectionalPerformanceMonitor and bidirectionalContinuityMonitor which are contained within the appropriate end points or intermediate points of the virtual path trails or virtual connection trails (vpTTPBidirectional, vpCTPBidirectional, vcTTPBidirectional or vcCTPBidirectional). Loopback and alarm OAM flows are handled directly by the instances which represent the end points or intermediate points. ATM cell header abnormalities are recorded as instances of cellHeaderAbnormalityLogRecord which are contained in an instance of log which is contained in the instance of atmSwitch.
Statistical information which is currently being gathered is represented by currentData** objects and that which has been previously gathered is represented by historyData** objects. The historyData** objects are contained in the currentData** objects which are contained in the managed object which represents the source of the statistical information. The statistics for the number of incoming and outgoing cells is represented by instances of atmTrafficLoadCurrentData and atmTrafficLoadHistoryData contained (directly or indirectly) in the managed objects which represent the interfaces or represent intermediate points on trails. Statistics on discarded cells are represented by instances of cellLevelProtocolCurrentData and cellLevelProtocolHistoryData contained (directly or indirectly) in the managed objects which represent the interfaces. Statistics on header errors are represented by instances of tcAdaptorCurrentData and tcAdaptorHistoryData contained (directly or indirectly) in tcAdaptorTTP which represents the adaptation function. Statistics on the policing of traffic in accordance with traffic descriptors are represented by instances of upcNpcCurrentData and upcNpcHistoryData contained (directly or indirectly) in the managed objects which represent the interfaces or represent intermediate points on trails. Statistics collected through F4 and F5.
performance monitoring flows are represented by instances of vpVcPMCurrentData and vpVcPMHistoryData which are contained (directly or indirectly) in the managed objects which represent the modelling of performance monitoring by OAM flows.

4.1.2 ATM interworking and adaptation layer modelling

Figure 6: Entity relationship diagram - ATM interworking and adaptation layer modelling
4.1.3 Broadband customer administration modelling

Figure 7: Entity relationship diagram - broadband customer administration
4.1.4 Broadband routeing modelling

all object classes beside virtualPathGroup, crCircuitEndPointSubgroup and crCircuitEndPoint are contained in managedElementR1

Figure 8: Entity relationship diagram - broadband call routeing management
4.2 Inheritance hierarchy

4.3 Managed object naming and attribute syntax

Throughout the present document, all attributes are named according to the following guidelines:

- the name of an attribute is composed of the name of an object class followed by the string "Ptr" if and only if the attribute value is intended to identify a specific object class;
- if an attribute is intended to identify different object classes, a descriptive name is given to that attribute and a description is provided in the attribute behaviour;
- the name of an attribute is composed of the name of an object class followed by the string "Id" if and only the attribute value is intended to identify the name of the object class holding that attribute.

5 Formal object class definitions

This clause gives the formal definitions of the managed object classes, name bindings, general packages, behaviours, attributes, actions and notifications.

5.1 Object classes

This subclause specifies the object classes for all of the managed objects used in the management information model. These object classes are either defined here or by reference to other specifications. Classes of managed objects which are defined elsewhere and which are only used for containment are not included, but are identified by the name bindings for the classes specified here.

Unidirectional trails are modelled by bi-directional objects with the traffic descriptor in the unused direction set to a null value.

5.1.1 ATM generic fragment

The following classes which are defined in ITU-T Recommendation I.751 [4] may be instantiated:

- "I.751":atmAccessProfile;
- "I.751":atmCrossConnection;
- "I.751":atmCurrentData;
- "I.751":atmFabric;
- "I.751":atmTrafficLoadCurrentData;
- "I.751":atmTrafficLoadHistoryData;
- "I.751":bidirectionalContinuityMonitor;
- "I.751":bidirectionalPerformanceMonitor;
- "I.751":cellHeaderAbnormalityLogRecord;
- "I.751":cellLevelProtocolCurrentData;
- "I.751":cellLevelProtocolHistoryData;
- "I.751":interNNI;
- "I.751":intraNNI;
The following class which is defined in ITU-T Recommendation X.721 [16] may be instantiated:

5.1.1.1 Switch virtual path TTP (sVpTTP)

sVpTTP MANAGED OBJECT CLASS
DERIVED FROM Recommendation I.751*:vpTTPBidirectional;
CHARACTERIZED BY
sVpTTPPkg PACKAGE
BEHAVIOUR sVpTTPBeh;
ATTRIBUTES
vpType
GET-REPLACE;
CONDITIONAL PACKAGES
blockedForMaintenancePkg
PRESENT IF "requested by the managing system",
maintenanceSignallingRunningPkg
PRESENT IF "requested by the managing system.",
propagationDelayPkg
PRESENT IF "supported by the managing system",
remoteBlockingPkg
PRESENT IF "requested by the managing system.";
REGISTERED AS {managedObjectClass 1};
sVpTTPBeh BEHAVIOUR
DEFINED AS
"A switch virtual path TTP is an object class representing the end-point of an ATM VPC at a
switching network element."

5.1.2 ATM adaptation layer fragment

5.1.2.1 AAL profile (aalProfile)
aalTypeFiveProfilePkg
PRESENT IF "the aalType attribute is set to aa15";
REGISTERED AS {managedObjectClass 2};

aalProfileBeh BEHAVIOUR
DEFINED AS
"The aalProfile object class is a managed support object used to organize data that
describes the AAL processing functions of the ATM NE. The attribute aalType identifies the type of
AAL processing (i.e., AAL1, AAL3/4, or AAL5). The AAL profiling information is contained in packages
which are present based on the value of the aalType attribute".

5.1.2.2 AAL protocol current data (aalProtocolCurrentData)
aalProtocolCurrentData MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation Q.822: 1993": currentData;
CHARACTERIZED BY
aalProtocolCurrentDataPkg PACKAGE
BEHAVIOUR aalProtocolCurrentDataBeh;
CONDITIONAL PACKAGES
  aalTypeOnePerformanceParameterPkg
PRESENT IF "AAL Type 1 processing is being performed",
aalTypeThreeFourPerformanceParameterPkg
PRESENT IF "AAL Type 3/4 processing is being performed",
aalTypeFivePerformanceParameterPkg
PRESENT IF "AAL Type 5 processing is being performed";
REGISTERED AS {managedObjectClass 3};
aalProtocolCurrentDataBeh BEHAVIOUR
DEFINED AS
"The aalProtocolCurrentData object is a managed support object that contains the current
performance monitoring data collected as a result of performing Segmentation and Reassembly (SAR)
Level and Convergence Sublayer (CS) protocol monitoring. The granularityPeriod attribute inherited
from the scanner object class shall be set to 15-minutes. Instances of this object class shall be
inherently created by the managed system whenever an instance of the Interworking VCC Termination
Point object class is created that represents AAL functions.".

5.1.2.3 AAL protocol history data (aalProtocolHistoryData)
aalProtocolHistoryData MANAGED OBJECT CLASS
DERIVED FROM "ITU-T Recommendation Q.822: 1993": historyData;
CHARACTERIZED BY
aalProtocolHistoryDataPkg PACKAGE
BEHAVIOUR aalProtocolHistoryDataBeh;
CONDITIONAL PACKAGES
  aalTypeOnePerformanceParameterHistoryDataPkg
PRESENT IF "AAL Type 1 processing is being performed",
aalTypeThreeFourPerformanceParameterHistoryDataPkg
PRESENT IF "AAL Type 3/4 processing is being performed",
aalTypeFivePerformanceParameterHistoryDataPkg
PRESENT IF "AAL Type 5 processing is being performed";
REGISTERED AS {managedObjectClass 4};
aalProtocolHistoryDataBeh BEHAVIOUR
DEFINED AS
"The aalProtocolHistoryData object is a managed support object that contains the past
performance monitoring data collected as a result of performing Segmentation and Reassembly (SAR)
Level and Convergence Sublayer (CS) protocol monitoring. Instances of this object class can only be
created locally by an agent (managed system) according to the value of the historyRetention
attribute specified in the aalProtocolCurrentData object.";

5.1.3 Signalling fragment

5.1.3.1 SAAL UNI protocol profile (saalUniProtocolProfile)
saalUniProtocolProfile MANAGED OBJECT CLASS
CHARACTERIZED BY
saalUniProtocolProfilePkg PACKAGE
BEHAVIOUR saalUniProtocolProfileBeh;
ATTRIBUTES
  saalUniProtocolProfileId
    GET SET-BY-CREATE,
  bufferRelease
    DEFAULT VALUE bufferReleaseDefault
    GET SET-BY-CREATE,
  maxCc
    DEFAULT VALUE maxCcDefault
    GET SET-BY-CREATE,
maxInformationFieldLength
   DEFAULT VALUE maxInformationFieldLengthDefault
   GET SET-BY-CREATE,
maxLengthScopUuField
   DEFAULT VALUE maxLengthScopUuFieldDefault
   GET SET-BY-CREATE,
maxPd
   DEFAULT VALUE maxPdDefault
   GET SET-BY-CREATE,
maxScopCreditToPeer
   DEFAULT VALUE maxScopCreditToPeerDefault
   GET SET-BY-CREATE,
maxStat
   DEFAULT VALUE maxStatDefault
   GET SET-BY-CREATE,
sscopTimerCc
   DEFAULT VALUE scopTimerCcDefault
   GET SET-BY-CREATE,
sscopTimerIdle
   DEFAULT VALUE scopTimerIdleDefault
   GET SET-BY-CREATE,
sscopTimerKeepAlive
   DEFAULT VALUE scopTimerKeepAliveDefault
   GET SET-BY-CREATE,
sscopTimerNoResponse
   DEFAULT VALUE scopTimerNoResponseDefault
   GET SET-BY-CREATE,
sscopTimerPoll
   DEFAULT VALUE scopTimerPollDefault
   GET SET-BY-CREATE;
CONDITIONAL PACKAGES
"ITU-T Recommendation M.3100 (1992)" : createDeleteNotificationsPackage
   PRESENT IF "supported by an instance of this class",
pollAfterRetransmissionPackage
   PRESENT IF "an instance supports this national option",
REGISTERED AS {managedObjectClass 5};
ssaUniprotocolProfileBeh BEHAVIOUR
   DEFINED AS "The ssaUniprotocolProfile is a broadband-specific object class which comprises attributes
required for SSCOP, SSCF-UNI and Layer Management for UNI."

5.1.4 Broadband customer administration fragment

5.1.4.1 Available bit rate (abr)

abr MANAGED OBJECT CLASS
   DERIVED FROM bearerServiceBb;
   CHARACTERIZED BY
      abrPkg PACKAGE
      BEHAVIOUR abrBeh;
   REGISTERED AS {managedObjectClass 6};
abrBeh BEHAVIOUR
   DEFINED AS "This subclass of 'bearer service' represents the adaptation of connection-oriented data
with available bit rate".

5.1.4.2 ATM block transfer with delayed transmission (abtDt)

abtDt MANAGED OBJECT CLASS
   DERIVED FROM bearerServiceBb;
   CHARACTERIZED BY
      abtDtPkg PACKAGE
      BEHAVIOUR abtDtBeh;
   REGISTERED AS {managedObjectClass 7};
abtDtBeh BEHAVIOUR
   DEFINED AS "This subclass of 'bearer service' represents the adaptation of connection-oriented data
with ATM block transfer with delayed transmission".

5.1.4.3 ATM block transfer with immediate transmission (abtIt)

abtIt MANAGED OBJECT CLASS
   DERIVED FROM bearerServiceBb;
   CHARACTERIZED BY
      abtItPkg PACKAGE
BEHAVIOUR abtItBeh;
REGISTERED AS {managedObjectClass 8};

abtItBeh BEHAVIOUR
DEFINED AS
"This subclass of 'bearer service' represents the adaptation of connection-oriented data with ATM block transfer with immediate transmission".

### 5.1.4.4 Bearer service for broadband (bearerServiceBb)

**bearerServiceBb** MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
bearerServiceBbPkg PACKAGE
BEHAVIOUR bearerServiceBbBeh;
ATTRIBUTES
"ITU-T Q.824.0": bearerServiceId
GET SET-BY-CREATE,
"Recommendation X.721 | ISO/IEC 10165-2": administrativeState
GET-REPLACE,
"ITU-T Q.824.0": customizedResourcePtrList
DEFAULT VALUE ASN1DefinedTypesModule.emptySet
GET-REPLACE ADD-REMOVE;
NOTIFICATIONS
"Recommendation X.721 | ISO/IEC 10165-2": stateChange,
"Recommendation X.721 | ISO/IEC 10165-2": attributeValueChange;
REGISTERED AS {managedObjectClass 9};

**bearerServiceBbBeh** BEHAVIOUR
DEFINED AS
"The Bearer Service object class represents the common aspects of the bearer services. While the Bearer Service object class is not instantiated, it is a superclass from which specialized subclasses are derived and instantiated.

The attribute customizedResourcePtrList is synchronized with bearerServicePtrList in the customizedResource managed object class. That is, when bearerServicePtrList in the associated instance of the customizedResource object class or a subclass is updated, the customizedResourcePtrList is updated accordingly".

### 5.1.4.5 Calling line identification presentation dependent for broadband (cLIPDepBb)

cLIPDepBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
cLIPBbPkg;
CONDITIONAL PACKAGES
twoCallingPartyNumberDeliveryPkg
PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 10};

### 5.1.4.6 Calling line identification presentation independent for broadband (cLIPIndBb)

cLIPIndBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceIndependentBb;
CHARACTERIZED BY
cLIPBbPkg,
cLIPIndBbPkg PACKAGE
BEHAVIOUR cLIPIndBbBeh;
CONDITIONAL PACKAGES
twoCallingPartyNumberDeliveryPkg
PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 11};

cLIPIndBbBeh BEHAVIOUR
DEFINED AS
"The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".

### 5.1.4.7 Calling line identification restriction dependent for broadband (cLIRDepBb)

cLIRBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
cLIPBbPkg;
REGISTERED AS {managedObjectClass 12};
5.1.4.8 Calling line identification restriction independent for broadband (cLIRIndBb)

cLIRIndBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceIndependentBb;
CHARACTERIZED BY
cLIRBbPkg,
cLIRIndBBpkg PACKAGE
BEHAVIOUR cLIRIndBBBeh;
REGISTERED AS {managedObjectClass 13};
cLIRIndBBBeh BEHAVIOUR
DEFINED AS
"The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".

5.1.4.9 Closed user group for broadband (cUGBb)

cUGBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceIndependentBb;
CHARACTERIZED BY
cUGBBpkg PACKAGE
BEHAVIOUR cUGBBbeh;
ATTRIBUTES
cUGIndex GET,
cUGInterlockCode GET,
cUGDataNetworkIdentification GET,
cUGBarring GET-REPLACE;
REGISTERED AS {managedObjectClass 14};
cUGBBbeh BEHAVIOUR
DEFINED AS
"This managed object class is used to store the closed user group general subscription options specified by ITU-T Recommendation Q.2955.1. This package is instantiated by for each Closed User Group. When the value of cUGBarring is outgoingCallsBarred, this CUG must not be a preferential closed User Group (denoted by preferredCUGIndex in CUGSubscriptionOption managed object). An object of this class can only be deleted, if it is not referenced by a cugSubscriptionOption(Independent) object.

The "customizedResourcePtrList" and the "servicePtrList" can only be used mutually exclusive. This means that one of them has to be empty".

5.1.4.10 Closed user group subscription option dependent for broadband (cUGSubscriptionOptionDependentBb)

cUGSubscriptionOptionDependentBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
cUGSubscriptionOptionBbPkg;
REGISTERED AS {managedObjectClass 15};

5.1.4.11 Closed user group subscription option independent for broadband (cUGSubscriptionOptionIndependentBb)

cUGSubscriptionOptionIndependentBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceIndependentBb;
CHARACTERIZED BY
cUGSubscriptionOptionBbPkg,
cUGSubscriptionOptionIndependentBbPkg PACKAGE
BEHAVIOUR cUGSubscriptionOptionIndependentBbBeh;
REGISTERED AS {managedObjectClass 16};
cUGSubscriptionOptionIndependentBbBeh BEHAVIOUR
DEFINED AS
"The servicePtrList derived from the supplementaryServiceIndependent shall be empty".

5.1.4.12 Connected line identification presentation dependent for broadband (cOLPDepBb)

cOLPDepBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
cOLPBBpkg;
REGISTERED AS {managedObjectClass 17};
5.1.4.13 Connected line identification presentation independent for broadband (cOLPIndBb)

cOLPIndBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceIndependentBb;
CHARACTERIZED BY
cOLPIndBbPkg,
cOLPIndBbPkg PACKAGE
BEHAVIOUR cOLPIndBbBeh;
REGISTERED AS {managedObjectClass 18};
cOLPIndBbBeh BEHAVIOUR
DEFINED AS
"The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".

5.1.4.14 Connected line identification restriction dependent for broadband (cOLRDepBb)

cOLRDepBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
cOLRRDepBbPkg;
REGISTERED AS {managedObjectClass 19};

5.1.4.15 Connected line identification restriction independent for broadband (cOLRIndBb)

cOLRIndBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceIndependentBb;
CHARACTERIZED BY
cOLRIndBbPkg,
cOLRIndBbPkg PACKAGE
BEHAVIOUR cOLRIndBbBeh;
REGISTERED AS {managedObjectClass 20};
cOLRIndBbBeh BEHAVIOUR
DEFINED AS
"The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".

5.1.4.16 Customer profile for broadband (customerProfileBb)

customerProfileBb MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
CHARACTERIZED BY
customerProfileBbPkg PACKAGE
BEHAVIOUR customerProfileBbBeh;
ATTRIBUTES
"ITU-T Q.824.0":customerProfileId
GET SET-BY-CREATE,
accessPtrList
GET-REPLACE ADD-REMOVE,
"ITU-T Q.824.0":directoryNumberPtrList
GET-REPLACE ADD-REMOVE;
REGISTERED AS {managedObjectClass 21};
customerProfileBbBeh BEHAVIOUR
DEFINED AS
"The Customer Profile represents a single point of reference used to bind together a range of services and resources for customer administration purposes. It is a class of managed objects representing the characteristics of the Directory Number(s) (DN) assigned to an individual subscriber, independent of the access type and bearer service. Each instance of the customer profile object class includes a Directory Number Pointer List attribute that represents the Directory Number(s) assigned to the customer profile object and an Access Pointer List attribute that represents Access(es) also assigned to the customer profile object.

Objects which are related through direct or indirect containment or by a direct pointer relationship with a customerProfileBb object can not be related in the same way to a different customerProfileBb object.

More than one entry in the "directoryNumberPtrList" are allowed only if a "multipleSubscriberNumberIndBb" object is contained in this "customerProfileBb" object."

5.1.4.17 Customized resource for broadband (customizedResourceBb)

customizedResourceBb MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
CHARACTERIZED BY
customizedResourceBbPkg PACKAGE
BEHAVIOUR customizedResourceBbBeh;
ATTRIBUTES
"ITU-T Q.824.0":customizedResourceId
GET-SET-BY-CREATE,
"ITU-T Q.824.0":bearerServicePtrList
GET-REPLACE ADD-REMOVE,
"ITU-T Q.824.0":directoryNumberPtrList
GET-REPLACE ADD-REMOVE,
"ITU-T Q.824.0":teleServicePtrList
GET-REPLACE ADD-REMOVE,
supplementaryServicePtrList
GET-REPLACE ADD-REMOVE,
userDataPtr
GET-REPLACE;
REGISTERED AS {managedObjectClass 22};
customizedResourceBbBeh BEHAVIOUR
DEFINED AS
"The Customized Resource object is a class of managed objects that represents the service
provisioning for a subscriber. It allows association of a set of services and/or one userData object
to one or more Directory Numbers. The pointer list attributes: bearerServicePtrList,
directoryNumberPtrList, teleServicePtrList, supplementaryServiceIndependentPtrList and userDataPtr
should be maintained synchronized with their corresponding pointing attribute in the objects they
point out to. For example, the attribute directoryNumberPtrList in a subclass of the directoryNumber managed object class. That is, when a
reference to an instance of the subclass of the directoryNumber object class is added to (or deleted
from) the attribute directoryNumberPtrList, customizedResourcePtrList attribute in the corresponding
directoryNumber subclass is updated accordingly.
When no customized resource objects are contained in a customer profile object, then all
services/userData contained in this customer profile object are applicable to all directory numbers
associated with this customer profile object.
If one or more customized resource objects are contained in a customer profile object, then
only these services/userData (contained in this customer profile object) are applicable to a certain
directory number (associated with the customer profile object) which are explicitly associated to
this directory number object using a customized resource object.
Only one entry shall be contained in the directoryNumberPtrList".

5.1.4.18 Deterministic bit rate (dbr)
dbr MANAGED OBJECT CLASS
DERIVED FROM bearerServiceBb;
CHARACTERIZED BY
dbrPkg PACKAGE
BEHAVIOUR dbrBeh;
REGISTERED AS {managedObjectClass 23};
dbrBeh BEHAVIOUR
DEFINED AS
"This subclass of 'bearer service' represents the adaptation of connection-oriented data
with deterministic (constant) bit rate and timing relation between sender and receiver".

5.1.4.19 Direct dialling in independent for broadband (directDiallingInIndBb)
directDiallingInIndBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceIndependentBb;
CHARACTERIZED BY
directDiallingInIndBbPkg PACKAGE
BEHAVIOUR directDiallingInBeh;
CONDITIONAL PACKAGES
"ITU-T Q.824.2":digitsOptionPkg
PRESENT IF"if supported by administration";
REGISTERED AS {managedObjectClass 24};
directDiallingInIndBbBeh BEHAVIOUR
DEFINED AS
"This Supplementary Service enables a user to call directly via a public ISDN to a user on a
private ISDN by use of the public ISDN numbering plan as described in ITU Recommendation Q.2951.1.
Only one object of this class shall be contained within the superior managed object. The
servicePtrList and the customizedResourcePtrList derived from the supplementaryServiceIndependentBb
shall be empty".

5.1.4.20 Directory number E164 (directoryNumberE164)
directoryNumberE164 MANAGED OBJECT CLASS
DERIVED FROM*ITU-T Q.824.0*:directoryNumber;
CHARACTERIZED BY
directoryNumberE164Pkg PACKAGE
BEHAVIOUR directoryNumberE164Beh;
ATTRIBUTES
"ITU-T Q.824.0":e164DirectoryNumber
GET SET-BY-CREATE,
localDestinationPtr
GET;
REGISTERED AS {managedObjectClass 25};
directoryNumberE164Beh BEHAVIOUR
DEFINED AS
"The E.164 Directory Number object class represents directory numbers belonging to the
numbering plan of the ISDN era as defined in CCITT E.164. The E.164 Directory Number is a single-
valued, read-only attribute, set only at creation time. The E.164 Directory Number is updated
implicitly if the attribute values of the referenced localDestination object are modified. The
routingBlockPtrPkg inherited from the directoryNumber object class shall not be present.
Only one entry shall be contained in the customizedResourcePtrList".

5.1.4.21 Multiple subscriber number independent for broadband
(multipleSubscriberNumberIndBb)

multipleSubscriberNumberIndBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceIndependentBb;
CHARACTERIZED BY
multipleSubscriberNumberIndBbPkg PACKAGE
BEHAVIOUR multipleSubscriberNumberIndBbBeh;
ATTRIBUTES
"ITU-T Q.824.2": assocDefaultDN
GET-REPLACE;
CONDITIONAL PACKAGES
"ITU-T Q.824.2": networkOptionsPkg
PRESENT IF"if supported by administration";
REGISTERED AS {managedObjectClass 26};
multipleSubscriberNumberBehIndBb BEHAVIOUR
DEFINED AS
"The MSN supplementary service provides the possibility for assigning multiple numbers (not
necessarily consecutive) to a single public or private interface as described in ITU Recommendation
Q.2951.2. This enables the selection of multiple distinct terminals attached to the same interface.
The service provider shall fix the length of the numbers to be transmitted to the user's
installation. They may comprise the least significant digit up to the full ISDN number as defined in
CCITT Recommendation E.164. The digit(s) significant for terminal differentiation shall be an
integral part of the ISDN numbering scheme.
Only one object of this class shall be contained within the superior managed object. The
servicePtrList and the customizedResourcePtrList derived from the supplementaryServiceIndependentBb
shall be empty".

5.1.4.22 Statistical bit rate 1 (sbr1)
sbr1 MANAGED OBJECT CLASS
DERIVED FROM bearerServiceBb;
CHARACTERIZED BY
sbr1Pkg PACKAGE
BEHAVIOUR sbr1Beh;
ATTRIBUTES
timingRelation
GET-REPLACE;
REGISTERED AS {managedObjectClass 27};
sbr1Beh BEHAVIOUR
DEFINED AS
"This subclass of 'bearer service' represents the adaptation of connection-oriented data
with statistical (variable) bit rate".

5.1.4.23 Sub-addressing dependent for broadband (sUBDepBb)
sUBDepBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
sUBDepPkg;
REGISTERED AS {managedObjectClass 28};

5.1.4.24 Sub-addressing independent for broadband (sUBIndBb)
sUBIndBb MANAGED OBJECT CLASS
DERIVED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
sUBIndPkg,
sUBIndBbPkg PACKAGE
BEHAVIOUR sUBIndBbBeh;
5.1.4.25 Supplementary service dependent for broadband (supplementaryServiceDependentBb)

supplementaryServiceDependentBb MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
  supplementaryServiceDependentBbPkg PACKAGE
  supplementaryServiceDependentBbBeh BEHAVIOUR;
ATTRIBUTES
  "ITU-T Q.824.0": supplementaryServiceId
    GET SET-BY-CREATE;
  "Recommendation X.721 | ISO/IEC 10165-2": administrativeState
    GET-REPLACE;
NOTIFICATIONS
  "Recommendation X.721 | ISO/IEC 10165-2": stateChange;
  "Recommendation X.721 | ISO/IEC 10165-2": attributeValueChange;
REGISTERED AS (managedObjectClass 30);
supplementaryServiceDependentBbBeh BEHAVIOUR
DEFINED AS
"The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty."

5.1.4.26 Supplementary service independent for broadband (supplementaryServiceIndependentBb)

supplementaryServiceIndependentBb MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
  supplementaryServiceIndependentBbPkg PACKAGE
  supplementaryServiceIndependentBbBeh BEHAVIOUR;
ATTRIBUTES
  "ITU-T Q.824.0": supplementaryServiceId
    GET SET-BY-CREATE,
  customizedResourcePtrList
    GET-REPLACE ADD-REMOVE,
  "ITU-T Q.824.0": servicePtrList
    DEFAULT VALUE ASN1DefinedTypesModule.emptySet
    GET-REPLACE ADD-REMOVE;
NOTIFICATIONS
  "Recommendation X.721 | ISO/IEC 10165-2": stateChange;
  "Recommendation X.721 | ISO/IEC 10165-2": attributeValueChange;
  "Recommendation X.721 | ISO/IEC 10165-2": objectCreation;
  "Recommendation X.721 | ISO/IEC 10165-2": objectDeletion;
REGISTERED AS (managedObjectClass 31);
supplementaryServiceIndependentBbBeh BEHAVIOUR
DEFINED AS
"This object class is defined to allow the creation of specific supplementary service subclasses for those supplementary services that are defined by ITU-T to be configurable on a per bearer or teleservice basis. Supplementary services, as defined in I.210, are services that can only be used in conjunction with another bearer service or another teleservice. While the supplementaryServiceIndependentBb object class is not instantiated, it is a superclass from which specialized subclasses are derived and instantiated."

5.1.4.27 Teleservice for broadband (teleserviceBb)
teleserviceBb MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
teleServiceBBPkg PACKAGE
BEHAVIOUR teleServiceBBBeh;
ATTRIBUTES
  "ITU-T Q.824.0": teleServiceId
    GET SET-BY-CREATE,
  "ITU-T Q.824.0": bearerServicePtr
    GET-REPLACE,
  "Recommendation X.721 | ISO/IEC 10165-2": administrativeState
    GET-REPLACE,
  "ITU-T Q.824.0": customizedResourcePtrList
    DEFAULT VALUE ASN1DefinedTypesModule.emptySet
    GET-REPLACE ADD-REMOVE;
NOTIFICATIONS
  "Recommendation X.721 | ISO/IEC 10165-2": stateChange;
REGISTERED AS {managedObjectClass 32};
teleServiceBBBeh BEHAVIOUR
DEFINED AS
  "The teleservices managed object class defines a communication service that makes available
  layer 1 – layer 7 capabilities.
  While the teleserviceBB object class is not instantiated, it is a superclass from which
  specialized subclasses are derived and instantiated".

5.1.4.28 Uni access (uniAccess)

uniAccess MANAGED OBJECT CLASS
DERIVED FROM Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
  "Recommendation X.721 | ISO/IEC 10165-2": administrativeStatePackage,
  uniAccessPkg PACKAGE
BEHAVIOUR uniAccessBeh;
ATTRIBUTES
  uniAccessId
    GET,
  signallingStandard
    GET-REPLACE,
  customerProfilePtr
    GET-REPLACE,
  assocTPandVPCI
    GET-REPLACE
    ADD-REMOVE;
  connectionIdOffering
    DEFAULT VALUE connectionIdOfferingDefault
    GET-REPLACE;
CONDITIONAL PACKAGES
  maintenanceSignallingRunningPkg
    PRESENT IF "requested by the managing system";
  searchMethodPkg
    PRESENT IF "supplied by the managing system";
  signallingChannelPtrPkg
    PRESENT IF "nonassociated signalling is used for this object instance";
  signallingTypePkg
    PRESENT IF "the managed system supports associated signalling";
REGISTERED AS {managedObjectClass 33};
uniAccessBeh BEHAVIOUR
DEFINED AS
  "This managed object represents a group of VP's coming from the same User Network Interface
  (UNI). The VP's can be distributed over one or more physical interfaces. One physical interface can
  contain VP's of several object instances of the object class uniAccess.
  In the case of nonassociated signalling, all VP's of one uniAccess object instance are
  controlled by the same signalling channel and there is only one signalling channel for the group. In
  the case of associated signalling there is one signalling channel, typically VCI=5, for each VP in
  the group.
  Nonassociated signalling is assumed if the signallingTypePkg is not present in an uniAccess
  object instance.
  If the administrativeState attribute is set to locked, all signalled virtual connections
  shall be released. PVC's are not influenced by this attribute.
  It is not requested (but allowed) that the VPC which contains the signalling VCC is
  contained in the assocVPandVPCI list. If this VPC is not in the list then it cannot be used for on-demand connections controlled by the identified signalling VCC".

5.1.4.29 Unspecified bit rate (ubr)

ubr MANAGED OBJECT CLASS
DERIVED FROM bearerServiceBB;
CHARACTERIZED BY
  ubrPkg PACKAGE
BEHAVIOUR ubrBeh;
5.1.4.30 User data (userData)

userData MANAGED OBJECT CLASS
DEPRECATED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
userDataPkg PACKAGE
BEHAVIOUR userDataBeh;
ATTRIBUTES
- userDataId
  GET,
  "ITU-T Q.824.0": customizedResourcePtrList
  DEFAULT VALUE ASN1DefinedTypesModule.emptySet
  GET-REPLACE ADD-REMOVE,
- subscriberCategory
  DEFAULT VALUE ASN1DefinedTypesModule.subscriberCategoryDefault
  GET-REPLACE
NOTIFICATIONS
- "Recommendation X.721 | ISO/IEC 10165-2": attributeValueChange;
- "Recommendation X.721 | ISO/IEC 10165-2": objectCreation;
- "Recommendation X.721 | ISO/IEC 10165-2": objectDeletion;
CONDITIONAL PACKAGES
- originMarkPkg
  PRESENT IF "supplied by the managing system";
- preferredCarrierPkg
  PRESENT IF "carrier specific routing is supplied";
REGISTERED AS {managedObjectClass 35};

userDataBeh BEHAVIOUR
DEFINED AS
"This entity describes the properties of a certain subscriber (user). The properties may be
either valid for the whole superior customerProfile or for a certain directory number only,
depending from the use of customizedResource objects.
The attribute 'customizedResourcePtrList is synchronized with 'userDataPtr' in
'customizedResource'. That is, when 'userDataPtr' in the associated instance of
'customizedResource' or a subclass is updated, the 'customizedResourcePtrList' is updated
accordingly.
Only one 'userData' object with an empty 'customizedResourcePtrList' shall be contained in a
customerProfile object".

5.1.4.31 User to user signalling dependent for broadband
(userToUserSignallingDepBb)

userToUserSignallingDepBb MANAGED OBJECT CLASS
DEPRECATED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
userToUserSignallingBbPkg;
REGISTERED AS {managedObjectClass 36};

5.1.4.32 User to user signalling independent for broadband
(userToUserSignallingIndBb)

userToUserSignallingIndBb MANAGED OBJECT CLASS
DEPRECATED FROM supplementaryServiceDependentBb;
CHARACTERIZED BY
userToUserSignallingBbPkg,
userToUserSignallingIndBbPkg PACKAGE
BEHAVIOUR userToUserSignallingIndBbBeh;
REGISTERED AS {managedObjectClass 37};

userToUserSignallingIndBbBeh BEHAVIOUR
DEFINED AS
"The servicePtrList derived from the supplementaryServiceIndependentBb shall be empty".

5.1.5 Broadband and interworking call routing fragment

5.1.5.1 Abstract destination (abstractDestination)

abstractDestination MANAGED OBJECT CLASS
abstractDestinationPkg PACKAGE
BEHAVIOUR abstractDestinationBeh;
ATTRIBUTES
abstractDestinationId
GET;
NOTIFICATIONS
"Recommendation X.721|ISO/IEC 10165-2":objectCreation;
"Recommendation X.721|ISO/IEC 10165-2":objectDeletion;
"Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
CONDITIONAL PACKAGES
maxDigitsPkg
PRESENT IF "supplied by managing system";
ringTimeLimitPkg
PRESENT IF "supplied by managing system";
REGISTERED AS {managedObjectClass 38};
abstractDestinationBeh BEHAVIOUR
DEFINED AS
"This entity is a result of digit processing in the originating, transit or gateway exchange";

5.1.5.2 Analysis criteria (analysisCriteria)

analysisCriteria MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
analysisCriteriaPkg PACKAGE
BEHAVIOUR analysisCriteriaBeh;
ATTRIBUTES
analysisCriteriaId
GET;
activeTarget
GET-REPLACE;
callingPartyCategory
GET-REPLACE;
origin
GET-REPLACE;
NOTIFICATIONS
"Recommendation X.721|ISO/IEC 10165-2":objectCreation,
"Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
"Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
CONDITIONAL PACKAGES
carrierDataPtrPkg
PRESENT IF "the target is carrier dependent";
destinationCodePkg
PRESENT IF "in any case with exception of the case of one Point of Presence of the carrier";
destinationTypePkg
PRESENT IF "destinationCodePkg is present";
REGISTERED AS {managedObjectClass 39};

analysisCriteriaBeh BEHAVIOUR
DEFINED AS
"This entity describes the management information needed to manage the internal digit trees";

5.1.5.3 Call routing circuit end point for Broadband (crCircuitEndPointBb)

crCircuitEndPointBb MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
"Recommendation X.721|ISO/IEC 10165-2":administrativeStatePackage;
crCircuitEndPointBbPkg PACKAGE
BEHAVIOUR crCircuitEndPointBbBeh;
ATTRIBUTES
crCircuitEndPointId
GET;
cic
GET;
propagationDelay
GET-REPLACE;
timeslotPtr
GET;
CONDITIONAL PACKAGES
blockedForMaintenancePkg
PRESENT IF "supplied by the managing system";
remoteBlockingNBPkg
PRESENT IF "supplied by the managing system";
maintenanceSignallingRunningPkg
PRESENT IF "supplied by the managing system";
REGISTERED AS [managedObjectClass 40];

crCircuitEndPointBbBeh BEHAVIOUR
DEFINED AS
"This object class represents a termination point of an individual circuit. The CIC value has to be unique within the NNI access".

5.1.5.4 Call routing circuit end point subgroup for broadband (crCircuitEndPointSubgroupBb)

crCircuitEndPointSubgroupBb MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
crCircuitEndPointSubgroupBbPkg PACKAGE
BEHAVIOUR crCircuitEndPointSubgroupBbBeh;
ATTRIBUTES
crCircuitEndPointSubgroupId
GET,
"ITU-T M.3100": userLabel
GET-REPLACE;
searchMethod
GET-REPLACE;
REGISTERED AS [managedObjectClass 41];
crCircuitEndPointSubgroupBbBeh BEHAVIOUR
DEFINED AS
"This object class represents a set of circuit end points with similar characteristics. The value of the signallingType attribute of the superior nniAccess object shall be equal "nisup".

5.1.5.5 Call routing office data (callRoutingOfficeData)

callRoutingOfficeData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
callRoutingOfficeDataPkg PACKAGE
BEHAVIOUR callRoutingOfficeDataBeh;
ATTRIBUTES
callRoutingOfficeDataId
GET;
ownInternationalCode
GET-REPLACE;
NOTIFICATIONS
"Recommendation X.721 | ISO/IEC 10165-2": attributeValueChange;
REGISTERED AS [managedObjectClass 42];
callRoutingOfficeDataBeh BEHAVIOUR
DEFINED AS
"This entity describes the office data concerning the call routing application. One instance of this object class shall be automatically created by the managed system upon completion of system initialization".

5.1.5.6 Carrier data (carrierData)

carrierData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2": top;
CHARACTERIZED BY
carrierDataPkg PACKAGE
BEHAVIOUR carrierDataBeh;
ATTRIBUTES
carrierDataId
GET,
carrierCode
GET;
NOTIFICATIONS
"Recommendation X.721 | ISO/IEC 10165-2": objectCreation,
"Recommendation X.721 | ISO/IEC 10165-2": objectDeletion,
"Recommendation X.721 | ISO/IEC 10165-2": attributeValueChange;
CONDITIONAL PACKAGES
carrierParameterRequiredPkg
PRESENT IF "supplied by the managing system";
REGISTERED AS [managedObjectClass 43];
carrierDataBeh BEHAVIOUR
DEFINED AS
"This entity describes the necessary information concerning carrier available within one exchange."
5.1.5.7 Digit manipulation (digitManip)

digitManip MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
digitManipPkg PACKAGE
BEHAVIOUR digitManipBeh;
ATTRIBUTES
digitManipId
GET;
NOTIFICATIONS
*Recommendation X.721|ISO/IEC 10165-2":objectCreation,
*Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
*Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
CONDITIONAL PACKAGES
destinationTypePkg
PRESENT IF "modification of digits effects a change of the type of number",
digitCombInsertPkg
PRESENT IF "supplied by managing system",
digitCombReplacePkg
PRESENT IF "supplied by managing system",
digitSuppressPkg
PRESENT IF "supplied by managing system";
REGISTERED AS {managedObjectClass 44};
digitManipBeh BEHAVIOUR
DEFINED AS
"This entity describes the possibility to manipulate the called number (sequence of digits) and / or the destination type. Parts of the sequence or the whole number including the destination type may be changed. It is also used for signalling purposes, i.e. it can be referenced from 'routeData'. It is possible either to insert, to replace or to suppress digits. Reference for all changes is the original string, start position is the first digit.";

5.1.5.8 List of route termination points (listOfRouteTps)

listOfRouteTps MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
listOfRouteTpsPkg PACKAGE
BEHAVIOUR listOfRouteTpsBeh;
ATTRIBUTES
listOfRouteTpsId
GET,
listOfRoutes
GET-REPLACE,
usedAlgorithm
GET-REPLACE;
NOTIFICATIONS
*Recommendation X.721|ISO/IEC 10165-2":objectCreation,
*Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
*Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
REGISTERED AS {managedObjectClass 45};
listOfRouteTpsBeh BEHAVIOUR
DEFINED AS
"This entity describes a set of routes for a 'postAnalysisEvaluation' object. With it an ordered list of possible routes (instance 'routeData') exists meeting the quality parameters required by attributes of 'postAnalysisEvaluation'. Additional, it describes the traffic distribution about the set of routes.";

5.1.5.9 Local destination (localDestination)

localDestination MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
localDestinationPkg PACKAGE
BEHAVIOUR localDestinationBeh;
ATTRIBUTES
localDestinationId
GET,
excludedSubscriberCodes
GET-REPLACE ADD-REMOVE,
initialSubscriberCodes
GET-REPLACE,
localAreaCode
GET-REPLACE;
NOTIFICATIONS
*Recommendation X.721|ISO/IEC 10165-2":objectCreation,
*Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
*Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
5.1.5.10 NNI access (nniAccess)

nniAccess MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
CHARACTERIZED BY
nniAccessPkg PACKAGE
BEHAVIOUR nniAccessBeh;
ATTRIBUTES
nniAccessId
GET,
signallingProtocol
GET,
networkBorder
GET-REPLACE,
linkType
GET-REPLACE,
originForRouting
GET-REPLACE,
assocSignRouteSetNePart
GET;
CONDITIONAL PACKAGES
networkTypePkg
PRESENT IF "supplied by the managing system";
REGISTERED AS {managedObjectClass 47};
nniAccessBeh BEHAVIOUR
DEFINED AS
"This object class is used to group the VPC"s in broadband NNIs or equivalent narrowband links between two signalling points which are controlled by the same signalling protocol.";

5.1.5.11 Prefix digit analysis (prefixDigitAnalysis)

prefixDigitAnalysis MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
CHARACTERIZED BY
prefixDigitAnalysisPkg PACKAGE
BEHAVIOUR prefixDigitAnalysisBeh;
ATTRIBUTES
prefixDigitAnalysisId
GET,
code
GET-REPLACE ADD-REMOVE,
natureOfAddress
GET;
NOTIFICATIONS
"Recommendation X.721 | ISO/IEC 10165-2":objectCreation,
"Recommendation X.721 | ISO/IEC 10165-2":objectDeletion,
"Recommendation X.721 | ISO/IEC 10165-2":attributeValueChange;
REGISTERED AS {managedObjectClass 48};
prefixDigitAnalysisBeh BEHAVIOUR
DEFINED AS
"This entity describes the digits used as prefix dependent of the nature of the address.";

5.1.5.12 Post analysis evaluation (postAnalysisEvaluation)

postAnalysisEvaluation MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721 | ISO/IEC 10165-2":top;
CHARACTERIZED BY
postAnalysisEvaluationPkg PACKAGE
BEHAVIOUR postAnalysisEvaluationBeh;
ATTRIBUTES
postAnalysisEvaluationId
GET,
activeListOfRouteTps
GET-REPLACE,
reqBandwidthEgress
GET-REPLACE,
reqBandwidthIngress
GET-REPLACE,
reqBearerCapab
GET-REPLACE ADD-REMOVE,
abstractDestinationInstance
GET-REPLACE,
transitDelayLimit
GET-REPLACE;
NOTIFICATIONS
"Recommendation X.721|ISO/IEC 10165-2":objectCreation,
"Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
"Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
CONDITIONAL PACKAGES
reqNBTransferCapabilityPkg
PRESENT IF"narrowband transfer capability dependent routing required";
REGISTERED AS {managedObjectClass 49};
postAnalysisEvaluationBeh BEHAVIOUR
DEFINED AS
"This entity describes a set of information like abstractDestination and different quality
parameters. The required quality parameter of a certain call is compared with the defined value. For
a certain call only one instance has to match the required parameters. The network operator is
responsible to define a set of route selection criterias without gaps or overlapping parts.";

5.1.5.13 Route data (routeData)

routeData MANAGED OBJECT CLASS
DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
routeDataPkg PACKAGE
BEHAVIOUR routeDataBeh;
ATTRIBUTES
routeDataId
GET,
assocLinkGroup
GET-REPLACE;
NOTIFICATIONS
"Recommendation X.721|ISO/IEC 10165-2":objectCreation,
"Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
"Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
CONDITIONAL PACKAGES
digitManipPtrPkg
PRESENT IF"digit manipulation is required",
minDigitsPkg
PRESENT IF"minimum number of digits for seizing required",
sendTNSPkg
PRESENT IF"TNS has to be signalled";
REGISTERED AS {managedObjectClass 50};
routeDataBeh BEHAVIOUR
DEFINED AS
"This entity describes one element of the ordered list of routes ('listOfRouteTps').";

5.1.5.14 Virtual path group (virtualPathGroup)

virtualPathGroup MANAGED OBJECT CLASS
DERIVED FROM"Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
virtualPathGroupPkg PACKAGE
BEHAVIOUR virtualPathGroupBeh;
ATTRIBUTES
virtualPathgroupId
GET,
"ITU-T M.3100":userLabel
GET-REPLACE,
assignNonAssign
GET,
assocvPTTPandVPCIList
GET-REPLACE,
ADD-REMOVE;
CONDITIONAL PACKAGES
searchMethodPkg
PRESENT IF"object instance is of type assign";
REGISTERED AS {managedObjectClass 51};
virtualPathGroupBeh BEHAVIOUR
DEFINED AS
"This object class represents a set of end points of VPC"s with similar characteristics.
The VPC"s can be distributed over one or more physical interfaces. One physical interface can
contain VPC"s of several object instances of the object class virtualPathGroup.
All vPTTPBidirectional referenced by the assocvPTTPandVPCIList shall be administratively
locked before the virtualPathGroup can be deleted.";
5.1.5.15 XTPSG comb (xTPSGComb)

xTPSGComb MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
xTPSGCombPkg PACKAGE
BEHAVIOUR xTPSGCombBeh;
ATTRIBUTES
xtpsgCombId
GET,
listOfLinkGroups
GET-REPLACE,
usedAlgorithm
GET-REPLACE;
NOTIFICATIONS
"Recommendation X.721|ISO/IEC 10165-2":objectCreation,
"Recommendation X.721|ISO/IEC 10165-2":objectDeletion,
"Recommendation X.721|ISO/IEC 10165-2":attributeValueChange;
REGISTERED AS {managedObjectClass 52};
xTPSGCombBeh BEHAVIOUR
DEFINED AS
"This entity describes an ordered list of virtual path groups (vpg) or CEPSGs."

5.1.6 Circuit emulation service interworking fragment

5.1.6.1 CES service profile (cesServiceProfile)

cesServiceProfile MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721|ISO/IEC 10165-2":top;
CHARACTERIZED BY
cesServiceProfilePkg PACKAGE
BEHAVIOUR cesServiceProfileBeh;
ATTRIBUTES
cesServiceProfileId
GET,
cesBufferedCDVtolerance
GET-REPLACE,
channelAssociatedSignalling
GET-REPLACE;
REGISTERED AS {managedObjectClass 53};
cesServiceProfileBeh BEHAVIOUR
DEFINED AS
"This managed object is used to organize data that describes the circuit emulation service
interworking functions of the ATM NE.
The cesBufferedCDVtolerance attribute specifies the duration of user data that must be buffered
by the interworkingVCTTPBidirectional managed object to offset Cell Delay variation. The recommended
default value for DS1 CES is 750 micro seconds and 1000 micro seconds for DS3 CES.
The channelAssociatedSignalling attribute identifies which AAL1 format should be used. It
applies only to structured format. For unstructured format this attribute must be set to the default
value of basic.
Instances of this object class shall be explicitly created and deleted by the managing system.
An instance of this object class shall not be deleted if it is in use by any
interworkingVCTTPBidirectional object instance."

5.1.6.2 Interworking VC TTP Bi-directional (interworkingVCTTPBidirectional)

interworkingVCTTPBidirectional MANAGED OBJECT CLASS
DERIVED FROM "Recommendation I.751*:vcttpBidirectional;
CHARACTERIZED BY
interworkingVCTTPBidirectionalPkg PACKAGE
BEHAVIOUR interworkingVCTTPBidirectionalBeh;
ATTRIBUTES
serviceProfilePointer
GET-REPLACE,
aalProfilePointer
GET-REPLACE,
terminationPointList
GET;
CONDITIONAL PACKAGES
modifyTerminationPointListPkg
PRESENT IF "an instance supports addition and removal of interworked termination
points.";
REGISTERED AS {managedObjectClass 54};
interworkingVCTTPBidirectionalBeh BEHAVIOUR
**5.2 Name bindings**

**5.2.1 aalProfile-managedElementR1**

```plaintext
aalProfile-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS aProfile AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElementR1 AND SUBCLASSES;
WITH ATTRIBUTE aalProfileId;
CREATE
WITH-REFERENCE-OBJECT,
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
DELETES-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 1};
```

**5.2.2 aalProtocolCurrentData-interworkingVCTTPBidirectional**

```plaintext
aalProtocolCurrentData-interworkingVCTTPBidirectional NAME BINDING
SUBORDINATE OBJECT CLASS aProtocolCurrentData AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS interworkingVCTTPBidirectional AND SUBCLASSES;
WITH ATTRIBUTE "ITU-T Recommendation X.739":scannerId;
CREATE
WITH-REFERENCE-OBJECT,
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
DELETES-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 2};
```

**5.2.3 abstractDestination-managedElementR1**

```plaintext
abstractDestination-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS abstractDestination
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE abstractDestinationId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 3};
```

**5.2.4 analysisCriteria-managedElementR1**

```plaintext
analysisCriteria-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS analysisCriteria
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE analysisCriteriaId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 4};
```
5.2.5 bearerServiceBb-customerProfileBb

bearerServiceBb-customerProfileBb NAME BINDING
  SUBORDINATE OBJECT CLASS bearerServiceBb AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS customerProfileBb AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T Q.824.0":bearerServiceId; CREATE; DELETE;
  REGISTERED AS {nameBinding 5};

5.2.6 callRoutingOfficeData-managedElementR1

callRoutingOfficeData-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS callRoutingOfficeData AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1 AND SUBCLASSES;
  WITH ATTRIBUTE callRoutingOfficeDataId; CREATE; DELETE;
  REGISTERED AS {nameBinding 6};

5.2.7 carrierData-managedElementR1

carrierData-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS carrierData AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1 AND SUBCLASSES;
  WITH ATTRIBUTE carrierDataId; CREATE WITH-AUTOMATIC-INSTANCE-NAMING; DELETE;
  REGISTERED AS {nameBinding 7};

5.2.8 cesServiceProfile-managedElementR1

cesServiceProfile-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS cesServiceProfile AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1 AND SUBCLASSES;
  WITH ATTRIBUTE cesServiceProfileId; CREATE WITH-AUTOMATIC-INSTANCE-NAMING; DELETE;
  ONLY-IF-NO-CONTAINED-OBJECTS;
  REGISTERED AS {nameBinding 8};

5.2.9 crCircuitEndPoint-crCircuitEndPointSubgroup

crCircuitEndPoint-crCircuitEndPointSubgroup NAME BINDING
  SUBORDINATE OBJECT CLASS crCircuitEndPoint AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS crCircuitEndPointSubgroup AND SUBCLASSES;
  WITH ATTRIBUTE crCircuitEndPointId; CREATE WITH-AUTOMATIC-INSTANCE-NAMING; DELETE;
  REGISTERED AS {nameBinding 9};

5.2.10 crCircuitEndPointSubgroup-nniAccess

crCircuitEndPointSubgroup-nniAccess NAME BINDING
  SUBORDINATE OBJECT CLASS crCircuitEndPointSubgroup AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS nniAccess AND SUBCLASSES;
  WITH ATTRIBUTE crCircuitEndPointSubgroupId; CREATE WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE ONLY-IF-NO-CONTAINED-OBJECTS;
  REGISTERED AS {nameBinding 10};
5.2.11 customerProfileBb-managedElementR1

customerProfileBb-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS customerProfileBb
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T Q.824.0":customerProfileId;
  CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 11};

5.2.12 customizedResourceBb-customerProfileBb

customizedResourceBb-customerProfileBb NAME BINDING
  SUBORDINATE OBJECT CLASS customizedResourceBb
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS customerProfileBb
  AND SUBCLASSES;
  WITH ATTRIBUTE "ITU-T Q.824.0":customizedResourceId;
  CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 12};

5.2.13 digitManip-managedElementR1

digitManip-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS digitManip
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE digitManipId;
  CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 13};

5.2.14 directoryNumberE164-managedElementR1

directoryNumberE164-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS directoryNumberE164
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE directoryNumberId;
  CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 14};

5.2.15 listOfRouteTps-managedElementR1

listOfRouteTps-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS listOfRouteTps
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
  WITH ATTRIBUTE listOfRouteTpsId;
  CREATE
  WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE;
  REGISTERED AS {nameBinding 15};

5.2.16 localDestination-managedElementR1

localDestination-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS localDestination
  AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
  AND SUBCLASSES;
WITH ATTRIBUTE localDestinationId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 16};

5.2.17 nniAccess-managedElementR1

nniAccess-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS nniAccess AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE nniAccessId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 17};

5.2.18 postAnalysisEvaluation-managedElementR1

postAnalysisEvaluation-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS postAnalysisEvaluation
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE postAnalysisEvaluationId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 18};

5.2.19 prefixDigitAnalysis-managedElementR1

prefixDigitAnalysis-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS prefixDigitAnalysis
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE prefixDigitAnalysisId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 19};

5.2.20 routeData-managedElementR1

routeData-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS routeData
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE routeDataId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 20};

5.2.21 saalUniProtocolProfile-managedElementR1

saalUniProtocolProfile-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS saalUniProtocolProfile
AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T Recommendation M.3100":managedElementR1
AND SUBCLASSES;
WITH ATTRIBUTE saalUniProtocolProfileId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 21};

5.2.22 supplementaryServiceDependentBb-bearerServiceBb

supplementaryServiceDependentBb-bearerServiceBb NAME BINDING
SUBORDINATE OBJECT CLASS supplementaryServiceDependentBb
AND SUBCLASSES;
5.2.23 supplementaryServiceDependentBb-teleserviceBb

The name binding to managedElementR1 and subclasses as defined in I.751 [4] for subclasses of vpTTPBidirectional is used.

5.2.24 supplementaryServiceIndependentBb-customerProfileBb

5.2.25 sVpTTP-managedElementR1

5.2.26 teleserviceBb-customerProfileBb

5.2.27 userData-customerProfileBb

5.2.28 uniAccess-managedElementR1
5.2.29  vcCTPBidirectional-managedElementR1

vcCTPBidirectional-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS vcCTPBidirectional AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1 AND SUBCLASSES;
WITH ATTRIBUTE "ITU-T M.3100":cTPId;
BEHAVIOUR
vcCTPBidirectional-managedElementR1Behaviour BEHAVIOUR
DEFINED AS
"The value of vcTPId attribute (VCI value) in the vcCTPBidirectional object is used internal to the ATM Network Element and the value it is given is a local matter."
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 27};

5.2.30  virtualPathGroup-nniAccess

virtualPathGroup-nniAccess NAME BINDING
SUBORDINATE OBJECT CLASS virtualPathGroup AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS nniAccess AND SUBCLASSES;
WITH ATTRIBUTE virtualPathGroupId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {nameBinding 28};

5.2.31  xTPSGComb-managedElementR1

xTPSGComb-managedElementR1 NAME BINDING
SUBORDINATE OBJECT CLASS xTPSGComb AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "ITU-T M.3100":managedElementR1 AND SUBCLASSES;
WITH ATTRIBUTE xtpsgCombId;
CREATE
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE;
REGISTERED AS {nameBinding 30};

5.3  Definition of packages

5.3.1  AAL type 1 performance parameter package (aalTypeOnePerformanceParameterPkg)

aalTypeOnePerformanceParameterPkg PACKAGE
ATTRIBUTES
| sequenceViolations | REPLACE-WITH-DEFAULT |
|                   | DEFAULT VALUE ATMMIBMod.integerZero |
|                   | GET, |
| cellLoss          | REPLACE-WITH-DEFAULT |
|                   | DEFAULT VALUE ATMMIBMod.integerZero |
|                   | GET, |
| cellMisinsertion  | REPLACE-WITH-DEFAULT |
|                   | DEFAULT VALUE ATMMIBMod.integerZero |
|                   | GET, |
| bufferUnderflows  | REPLACE-WITH-DEFAULT |
|                   | DEFAULT VALUE ATMMIBMod.integerZero |
|                   | GET, |
| bufferOverflows   | REPLACE-WITH-DEFAULT |
|                   | DEFAULT VALUE ATMMIBMod.integerZero |
|                   | GET, |
| headerErrors      | REPLACE-WITH-DEFAULT |
DEFAULT VALUE ATMMIBMod.integerZero
GET,
stdPointerReframes
REPLACE-WITH-DEFAULT
DEFAULT VALUE ATMMIBMod.integerZero
GET,
stdPointerParityFailures
REPLACE-WITH-DEFAULT
DEFAULT VALUE ATMMIBMod.integerZero
GET;
REGISTERED AS {package 1};

5.3.2 AAL type 1 performance parameter history data package (aalTypeOnePerformanceParameterHistoryDataPkg)

aalTypeOnePerformanceParameterHistoryDataPkg PACKAGE
ATTRIBUTES
  sequenceViolations
  GET,
cellLoss
  GET,
cellMisinsertion
  GET,
bufferUnderflows
  GET,
bufferOverflows
  GET,
headerErrors
  GET,
stdPointerReframes
  GET,
stdPointerParityFailures
  GET;
REGISTERED AS {package 2};

5.3.3 AAL type 1 profile package (aalTypeOneProfilePkg)

aalTypeOneProfilePkg PACKAGE
ATTRIBUTES
  cbrRate
  GET,
cellLossIntegrationPeriod,
  GET,
clockRecoveryType
  GET,
forwardErrorCorrectionMethod
  GET,
partiallyFilledCells
  GET,
structuredDataTransfer
  GET,
subType
  GET;
REGISTERED AS {package 3};

5.3.4 AAL type 3/4 performance parameter package (aalTypeThreeFourPerformanceParameterPkg)

aalTypeThreeFourPerformanceParameterPkg PACKAGE
ATTRIBUTES
  sumOfInvalidSARFieldErrors
  REPLACE-WITH-DEFAULT
  DEFAULT VALUE ATMMIBMod.integerZero
  GET,
  sumOfIncorrectSARFieldErrors
  REPLACE-WITH-DEFAULT
  DEFAULT VALUE ATMMIBMod.integerZero
  GET,
sarCrcViolations
  REPLACE-WITH-DEFAULT
  DEFAULT VALUE ATMMIBMod.integerZero
  GET,
comsEomsUnexpectedSN
  REPLACE-WITH-DEFAULT
  DEFAULT VALUE ATMMIBMod.integerZero
  GET,
bomsEomsUnexpectedMID
  DEFAULT VALUE ATMMIBMod.integerZero
  GET;
5.3.5 AAL type 3/4 performance parameter history data package (aalTypeThreeFourPerformanceParameterHistoryDataPkg)

aalTypeThreeFourPerformanceParameterHistoryDataPkg PACKAGE
ATTRIBUTES
  sumOfInvalidSARFieldErrors
  GET,
  sumOfIncorrectSARFieldErrors
  GET,
  sarCrcViolations
  GET,
  comsEomsUnexpectedSN
  GET,
  bomsEomsUnexpectedMID
  GET,
  sriTimeOuts
  GET,
  numberOfAborts
  GET,
  sumOfInvalidCSFieldErrors
  GET,
  sumOfIncorrectCSFieldErrors
  GET,
  bETagMismatch
  GET,
  lengthBASizeMismatch
  GET,
  lengthMismatch
  GET;
REGISTERED AS {package 5};

5.3.6 AAL type 3/4 profile package (aalTypeThreeFourProfilePkg)

aalTypeThreeFourProfilePkg PACKAGE
ATTRIBUTES
  maxCpcsPduSize
  GET,
  midRange
  GET,
  aal Mode
  GET,
  sscsType
  GET;
REGISTERED AS {package 6};
5.3.7 AAL type 5 performance parameter package (aalTypeFivePerformanceParameterPkg)

```
aalTypeFivePerformanceParameterPkg PACKAGE
ATTRIBUTES
    sumOfInvalidCSFieldErrors
        REPLACE-WITH-DEFAULT
        DEFAULT VALUE ATMMIBMod.integerZero
        GET,
    crcViolations
        REPLACE-WITH-DEFAULT
        DEFAULT VALUE ATMMIBMod.integerZero
        GET,
    reassemblyTimerExpirations
        REPLACE-WITH-DEFAULT
        DEFAULT VALUE ATMMIBMod.integerZero
        GET;
REGISTERED AS {package 7};
```

5.3.8 AAL type 5 performance parameter history data package (aalTypeFivePerformanceParameterHistoryDataPkg)

```
aalTypeFivePerformanceParameterHistoryDataPkg PACKAGE
ATTRIBUTES
    sumOfInvalidCSFieldErrors
        GET,
    crcViolations
        GET,
    reassemblyTimerExpirations
        GET;
REGISTERED AS {package 8};
```

5.3.9 AAL type 5 profile package (aalTypeFiveProfilePkg)

```
aalTypeFiveProfilePkg PACKAGE
ATTRIBUTES
    maxCpcsPduSize
        GET,
    aal Mode
        GET,
    sscsType
        GET;
REGISTERED AS {package 9};
```

5.3.10 Blocked for maintenance package (blockedForMaintenancePkg)

```
blockedForMaintenancePkg PACKAGE
ATTRIBUTES
    blockedForMaintenance
        DEFAULT VALUE ASN1DefinedTypesModule.defaultBlockedForMaintenance
        GET-REPLACE;
REGISTERED AS {package 10};
```

5.3.11 Calling line identification presentation for broadband package (cLIPBbPkg)

```
cLIPBbPkg PACKAGE
BEHAVIOUR cLIPBbBeh;
ATTRIBUTES
    "ITU-T Q.824.2": noRestrictionsAllowed
        GET-REPLACE;
REGISTERED AS {package 11};
cLIPBbBeh BEHAVIOUR
DEFINED AS
    "This Supplementary Service (described in Q.2951.3) provides the called party with the possibility of receiving identification of the calling party. In addition to the ISDN number, the calling line identity may include a subaddress generated by the calling user and transparently transported by the network. The network shall deliver the calling line identity to the called party during call establishment, regardless of the terminal capability to handle the information.";
```
5.3.12 Calling line identification restriction for broadband package (cLIRBbPkg)

cLIRBbPkg PACKAGE
BEHAVIOUR cLIRBbBeh;
ATTRIBUTES
"ITU-T Q.824.2": callIdRestrictionOptions
GET-REPLACE;
REGISTERED AS {package 12};
cLIRBbBeh BEHAVIOUR
DEFINED AS
"This Supplementary Service (described in Q.2951.4) provides the calling party with the
possibility to prevent presentation of the calling party's ISDN number, and subaddress information
(if any) to the called party. If the called party subscribes to the CLIP Supplementary Service then
the called party shall receive an indication that the calling party information is not available due
to restriction."

5.3.13 Carrier data pointer package (carrierDataPtrPkg)

carrierDataPtrPkg PACKAGE
ATTRIBUTES
carrierDataPtr
GET;
REGISTERED AS {package 13};

5.3.14 Carrier parameter required package (carrierParameterRequiredPkg)

carrierParameterRequiredPkg PACKAGE
ATTRIBUTES
cSRequired
GET-REPLACE,
cIPRequired
GET-REPLACE;
REGISTERED AS {package 14};

5.3.15 Closed user group subscription option package for broadband (cUGSubscriptionOptionBbPkg)

cUGSubscriptionOptionBbPkg PACKAGE
BEHAVIOUR cUGSubscriptionOptionBbBeh;
ATTRIBUTES
preferredCUGIndex
GET-REPLACE,
interCUGaccess
GET-REPLACE;
REGISTERED AS {package 15};
cUGSubscriptionOptionBbBeh BEHAVIOUR
DEFINED AS
"The CUG subscription options object may only be instantiated if either attribute
preferredCUGIndex is assigned a non-NULL value or attribute interCUGaccess is not empty. M_SET
operations which would result in preferredCUGIndex value NULL and interCUGaccess value empty set are
not allowed. The value of attribute preferredCUGIndex should not be NULL when interCUGvalue is
"none" or "incomingaccess".";

5.3.16 Connected line identification presentation for broadband package (cOLPBbPkg)

cOLPBbPkg PACKAGE
BEHAVIOUR cOLPBbBeh;
ATTRIBUTES
noColpRestrictionsAllowed
GET-REPLACE;
REGISTERED AS {package 16};
cOLPBbBeh BEHAVIOUR
DEFINED AS
"This Supplementary Service (described in Q.2951.5) provides the calling party with the
possibility of receiving identification of the connected party.";
5.3.17 Connected line identification restriction for broadband package (cOLRBbPkg)

cOLRBbPkg PACKAGE
BEHAVIOUR cOLRBbBeh;
ATTRIBUTES
    connIdRestrictionOptions
    GET-REPLACE;
REGISTERED AS {package 17};
cOLRBbBeh BEHAVIOUR
DEFINING AS
"This Supplementary Service (described in Q.2951.6) provides the called party with the possibility to prevent presentation of the connected party's ISDN number, and subaddress information (if any) to the calling party.";

5.3.18 Destination code package (destinationCodePkg)

destinationCodePkg PACKAGE
ATTRIBUTES
    destinationCode
    GET;
REGISTERED AS {package 18};

5.3.19 Destination type package (destinationTypePkg)

destinationTypePkg PACKAGE
ATTRIBUTES
    destinationType
    GET;
REGISTERED AS {package 19};

5.3.20 Digit comb insertion package (digitCombInsertPkg)

digitCombInsertPkg PACKAGE
ATTRIBUTES
    digitCombInsert
    GET-REPLACE ADD-REMOVE;
REGISTERED AS {package 20};

5.3.21 Digit comb replace package (digitCombReplacePkg)

digitCombReplacePkg PACKAGE
ATTRIBUTES
    digitCombReplace
    GET-REPLACE ADD-REMOVE;
REGISTERED AS {package 21};

5.3.22 Digit manipulation pointer package (digitManipPtrPkg)

digitManipPtrPkg PACKAGE
ATTRIBUTES
    digitManipPtr
    GET-REPLACE;
REGISTERED AS {package 22};

5.3.23 Digit suppression package (digitSuppressPkg)

digitSuppressPkg PACKAGE
ATTRIBUTES
    digitSuppress
    GET-REPLACE ADD-REMOVE;
REGISTERED AS {package 23};

5.3.24 Maintenance signalling running package (maintenanceSignallingRunningPkg)

maintenanceSignallingRunningPkg PACKAGE
ATTRIBUTES
5.3.25 Maximum digits package (maxDigitsPkg)

maxDigitsPkg PACKAGE
  ATTRIBUTES
  maxDigits
  GET-REPLACE;
  REGISTERED AS {package 25};

5.3.26 Minimum digits package (minDigitsPkg)

minDigitsPkg PACKAGE
  ATTRIBUTES
  minDigits
  GET-REPLACE;
  REGISTERED AS {package 26};

5.3.27 Modify termination point list package (modifyTerminationPointListPkg)

modifyTerminationPointListPkg PACKAGE
  ACTIONS
  addTerminationPoint, removeTerminationPoint;
  REGISTERED AS {package 27};

5.3.28 Network type package (networkTypePkg)

networkTypePkg PACKAGE
  ATTRIBUTES
  networkType
  GET;
  REGISTERED AS {package 28};

5.3.29 Origin mark package (originMarkPkg)

originMarkPkg PACKAGE
  ATTRIBUTES
  originMark
  GET-REPLACE;
  REGISTERED AS {package 29};

5.3.30 Poll after retransmission package (pollAfterRetransmissionPkg)

pollAfterRetransmissionPkg PACKAGE
  BEHAVIOUR pollAfterRetransmissionPkgBeh
  ATTRIBUTES
  pollAfterRetransmission
  GET SET-BY-CREATE;
  REGISTERED AS {package 30};
pollAfterRetransmissionPkgBeh BEHAVIOUR
  DEFINED AS
  "This package should be used, if the poll after retransmission can be selected at creation
time of a saalUniProtocolProfile."

5.3.31 Preferred carrier package (preferredCarrierPkg)

preferredCarrierPkg PACKAGE
  ATTRIBUTES
  preferredCarrier
  GET-REPLACE;
  REGISTERED AS {package 31};
5.3.32 Propagation delay package (propagationDelayPkg)

propagationDelayPkg PACKAGE
    ATTRIBUTES
        propagationDelay
            GET-REPLACE;
    REGISTERED AS {package 32};

5.3.33 Remote blocking package (remoteBlockingPkg)

remoteBlockingPkg PACKAGE
    ATTRIBUTES
        remoteBlocking
            INITIAL VALUE DERIVATION RULE "value is set by the managed system"
            GET;
    REGISTERED AS {package 33};

5.3.34 Remote blocking NB package (remoteBlockingNBPkg)

remoteBlockingNBPkg PACKAGE
    ATTRIBUTES
        remoteBlocking
            INITIAL VALUE DERIVATION RULE "value is set by the managed system"
            GET,
        remoteBlockingReason
            INITIAL VALUE DERIVATION RULE "value is set by the managed system"
            GET;
    REGISTERED AS {package 34};

5.3.35 Required NB transfer capability package (reqNBTransferCapabilityPkg)

reqNBTransferCapabilityPkg PACKAGE
    ATTRIBUTES
        reqNBTransferCapability
            GET-REPLACE ADD-REMOVE;
    REGISTERED AS {package 35};

5.3.36 Ring time limit package (ringTimeLimitPkg)

ringTimeLimitPkg PACKAGE
    ATTRIBUTES
        ringTimeLimit
            GET-REPLACE;
    REGISTERED AS {package 36};

5.3.37 Search method package (searchMethodPkg)

searchMethodPkg PACKAGE
    ATTRIBUTES
        searchMethod
            GET-REPLACE;
    REGISTERED AS {package 37};

5.3.38 Send TNS package (sendTNSPkg)

sendTNSPkg PACKAGE
    ATTRIBUTES
        sendTNS
            GET-REPLACE;
    REGISTERED AS {package 38};

5.3.39 Signalling channel pointer package (signallingChannelPtrPkg)

signallingChannelPtrPkg PACKAGE
    ATTRIBUTES
        aalPointer
            GET-REPLACE,
        signallingChannelPtr
            GET;
5.3.40 Signalling type package (signallingTypePkg)

signallingTypePkg PACKAGE
  ATTRIBUTES
  signallingType
       DEFAULT VALUE ASN1DefinedTypesModule.defaultSignallingType
       GET;
  REGISTERED AS [package 40];

5.3.41 Sub-addressing for broadband package (sUBBbPkg)

sUBBbPkg PACKAGE
  BEHAVIOUR sUBBbBeh;
  REGISTERED AS [package 41];

sUBBbBeh BEHAVIOUR
  DEFINED AS
  "This Supplementary Service (described in Q.2951.8) provides the called user to expand his
  addressing capacity beyond the one given by the ISDN number.";

5.3.42 Two calling party number delivery package (twoCallingPartyNumberDeliveryPkg)

twoCallingPartyNumberDeliveryPkg PACKAGE
  ATTRIBUTES
  twoCallingPartyNumberDelivery
       DEFAULT VALUE ASN1DefinedTypesModule.defaultTwoCallingPartyNumberDelivery
       GET–REPLACE;
  REGISTERED AS [package 42];

5.3.43 User to user signalling for broadband package (userToUserSignallingBbPkg)

userToUserSignallingBbPkg PACKAGE
  BEHAVIOUR userToUserSignallingBbBeh;
  REGISTERED AS [package 43];

userToUserSignallingBbBeh BEHAVIOUR
  DEFINED AS
  "This service allows an ISDN subscriber to send/receive a limited amount of information
  to/from another ISDN subscriber over the signalling channel associated with their call according to
  Q.2957.";

5.4 Definition of attributes

5.4.1 AAL mode (aalMode)

aalMode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AalMode;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR aalModeBeh;
  REGISTERED AS [attribute 1];

aalModeBeh BEHAVIOUR
  DEFINED AS
  "This attribute indicates whether the AAL for the supporting VCC is operating in message
  mode or streaming mode, assured or unassured.";

5.4.2 AAL pointer (aalPointer)

aalPointer ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR aalPointerBeh;
  REGISTERED AS [attribute 2];
aalPointerBeh BEHAVIOUR
5.4.3 AAL profile identifier (aalProfileId)

<table>
<thead>
<tr>
<th>aalProfileId ATTRIBUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;</td>
</tr>
<tr>
<td>MATCHES FOR EQUALITY;</td>
</tr>
<tr>
<td>BEHAVIOUR aalProfileIdBeh;</td>
</tr>
<tr>
<td>REGISTERED AS {attribute 3};</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>aalProfileIdBeh BEHAVIOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;This attribute identifies the associated object which represents the functions performed at the ATM adaptation layer.&quot;;</td>
</tr>
</tbody>
</table>

5.4.4 AAL profile pointer (aalProfilePointer)

<table>
<thead>
<tr>
<th>aalProfilePointer ATTRIBUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;</td>
</tr>
<tr>
<td>MATCHES FOR EQUALITY;</td>
</tr>
<tr>
<td>BEHAVIOUR aalProfilePointerBeh;</td>
</tr>
<tr>
<td>REGISTERED AS {attribute 4};</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>aalProfilePointerBeh BEHAVIOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;This attribute can be used as an RDN when naming an instance of the aalProfile managed object class.&quot;;</td>
</tr>
</tbody>
</table>

5.4.5 AAL type (aalType)

<table>
<thead>
<tr>
<th>aalType ATTRIBUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AalType;</td>
</tr>
<tr>
<td>MATCHES FOR EQUALITY;</td>
</tr>
<tr>
<td>BEHAVIOUR aalTypeBeh;</td>
</tr>
<tr>
<td>REGISTERED AS {attribute 5};</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>aalTypeBeh BEHAVIOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;This attribute identifies the AAL Type. Valid types are AAL1, AAL3/4, and AAL5.&quot;;</td>
</tr>
</tbody>
</table>

5.4.6 Abstract destination identifier (abstractDestinationId)

<table>
<thead>
<tr>
<th>abstractDestinationId ATTRIBUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;</td>
</tr>
<tr>
<td>MATCHES FOR EQUALITY;</td>
</tr>
<tr>
<td>BEHAVIOUR abstractDestinationIdBeh;</td>
</tr>
<tr>
<td>REGISTERED AS {attribute 6};</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>abstractDestinationIdBeh BEHAVIOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;This entity describes the object identifier attribute of the object class 'abstractDestination'.&quot;;</td>
</tr>
</tbody>
</table>

5.4.7 Abstract destination instance (abstractDestinationInstance)

<table>
<thead>
<tr>
<th>abstractDestinationInstance ATTRIBUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AbstractDestinationInstance;</td>
</tr>
<tr>
<td>MATCHES FOR EQUALITY;</td>
</tr>
<tr>
<td>BEHAVIOUR abstractDestinationInstanceBeh;</td>
</tr>
<tr>
<td>REGISTERED AS {attribute 7};</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>abstractDestinationInstanceBeh BEHAVIOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;This entity describes the pointer to the instance of 'abstractDestination'.&quot;;</td>
</tr>
</tbody>
</table>

5.4.8 Access pointer list (accessPtrList)

<table>
<thead>
<tr>
<th>accessPtrList ATTRIBUTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SetOfInstances;</td>
</tr>
<tr>
<td>MATCHES FOR EQUALITY;</td>
</tr>
<tr>
<td>BEHAVIOUR accessPtrListBeh;</td>
</tr>
</tbody>
</table>
REGISTERED AS {attribute 8};

accessPtrListBeh BEHAVIOUR
DEFINED AS
"This is a set-valued attribute whose value(s) points to instances of the Access object class or its subclasses."

5.4.9 Active list of route termination points (activeListOfRouteTps)

activeListOfRouteTps ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ActiveListOfRouteTps;
MATCHES FOR EQUALITY;
BEHAVIOUR activeListOfRouteTpsBeh;
REGISTERED AS {attribute 9};

activeListOfRouteTpsBeh BEHAVIOUR
DEFINED AS
"This entity describes the pointer to the selected 'ListOfRouteTps' object, which contains an ordered list of instances of 'routeData' matching the selection criteria."

5.4.10 Active target (activeTarget)

activeTarget ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ActiveTarget;
MATCHES FOR EQUALITY;
BEHAVIOUR activeTargetBeh;
REGISTERED AS {attribute 10};

activeTargetBeh BEHAVIOUR
DEFINED AS
"This entity describes the target which is currently addressed by the 'analysisCriteria' instance."

5.4.11 Analysis criteria identifier (analysisCriteriaId)

analysisCriteriaId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR analysisCriteriaIdBeh;
REGISTERED AS {attribute 11};

analysisCriteriaIdBeh BEHAVIOUR
DEFINED AS
"This entity describes the object identifier attribute of the object class 'analysisCriteria'."

5.4.12 Assign non-assign (assignNonAssign)

assignNonAssign ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AssignNonAssign;
MATCHES FOR EQUALITY;
BEHAVIOUR assignNonAssignBeh;
REGISTERED AS {attribute 12};

assignNonAssignBeh BEHAVIOUR
DEFINED AS
"Indicates whether the exchange is for the VPC's of this object instance the assigning or the nonassigning exchange."

5.4.13 Associated signalling route set NE part (assocSignRouteSetNePart)

assocSignRouteSetNePart ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
MATCHES FOR EQUALITY;
BEHAVIOUR assocSignRouteSetNePartBeh;
REGISTERED AS {attribute 13};

assocSignRouteSetNePartBeh BEHAVIOUR
DEFINED AS
"Identifies the CCS7 signalling resource (Q.2751:signRouteSetNePart)."
5.4.14  Associated termination point and VPCI (assocTPandVPCI)

assocTPandVPCI ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AssocTPandVPCI;
   MATCHES FOR EQUALITY;
   BEHAVIOUR assocTPandVPCIBeh;
   REGISTERED AS {attribute 14};
assocTPandVPCIBeh BEHAVIOUR
   DEFINED AS
   "This is a set-valued attribute whose value(s) point to instances of the vpTTPBidirectional
   managed object class or its subclasses. This vpTTPBidirectional object instances terminate the VPC's
   managed by this uni access. A VPCI value is related to every pointer, corresponding to the two
   octets defined for ITU-T UNI signalling. In the case of associated signalling, additionally a
   signalling channel pointer is related to every pointer. The optional signChannel in the associated
   ASN.1 definition which identifies the signalling channel for associated signalling is omitted for
   nonassociated signalling.";

5.4.15  Associated VP TTP and VPCI list (assocTTPandVPCIList)

assocvpTTPandVPCIList ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AssocvpTTPandVPCIList;
   MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
   BEHAVIOUR assocvpTTPandVPCIList;
   REGISTERED AS {attribute 15};
assocvpTTPandVPCIListBeh BEHAVIOUR
   DEFINED AS
   "This is a set-valued attribute whose value(s) point to instances of the vpTTPBidirectional
   managed object class or its subclasses. These vpTTPBidirectional object instances terminate the VPCs
   managed by this nni access. A VPCI value is related to every pointer. A vpTTPBidirectional shall be administratively locked before it can be removed from this
   list.";

5.4.16  Associated link groupComb or VP group (assocLinkGroup)

assocLinkGroup ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.AssocLinkGroup;
   MATCHES FOR EQUALITY;
   BEHAVIOUR assocLinkGroupBeh;
   REGISTERED AS {attribute 16};
assocLinkGroupBeh BEHAVIOUR
   DEFINED AS
   "This entity describes the result pointer to an instance of 'xTPSGComb',
    'crCircuitEndPointSubgroup' or 'virtualPathGroup'.";

5.4.17  B/E tag mismatch (bETagMismatch)

bETagMismatch ATTRIBUTE
   DERIVED FROM"ITU-T Recommendation X.721":counter;
   BEHAVIOUR bETagMismatchBeh;
   REGISTERED AS {attribute 17};
bETagMismatchBeh BEHAVIOUR
   DEFINED AS
   "This attribute represents the number of times an incoming CS_PDU had a BTag field value
   that did not equal the ETag field value.";

5.4.18  Blocked for maintenance (blockedForMaintenance)

blockedForMaintenance ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.BlockedForMaintenance;
   MATCHES FOR EQUALITY;
   BEHAVIOUR blockedForMaintenanceBeh;
   REGISTERED AS {attribute 18};
blockedForMaintenanceBeh BEHAVIOUR
   DEFINED AS
   "This attribute indicates the blocking state of the virtual path and is typically used when
   creating new VPs. A blocked virtual path cannot be selected for new non-test traffic, however it can
   be used for test calls. The blocking of a virtual path has no influence on existing calls (non-test
   calls and test calls).";
5.4.19 BOM/EOM unexpected MID (bomsEomsUnexpectedMID)

bomsEomsUnexpectedMID ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR bomsEomsUnexpectedMIDBeh;
  REGISTERED AS {attribute 19};

bomsEomsUnexpectedMIDBeh BEHAVIOUR
  DEFINED AS
  "This attribute represents the number of BOM/EOM segments with an unexpected MID value.
  This attribute will be incremented by one each time a BOM is received with a currently active MID (a
  MID for which an EOM has not yet been received), or when an EOM is received for which a MID is NOT
  currently active.";

5.4.20 Buffer overflows (bufferOverflows)

bufferOverflows ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR bufferOverflowsBeh;
  REGISTERED AS {attribute 20};

bufferOverflowsBeh BEHAVIOUR
  DEFINED AS
  "This attribute represents a count of the number of times the reassembly buffer overflows. If
  the interworking function is implemented with multiple buffers, such as a cell level buffer and a
  bit level buffer, then either buffer overflow will cause this count to be incremented.";

5.4.21 Buffer release (bufferRelease)

bufferRelease ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.BufferRelease;
  BEHAVIOUR bufferReleaseBeh;
  REGISTERED AS {attribute 21};

bufferReleaseBeh BEHAVIOUR
  DEFINED AS
  "This attribute determines whether SSCOP can release its transmission buffer and
  transmission queue on connection release and can selectively release messages from the transmission
  buffer when older messages are still outstanding.";

5.4.22 Buffer underflows (bufferUnderflows)

bufferUnderflows ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR bufferUnderflowsBeh;
  REGISTERED AS {attribute 22};

bufferUnderflowsBeh BEHAVIOUR
  DEFINED AS
  "This attribute represents a count the number of times the reassembly buffer underflows. In
  the case of a continuous underflow caused by a loss of ATM cell flow, a single buffer underflow
  should be counted. If the interworking function is implemented with multiple buffers, such as a cell
  level buffer and a bit level buffer, then either buffer underflow will cause this count to be
  incremented.";

5.4.23 Calling party category (callingPartyCategory)

callingPartyCategory ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CallingPartyCategory;
  MATCHES FOR EQUALITY;
  BEHAVIOUR callingPartyCategoryBeh;
  REGISTERED AS {attribute 23};

callingPartyCategoryBeh BEHAVIOUR
  DEFINED AS
  "This entity describes the category as the type of calling subscriber considered for the routing
  process.";

5.4.24 Call routing circuit endpoint identifier (crCircuitEndPointId)

crCircuitEndPointId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR crCircuitEndPointIdBeh;
5.4.25 Call routing circuit endpoint subgroup identifier (crCircuitEndPointSubgroupId)

```
crCircuitEndPointSubgroupId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR crCircuitEndPointSubgroupIdBeh;
REGISTERED AS {attribute 25};
```

**crCircuitEndPointSubgroupIdBeh BEHAVIOUR**

"This attribute is used to name instances of the crCircuitEndPointSubgroup managed object class."

5.4.26 Call routing office data identifier (callRoutingOfficeDataId)

```
callRoutingOfficeDataId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR callRoutingOfficeDataIdBeh;
REGISTERED AS {attribute 26};
```

**callRoutingOfficeDataIdBeh BEHAVIOUR**

"This entity describes the object identifier attribute of the object class 'callRoutingOfficeData'."

5.4.27 Carrier code (carrierCode)

```
carrierCode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CarrierCode;
  MATCHES FOR EQUALITY;
  BEHAVIOUR carrierCodeBeh;
REGISTERED AS {attribute 27};
```

**carrierCodeBeh BEHAVIOUR**

"This entity describes the unambiguous carrier specific code used to distinguish from other carrier concerning the exchange. It can be dialled by the customer or supplied by the originating exchange."

5.4.28 Carrier data identifier (carrierDataId)

```
carrierDataId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR carrierDataIdBeh;
REGISTERED AS {attribute 28};
```

**carrierDataIdBeh BEHAVIOUR**

"This entity describes the object identifier attribute of the object class 'carrierData'."

5.4.29 Carrier data pointer (carrierDataPtr)

```
carrierDataPtr ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CarrierDataPtr;
  MATCHES FOR EQUALITY;
  BEHAVIOUR carrierDataPtrBeh;
REGISTERED AS {attribute 29};
```

**carrierDataPtrBeh BEHAVIOUR**

"This entity describes the pointer to an instance of 'carrierData'."

5.4.30 CBR rate (cbrRate)

```
cbrRate ATTRIBUTE
```

REGISTERED AS {attribute 24};

crCircuitEndPointBeh BEHAVIOUR

"This attribute is used to name instances of the crCircuitEndPoint managed object class."
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR cbrRateBeh;
REGISTERED AS {attribute 30};
cbrRateBeh BEHAVIOUR
DEFINED AS
"This attribute represents the rate of the CBR service supported by the AAL."

5.4.31 Cell loss (cellLoss)

cellLoss ATTRIBUTE
DERIVED FROM "ITU-T Recommendation X.721":counter;
BEHAVIOUR cellLossBeh;
REGISTERED AS {attribute 31};
cellLossBeh BEHAVIOUR
DEFINED AS
"This attribute represents a count of lost cells, as detected by the AAL sequence number processing, for example. This count records the number of cells detected as lost in the network prior to the destination interworking function AAL1 layer processing. A negative value indicates that this attribute is not supported."
5.4.36 Channel associated signalling (channelAssociatedSignalling)

channelAssociatedSignalling ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ChannelAssociatedSignalling;
MATCHES FOR EQUALITY;
BEHAVIOUR channelAssociatedSignallingBeh;
REGISTERED AS {attribute 36};

channelAssociatedSignallingBeh BEHAVIOUR
DEFINED AS
"This attribute identifies which AAL1 format should be used. This attribute applies only to structured format. The default value Basic does not carry channel associated signalling (CAS) bits and uses a single 125 usec frame. e1Cas, ds1sfCas, and ds1EsfCas carry CAS bits in a multiframe structure for E1, DS1 SF, and DS1 ESF respectively."

5.4.37 CIP required (cIPRequired)

cIPRequired ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CIPRequired;
BEHAVIOUR cIPRequiredBeh;
REGISTERED AS {attribute 37};
cIPRequiredBeh BEHAVIOUR
DEFINED AS
"This entity indicates if the CIP (carrier identification parameter) has to be signalled further."

5.4.38 Circuit identification code (cic)

cic ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Cic;
MATCHES FOR EQUALITY;
BEHAVIOUR cicBeh;
REGISTERED AS {attribute 38};
cicBeh BEHAVIOUR
DEFINED AS
"This attribute indicates the Circuit Identification Code (CIC) of the circuit which is terminated by the circuit end point. The value of the CIC is identical in the two circuit end points which terminate the circuit."

5.4.39 Clock recovery type (clockRecoveryType)

clockRecoveryType ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ClockRecoveryType;
MATCHES FOR EQUALITY;
BEHAVIOUR clockRecoveryTypeBeh;
REGISTERED AS {attribute 39};
clockRecoveryTypeBeh BEHAVIOUR
DEFINED AS
"This attribute indicates whether the clock recovery type is Synchronous, SRTS (Synchronous Residual Time Stamp), or Adaptive Clock Recovery."

5.4.40 Closed user group barring (cugBarring)

cUGBarring ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CUGBarring;
MATCHES FOR EQUALITY;
BEHAVIOUR cUGBarringBeh;
REGISTERED AS {attribute 40};
cUGBarringBeh BEHAVIOUR
DEFINED AS
"This attribute maintains the Intra-CUG restriction of the General subscription option in ITU-T Recommendation Q.2955.1."

5.4.41 Closed user group data network identification
(cUGDataNetworkIdentification)

cUGDataNetworkIdentification ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CUGDataNetworkIdentification;
MATCHES FOR EQUALITY;
BEHAVIOUR cUGDataNetworkIdentificationBeh;
REGISTERED AS {attribute 41};
cUGDataNetworkIdentificationBeh BEHAVIOUR
DEFINED AS
"This information is signalled during setup of a CUG call and serves (in conjunction with
the closed user group InterlockCode) to uniquely identify the CUG in the international network. It
can be thought of as the area code of the CUG."

5.4.42 Closed user group index (cUGIndex)

cUGIndex ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CUGIndex;
MATCHES FOR EQUALITY;
BEHAVIOUR cUGIndexBeh;
REGISTERED AS {attribute 42};
cUGIndexBeh BEHAVIOUR
DEFINED AS
"cUGIndex of General subscription option in ITU-T Recommendation Q.2955.1 must be explicitly
assigned upon object creation. No two instances of the closed user group object class contained
within a single object may have identical values for attribute cUGIndex."

5.4.43 Closed user group interlock code (cUGInterlockCode)

cUGInterlockCode ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CUGInterlockCode;
MATCHES FOR EQUALITY;
BEHAVIOUR cUGInterlockCodeBeh;
REGISTERED AS {attribute 43};
cUGInterlockCodeBeh BEHAVIOUR
DEFINED AS
"The attribute cUGInterlockCode must be assigned explicitly upon object creation. No
multiple instances of the closed user group object class contained within a single object are
allowed to have identical combinations of attribute cUGInterlockCode and
cUGDataNetworkIdentification."

5.4.44 Code (code)

code ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Code;
BEHAVIOUR codeBeh;
REGISTERED AS {attribute 44};
codeBeh BEHAVIOUR
DEFINED AS
"This entity describes the prefix digits."

5.4.45 COM/EOM unexpected SN (comsEomsUnexpectedSN)

comsEomsUnexpectedSN ATTRIBUTE
DERIVED FROM"ITU-T Recommendation X.721":counter;
BEHAVIOUR comsEomsUnexpectedSNBeh;
REGISTERED AS {attribute 45};
comsEomsUnexpectedSNBeh BEHAVIOUR
DEFINED AS
"This attribute represents the number of COM and EOM segments received with an unexpected
Sequence Number (SN). For a particular message (i.e., MID) transported over a VPC or VCC, this
attribute is incremented by one each time a COM or EOM is received with a SAR Sequence Number (SN)
that is not correct relative to the SN in the previous (non-EOM) segment."

5.4.46 Connected line identification restriction options
(connIdRestrictionOptions)

connIdRestrictionOptions ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ConnIdRestrictionOptions;
MATCHES FOR EQUALITY;
BEHAVIOUR connIdRestrictionOptionsBeh;
REGISTERED AS {attribute 46};
connIdRestrictionOptionsBeh BEHAVIOUR
 DEFINED AS
 "This attribute of the COLRBB supplementary Service allows the subscriber to select the mode
 in which the connected line identification restriction is applied. Valid options for the mode are:
 Permanent to have the service active for all calls, or Temporary to have the service requested by
 the user per call.";

5.4.47 Connection identification offering (connectionIdOffering)

connectionIdOffering ATTRIBUTE
 WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ConnectionIdOffering;
 MATCHES FOR EQUALITY;
 BEHAVIOUR connectionIdOfferingBeh;
 REGISTERED AS {attribute 47};

connectionIdOfferingBeh BEHAVIOUR
 DEFINED AS
 "This attribute indicates which procedure is used for the selection of VPCI and VCI.";

5.4.48 CRC violations (crcViolations)

crcViolations ATTRIBUTE
 DERIVED FROM "ITU-T Recommendation X.721":counter;
 BEHAVIOUR crcViolationsBeh;
 REGISTERED AS {attribute 48};

crcViolationsBeh BEHAVIOUR
 DEFINED AS
 "This attribute represents the number of CRC violations that were detected for the incoming
 AAL PDUs.";

5.4.49 CSP Required (cSPRequired)

cSPRequired ATTRIBUTE
 WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.CSPRequired;
 MATCHES FOR EQUALITY;
 BEHAVIOUR cSPRequiredBeh;
 REGISTERED AS {attribute 49};

cSPRequiredBeh BEHAVIOUR
 DEFINED AS
 "This entity indicates if the CSP (carrier selection parameter) has to be signalled
 further.";

5.4.50 Customer profile pointer (catmCustomerProfilePtr)

customerProfilePtr ATTRIBUTE
 WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;
 MATCHES FOR EQUALITY;
 BEHAVIOUR customerProfilePtrBeh;
 REGISTERED AS {attribute 50};

customerProfilePtrBeh BEHAVIOUR
 DEFINED AS
 "This attribute is used as a pointer to an instance of the customerProfile managed object
 class.";

5.4.51 Customized resource pointer list (customizedResourcePtrList)

customizedResourcePtrList ATTRIBUTE
 WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SetOfInstances;
 MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
 BEHAVIOUR customizedResourcePtrListBeh;
 REGISTERED AS {attribute 51};

customizedResourcePtrListBeh BEHAVIOUR
 DEFINED AS
 "This is a set-valued attribute whose value(s) points to instances of subclasses of the
 customizedResource object class.";

5.4.52 Destination code (destinationCode)

destinationCode ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DestinationCode;
MATCHES FOR EQUALITY;
BEHAVIOUR destinationCodeBeh;
REGISTERED AS {attribute 52};
destinationCodeBeh BEHAVIOUR
DEFINED AS "This entity describes the digit string including the local area code.";

5.4.53  Destination type (destinationType)

destinationType ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DestinationType;
MATCHES FOR EQUALITY;
BEHAVIOUR destinationTypeBeh;
REGISTERED AS {attribute 53};
destinationTypeBeh BEHAVIOUR
DEFINED AS "This entity describes unambiguously the type of destination like international, national or local.";

5.4.54  Digit comb insertion (digitCombInsert)
digitCombInsert ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DigitCombInsert;
MATCHES FOR EQUALITY;
BEHAVIOUR digitCombInsertBeh;
REGISTERED AS {attribute 54};
digitCombInsertBeh BEHAVIOUR
DEFINED AS "This entity describes which sequence of digits is to be inserted and where.";

5.4.55  Digit comb replace (digitCombReplace)
digitCombReplace ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DigitCombReplace;
MATCHES FOR EQUALITY;
BEHAVIOUR digitCombReplaceBeh;
REGISTERED AS {attribute 55};
digitCombReplaceBeh BEHAVIOUR
DEFINED AS "This entity describes which sequence of digits is to be replaced and through which.";

5.4.56  Digit manipulation identifier (digitManipId)
digitManipId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR digitManipIdBeh;
REGISTERED AS {attribute 56};
digitManipIdBeh BEHAVIOUR
DEFINED AS "This entity describes the object identifier attribute of the object class 'digitManip'.";

5.4.57  Digit manipulation pointer (digitManipPtr)
digitManipPtr ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.DigitManipPtr;
MATCHES FOR EQUALITY;
BEHAVIOUR digitManipPtrBeh;
REGISTERED AS {attribute 57};
digitManipPtrBeh BEHAVIOUR
DEFINED AS "This entity describes the pointer to 'digitManip'";

5.4.58  Digit suppression (digitSuppress)
digitSuppress ATTRIBUTE
5.4.59 Excluded subscriber codes (excludedSubscriberCodes)

excludedSubscriberCodes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ExcludedSubscriberCodes;
    MATCHES FOR EQUALITY;
    BEHAVIOUR excludedSubscriberCodesBeh;
    REGISTERED AS {attribute 59};

excludedSubscriberCodesBeh BEHAVIOUR
    DEFINED AS
    "This entity describes a set of directory numbers excluded from this local destination.";

5.4.60 Forward error correction method (forwardErrorCorrectionMethod)

forwardErrorCorrectionMethod ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.FecMethod;
    MATCHES FOR EQUALITY;
    BEHAVIOUR errorCorrectionTypeBeh;
    REGISTERED AS {attribute 60};

forwardErrorCorrectionMethodBeh BEHAVIOUR
    DEFINED AS
    "This attribute indicates the FEC method: no FEC, FEC for Loss Sensitive Signal Transport,
    or FEC for Delay Sensitive Signal Transport.";

5.4.61 Header errors (headerErrors)

headerErrors ATTRIBUTE
    DERIVED FROM "ITU-T Recommendation X.721":counter;
    BEHAVIOUR crcViolationsBeh;
    REGISTERED AS {attribute 61};

headerErrorsBeh BEHAVIOUR
    DEFINED AS
    "This attribute represents a count of the number of AAL1 header errors detected, including
    those corrected. Header errors include correctable and uncorrectable CRC plus bad parity."

5.4.62 Initial subscriber codes (initialSubscriberCodes)

initialSubscriberCodes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.InitialSubscriberCodes;
    MATCHES FOR EQUALITY;
    BEHAVIOUR initialSubscriberCodesBeh;
    REGISTERED AS {attribute 62};

initialSubscriberCodesBeh BEHAVIOUR
    DEFINED AS
    "This entity describes the upper bound for the scope of the possible directory numbers which
    can belong to this local destination.";

5.4.63 Inter closed user group access (interCUGaccess)

interCUGaccess ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.InterCUGaccess;
    MATCHES FOR EQUALITY;
    BEHAVIOUR interCUGaccessBeh;
    REGISTERED AS {attribute 63};

interCUGaccessBeh BEHAVIOUR
    DEFINED AS
    "Inter-CUG access of per service subscription option in ITU-T Recommendation Q.2955.1.";
5.4.64  Length BA size mismatch (lengthBASizeMismatch)

lengthBASizeMismatch ATTRIBUTE
   DERIVED FROM "ITU-T Recommendation X.721":counter;
   BEHAVIOUR lengthBASizeMismatchBeh;
   REGISTERED AS {attribute 64};

lengthBASizeMismatchBeh BEHAVIOUR
   DEFINED AS
   "This attribute represents the number of CS_PDUs in which the Length field value was not consistent with the BASize field value. The definition of consistent depends on the mode in which CS_PDU fragments are being processed. In the message-mode, the BASize field must equal the Length field. In the streaming mode, the BASize field must be less than the Length field."

5.4.65  Length mismatch (lengthMismatch)

lengthMismatch ATTRIBUTE
   DERIVED FROM "ITU-T Recommendation X.721":counter;
   BEHAVIOUR lengthMismatchBeh;
   REGISTERED AS {attribute 65};

lengthMismatchBeh BEHAVIOUR
   DEFINED AS
   "This attribute represents the number of CS_PDUs received with a Length field value that does not represent the actual length of the CS_PDU payload."

5.4.66  Link type (linkType)

linkType ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.LinkType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR linkTypeBeh;
   REGISTERED AS {attribute 66};

linkTypeBeh BEHAVIOUR
   DEFINED AS
   "This attribute is used to indicate whether the NNI is an international interface or not."

5.4.67  List of routes (listOfRoutes)

listOfRoutes ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ListOfRoutes;
   MATCHES FOR EQUALITY;
   BEHAVIOUR listOfRoutesBeh;
   REGISTERED AS {attribute 67};

listOfRoutesBeh BEHAVIOUR
   DEFINED AS
   "This entity describes the sequence of the selected routes ('routeData')."

5.4.68  List of route termination points identifier (listOfRouteTpsId)

listOfRouteTpsId ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR listOfRouteTpsIdBeh;
   REGISTERED AS {attribute 68};

listOfRouteTpsIdBeh BEHAVIOUR
   DEFINED AS
   "This entity describes the object identifier attribute of the object class 'listOfRouteTps'."

5.4.69  List of link groups (listOfLinkGroups)

listOfLinkGroups ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ListOfLinkGroups;
   MATCHES FOR EQUALITY;
   BEHAVIOUR listOfLinkGroupsBeh;
   REGISTERED AS {attribute 69};

listOfLinkGroupsBeh BEHAVIOUR
   DEFINED AS
   "This entity describes the sequence of instances of 'virtualPathGroup' or 'crCircuitEndPointSubgroup'."
5.4.70  Local area code (localAreaCode)

localAreaCode ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.LocalAreaCode;
MATCHES FOR EQUALITY;
BEHAVIOUR localAreaCodeBeh
REGISTERED AS {attribute 70};

localAreaCodeBeh BEHAVIOUR
DEFINED AS
"This entity describes the local area code of the subscribers which belong to this local
destination. The local area code is used without any prefix.";

5.4.71  Local destination identifier (localDestinationId)

localDestinationId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR localDestinationIdBeh;
REGISTERED AS {attribute 71};

localDestinationIdBeh BEHAVIOUR
DEFINED AS
"This entity describes the object identifier attribute of the object class
'localDestination'.";

5.4.72  Local destination pointer (localDestinationPtr)

localDestinationPtr ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
MATCHES FOR EQUALITY;
BEHAVIOUR localDestinationPtrBeh;
REGISTERED AS {attribute 72};

localDestinationPtrBeh BEHAVIOUR
DEFINED AS
"This attribute describes the pointer to localDestination. The directoryNumberE164 shall be
member of the local area defined by the localAreaCode and the initial digit string part of the SN
part of the directoryNumberE164 shall match with one of the initialSubscriberCodes of the referenced
object. The directoryNumberE164 shall not be excluded by one of the excludedSubscriberCodes from the
referenced object.";

5.4.73  Maintenance signalling running (maintenanceSignallingRunning)

maintenanceSignallingRunning ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaintenanceSignallingRunning;
MATCHES FOR EQUALITY;
BEHAVIOUR maintenanceSignallingRunningBeh;
REGISTERED AS {attribute 73};

maintenanceSignallingRunningBeh BEHAVIOUR
DEFINED AS
"This attribute indicates that a maintenance signalling procedure (e.g. reset, restart,
blocking, unblocking) is running.";

5.4.74  Maximum CC (maxCc)

maxCc ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxCc;
BEHAVIOUR maxCcBeh;
REGISTERED AS {attribute 74};

maxCcBeh BEHAVIOUR
DEFINED AS
"This attribute defines the maximum value [PDUs] of the state variable VT(CC), corresponding
to the maximum number of transmissions of BGN, END, ER or Rs PDUs.";

5.4.75  Maximum CPCS_PDU size (maxCpcsPduSize)

maxCpcsPduSize ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxCpcsPduSize;
MATCHES FOR EQUALITY;
BEHAVIOUR maxCpcsPduSizeBeh;
REGISTERED AS {attribute 75};
maxCpcsPduSizeBeh BEHAVIOUR
DEFINED AS
"This multi-valued attribute represents the maximum CPCS_PDU size that will be transmitted over the connection in both the incoming (forward) and outgoing (backward) direction of transmission."

5.4.76 Maximum digits (maxDigits)

maxDigits ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxDigits;
MATCHES FOR EQUALITY;
BEHAVIOUR maxDigitsBeh;
REGISTERED AS {attribute 76};
maxDigitsBeh BEHAVIOUR
DEFINED AS
"This entity describes the maximum number of digits required by the destination exchange. Further digits will be ignored."

5.4.77 Maximum information field length (maxInformationFieldLength)

maxInformationFieldLength ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxInformationFieldLength;
BEHAVIOUR maxInformationFieldLengthBeh;
REGISTERED AS {attribute 77};
maxInformationFieldLengthBeh BEHAVIOUR
DEFINED AS
"This attribute defines the maximum length of the information field in SD PDUs, UD PDUs and MD PDUs "k". The unit of the INTEGER value is octets.";

5.4.78 Maximum length of SSCOP user to user field (maxLengthSscopUuField)

maxLengthSscopUuField ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxLengthSscopUuField;
BEHAVIOUR maxLengthSscopUuFieldBeh;
REGISTERED AS {attribute 78};
maxLengthSscopUuFieldBeh BEHAVIOUR
DEFINED AS
"This attribute defines the maximum length of a variable length SSCOP UU field "j". The SSCOP UU is an optional field of BGN PDUs, BGAK PDUs, BGREJ PDUs, END PDUs and RS PDUs. The unit of the INTEGER value is octets";

5.4.79 Maximum PD (maxPd)

maxPd ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxPd;
BEHAVIOUR maxPdBeh;
REGISTERED AS {attribute 79};
maxPdBeh BEHAVIOUR
DEFINED AS
"This attribute defines the maximum acceptable value [PDUs] of the state variable VT(PD) before sending a POLL PDU and resetting VT(PD) to zero. The VT(PD) is incremented each time an SD PDU is transmitted."

5.4.80 Maximum SSCOP credit to peer (maxSscopCreditToPeer)

maxSscopCreditToPeer ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxSscopCreditToPeer;
BEHAVIOUR maxSscopCreditToPeerBeh;
REGISTERED AS {attribute 80};
maxSscopCreditToPeerBeh BEHAVIOUR
DEFINED AS
"This attribute defines the absolute value [PDUs] of the size of the receive window given to the peer. This value is added to VR(R) to generate VR(MR). VR(MR) is mapped to N(MR) by transmission of STAT, USTAT, RS RSAK, ER, ERAK, BGN or BGAK PDUs.";
5.4.81 Maximum STAT (maxStat)

maxStat ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MaxStat;
BEHAVIOUR maxStatBeh;
REGISTERED AS {attribute 81};

maxStatBeh BEHAVIOUR
DEFINED AS
"This attribute defines the maximum number of list elements placed in a STAT PDU.";

5.4.82 MID range (midRange)

midRange ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MidRange;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR midRangeBeh;
REGISTERED AS {attribute 82};

midRangeBeh BEHAVIOUR
DEFINED AS
"This attribute represents the range of MID values supported at the AAL for the supporting VCC.";

5.4.83 Minimum digits (minDigits)

minDigits ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.MinDigits;
MATCHES FOR EQUALITY;
BEHAVIOUR minDigitsBeh;
REGISTERED AS {attribute 83};

minDigitsBeh BEHAVIOUR
DEFINED AS
"This entity describes the minimum number of digits required before the outgoing termination point can be seized. It is only needed in case of overlapped dialling."

5.4.84 Nature of address (natureOfAddress)

natureOfAddress ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NatureOfAddress;
MATCHES FOR EQUALITY;
BEHAVIOUR natureOfAddressBeh;
REGISTERED AS {attribute 84};

natureOfAddressBeh BEHAVIOUR
DEFINED AS
"This entity describes the destination type of the prefix."

5.4.85 Network border (networkBorder)

networkBorder ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NetworkBorder;
MATCHES FOR EQUALITY;
BEHAVIOUR networkBorderBeh;
REGISTERED AS {attribute 85};

networkBorderBeh BEHAVIOUR
DEFINED AS
"This attribute is used to indicate whether the NNI is an operator network border or not."

5.4.86 Network type (networkType)

networkType ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NetworkType;
MATCHES FOR EQUALITY;
BEHAVIOUR networkTypeBeh;
REGISTERED AS {attribute 86};

networkTypeBeh BEHAVIOUR
DEFINED AS
"This attribute is used to indicate, if an access belongs to a national transit network. It is used together with the linkType and the signallingType to generate the setting of the location field according to Q.850.";
5.4.87 NNI access identifier (nniAccessId)

nniAccessId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR nniAccessIdBeh;
  REGISTERED AS {attribute 87};

nniAccessIdBeh BEHAVIOUR
  DEFINED AS "This attribute is used to name instances of the nniAccess managed object class.";

5.4.88 No connected line identification presentation restrictions allowed (noColpRestrictionsAllowed)

noColpRestrictionsAllowed ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Boolean;
  MATCHES FOR EQUALITY;
  BEHAVIOUR noColpRestrictionsAllowedBeh;
  REGISTERED AS {attribute 88};

noColpRestrictionsAllowedBeh BEHAVIOUR
  DEFINED AS "This attribute of COLP is where the calling party continues to have the capability to override the COLR restriction and have the connected party number presented as described in the COLP supplementary service. A TRUE value of this attribute permits the called party COLP supplementary service to override the calling party COLR supplementary service.";

5.4.89 Number of aborts (numberOfAborts)

numberOfAborts ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR numberOfAbortsBeh;
  REGISTERED AS {attribute 89};

numberOfAbortsBeh BEHAVIOUR
  DEFINED AS "This attribute provides a count of the number aborts (i.e., EOM with SAR_PDU Length Indication = 63) that are received for the underlying VPC or VCC.";

5.4.90 Origin (origin)

origin ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Origin;
  MATCHES FOR EQUALITY;
  BEHAVIOUR originBeh;
  REGISTERED AS {attribute 90};

originBeh BEHAVIOUR
  DEFINED AS "This entity describes the origin of the calling subscriber considered for the routing process.";

5.4.91 Origin for routing (originForRouting)

originForRouting ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
  MATCHES FOR EQUALITY;
  BEHAVIOUR originForRoutingBeh;
  REGISTERED AS {attribute 91};

originForRoutingBeh BEHAVIOUR
  DEFINED AS "This attribute determines the origin assigned to the NNI access for call routing purpose.";

5.4.92 Origin mark (originMark)

originMark ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
  MATCHES FOR EQUALITY;
  BEHAVIOUR originMarkBeh;
5.4.93 Own international code (ownInternationalCode)

ownInternationalCode ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.OwnInternationalCode;
  MATCHES FOR EQUALITY;
  BEHAVIOUR ownInternationalCodeBeh;
  REGISTERED AS {attribute 93};

ownInternationalCodeBeh BEHAVIOUR
  DEFINED AS
  "This entity describes the country code of the calling party. The own international code is used without any prefix."

5.4.94 Partially filled cells (partiallyFilledCells)

partiallyFilledCells ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR partiallyFilledCellsBeh;
  REGISTERED AS {attribute 94};

partiallyFilledCellsBeh BEHAVIOUR
  DEFINED AS
  "This attribute identifies the number of leading octets in use."

5.4.95 Poll after retransmission (pollAfterRetransmission)

pollAfterRetransmission ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PollAfterRetransmission;
  BEHAVIOUR pollAfterRetransmissionBeh;
  REGISTERED AS {attribute 95};
pollAfterRetransmissionBeh BEHAVIOUR
  DEFINED AS
  "This attribute specifies if a POLL is transmitted each time the retransmission queue is emptied"

5.4.96 Post analysis evaluation identifier (postAnalysisEvaluationId)

postAnalysisEvaluationId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR postAnalysisEvaluationIdBeh;
  REGISTERED AS {attribute 96};

postAnalysisEvaluationIdBeh BEHAVIOUR
  DEFINED AS
  "This entity describes the object identifier attribute of the object class 'postAnalysisEvaluation'."

5.4.97 Preferred carrier (preferredCarrier)

preferredCarrier ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PreferredCarrier;
  MATCHES FOR EQUALITY;
  BEHAVIOUR preferredCarrierBeh;
  REGISTERED AS {attribute 97};

preferredCarrierBeh BEHAVIOUR
  DEFINED AS
  "This attribute identifies the default carrier to use when one is not explicitly identified in the call setup message received and processed by the managed system."

5.4.98 Preferred closed user group index (preferredCUGIndex)

preferredCUGIndex ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PreferredCUGIndex;
MATCHES FOR EQUALITY;
BEHAVIOUR preferredCUGIndexBeh;
REGISTERED AS {attribute 98};

preferredCUGIndexBeh BEHAVIOUR
DEFINED AS
"This attribute indicates the index of the preferred CUG."

5.4.99  Prefix digit analysis identifier (prefixDigitAnalysisId)

prefixDigitAnalysisId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR prefixDigitAnalysisIdBeh;
  REGISTERED AS {attribute 99};

prefixDigitAnalysisIdBeh BEHAVIOUR
DEFINED AS
"This entity describes the object identifier attribute of the object class 'prefixDigitAnalysis'."

5.4.100  Propagation delay (propagationDelay)

propagationDelay ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PropagationDelay;
  MATCHES FOR EQUALITY;
  BEHAVIOUR propagationDelayBeh;
  REGISTERED AS {attribute 100};

propagationDelayBeh BEHAVIOUR
DEFINED AS
"Indicates the expected propagation delay."

5.4.101  Reassembly timer expirations (reassemblyTimerExpirations)

reassemblyTimerExpirations ATTRIBUTE
  DERIVED FROM"ITU-T Recommendation X.721":counter;
  BEHAVIOUR reassemblyTimerExpirationsBeh;
  REGISTERED AS {attribute 101};

reassemblyTimerExpirationsBeh BEHAVIOUR
DEFINED AS
"This attribute provides a count of reassembly timer expirations. A negative value indicates that this attribute is not supported.

5.4.102  Remote blocking (remoteBlocking)

remoteBlocking ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.RemoteBlocking;
  MATCHES FOR EQUALITY;
  BEHAVIOUR remoteBlockingBeh;
  REGISTERED AS {attribute 102};

remoteBlockingBeh BEHAVIOUR
DEFINED AS
"This attribute indicates the remote blocking state of the virtual path. A blocked virtual path cannot be selected for new non-test traffic, however it can be used for test calls. The blocking of a virtual path has no influence to existing calls (non-test calls and test calls)."

5.4.103  Remote blocking reason (remoteBlockingReason)

remoteBlockingReason ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.RemoteBlockingReason;
  MATCHES FOR EQUALITY;
  BEHAVIOUR remoteBlockingReasonBeh;
  REGISTERED AS {attribute 103};

remoteBlockingReasonBeh BEHAVIOUR
DEFINED AS
"Indicates the reason when the circuit was remotely blocked."
5.4.104 Required bandwidth egress (reqBandwidthEgress)

reqBandwidthEgress ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ReqBandwidthEgress;
MATCHES FOR EQUALITY;
BEHAVIOUR reqBandwidthEgressBeh;
REGISTERED AS {attribute 104};

reqBandwidthEgressBeh BEHAVIOUR
DEFINED AS
"This entity describes the range of supported bandwidth";

5.4.105 Required bandwidth ingress (reqBandwidthIngress)

reqBandwidthIngress ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ReqBandwidthIngress;
MATCHES FOR EQUALITY;
BEHAVIOUR reqBandwidthIngressBeh;
REGISTERED AS {attribute 105};

reqBandwidthIngressBeh BEHAVIOUR
DEFINED AS
"This entity describes the range of supported bandwidth";

5.4.106 Required bearer capability (reqBearerCapab)

reqBearerCapab ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ReqBearerCapab;
MATCHES FOR EQUALITY;
BEHAVIOUR reqBearerCapabBeh;
REGISTERED AS {attribute 106};

reqBearerCapabBeh BEHAVIOUR
DEFINED AS
"This entity describes the supported bearer capabilities.";

5.4.107 Required NB transfer capability (reqNBTransferCapability)

reqNBTransferCapability ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ReqNBTransferCapability;
MATCHES FOR EQUALITY;
BEHAVIOUR reqNBTransferCapabilityBeh
REGISTERED AS {attribute 107};

reqNBTransferCapabilityBeh BEHAVIOUR
DEFINED AS
"This entity describes the N-ISDN bearer capability of the underlying routes.";

5.4.108 Ring time limit (ringTimeLimit)

ringTimeLimit ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.RingTimeLimit;
MATCHES FOR EQUALITY;
BEHAVIOUR ringTimeLimitBeh;
REGISTERED AS {attribute 108};

ringTimeLimitBeh BEHAVIOUR
DEFINED AS
"This attribute limits the ring time.";

5.4.109 Route data identifier (routeDataId)

routeDataId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
MATCHES FOR EQUALITY;
BEHAVIOUR routeDataIdBeh;
REGISTERED AS {attribute 109};

routeDataIdBeh BEHAVIOUR
DEFINED AS
"This entity describes the object identifier attribute of the object class 'routeData'.";
5.4.110 SAAL UNI protocol profile identifier (saalUniProtocolProfileId)

saalUniProtocolProfileId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR saalUniProtocolProfileIdBeh;
  REGISTERED AS {attribute 110};

saalUniProtocolProfileIdBeh BEHAVIOUR
  DEFINED AS
  "This attribute is used for naming instances of the object class saalUniProtocolProfile.";

5.4.111 SAR CRC violations (sarCrcViolations)

sarCrcViolations ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR sarCrcViolationsBeh;
  REGISTERED AS {attribute 111};

sarCrcViolationsBeh BEHAVIOUR
  DEFINED AS
  "This attribute represents the number of CRC violations that were detected for the incoming SAR PDUs.";

5.4.112 Search method (searchMethod)

searchMethod ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SearchMethod;
  MATCHES FOR EQUALITY;
  BEHAVIOUR searchMethodBeh;
  REGISTERED AS {attribute 112};

searchMethodBeh BEHAVIOUR
  DEFINED AS
  "This attribute describes the method how to select a VPC with sufficient free bandwidth or an idle circuit within this object instance. The following algorithms are defined for that purpose:
  - **forwardSequential**: This algorithm selects the VPC with the lowest VPCI value, which has sufficient free bandwidth in the broadband case. This algorithm selects the idle circuit with the lowest CIC number in the narrowband case.
  - **backwardSequential**: This algorithm selects the VPC with the highest VPCI value, which has sufficient free bandwidth in the broadband case. This algorithm selects the idle circuit with the highest CIC number in the narrowband case.
  - **forwardCyclic**: In the broadband case this algorithm selects the VPC with sufficient free bandwidth with the lowest VPCI value that is larger than the VPCI value of the previously selected VPC. If no such VPC exists, it selects the VPC with sufficient bandwidth with the lowest VPCI value that is less than the VPCI value of the previously selected VPC.
    In the narrowband case this algorithm selects the idle circuit with the lowest CIC number that is larger than the CIC number of the previously selected circuit. If no such idle circuit exists, it selects the idle circuit with the lowest CIC number that is less than the CIC number of the previously selected circuit.
  - **backwardCyclic**: In the broadband case this algorithm selects the VPC with sufficient bandwidth with the highest VPCI value that is less than the VPCI value of the previously selected VPC. If no such VPC exists, it selects the VPC with sufficient bandwidth with the highest VPCI value that is larger than the VPCI value number of the previously selected circuit.
    In the narrowband case this algorithm selects the idle circuit with the highest CIC number that is less than the CIC number of the previously selected circuit. If no such idle circuit exists, it selects the idle circuit with the highest CIC number that is larger than the CIC number of the previously selected circuit.";

5.4.113 Sends TNS (sendTNS)

sendTNS ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SendTNS;
  MATCHES FOR EQUALITY;
  BEHAVIOUR sendTNSBeh;
  REGISTERED AS {attribute 113};

sendTNSBeh BEHAVIOUR
  DEFINED AS
  "This entity describes whether for this instance of 'routeData' the TNS is to be signalled to the next node.";

5.4.114 Sequence violations (sequenceViolations)

sequenceViolations ATTRIBUTE
5.4.115 Service profile pointer (serviceProfilePointer)

serviceProfilePointer ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;
   MATCHES FOR EQUALITY;
   BEHAVIOUR serviceProfilePointerBeh;
   REGISTERED AS {attribute 115};

serviceProfilePointerBeh BEHAVIOUR
DEFINED AS
"This attribute provides a pointer to a managed object instance that provides information used to control service interworking (e.g., a cesServiceProfile object).";

5.4.116 Signalling channel pointer (signallingChannelPtr)

signallingChannelPtr ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
   MATCHES FOR EQUALITY;
   BEHAVIOUR signallingChannelPtrBeh;
   REGISTERED AS {attribute 116};

signallingChannelPtrBeh BEHAVIOUR
DEFINED AS
"This attribute is used as a pointer to an instance of the vcTTPBidirectional managed object class. The referenced vcTTPBidirectional instance terminates the signalling virtual channel.";

5.4.117 Signalling protocol (signallingProtocol)

signallingProtocol ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SignallingProtocol;
   MATCHES FOR EQUALITY;
   BEHAVIOUR signallingProtocolBeh;
   REGISTERED AS {attribute 117};

signallingProtocolBeh BEHAVIOUR
DEFINED AS
"This attribute indicates which type of signalling protocol is used.";

5.4.118 Signalling standard (signallingStandard)

signallingStandard ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SignallingStandard;
   MATCHES FOR EQUALITY;
   BEHAVIOUR signallingStandardBeh;
   REGISTERED AS {attribute 118};

signallingStandardBeh BEHAVIOUR
DEFINED AS
"This attribute is used to indicate the type of signalling used by instances of this class.";

5.4.119 Signalling type (signallingType)

signallingType ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SignallingType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR signallingTypeBeh;
   REGISTERED AS {attribute 119};

signallingTypeBeh BEHAVIOUR
DEFINED AS
"This attribute is used to indicate whether associated or nonassociated signalling is used at the instance of this class.";
5.4.120 SRI timeouts (sriTimeOuts)

sriTimeOuts ATTRIBUTE
   DERIVED FROM "ITU-T Recommendation X.721"; counter;
   BEHAVIOUR sriTimeOutsBeh;
   REGISTERED AS {attribute 120};

sriTimeOutsBeh BEHAVIOUR
   DEFINED AS
      "This attribute represents a count of the number of SRI time-outs that occurred on an ATM connection.";

5.4.121 SSCOP timer CC (sscopTimerCc)

sscopTimerCc ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerCc;
   BEHAVIOUR sscopTimerCcBeh;
   REGISTERED AS {attribute 121};

sscopTimerCcBeh BEHAVIOUR
   DEFINED AS
      "This attribute defines the time interval between transmissions of BGN, END, RS and ER PDUs when an acknowledge to these PDUs has not been received. The unit for the INTEGER value is milliseconds.";

5.4.122 SSCOP timer idle (sscopTimerIdle)

sscopTimerIdle ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerIdle;
   BEHAVIOUR sscopTimerIdleBeh;
   REGISTERED AS {attribute 122};

sscopTimerIdleBeh BEHAVIOUR
   DEFINED AS
      "This attribute defines the SSCOP timer IDLE. The SSCOP connection is partitioned into phases. The SSCOP timer IDLE supervises the idle phase. In this phase the timer NO_RESPONSE is not running and no POLL PDUs are transmitted. The unit for the INTEGER value is milliseconds.";

5.4.123 SSCOP timer keep alive (sscopTimerKeepAlive)

sscopTimerKeepAlive ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerKeepAlive;
   BEHAVIOUR sscopTimerKeepAliveBeh;
   REGISTERED AS {attribute 123};

sscopTimerKeepAliveBeh BEHAVIOUR
   DEFINED AS
      "This attribute defines the SSCOP timer KEEP_ALIVE. The SSCOP connection is partitioned into phases. The SSCOP timer KEEP_ALIVE supervises the transient phase. In this phase there are no outstanding acknowledgements or new data pending transmission. The unit for the INTEGER value is milliseconds.";

5.4.124 SSCOP timer no response (sscopTimerNoResponse)

sscopTimerNoResponse ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerNoResponse;
   BEHAVIOUR sscopTimerNoResponseBeh;
   REGISTERED AS {attribute 124};

sscopTimerNoResponseBeh BEHAVIOUR
   DEFINED AS
      "This attribute defines the SSCOP timer NO_RESPONSE. This timer is used to detect a faulty connection. The timer runs with either the timer POLL or KEEP_ALIVE simultaneously. The unit for the INTEGER value is milliseconds.";

5.4.125 SSCOP timer poll (sscopTimerPoll)

sscopTimerPoll ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SscopTimerPoll;
   BEHAVIOUR sscopTimerPollBeh;
   REGISTERED AS {attribute 125};

sscopTimerPollBeh BEHAVIOUR
   DEFINED AS
"This attribute defines the SSCOP timer POLL. The SSCOP connection is partitioned into phases. The SSCOP timer POLL supervises the active phase. In this new data is pending, transmission or acknowledgements are outstanding. The unit for the INTEGER value is milliseconds."

5.4.126 SSCS type (sccsType)

sccsType ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SccsType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR sccsTypeBeh;
  REGISTERED AS {attribute 126};

sccsTypeBeh BEHAVIOUR
  DEFINED AS
  "This attribute identifies the SSCS type for the AAL. Valid values are NULL, Data SSCS based on SSCOP (assured operation), Data SSCS based on SSCOP (non-assured operation), or Frame Relay SSCS."

5.4.127 STD pointer parity failures (stdPointerParityFailures)

stdPointerParityFailures ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR stdPointerParityFailuresBeh;
  REGISTERED AS {attribute 127};

stdPointerParityFailuresBeh BEHAVIOUR
  DEFINED AS
  "This attribute represents a count of the number of times the AAL reassembler detects a parity check failure at the point where a structured data pointer is expected. This count is only meaningful for structured data transfer modes as unstructured modes do not use pointers. A negative value indicates that this attribute is not supported."

5.4.128 STD pointer reframes (stdPointerReframes)

stdPointerReframes ATTRIBUTE
  DERIVED FROM "ITU-T Recommendation X.721":counter;
  BEHAVIOUR stdPointerReframesBeh;
  REGISTERED AS {attribute 128};

stdPointerReframesBeh BEHAVIOUR
  DEFINED AS
  "This attribute represents a count of the number of events in which the AAL1 reassembler found that a structured data pointer is not where it is expected, and the pointer must be reacquired. This count is only meaningful for structured data transfer modes as unstructured modes do not use pointers. A negative value indicates that this attribute is not supported, however it must be supported when pointers are used."

5.4.129 Structured data transfer (structuredDataTransfer)

structuredDataTransfer ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Boolean;
  MATCHES FOR EQUALITY;
  BEHAVIOUR structuredDataTransferBeh;
  REGISTERED AS {attribute 129};

structuredDataTransferBeh BEHAVIOUR
  DEFINED AS
  "This attribute indicates whether Structured Data Transfer (SDT) has been configured at the AAL. A value of TRUE means SDT has been selected. This attribute value cannot be set to TRUE when the errorCorrectionType attribute equals TRUE."

5.4.130 Subscriber category (subscriberCategory)

subscriberCategory ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SubscriberCategory;
  MATCHES FOR EQUALITY;
  BEHAVIOUR subscriberCategoryBeh;
  REGISTERED AS {attribute 130};

subscriberCategoryBeh BEHAVIOUR
  DEFINED AS
  "This attribute determines the category of the calling subscriber."
5.4.131 Subtype (subType)

subType ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SubType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR subTypeBeh;
   REGISTERED AS {attribute 131};

subTypeBeh BEHAVIOUR
   DEFINED AS
     "This attribute is used to identify the AAL subtype. Valid values for this attribute are NULL, Voice-band based on 64 kbps, Circuit Emulation (synchronous), Circuit Emulation (asynchronous), High-quality Audio, and Video.";

5.4.132 Sum of incorrect CS field errors (sumOfIncorrectCSFieldErrors)

sumOfIncorrectCSFieldErrors ATTRIBUTE
   DERIVED FROM "ITU-T Recommendation X.721":counter;
   BEHAVIOUR sumOfIncorrectCSFieldErrorsBeh;
   REGISTERED AS {attribute 132};

sumOfIncorrectCSFieldErrorsBeh BEHAVIOUR
   DEFINED AS
     "This attribute provides a sum-of-errors count for incorrect Convergence Sublayer (CS) field errors. For AAL Type 3/4, this attribute provides a single count of CS_PDUs discarded due to one of the following error conditions: BETag mismatch, BASize field value not consistent with Length field value, or Length field value not consistent with CS_PDU length.";

5.4.133 Sum of incorrect SAR field errors (sumOfIncorrectSARFieldErrors)

sumOfIncorrectSARFieldErrors ATTRIBUTE
   DERIVED FROM "ITU-T Recommendation X.721":counter;
   BEHAVIOUR sumOfIncorrectSARFieldErrorsBeh;
   REGISTERED AS {attribute 133};

sumOfIncorrectSARFieldErrorsBeh BEHAVIOUR
   DEFINED AS
     "This attribute provides a sum-of-errors count for incorrect Segmentation And Reassembly (SAR) field errors. For AAL Type 3/4, this attribute provides a single count of SAR_PDUs discarded due to one of the following errors: CRC violation, unexpected Sequence Number (SN) field value, or unexpected MID field value";

5.4.134 Sum of invalid CS field errors (sumOfInvalidCSFieldErrors)

sumOfInvalidCSFieldErrors ATTRIBUTE
   DERIVED FROM "ITU-T Recommendation X.721":counter;
   BEHAVIOUR sumOfInvalidCSFieldErrorsBeh;
   REGISTERED AS {attribute 134};

sumOfInvalidCSFieldErrorsBeh BEHAVIOUR
   DEFINED AS
     "This attribute provides a sum-of-errors count for invalid Convergence Sublayer (CS) field errors. For AAL Type 3/4, this attribute provides a single count of the number of CS_PDUs discarded due to one of the following error conditions: Common Part Indicator (CPI) field not equal to 0, Alignment field value not equal to 0, or BASize field value < 37 octets for multi-segment messages. For AAL Type 5, this attribute provides a single count of the number of CS_PDUs discarded due to one of the following error conditions: Invalid Common Part Indicator (CPI), oversized received SDU, or length violation.";

5.4.135 Sum of invalid SAR field errors (sumOfInvalidSARFieldErrors)

sumOfInvalidSARFieldErrors ATTRIBUTE
   DERIVED FROM "ITU-T Recommendation X.721":counter;
   BEHAVIOUR sumOfInvalidSARFieldErrorsBeh;
   REGISTERED AS {attribute 135};

sumOfInvalidSARFieldErrorsBeh BEHAVIOUR
   DEFINED AS
     "This attribute provides a sum-of-errors count for invalid Segmentation And Reassembly (SAR) field errors. For AAL Type 3/4, this attribute provides a single count of the number of SAR_PDUs discarded due to one of the following error conditions: MID=0 when there is multiplexing, MID not equal to 0 when there is no multiplexing, Length field not equal to 44 octets for a BOM or COM, Length field not in the set {4, 8, ..., 44} octets or 63 octets for an EOM, or Length field not in the set {8, 12, ..., 44} octets for an SSM";
5.4.136 Supplementary service pointer list (supplementaryServicePtrList)

supplementaryServicePtrList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.SetOfInstances;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR supplementaryServicePtrListBeh;
REGISTERED AS {attribute 136};
supplementaryServicePtrListBeh BEHAVIOUR
  DEFINED AS
  "This is a set-valued attribute whose value(s) points to instances of subclasses of the
  supplementaryServiceIndependentBb object class.";

5.4.137 Termination point list (terminationPointList)

terminationPointList ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectList;
  MATCHES FOR EQUALITY;
  BEHAVIOUR terminationPointListBeh;
REGISTERED AS {attribute 137};
terminationPointListBeh BEHAVIOUR
  DEFINED AS
  "This attribute provides an ordered list of the termination points (e.g. nDS0/DS1/DS3/E3/J2/Frame Relay) that are interworked. The traffic characteristics of the interworked ATM VC termination point must be able to accommodate the combination of traffic characteristics of all the termination points in this list.";

5.4.138 Timeslot pointer (timeslotPtr)

timeslotPtr ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR timeslotPtrBeh;
REGISTERED AS {attribute 138};
timeslotPtrBeh BEHAVIOUR
  DEFINED AS
  "Pointer to the terminated timeslot (e.g. e0CTP, ds0CTP).";

5.4.139 Timing relation (timingRelation)

timingRelation ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.TimingRelation;
  MATCHES FOR EQUALITY;
  BEHAVIOUR timingRelationBeh;
REGISTERED AS {attribute 139};
timingRelationBeh BEHAVIOUR
  DEFINED AS
  "This attribute indicates the timing relation between sender and receiver (end-to-end).";

5.4.140 Transit delay limit (transitDelayLimit)

transitDelayLimit ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.TransitDelayLimit;
  MATCHES FOR EQUALITY;
  BEHAVIOUR transitDelayLimitBeh;
REGISTERED AS {attribute 140};
transitDelayLimitBeh BEHAVIOUR
  DEFINED AS
  "This entity describes the range of transit delay value for the underlying routes. The propagation delay (delay already encountered as signalled) plus the transit delay (for this route) have to be less than the end to end transit delay required by the user.";

5.4.141 Two calling party number delivery (twoCallingPartyNumberDelivery)

twoCallingPartyNumberDelivery ATTRIBUTE
  WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.Boolean;
  MATCHES FOR EQUALITY;
  BEHAVIOUR twoCallingPartyNumberDeliveryBeh;
REGISTERED AS {attribute 141};
twoCallingPartyNumberDeliveryBeh BEHAVIOUR
   DEFINED AS
   "This attribute indicates whether two calling party numbers have to be sent to the called
   party if two were received."

5.4.142 UNI access identifier (uniAccessId)
uniAccessId ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR uniAccessIdBeh;
   REGISTERED AS {attribute 142};
uniAccessIdBeh BEHAVIOUR
   DEFINED AS
   "This attribute is used to name instances of the uniAccess managed object class."

5.4.143 Used algorithm (usedAlgorithm)
usedAlgorithm ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.UsedAlgorithm;
   MATCHES FOR EQUALITY;
   BEHAVIOUR usedAlgorithmBeh;
   REGISTERED AS {attribute 143};
usedAlgorithmBeh BEHAVIOUR
   DEFINED AS
   "This attribute describes the method how to select a resource from the pointer list."

5.4.144 User data identifier (userDataId)
userDataId ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR userDataIdBeh;
   REGISTERED AS {attribute 144};
userDataIdBeh BEHAVIOUR
   DEFINED AS
   "This attribute is used to name objects of the userData managed object class."

5.4.145 User data pointer (userDataPtr)
userDataPtr ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.PointerOrNull;
   MATCHES FOR EQUALITY;
   BEHAVIOUR userDataPtrBeh;
   REGISTERED AS {attribute 145};
userDataPtrBeh BEHAVIOUR
   DEFINED AS
   "This attribute describes a single pointer to an object of the userData object class or its
   subclasses."

5.4.146 Virtual path group identifier (virtualPathGroupId)
virtualPathGroupId ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR virtualPathGroupIdBeh;
   REGISTERED AS {attribute 146};
virtualPathGroupIdBeh BEHAVIOUR
   DEFINED AS
   "This attribute is used to name instances of the virtualPathGroup managed object class."

5.4.147 Virtual path type (vpType)
vpType ATTRIBUTE
   WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.VpType;
   MATCHES FOR EQUALITY;
   BEHAVIOUR vpTypeBeh;
   REGISTERED AS {attribute 147}
vpTypeBeh BEHAVIOUR
    DEFINED AS
    "This attribute indicates whether a virtual path can be used for permanent, for on-demand or
    for both types of virtual channels.";

5.4.148 XTPSG comb identifier (xtpsgCombId)

xtpsgCombId ATTRIBUTE
    WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule.NameType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR xtpsgCombIdBeh;
    REGISTERED AS [attribute 148];

xtpsgCombIdBeh BEHAVIOUR
    DEFINED AS
    "This entity describes the object identifier attribute of the object class 'xtpsgCombId'.";

5.5 Definition of actions

5.5.1 Add termination point (addTerminationPoint)

addTerminationPoint ACTION
    BEHAVIOUR addTerminationPointBeh;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX ASN1DefinedTypesModule.AddTerminationPointInfo;
    WITH REPLY SYNTAX ASN1DefinedTypesModule.AddTerminationPointReply;
    REGISTERED AS (action 1);

addTerminationPointBeh BEHAVIOUR
    DEFINED AS
    "This action is used to add one or more termination point objects to the identified
    interworkingVCTTPBidirectional. The traffic characteristics of the interworked ATM VC termination
    point must be able to accommodate the additional termination point.
    Supplied with this action is the following information:
    New TPs - This parameter identifies the additional Termination Points to be added to the existing
    terminationPointList attribute of the identified interworkingVCTTPBidirectional object.
    InterworkingVCTTPBidirectional - This parameter identifies the instance of the
    interworkingVCTTPBidirectional object class to which the additional termination point to be
    interworked.
    If the request is granted, the terminationPointList attribute, in the
    interworkingVCTTPBidirectional object, shall be reset to reflect the new termination point added.";

5.5.2 Remove termination point (removeTerminationPoint)

removeTerminationPoint ACTION
    BEHAVIOUR removeTerminationPointBeh;
    MODE CONFIRMED;
    WITH INFORMATION SYNTAX ASN1DefinedTypesModule.RemoveTerminationPointInfo;
    WITH REPLY SYNTAX ASN1DefinedTypesModule.RemoveTerminationPointReply;
    REGISTERED AS (action 2);

removeTerminationPointBeh BEHAVIOUR
    DEFINED AS
    "This action is used to remove one or more termination point objects from the identified
    interworkingVCTTPBidirectional.
    Supplied with this action is the following information:
    Existing TPs - This parameter identifies the existing Termination Points to be removed from the
    identified interworkingVCTTPBidirectional object.
    InterworkingVCTTPBidirectional - This parameter identifies the instance of the
    interworkingVCTTPBidirectional object class from which the identified termination points should be
    removed.
    If the request is granted, the terminationPointList attribute, in the
    interworkingVCTTPBidirectional object, shall be reset to reflect the remaining termination points.";

6 Type definitions

ASN1DefinedTypesModule {to be assigned}

DEFINITIONS IMPLICIT TAGS ::=
IMPORTS
  Attribute,
  ObjectClass,
  ObjectInstance
FROM CMIP-1 {joint-iso-ccitt ms(9) cmip(1) version1(1) protocol(3)}

Failed
ObjectList
PointerOrNull
ProblemCause
FROM ASN1DefinedTypesModule {ccitt recommendation m 3100
  informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)}

ElapsedTime
FROM
BCRTR836Iss1Mod {1 3 17 104 module(9) tr836(3) bCRTR836Iss1Mod(1)}

-- additional value definitions to probableCause production
  cellStarvation ProbableCause ::= globalValue: {atmProbableCause 4}
  activeDefault ActiveInactive ::= active
  offDefault OnOff ::= off
  recDurDefault INTEGER ::= 4

informationModel OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0) 376
  informationModel(0)}

standardSpecificationExtension OBJECT IDENTIFIER ::= {informationModel
  standardSpecificationExtension(0)}

managedObjectClass OBJECT IDENTIFIER ::= {informationModel managedObjectClass(3)}

package OBJECT IDENTIFIER ::= {informationModel package(4)}

nameBinding OBJECT IDENTIFIER ::= {informationModel nameBinding(6)}

attribute OBJECT IDENTIFIER ::= {informationModel attribute(7)}

action OBJECT IDENTIFIER ::= {informationModel action(9)}

notification OBJECT IDENTIFIER ::= {informationModel notification(10)}

AalMode ::= ENUMERATED {
  message_assured (0),
  message_unassured (1),
  streaming_assured (2),
  streaming_unassured (3)}

AalType ::= ENUMERATED {
  aal1 (0),
  aal2 (1), -- encoded for future use
  aal34 (2),
  aal5 (3)}

AbstractDestinationInstance ::= ObjectInstance

ActiveListOfRouteTps ::= ObjectInstance

ActiveTarget ::= CHOICE {
  pointer ObjectInstance,
  carrierRequired NULL}

AddTerminationPointInfo ::= SEQUENCE {
  newTps NewTps,
  interworkingVCTTPBidirectionalInstance ObjectInstance}

AddTerminationPointReply ::= SEQUENCE OF SEQUENCE {
  tpAdded ObjectInstance,
  tpNotAdded ProblemCause OPTIONAL}

AssignNonAssign ::= ENUMERATED {
  assign (0),
  nonAssign (1)}

AssocTPandVPCI ::= SET OF SEQUENCE {
  tp ObjectInstance,
  vpci Integer(0..65535),
  signChannel ObjectInstance OPTIONAL}

AssocvTPandVPCIList ::= SET OF SEQUENCE {
  tp ObjectInstance,
  vpci Integer}
AssocLinkGroup ::= ObjectInstance

BearerCapab ::= INTEGER {
  dbr (0),
  sbrRt (1),
  sbrNrt (2),
  abr (3),
  ubr (4),
  abtDt (5),
  abtIt (6) }

BlockedForMaintenance ::= ENUMERATED {
  blocked (0),
  unblocked (1) }

BufferRelease ::= BOOLEAN
bufferReleaseDefault BufferRelease ::= FALSE

CallingPartyCategory ::= CHOICE {
  unused NULL,
  category Category }

Category ::= BIT STRING (SIZE (8)) -- acc. Q.2763

CarrierCode ::= NetworkIdentification

CarrierDataPtr ::= ObjectInstance

CCITTNetworkPlanIndicator ::= INTEGER

ChannelAssociatedSignalling ::= ENUMERATED {
  basic (0),
  e1Cas (1),
  ds1SfCas (2),
  ds1EsfCas (3),
  j2Cas (4)
}

Cic ::= INTEGER (0..65335)

CIPRequired ::= Boolean

ClockRecoveryType ::= ENUMERATED {
  synchronous (0),
  srts (1),
  adaptive (2)}

Code ::= SET OF DigitString4

CSPRequired ::= Boolean

ConnIdRestrictionOptions ::= SEQUENCE {
  mode ENUMERATED { permanent(1), temporary(2) },
  default ENUMERATED { restricted(1), notRestr(2) } OPTIONAL -- for temporary mode only --
}

ConnectionIdOffering ::= INTEGER {
  exclusiveVpciExclusiveVci (0),
  exclusiveVpciAnyVci (1),
  noIndication (8) }

connectionIdOfferingDefault ConnectionIdOffering ::= exclusiveVpciExclusiveVci

CUGBarring ::= ENUMERATED {
  none (1),
  incomingCallsBarred (2),
  outgoingCallsBarred (3) }

CUGDataNetworkIdentification ::= NumericString (SIZE(4)) -- Q.2763

CUGIndex ::= INTEGER (0..65535) -- Q.2955

CUGInterlockCode ::= INTEGER (0..65535) -- Q.2763

DestinationCode ::= DigitString15

DestinationType ::= INTEGER {
  international (1),
  national (2),
  local (3) }
defaultBlockedForMaintenance ::= blocked
defaultSignallingType SignallingType ::= nonassociated
defaultTwoCallingPartyNumberDelivery ::= TRUE

DigitComb ::= SEQUENCE OF DigitElement

DigitCombInsert ::= SET OF SEQUENCE {
   startPosition [0] INTEGER,
   combination [1] DigitComb
}

DigitCombReplace ::= SET OF SEQUENCE {
   startPosition [0] INTEGER,
   endPosition [1] INTEGER,
   combination [2] DigitComb
}

DigitElement ::= PrintableString
   (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
   (SIZE (1))

DigitManipPtr ::= ObjectInstance

DigitString4 ::= PrintableString
   (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
   (SIZE (1..4))

DigitString8 ::= PrintableString
   (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
   (SIZE (1..8))

DigitString15 ::= PrintableString
   (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
   (SIZE (1..15))

DigitSuppress ::= SET OF SEQUENCE {
   startPosition [0] INTEGER,
   endPosition [1] INTEGER
}

emptySet SetOfInstances ::= { }

ExcludedSubscriberCodes ::= SET OF PrintableString
   (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
   (SIZE (1..8))

ExistingTPs ::= SEQUENCE OF ObjectInstance

FecMethod ::= ENUMERATED{
   noFEC (0),
   lossSensitiveSignalFEC (1),
   delaySensitiveSignalFEC (2)}

InitialSubscriberCodes ::= SET OF PrintableString
   (FROM("1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9"|"0"|"A"|"B"|"C"|"D"|"E"|"F"))
   (SIZE (1..8))

Integer ::= INTEGER

InterCUGaccess ::= ENUMERATED{
   none (1),
   outgoingPermanentAccess (2),
   outgoingPerCallAccess (3),
   incomingAccess (4),
   outgoingPermanentAndIncomingAccess (5),
   outgoingPerCallAndIncomingAccess (6)}

LinkType ::= ENUMERATED{
   national (0),
   international (1)}

ListOfRoutes ::= SEQUENCE OF ObjectInstance

ListOfLinkGroups ::= SEQUENCE OF ObjectInstance

LocalAreaCode ::= NumericString (FROM (*0*|*1*|*2*|*3*|*4*|*5*|*6*|*7*|*8*|*9*))

MaintenanceSignallingRunning ::= BOOLEAN

MaxCc ::= INTEGER
maxCcDefault MaxCc ::= 4

MaxCpcsPduSize ::= SEQUENCE {

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MaxDigits ::= INTEGER
MaxInformationFieldLength ::= INTEGER
MaxLengthSscopUuField ::= INTEGER
MaxPd ::= INTEGER
MaxSscopCreditToPeer ::= INTEGER
MaxStat ::= INTEGER
MidRange ::= SEQUENCE {
  lowvalue [0] INTEGER (1..66536)
  highvalue [1] INTEGER (1..66536)}
MinDigits ::= INTEGER
NationalNetworkIdenPlanIdenticator ::= INTEGER
NatureOfAddress ::= DestinationType
NBTransferCapability ::= INTEGER {
  speech (0),
  r64kbitUnrestricted (1),
  r56kbitDigitalRestricted (2),
  r3point1khzAudio (3),
  r7khzAudio (4),
  video (5)}
NBTransferCapabilitySet ::= SET OF NBTransferCapability
NetworkBorder ::= ENUMERATED {
  intraNetwork (0),
  interNetwork (1)}
NetworkIdentification ::= DigitString8
NetworkIdentificationPlan ::= CHOICE {
  cCITTNetworkPlanIndicator [0] CCITTNetworkPlanIndicator,
  nationalNetworkIdenPlanIdocator [1] NationalNetworkIdenPlanIdocator}
NetworkType ::= ENUMERATED {
  transit (0),
  nonTransit (1)}
NewTPs ::= SEQUENCE OF ObjectInstance
Origin ::= CHOICE {
  unused NULL,
  origin INTEGER}
OwnInternationalCode ::= NumericString
  (FROM "0"|"1"|"2"|"3"|"4"|"5"|"6"|"7"|"8"|"9")
PollAfterRetransmission ::= BOOLEAN
PreferredCarrier ::= SEQUENCE {
  networkIdentificationPlan NetworkIdentificationPlan,
  typesOfNetworkIdentification TypesOfNetworkIdentification}
PreferredCUGIndex ::= CHOICE{
  notDefined [0] NULL,
  defined [1] CUGIndex}
PropagationDelay ::= INTEGER (0..65535)
RemoteBlocking ::= ENUMERATED {
  remoteBlocked (0),
  remoteUnblocked (1)}
RemoteBlockingReason ::= INTEGER {
  none (0),
  mob (1),
  hob (2),
  mobAndHob (3) }

RemoveTerminationPointInfo ::= SEQUENCE {
  existingTPs ExistingTPs,
  interworkingVCTTPBidirectionalInstance ObjectInstance}

RemoveTerminationPointReply ::= SEQUENCE OF SEQUENCE {
  tpInstance ObjectInstance,
  tpRemovalProblem ProblemCause OPTIONAL
  -- absent if tpInstance is removed
}

ReqBandwidthEgress ::= SEQUENCE {
  lowerLimit INTEGER,
  upperLimit INTEGER }

ReqBandwidthIngress ::= SEQUENCE {
  lowerLimit INTEGER,
  upperLimit INTEGER }

ReqBearerCapab ::= SET OF BearerCapab

ReqNBTransferCapability ::= CHOICE {
  withoutNBCapab NULL,
  withNBCapab NBTransferCapabilitySet }

RingTimeLimit ::= INTEGER

SearchMethod ::= INTEGER {
  forwardSequential (0),
  backwardSequential (1),
  forwardCyclic (2),
  backwardCyclic (3) }

SendTNS ::= BOOLEAN

SetOfInstances ::= SET OF ObjectInstance

SignallingStandard ::= INTEGER {
  iTU (0),
  aTMF (1) }

SignallingProtocol ::= ENUMERATED {
  nisup (0),
  bisup (1) }

SignallingType ::= ENUMERATED {
  nonassociated (0),
  associated (1) }

SscopTimerCc ::= INTEGER

sscopTimerCcDefault SscopTimerCc ::= 1000

SscopTimerIdle ::= INTEGER

sscopTimerIdleDefault SscopTimerIdle ::= 15000

SscopTimerKeepAlive ::= INTEGER

sscopTimerKeepAliveDefault SscopTimerKeepAlive ::= 2000

SscopTimerNoResponse ::= INTEGER

sscopTimerNoResponseDefault SscopTimerNoResponse ::= 7000

SscopTimerPoll ::= INTEGER

sscopTimerPollDefault SscopTimerPoll ::= 750

SscsType ::= ENUMERATED {
  null (0),
  dataAssured (1),
  dataNonAssured (2),
  frameRelay (3) }

SubscriberCategory ::= INTEGER {
  unknownAtThisMoment (0), -- for national use
  operatorLanguageFrench (1),
  operatorLanguageEnglish (2),
  operatorLanguageGerman (3),
  -- acc. Q.2763
operatorLanguageRussian (4),
operatorLanguageSpanish (5), -- for national use
nationalOperator (9),
callingSubscriber (10),
callingSubscriberWithPriority (11),
dataCall (12),
testCall (13),
psPhone (15) } (0..255)

SubType ::= ENUMERATED {
  null (0),
  voiceBand (1),
  circuitEmulationSynchronous (2),
  circuitEmulationAsynchronous (3),
  highQualityAudio (4),
  video (5)}

TimingRelation ::= INTEGER {
  timingNotRequired (0),
  timingRequired (1) }

TransitDelayLimit ::= SEQUENCE {
  lowerLimit INTEGER,
  upperLimit UpLimit }

TypesOfNetworkIdentification ::= INTEGER

UpLimit ::= CHOICE {
  noLimit NULL,
  limit INTEGER }

UsedAlgorithm ::= INTEGER {
  sequential (0),
  cyclic (1) }

VpType ::= ENUMERATED {
  on-demand (0),
  permanent (1),
  mixed (2)}

END -- of ASN1DefinedTypesModule

7 Protocol stacks

The protocol stacks specified in ITU-T Recommendations Q.811 [22], Q.812 [23], G.773 [24] and the SDH digital
cross-connect part of G.784 [25] can be used as part of the present document.
Annex A (normative):
ATM switch management requirements

This clause uses as a reference ITU-T Recommendation I.751 [4] about the management of the ATM cross-connects, and describes or enhances management requirements for those aspects present only in the ATM switch.

The complete set of management requirements for ATM switching network elements has to be composed from the present and the above mentioned documents.

ATM adaptation layer 5 is specified in ITU-T Recommendation I.363.5 [2]

The signalling ATM adaptation layer is split into the Service Specific Connection-Oriented Protocol (SSCOP) defined in ITU-T Recommendation Q.2110 [7] and the Service Specific Coordination Function (SSCF) defined for the UNI in ITU-T Recommendation Q.2130 [8] and for the NNI in ITU-T Recommendation Q.2140 [9].

DSS2 user signalling is defined in ITU-T Recommendation Q.2931 [14] and B-ISUP network signalling is defined in ITU-T Recommendations Q.2761 to Q2764 [10] to [13].

A.1 Configuration management functions

Configuration management provides functions to exercise control over, identify, collect data from and provide data to NEs.

On one side, in an ATM cross-connect VP/VC connections are set up, modified and released via configuration management functions. On the other side, in an ATM switch, connections are set up, modified and released by signalling procedures, and configuration management is concerned mainly with managing control entities.

A.1.1 General NE configuration functions

This group of functions includes the set of procedures needed to bring the Network Element (NE) into service and to take care of hardware and software modifications and upgrades. It also includes the requirements for customer administration and call routing.

A.1.2 ATM transport layer configuration functions

A.1.2.1 VPC/VCC configuration functions

The capability of setting a VP/VC connection in an unlocked administrative state (traffic flow is enabled), or in a locked state (traffic flow is suspended) has to be provided.

This capability will be used by system management to take corrective actions in response to performance degradation or fault of the virtual connection.

A.1.3 ATM adaptation layer configuration functions

The various ATM adaptation layers generate requirements for configuration management and these requirements which are listed here. Each trail on the virtual channel layer supports a single ATM adaptation layer, which may either be configured or defined by call control. Unless otherwise stated, changes to the ATM adaptation layer may be requested, but such a request may be rejected if the change is not supported by the implementation. Likewise, unless otherwise stated, it shall always be possible to read the details of the actual configuration of the ATM adaptation layers.

A.1.3.1 Configuration management requirements for ATM adaptation layer 5

The following items may be read and changes may be requested:

- the maximum number of octets in CPCS-PDU payload which is supported by ATM adaptation layer 5 both for transmit and for receive directions;
- the form of data encapsulation used over the ATM adaptation layer 5 Service Specific Convergence Sublayer (SSCS).

A.1.3.2 Configuration management requirements for the signalling ATM adaptation layer

The type of SSCS used may be read and changes may be requested.

It should be possible to configure timer values for the SAAL.

A.1.4 Broadband signalling configuration functions

A.1.4.1 Co-ordination of VPCI values

There is a requirement for management co-ordination between interconnected switches so that the switch which handles the signalling is aware of how the VPCI mappings differ from those of directly connected accesses when the access is connected indirectly via another switch with cross-connect functionality.

A.2 Performance management functions

Performance management provides functions to evaluate and report upon the behaviour of telecommunications equipment and the effectiveness of the network element.

Performance management functions will be based on ITU-T Recommendation Q.822 [26]; the set of monitored parameters is detailed in the following subclauses.

The identified functions for the ATM switches are concerned with performance and error measurements to report the general behaviour of the network element and can be useful to detect situations of degraded performance and identify possible causes of the abnormal situation.

A.2.1 General NE performance functions

A.2.2 ATM transport layer performance functions

Three main sets of parameters need to be monitored; the first one is related to the OAM F4 and F5 flows mechanism, the second one deals with load and traffic related parameters, while the third one relies on system-dependent techniques.

A.2.2.1 F4 / F5 OAM flows related parameters

Performance monitoring is based on the use of OAM flows, both segment and end-to-end (ITU-T Recommendation I.610 [3]). At the ATM layer the F4 and F5 flows are considered.

Each trail termination point must have the capability to generate the F4 / F5 flows on the outgoing link and/or to process the incoming F4 / F5 flows.

These flows can be used to monitor the following parameters, at VP and VC layer, respectively:

- Bit error rate;
- Cell loss / insertion;
- Cell transfer delay;
- Cell delay variation.

Suitable mechanisms are present in the flow, to support these functions, such as the block error detection code (BIP-X - I.610).
When the measured values of these parameters exceed a preassigned threshold, an alarm is generated and sent to the TMN and to the control plane functions.

A.2.2.2 Load and traffic related parameters

The following parameters related to load and traffic need to be monitored; various methods can be used not included in the OAM flow mechanism.

- internal overload / congestion;
- external congestion;
- blocking at virtual connection level.

Functions responsible for the supervision of the overload and congestion state of the node (internal congestion) and of the network (external congestion) are examined below.

Possible causes of overload can be faults inside the switching fabric, lack of internal capacity due to a poor system engineering that is unable to deal with traffic bursts, or malfunctioning of the UPC/NPC functions.

Overload conditions can be indicated by overflow of the buffers located at the input and/or output of the switching fabric. In this case the automatic reaction to the condition is to discard cells, possibly in a selective way if a priority mechanism has been adopted.

If the overload condition persists, the switch can enter into a congestion state. This status is also shown by a permanent buffer overflow condition.

When a network element enters a congestion state, the system has to inform all the downstream nodes about its condition; a notification of this state is inserted in all the cells leaving the node through a particular code on the PTI field of the ATM cell header (see ITU-T Recommendation I.361 [27]).

The congestion indication is therefore propagated forward in the network.

Monitoring of congested cells on a VP/VC basis can be used to prevent the congestion of the whole network.

At virtual connection level, the switch can experience a connection blocking state when it is impossible to connect an allocatable VP/VC connection on an input interface with an equivalent allocatable VP/VC connection on the corresponding output interface. The connection control cannot accept the new VP/VC connection, although the interfaces have enough capacity available.

Causes of this event can be internal blocking inside the switching fabric, due to implementation of the switching fabric itself with a blocking architecture, or use of resources management policies to guarantee the requested quality of service.

A.2.2.3 Additional parameters

The following parameters need also to be monitored.

- HEC error check;
- cell multiplexing error check;
- UPC/NPC intervention.

The HEC and the cell multiplexing error checking functions are performed at the lower layers of the B-ISDN protocol reference model (at physical layer and ATM layer, respectively). In the first case indications are provided about cells affected by multiple errors on the header, so that correction procedures cannot be applied; in the second case cells come in with an apparently correct cell header, but the internal VCI/VPI translation table does not contain any valid entry for that VCI/VPI. This means that a VCI/VPI multiplexing error has occurred.

It is assumed that in both cases cells are discarded.

The UPC and NPC functions mark or discard cells when they exceed the agreed service parameters. The number of tagged cells need to be counted on a VP and/or VC basis.
A.2.3 ATM adaptation layer performance functions

Sets of parameters need to be monitored for the various ATM adaptation layers.

A.2.3.1 Performance management requirements for ATM adaptation layer 5

Performance monitoring of ATM adaptation layer 5 is concerned with the use of the payload type field in the ATM cell header and the use of the last 8 octets of the CPCS-PDU (see ITU-T Recommendation I.363.5 [2]). In particular, the following should be monitored:

- undelineated ATM cell sequences which are longer than the maximum number of cells in a CPCS-PDU;
- inconsistencies between the number of ATM cells in a CPCS-PDU as indicated by the coding in the cells’ payload type field and the length of the CPCS as indicated in the length field of the CPCS-PDU trailer;
- the error rate as detected by the CRC field in the CPCS-PDU.

In addition, the following performance statistics should be available:

- number of received and transmitted PDUs;
- PDUs discarded due to CRC errors;
- PDUs discarded due to reassembly time out;
- PDUs discarded due to overlarge size;
- PDUs discarded due to protocol errors.

A.3 Fault management functions

Fault management is a set of functions which enables the detection, isolation and correction of abnormal operation of the ATM switch.

A.3.1 Alarm surveillance

A.3.1.1 General NE alarm surveillance functions

A.3.1.2 ATM transport layer alarm surveillance functions

When a fault or a condition of severely degraded performance situation is detected, a connection termination point shall be able to send a VP-AIS alarm on the OAM F4 / F5 flow, and to send an alarm to the TMN and to the control plane functions.

A.3.1.3 ATM adaptation layer alarm surveillance functions

A.3.1.4 Alarm surveillance requirements for ATM adaptation layers

Detected problems in the ATM adaptation layers will generate various alarms.

A.3.1.4.1 Alarm surveillance management requirements for ATM adaptation layer 5

Alarms are generated under the following conditions:

- when the payload type field in the ATM cell header fails to indicate the last ATM cell of a CPCS-PDU for more than the maximum number of cells in a CPCS-PDU;
- when the number of ATM cells in a CPCS-PDU is not consistent with the length of the CPCS as indicated in the length field of the CPCS-PDU trailer;
- when the error rate as detected by the CRC field in the CPCS-PDU becomes too high.

A.3.2 Test and fault localization

A.3.2.1 General NE test and fault localization functions

A.3.2.2 ATM transport layer test and fault localization functions

The mechanism of continuity check, performed using OAM F4/F5 flows, is used for testing the integrity of the translation and routing tables of the NE. When a connection termination point does not transmit user cells and there is no failure indication through the VP-AIS and VP-FERF signals, then it must be able to send a continuity check signal. If the receiving termination point receives no OAM cells, it will generate a VP-FERF signal. This mechanism is useful for localization of the termination points that has experienced a failure.

A.3.2.3 ATM adaptation layer test and fault localization functions

When a fault is suspected in the ATM adaptation layers, or an alarm has been generated, it is may be necessary to perform activities to check the correct operation of the ATM adaptation layers and to identify the origin of a confirmed ATM adaptation layer fault.

A.3.2.3.1 Testing and fault localization requirements for ATM adaptation layer 5

Non-intrusive testing of ATM adaptation layer 5 shall be carried out by generating and detecting patterns on the CPCS-UU octet of the CPCS-PDU trailer and/or on the padding octets. Intrusive testing of ATM adaptation layer 5 shall be carried out by generating and detecting patterns on the CPCS-PDU payload. These patterns may either be looped back to their source or sent in a single direction.

A.3.3 Fault correction

A.3.3.1 General NE fault correction functions

A.3.3.2 ATM transport layer fault correction functions

When a failure in a VP/VC connection occurs, it is possible to perform fault correction by protection switching.

The mechanism of protection switching is based on the use of a spare VP/VC connection, shared among a group of active virtual connections and it is directed by Layer Management.

A.4 Modelling specific requirements

The ITU-T Recommendation Q.2764 [13] describes a parameter transit network selection for the setup messages. This parameter may be “included in the setup message from the calling party or provided on a subscription basis”. This information “is used for routing the call/connection, e.g. to a specific B-ISDN”.

To support this parameter, it should be possible to assign a preferred carrier (transit network) value either to the whole customer or to an individual directory number.


To support this parameter, it should be possible to assign a category value either to the whole customer or to an individual directory number.

The call routing management allows to mark an NNI with an origination mark, to support the origination dependent routing of incoming calls. Origination dependent routing should also be possible for calls coming from a UNI.

It should be possible to mark either the whole customer or an individual directory number with an origination mark, which can be used e.g. for the origination dependent routing.
Annex B (normative):
Reference scenario for the management of the ATM switching network element

The definition of the reference configuration for B-ISDN management is based on ITU-T Recommendations. I.311 [1], I.610 [3], I.751 [4] and ETS 300 469 [20].

ITU-T Recommendation I.311 [1] is mainly concerned with the communication scenario between user and network elements to provide control and management information exchange. ITU-T Recommendation I.610 [3] deals with the TMN architecture for the B-ISDN customer access. ITU-T Recommendation I.751 [4] and ETS 300 469 [20] propose a TMN architecture specialized for a VP cross-connect network, subdivided into an upper level (network OS) and a lower level (NE OS).

The reference scenario for the ATM switch management is shown in figure B.1.

![Figure B.1: ATM cross connect / ATM switch model](image)

NOTE: Solid line - illustrates the application for ATM Cross Connect.
Dashed line - illustrates the extensions for an ATM Switch

The present document focuses on the Q3 interface between the NE OS and the ATM switch, describing an object model for the management of control plane functions for the ATM switch. For example, it will address management of routing, customer administration, and management of the virtual channels for signalling information transfer.

The location of the Q3 interface is illustrated in figure B.2 and the protocol stacks used at this point are specified in clause 7 of the present document.

The Q3 interface is the TMN interface between network elements or Q-adaptors which interface to operations systems without mediation and between operations systems and mediation devices. The use of standards at these points is mandatory. The specification of Q_x interfaces and proprietary interfaces is outside the scope of the present document.
NOTE 1: Qx and M (proprietary) interfaces are outside the scope of this EN.
NOTE 2: A mediation device can only have a M interface if it contains Q-adapter functionality.

Figure B.2: Location of the Q3 interface

Protocols on the Q3 interface between the management plane and TMN will be considered at a later stage. Work will be concentrated on two items, namely mapping the information model onto CMIP and mapping CMIP onto the ATM protocol stack.
Annex C (informative):
Functional architecture

C.1 Lower layers: SDH based interfaces

The functional architecture for SDH based interfaces is shown in figure C.1. The lowest layer of the functional architecture is the physical media layer. At the sink terminations of this layer, the incoming interface signal (which may be optical or electrical) is converted into an internal logic level and timing is recovered. A loss of incoming signal will typically result in a LOS (Loss Of Signal) alarm being raised. At the source terminations of this layer the internal logic level signals are converted into outgoing interface signals. An alarm may be raised if a transmit component such as a transmit laser fails. Alarms raised at the physical media layer may result in F1 OAM layer flows in the client layer.

The SDH regenerator section layer is the client layer which is served by the physical media layer. The sink terminations of this layer perform the descrambling of the incoming signal and the processing and removal of the regenerator section layer. A loss of framing will typically result in a Loss of Frame (LOF) alarm being raised and may result in an F1 OAM layer flow. The source terminations of this layer generate the regenerator section overhead and scramble the signal. The monitoring of the regenerator section layer error rate which is part of the regenerator section overhead may result in warnings or alarms being raised and may result in F2 OAM layer flows in the client layer.

The SDH multiplexer section layer is the client layer which is served by the regenerator section layer. The sink terminations of this layer perform the processing and the removal of the section overhead, whereas the source terminations generate and add this overhead. The loss of the pointer in the section overhead and the monitoring of the error rate for the multiplex section overhead may result in F3 OAM layer flows in the client layer.

The higher order SDH path layer is the client layer which is served by the SDH multiplexer layer. The sink terminations of this layer perform the processing and removal of the path overhead, whereas the source terminations generate and add this overhead. Monitoring of path error rate may result in alarms being raised and in F3 OAM flows, as may errors in the path ID label or the path signal label.

For ATM applications, the SDH transmission convergence layer replaces the lower order SDH path layer as the client layer which is served by the higher order SDH path layer. The sink terminations of this layer perform the adaptation to the higher ATM layers from the SDH path layer, whereas the source terminations perform the adaptation to the SDH path layer from the higher ATM layers. The loss of cell delineation, uncorrectable header errors, degraded header error performance and the detection of too many IDLE ATM cells can give rise to warnings, alarms, and F3 OAM flows. The terminations of this layer ensure that no IDLE cells are passed to its client layer.
Figure C.1: Functional architecture for ATM on a SDH based Interface
C.2 Lower layers: cell based interfaces

The functional architecture for cell based interfaces is shown in figure C.2.

As for the SDH case, the lowest layer of the functional architecture is the physical media layer. At the sink terminations of this layer the incoming interface signal (which may be optical or electrical) is converted into an internal logic level and timing is recovered. A loss of incoming signal will typically result in a LOS alarm being raised. At the source terminations of this layer the internal logic level signals are converted into outgoing interface signals. An alarm may be raised if a transmit component such as a transmit laser fails. Alarms raised at the physical media layer may result in F1 OAM layer flows in the client layer.

The cell based transmission convergence layer is the client layer which is served by the physical media layer. The sink terminations of this layer perform the adaptation to the higher ATM layers from the media layer, whereas the source terminations perform the adaptation to the media layer from the higher ATM layers. Loss of F1 PL-OAM cells and degraded performance can give rise to alarms, warnings and F1 OAM flows. The loss of F3 PL-OAM cells, loss of cell delineation, uncorrectable header errors, degraded header error performance and the detection of too many IDLE ATM cells can give rise to warnings, alarms, and F3 OAM flows. The terminations of this layer ensure that no IDLE cells, F1 PL-OAM cells or F3 PL-OAM cells are passed to its client layer.

C.3 Higher ATM layers

The higher ATM layers are common to both SDH based interfaces and cell based interfaces. The virtual path layer is the client which is served by the appropriate transmission convergence layer. The sink terminations of this layer ensure that none of the VP overhead (VCI =3 and VCI=4) which supports the F4 layer OAM flows are passed onto its client layer. The terminations at this layer correspond to the endpoints of ATM VPCs.
The virtual channel layer is the client which is served by the virtual path layer. The sink terminations of this layer ensure that none of the VC overhead (PTI=4 and PTI=5) which supports the F5 layer OAM flows are passed onto its client layer. The terminations at this layer correspond to the endpoints of ATM VCCs.
Annex D (informative):
Bibliography

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## History

### Document history

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