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Technical Specification

**Telecommunications Management Network (TMN);
Management of broadband Access Networks (ANs);
Asymmetrical Digital Subscriber Line (ADSL)
Network Element Management;
Part 1: CMIP Model**



Reference

DTS/TMN-00012

Keywords

access, management, OAM, OAN, TMN

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications Management Network (TMN).

The present document is part 1 of a multi-part deliverable covering the information models and protocols for the management and control of Asymmetrical Digital Subscriber Line (ADSL) network element, as identified below:

Part 1: "CMIP Model".

NOTE: Additional parts are for further study.

1 Scope

The present document specifies the Q3 interface between a Broadband Access Network based on Asymmetrical Digital Subscriber Line (ADSL) technology and the Telecommunications Management Network (TMN). 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 [3].

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.

Security management is also outside the scope of the present document.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc). or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] ADSL Forum Technical Report TR-028: "CMIP Specification for ADSL Network Element Management".
- [2] ITU-T Recommendation G.773: "Protocol suites for Q-interfaces for management of transmission systems".
- [3] ITU-T Recommendation M.3010: "Principles for a Telecommunications management network".
- [4] ITU-T Recommendation Q.811: "Lower layer protocol profiles for the Q3 and X interfaces".
- [5] ITU-T Recommendation Q.812: "Upper layer protocol profiles for the Q3 and X interfaces".

3 Definitions, abbreviations and conventions

3.1 Definitions

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

access network: collection of network equipment which provides a transport capability for the provision of telecommunications services between a Service Node Interface (SNI) and one or more associated User Network Interfaces (UNI)

NOTE 1: User signalling is carried transparently by the AN.

customer: person or organization that uses the services provided by the network provider or the service provider

NOTE 2: A customer can be a service provider as well.

data communications network: refers to the management communications network which is needed to transfer management information between OSFs and between OSFs and the NEs

drop medium: refers to the network used to transport services in a common format from the Remote Node to the Network Termination

element management layer: EM functions manage the physical resources which reside in the access network

NOTE 3: Typical management functions at this level are configuration, fault management and performance monitoring. EM functions are responsible for understanding the details of transmission technology information and equipment thus removing the need for this complexity of information to be held by higher layer management functions.

element/network/service management system: collection of functions at a specific layer which are implemented on a physical platform

extended feeder: provides the physical resources to extend the AN over larger distances

NOTE 4: These physical resources will not alter the transmission on the SNI and will require minimal management. This is not considered to be part of the Network Element.

network element layer: refers to the physical resources that reside in the Access Network

network management layer: NM functions coordinate the management of network elements to provide a user-to-user or service node to user path in order to transport telecommunications services

NOTE 5: NM Functions will coordinate multiple EM OSFs to provide overall network supervision.

network termination: physical resource which resides in the customer's premises and forms the boundary of the access network (UNI)

NOTE 6: It provides onward transmission of services over building wiring to customer premises equipment.

operations system function: collection of similar functions which provide different levels of management capability

NOTE 7: Four layers of management capability are defined: Network Element (NE), Element Management (EM), Network Management (NM) and Service Management (SM). Each layer providing management services to the layer above.

service management layer: SM functions manage the services supported by the network

NOTE 8: These functions are not concerned with the physical nature of the network. Typical functions of this layer are service creation, provision, cessation, billing and accounting information.

service node: network element that provides access to various switched and/or permanent telecommunications services

NOTE 9: For switched services, the Service node provides call control, connection control and resource handling functions.

user: crafts person interacting with the management system

3.2 Abbreviations

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

ADSL	Asymmetric Digital Subscriber Line
AN	Access Network
ASN.1	Abstract Syntax Notation one
ATM	Asynchronous Transfer Mode
ATU-C	ADSL Termination Unit-Central
ATU-R	ADSL Termination Unit-Remote
BER	Bit Error Rate
CMIP	Common Management Information Protocol
CRC	Cyclic Redundancy Check
EM	Element Management
GDMO	Guidelines for the Definition of Managed Objects
NE	Network Element
NM	Network Management
SES	Severely Errored Seconds
SM	Service Management

SNI	Service Node Interface
TMN	Telecommunications Management Network
UAS	UnAvailable Seconds
UNI	User Network Interface

3.3 Conventions

Objects and their characteristics and associated ASN.1 defined here are given names with capitals used to indicate the start of the next word and acronyms are treated as if they were words.

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

- The name of an attribute ends in the string "Ptr" if and only the attribute value is intended to identify a single object.
- The name of an attribute ends in the string "PtrList" if and only the attribute value is intended to identify one or more objects.
- The name of an attribute is composed of the name of an object class followed by the string "Ptr" if and only 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 ends in the string "Id" if and only the attribute value is intended to identify the name of an object, in which case this attribute should be the first one listed, should use ASN.1 NameType and should not be used to convey other information.
- 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.

4 General overview

The following information model diagrams have been drawn for the purpose of clarifying the relations between the different object classes of the model:

- 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).

These diagrams are only for clarification. The formal specification in terms of GDMO templates and ASN.1 type definitions are the relevant information for implementations.

4.1 Entity-relationship models

The following conventions are used in the diagrams:

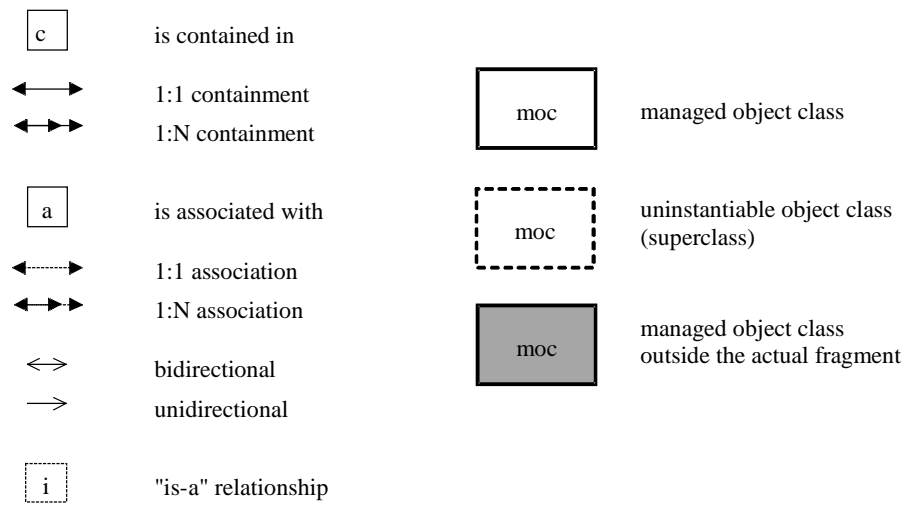


Figure 1: Conventions used in diagrams for entity relationship models

Where the directionality of containment is not clear it can be identified by implications since the root class is unique.

4.1.1 Entity-relationship diagram for the ADSL fragment

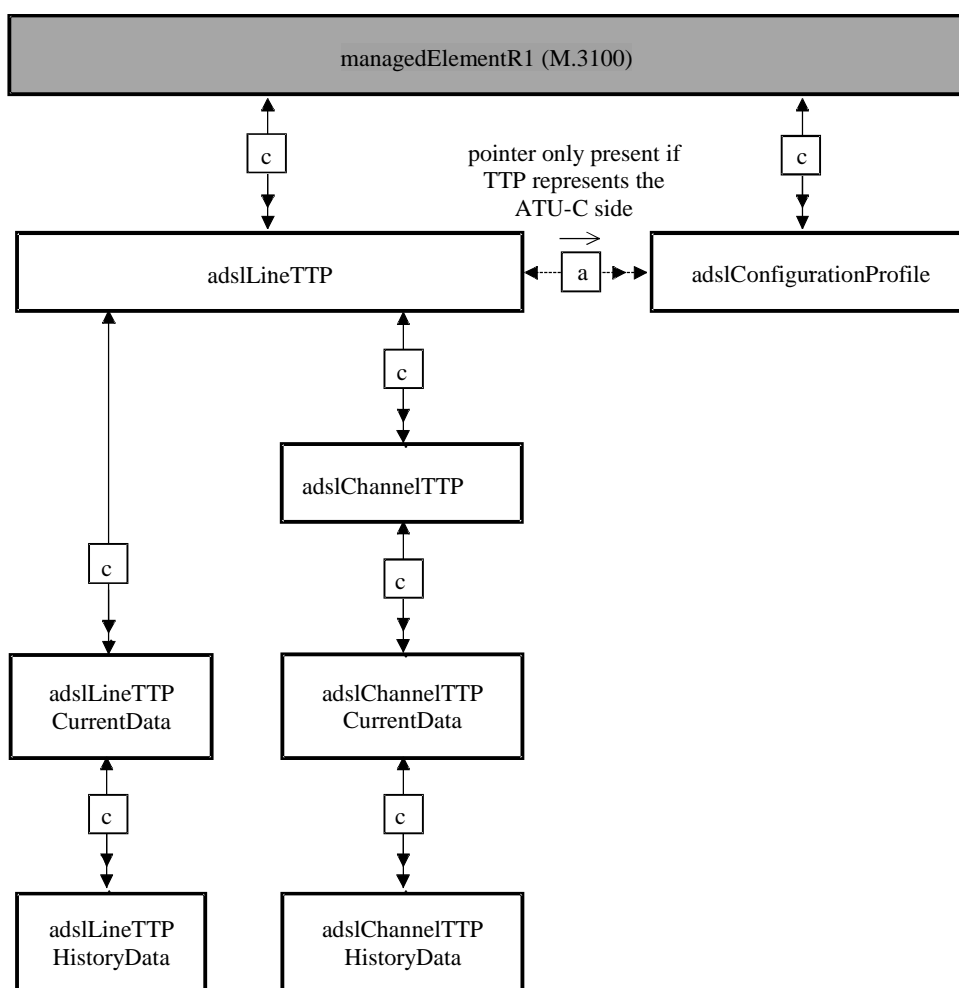


Figure 2: Entity relationship diagram - ADSL fragment

4.2 Inheritance hierarchy

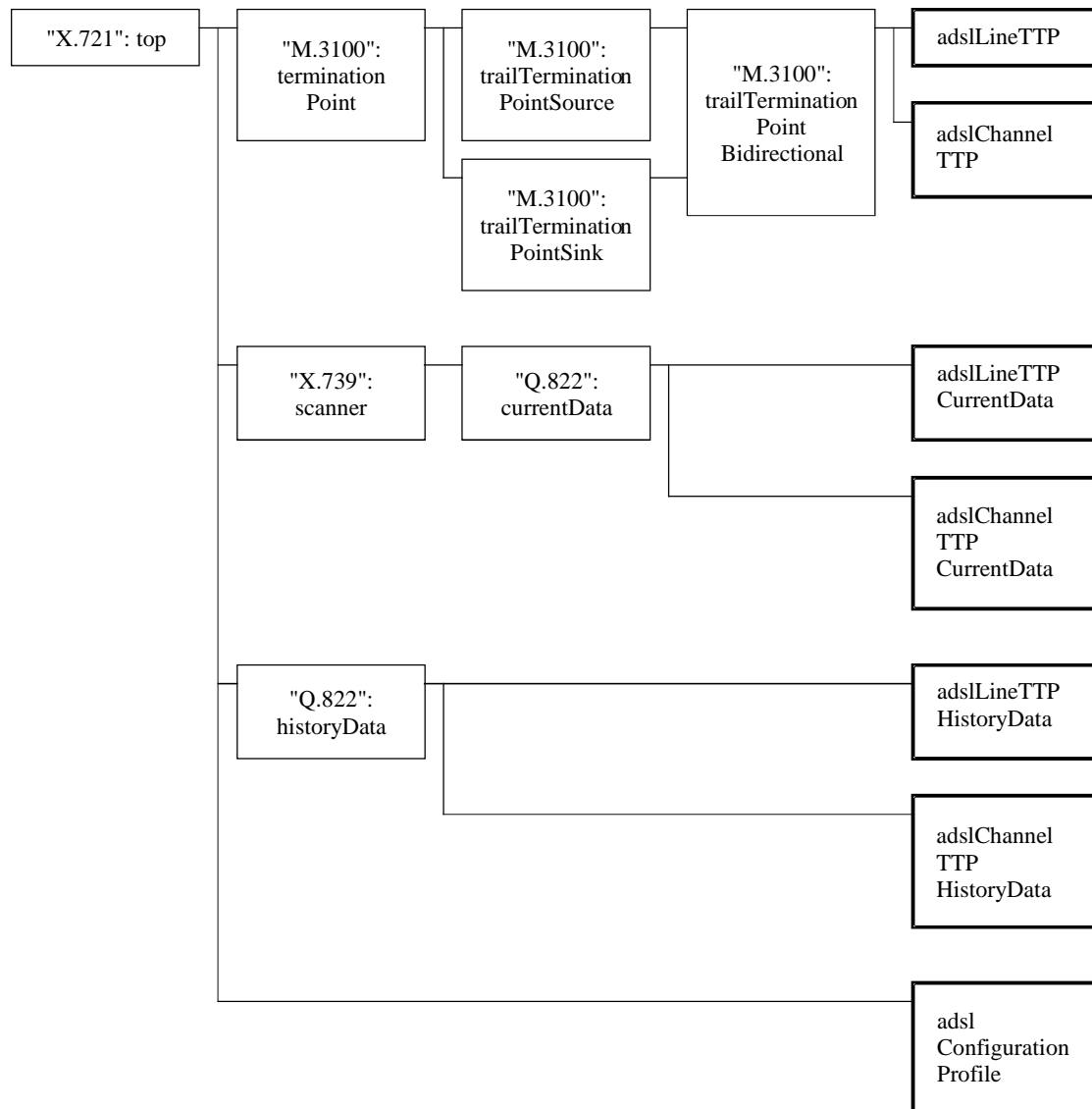


Figure 3: Inheritance hierarchy

5 Formal object class definitions

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

Formal definitions are shown in annex B.

6 Type definitions

Type definitions are shown in clause B.6.

7 Protocol stacks

The protocol stacks specified in ITU-T Recommendations Q.811 [4], Q.812 [5] and G.773 [2] can be used as part of the protocol stack for the present document.

Annex A (normative): Management requirements

A.1 Configuration

A.1.1 Physical configuration

This clause defines requirements for the configuration of the physical equipment.

It should be possible to add and remove the following physical equipment:

- 1) an ADSL Multiplexer;
- 2) a shelf within a multiplexer;
- 3) a card on a shelf;
- 4) an ADSL line.

A.1.2 Logical configuration

This clause defines requirements for the configuration of the logical entities that have manageable features.

It should be possible to add, modify and remove and remove the following logical entities:

- 1) a network node interface;
- 2) an ATU-C;
- 3) an ATU-R;
- 4) an ATM Port on an ATU-R;
- 5) an ATM connection.

A.2 Performance monitoring

This clause defines requirements for the performance monitoring of ADSL.

A.2.1 ADSL line terminations

It should be possible to measure and record the following:

- 1) the number of seconds with a loss of frame;
- 2) the number of seconds with a loss of link;
- 3) the number of seconds with a loss of signal;
- 4) the number of seconds with a loss of power;
- 5) the number of errored seconds;
- 6) the number of severely errored seconds;
- 7) the number of unavailable seconds;

- 8) the number of fast retrain attempts;
- 9) the number of failed retrain attempts;
- 10) the number of seconds with a forward error connection failures.

A.2.2 ADSL channel terminations

It should be possible to measure and record the following:

- 1) the number of received encoded blocks;
- 2) the number of transmitted encoded blocks;
- 3) the number of received blocks with errors that were corrected;
- 4) the number of received blocks with uncorrectable errors;
- 5) the number of CRC-8 anomalies in the channel.

Annex B (informative): Referenced definitions

This annex contains the referenced GDMO and ASN.1 definitions from ADSL Forum TR-028 [1]. This is provided for convenience only and TR-028 [1] should be consulted for the normative text.

B.1 Object classes

B.1.1 adslChannelTTP

```
adslChannelTTP MANAGED OBJECT CLASS
  DERIVED FROM "Rec. M.3100":trailTerminationPointBidirectional;
  CHARACTERIZED BY
    "Rec. X.721 | ISO/IEC 10165-2":administrativeStatePackage,
    "Rec. M.3100":createDeleteNotificationsPackage,
    "Rec. M.3100":attributeValueChangeNotificationsPackage,
    adslChannelTTPPkg PACKAGE
    BEHAVIOUR adslChannelTTPbeh;
  ATTRIBUTES
    adslChannelTTPId
      GET,
    channelType
      GET
      SET-BY-CREATE,
    currentChannelRate
      GET,
    previousChannelRate
      GET;;;
  CONDITIONAL PACKAGES
    interleaveDelayPkg
      PRESENT IF "The channelType is Interleaved",
    currentCrcBLPkg
      PRESENT IF "The channelType is Fast or Interleaved",
    rateAdaptationNotificationPkg
      PRESENT IF "The channelType is Fast or Interleaved, and Run-time rate adaptation is
supported";
REGISTERED AS { adslfNMObjectClass 1 };

adslChannelTTPbeh BEHAVIOUR
  DEFINED AS
    "adslChannelTTP object is used to model channel terminations on ATU-C and ATU-R. It
represent both connection and trail termination aspects. One instance of this managed object class
is created for each supported channel.
    For a given adslLineTTP object instance the total of current channel rates of the contained
adslChannelTTP instances cannot exceed its line rate.
    The inherited supportedByObjectList attribute points to the associated equipment unit(s).";
```

B.1.2 adslChannelTTPCurrentData

```
adslChannelTTPCurrentData MANAGED OBJECT CLASS
  DERIVED FROM "Rec. Q.822":currentData;
  CHARACTERIZED BY
    "Rec. M.3100":createDeleteNotificationsPackage,
    "Rec. M.3100":attributeValueChangeNotificationsPackage,
    "Rec. Q822":thresholdPkg,
    adslChannelTTPCurrentDataPkg PACKAGE
    BEHAVIOUR adslChannelTTPCurrentDataBeh;;;
  CONDITIONAL PACKAGES
    adslChannelRvcBlocksPkg PRESENT IF
      "an instance supports it",
    adslChannelTxBlocksPkg PRESENT IF
      "an instance supports it",
    adslChannelCorrectedBlocksPkg PRESENT IF
      "an instance supports it",
    adslChannelUncorrectedBlocksPkg PRESENT IF
      "an instance supports it",
    adslChannelCodeViolationsPkg PRESENT IF
```

```

        "an instance supports it";
REGISTERED AS { adslfNMObjectClass 2 };

adslChannelTTPCurrentDataBeh BEHAVIOUR
    DEFINED AS
        "adslChannelTTPCurrentData object is used to monitor performance monitoring aspects of an
        ADSL channel. Instances of this managed object class shall model 1 Day counters";

```

B.1.3 adslChannelTTPHistoryData

```

adslChannelTTPHistoryData MANAGED OBJECT CLASS
    DERIVED FROM "Rec. Q.822":historyData;
    CHARACTERIZED BY
        "Rec. X.721 | ISO/IEC 10165-2":objectDeleteNotificationPkg,
        "Rec. Q.822":historyDataSuspectIntervalFlagPkg,
        adslChannelTTPHistoryDataPkg PACKAGE
        BEHAVIOUR adslChannelTTPHistoryDataBeh;;;
    CONDITIONAL PACKAGES
        adslChannelRvcBlocksRecordPkg PRESENT IF
            "an instance supports it",
        adslChannelTxBlocksRecordPkg PRESENT IF
            "an instance supports it",
        adslChannelCorrectedBlocksRecordPkg PRESENT IF
            "an instance supports it",
        adslChannelUncorrectedBlocksRecordPkg PRESENT IF
            "an instance supports it",
        adslChannelCodeViolationsRecordPkg PRESENT IF
            "an instance supports it";
REGISTERED AS { adslfNMObjectClass 3 };

adslChannelTTPHistoryDataBeh BEHAVIOUR
    DEFINED AS
        "adslChannelTTPHistoryData object is used to keep previous performance monitoring counters
        of an ADSL channel.";

```

B.1.4 adslConfigurationProfile

```

adslConfigurationProfile MANAGED OBJECT CLASS
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2" top;
    CHARACTERIZED BY
        "Rec. M.3100":createDeleteNotificationsPackage,
        "Rec. M.3100":attributeValueChangeNotificationsPackage,
        adslConfigurationProfilePkg PACKAGE
        BEHAVIOUR adslConfigurationProfileBeh;
    ATTRIBUTES
        adslConfigurationProfileId
            GET,
        rateModeAtuC
            GET
            SET-BY-CREATE,
        targetSnrMarginAtuC
            GET
            SET-BY-CREATE,
        maxSnrMarginAtuC
            GET
            SET-BY-CREATE,
        minSnrMarginAtuC
            GET
            SET-BY-CREATE,
        rateModeAtuR
            GET
            SET-BY-CREATE,
        targetSnrMarginAtuR
            GET
            SET-BY-CREATE,
        maxSnrMarginAtuR
            GET
            SET-BY-CREATE,
        minSnrMarginAtuR
            GET
            SET-BY-CREATE,
        configuredChannelTypes
            GET
            SET-BY-CREATE;;;
    CONDITIONAL PACKAGES
        rateAdaptivePkg

```

```

    PRESENT IF "Rate adaptive ADSL mode is available",
    fastPkg
    PRESENT IF "Fast channel mode is supported",
    interleavedPkg
    PRESENT IF "Interleaved channel mode is supported",
    rateChangeRatioPkg
    PRESENT IF "Rate adaptive ADSL mode is available, and, both Fast and Interleaved
channels are supported at the same time"
    powerManagementPkg
    PRESENT IF "Optional power management procedures are supported";
REGISTERED AS { adslfNMObjectClass 4 };

adslConfigurationProfileBeh BEHAVIOUR
    DEFINED AS
        "adslConfigurationProfile managed object class contains a list of parameters to be used in
configuring an ADSL Modem.
        The instances of this object class is pointed to by adslLineTTP object instances
representing ATU-C side of an ADSL Line. However, this object class defines the attributes
pertaining to both the ATU-C, as well as the related ATU-R. Note that the ATU-C configures the ATU-
R.

        The fastPkg and interleavedPkg control the configuration of channels to be supported. If
fastPkg is present, fast channel is configured. If interleavedPkg is present, the interleaved
channel is configured. If both fastPkg and interleavedPkg are present, both channels are
configured.";
```

B.1.5 adslLineTTP

```

adslLineTTP MANAGED OBJECT CLASS
    DERIVED FROM "Rec. M.3100":trailTerminationPointBidirectional;
    CHARACTERIZED BY
        "Rec. X.721 | ISO/IEC 10165-2":administrativeStatePackage,
        "Rec. M.3100":createDeleteNotificationsPackage,
        "Rec. M.3100":attributeValueChangeNotificationsPackage,
        "Rec. M.3100":stateChangeNotificationsPackage,
        initFailurePkg,
        adslLineTTPPkg PACKAGE
        BEHAVIOUR adslLineTTPBeh;
        ATTRIBUTES
            adslLineTTPId
                GET
                SET-BY-CREATE,
            lineCoding
                GET,
            currentSnrMargin
                GET,
            currentAttenuation
                GET,
            currentOutputPower
                GET,
            currentAttainableRate
                GET,
            currentLineRate
                GET,
            previousLineRate
                GET,
            supportedChannelTypes
                GET,
            adslAvailabilityStatus
                GET,
            supportedOperationalModes
                GET,
            currentOperationalMode
                GET;;
        CONDITIONAL PACKAGES
            adslConfigurationProfilePointerPkg
                PRESENT IF "The object instance represents the ATU-C side of the ADSL line",
            allowedOperationalModesPkg
                PRESENT IF "The object instance represents the ATU-C side of the ADSL line";
REGISTERED AS { adslfNMObjectClass 5 };

adslLineTTPBeh BEHAVIOUR
    DEFINED AS
        "adslLineTTP object is used to model a Physical ADSL line termination.
        The inherited supportedByObjectList attribute points to the associated equipment unit(s).
        The inherited downstreamConnectivityPointer of an adslLineTTP instance representing the ATU-
C side of the ADSL line, points to the related adslLineTTP instance representing the ATU-R side of
the ADSL line.
```

The inherited `upstreamConnectivityPointer` of an `adslLineTTP` instance representing the ATU-R side of the ADSL line, points to the related `adslLineTTP` instance representing the ATU-C side of the ADSL line.

The `configurationProfilePointer` attribute, which is only present for the instances of `adslLineTTP` object representing the ATU-C side of the ADSL line, points to the object class instance representing physical line configuration information for both ATU-C and ATU-R.

The `adslAvailabilityStatus` attribute further qualifies the inherited `operationState` attribute.

The `lineCodeSpecificProfilePointer` attribute is included for future expansion of the model with vendor or line code specific information";

B.1.6 adslLineTTPCurrentData

`adslLineTTPCurrentData` MANAGED OBJECT CLASS

DERIVED FROM "Rec. Q.822":`currentData`;

CHARACTERIZED BY

"Rec. M.3100":`createDeleteNotificationsPackage`,
 "Rec. M.3100":`attributeValueChangeNotificationsPackage`,
 "Rec. Q.822":`thresholdPkg`,

`adslLineTTPCurrentDataPkg` PACKAGE

BEHAVIOUR `adslLineTTPCurrentDataBeh`;;

CONDITIONAL PACKAGES

`adslLofsPkg` PRESENT IF
 "an instance supports it",
`adslLolsPkg` PRESENT IF
 "an instance supports it",
`adslLossPkg` PRESENT IF
 "an instance supports it",
`adslLprsPkg` PRESENT IF
 "an instance supports it",
`adslEssPkg` PRESENT IF
 "an instance supports it",
`adslSessPkg` PRESENT IF
 "an instance supports it",
`adslUassPkg` PRESENT IF
 "an instance supports it",
`adslFastRetrainPkg` PRESENT IF
 "an instance supports it",
`adslFecsPkg` PRESENT IF
 "an instance supports it";

REGISTERED AS { `adslfNMObjectClass 6` };

`adslLineTTPCurrentDataBeh` BEHAVIOUR

DEFINED AS

"`adslLineTTPCurrentData` object is used to monitor performance monitoring aspects of an ADSL physical line. Instances of this managed object class shall model 15 Min and 1 Day counters";

B.1.7 adslLineTTPHistoryData

`adslLineTTPHistoryData` MANAGED OBJECT CLASS

DERIVED FROM "Recommendation Q.822":`historyData`;

CHARACTERIZED BY

"Rec. X.721 | ISO/IEC 10165-2":`objectDeleteNotificationPkg`,
 "Rec. Q.822":`historyDataSuspectIntervalFlagPkg`,

`adslLineTTPHistoryDataPkg` PACKAGE

BEHAVIOUR `adslLineTTPHistoryDataBeh`;;

CONDITIONAL PACKAGES

`adslLofsRecordPkg` PRESENT IF
 "an instance supports it",
`adslLolsRecordPkg` PRESENT IF
 "an instance supports it",
`adslLossRecordPkg` PRESENT IF
 "an instance supports it",
`adslLprsRecordPkg` PRESENT IF
 "an instance supports it",
`adslEssRecordPkg` PRESENT IF
 "an instance supports it",
`adslSessRecordPkg` PRESENT IF
 "an instance supports it",
`adslUassRecordPkg` PRESENT IF
 "an instance supports it",
`adslFastRetrainRecordPkg` PRESENT IF
 "an instance supports it",
`adslFecsRecordPkg` PRESENT IF
 "an instance supports it";

REGISTERED AS { `adslfNMObjectClass 7` };

```

adslLineTTPHistoryDataBeh BEHAVIOUR
  DEFINED AS
    "adslLineTTPHistoryData object is used to keep previous performance counters of an ADSL
    physical line.";

```

B.2 Name bindings

B.2.1 adslChannelTTP-adslLineTTP

```

adslChannelTTP-adslLineTTP NAME BINDING
  SUBORDINATE OBJECT CLASS adslChannelTTP;
  NAMED BY SUPERIOR OBJECT CLASS adslLineTTP;
  WITH ATTRIBUTE adslChannelTTPId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS ;
REGISTERED AS { adslfNMNameBinding 1 };

```

B.2.2 adslChannelTTPCurrentData-adslChannelTTP

```

adslChannelTTPCurrentData-adslChannelTTP NAME BINDING
  SUBORDINATE OBJECT CLASS adslChannelTTPCurrentData;
  NAMED BY SUPERIOR OBJECT CLASS adslChannelTTP;
  WITH ATTRIBUTE "Recommendation X.739":scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS ;
REGISTERED AS { adslfNMNameBinding 2 };

```

B.2.3 adslChannelTTPHistoryData-adslChannelTTPCurrentData

```

adslChannelTTPHistoryData-adslChannelTTPCurrentData NAME BINDING
  SUBORDINATE OBJECT CLASS adslChannelTTPHistoryData;
  NAMED BY SUPERIOR OBJECT CLASS adslChannelTTPCurrentData;
  WITH ATTRIBUTE "Recommendation Q.822":historyDataId;
REGISTERED AS { adslfNMNameBinding 3 };

```

B.2.4 adslConfigurationProfile-managedElementR1

```

adslConfigurationProfile-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS adslConfigurationProfile;
  NAMED BY SUPERIOR OBJECT CLASS managedElementR1;
  WITH ATTRIBUTE adslConfigurationProfileId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS ;
REGISTERED AS { adslfNMNameBinding 4 };

```

B.2.5 adslLineTTP-managedElementR1

```

adslLineTTP-managedElementR1 NAME BINDING
  SUBORDINATE OBJECT CLASS adslLineTTP;
  NAMED BY SUPERIOR OBJECT CLASS "Rec. M.3100":managedElementR1;
  WITH ATTRIBUTE adslLineTTPId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS ;
REGISTERED AS { adslfNMNameBinding 5 };

```

B.2.6 adslLineTTPCurrentData-adslLineTTP

```
adslLineTTPCurrentData-adslLineTTP NAME BINDING
  SUBORDINATE OBJECT CLASS adslLineTTPCurrentData;
  NAMED BY SUPERIOR OBJECT CLASS adslLineTTP;
  WITH ATTRIBUTE "Recommendation X.739":scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS { adslfNMNameBinding 6 };
```

B.2.7 adslLineTTPHistoryData-adslLineTTPCurrentData

```
adslLineTTPHistoryData-adslLineTTPCurrentData NAME BINDING
  SUBORDINATE OBJECT CLASS adslLineTTPHistoryData;
  NAMED BY SUPERIOR OBJECT CLASS adslLineTTPCurrentData;
  WITH ATTRIBUTE "Recommendation Q.822":historyDataId;
REGISTERED AS { adslfNMNameBinding 7 };
```

B.3 Packages

B.3.1 adslChannelCorrectedBlocksPkg

```
adslChannelCorrectedBlocksPkg PACKAGE
  ATTRIBUTES
    adslChannelCorrectedBlocks
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 1 };
```

B.3.2 adslChannelCorrectedBlocksRecordPkg

```
adslChannelCorrectedBlocksRecordPkg PACKAGE
  ATTRIBUTES
    adslChannelCorrectedBlocks
      GET;
REGISTERED AS { adslfNMPackage 2 };
```

B.3.3 adslChannelRcvBlocksPkg

```
adslChannelRcvBlocksPkg PACKAGE
  ATTRIBUTES
    adslChannelRcvBlocks
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 3 };
```

B.3.4 adslChannelRcvBlocksRecordPkg

```
adslChannelRcvBlocksRecordPkg PACKAGE
  ATTRIBUTES
    adslChannelRcvBlocks
      GET;
REGISTERED AS { adslfNMPackage 4 };
```

B.3.5 adslChannelTxBlocksPkg

```
adslChannelTxBlocksPkg PACKAGE
  ATTRIBUTES
    adslChannelTxBlocks
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 5 };
```

B.3.6 adslChannelTxBlocksRecordPkg

```
adslChannelTxBlocksRecordPkg PACKAGE
  ATTRIBUTES
    adslChannelTxBlocks
      GET;
REGISTERED AS { adslfNMPackage 6 };
```

B.3.7 adslChannelUncorrectedBlocksPkg

```
adslChannelUncorrectedBlocksPkg PACKAGE
  ATTRIBUTES
    adslChannelUncorrectedBlocks
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 7 };
```

B.3.8 adslChannelUncorrectedBlocksRecordPkg

```
adslChannelUncorrectedBlocksRecordPkg PACKAGE
  ATTRIBUTES
    adslChannelUncorrectedBlocks
      GET;
REGISTERED AS { adslfNMPackage 8 };
```

B.3.9 adslConfigurationProfilePointerPkg

```
adslConfigurationProfilePointerPkg PACKAGE
  ATTRIBUTES
    adslConfigurationProfilePointer
      GET-REPLACE,
    lineCodeSpecificProfilePointer
      GET-REPLACE;
REGISTERED AS { adslfNMPackage 9 };
```

B.3.10 adslEssPkg

```
adslEssPkg PACKAGE
  ATTRIBUTES
    adslEss
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 10 };
```

B.3.11 adslEssRecordPkg

```
adslEssRecordPkg PACKAGE
  ATTRIBUTES
    adslEss
      GET;
REGISTERED AS { adslfNMPackage 11 };
```

B.3.12 adslFastRetrainPkg

```
adslFastRetrainPkg PACKAGE
  ATTRIBUTES
    adslNumFastRetrains
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET,
    adslFailedFastRetrains
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 12 };
```

B.3.13 adslFastRetrainRecordPkg

```
adslFastRetrainRecordPkg PACKAGE
  ATTRIBUTES
    adslNumFastRetrains
      GET,
    adslFailedFastRetrains
      GET;
REGISTERED AS { adslfNMPackage 13 };
```

B.3.14 adslLofsPkg

```
adslLofsPkg PACKAGE
  ATTRIBUTES
    adslLofs
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 14 };
```

B.3.15 adslLofsRecordPkg

```
adslLofsRecordPkg PACKAGE
  ATTRIBUTES
    adslLofs
      GET;
REGISTERED AS { adslfNMPackage 15 };
```

B.3.16 adslLolsPkg

```
adslLolsPkg PACKAGE
  ATTRIBUTES
    adslLols
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 16 };
```

B.3.17 adslLolsRecordPkg

```
adslLolsRecordPkg PACKAGE
  ATTRIBUTES
    adslLols
      GET;
REGISTERED AS { adslfNMPackage 17 };
```

B.3.18 adslLossPkg

```
adslLossPkg PACKAGE
  ATTRIBUTES
    adslLoss
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 18 };
```

B.3.19 adslLossRecordPkg

```
adslLossRecordPkg PACKAGE
  ATTRIBUTES
    adslLoss
      GET;
REGISTERED AS { adslfNMPackage 19 };
```


B.3.20 adslLprsPkg

```
adslLprsPkg PACKAGE
  ATTRIBUTES
    adslLprs
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 20 };
```

B.3.21 adslLprsRecordPkg

```
adslLprsRecordPkg PACKAGE
  ATTRIBUTES
    adslLprs
      GET;
REGISTERED AS { adslfNMPackage 21 };
```

B.3.22 adslSessPkg

```
adslSessPkg PACKAGE
  ATTRIBUTES
    adslSess
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 22 };
```

B.3.23 adslSessRecordPkg

```
adslSessRecordPkg PACKAGE
  ATTRIBUTES
    adslSess
      GET;
REGISTERED AS { adslfNMPackage 23 };
```

B.3.24 adslUassPkg

```
adslUassPkg PACKAGE
  ATTRIBUTES
    adslUass
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 24 };
```

B.3.25 adslUassRecordPkg

```
adslUassRecordPkg PACKAGE
  ATTRIBUTES
    adslUass
      GET;
REGISTERED AS { adslfNMPackage 25 };
```

B.3.26 allowedOperationalModesPkg

```
allowedOperationalModesPkg PACKAGE
  ATTRIBUTES
    allowedOperationalModes
      GET-REPLACE
      ADD-REMOVE;
REGISTERED AS { adslfNMPackage 26 };
```

B.3.27 currentCrcBLPkg

```
currentCrcBLPkg PACKAGE
  ATTRIBUTES
    currentCrcBL
      GET;
REGISTERED AS { adslfNMPackage 27 };
```

B.3.28 fastPkg

```
fastPkg PACKAGE
  ATTRIBUTES
    fastMinTxRateAtuC
      GET
      SET-BY-CREATE,
    fastMaxTxRateAtuC
      GET
      SET-BY-CREATE,
    fastMinTxRateAtuR
      GET
      SET-BY-CREATE,
    fastMaxTxRateAtuR
      GET
      SET-BY-CREATE;
REGISTERED AS { adslfNMPackage 28 };
```

B.3.29 initFailurePkg

```
initFailurePkg PACKAGE
  ATTRIBUTES
    initFailedNotificationSwitch
      GET-REPLACE;
  NOTIFICATIONS
    initFailedNotification;
REGISTERED AS { adslfNMPackage 29 };
```

B.3.30 interleavedPkg

```
interleavedPkg PACKAGE
  ATTRIBUTES
    interleavedMinTxRateAtuC
      GET
      SET-BY-CREATE,
    interleavedMaxTxRateAtuC
      GET
      SET-BY-CREATE,
    maxInterleaveDelayAtuC
      GET
      SET-BY-CREATE,
    interleavedMinTxRateAtuR
      GET
      SET-BY-CREATE,
    interleavedMaxTxRateAtuR
      GET
      SET-BY-CREATE,
    maxInterleaveDelayAtuR
      GET
      SET-BY-CREATE;
REGISTERED AS { adslfNMPackage 30 };
```

B.3.31 interleaveDelayPkg

```
interleaveDelayPkg PACKAGE
  ATTRIBUTES
    interleaveDelay
      GET;
REGISTERED AS { adslfNMPackage 31 };
```

B.3.32 rateAdaptationNotificationPkg

```
rateAdaptationNotificationPkg PACKAGE
  ATTRIBUTES
    upThreshold
      GET-REPLACE,
    downThreshold
      GET-REPLACE;
  NOTIFICATIONS
    rateChangeNotification;
REGISTERED AS { adslfNMPackage 32 };
```

B.3.33 rateAdaptivePkg

```
rateAdaptivePkg PACKAGE
  ATTRIBUTES
    downShiftSnrMarginAtuC
      GET
      SET-BY-CREATE,
    upShiftSnrMarginAtuC
      GET
      SET-BY-CREATE,
    minDownShiftTimeAtuC
      GET
      SET-BY-CREATE,
    minUpShiftTimeAtuC
      GET
      SET-BY-CREATE,
    downShiftSnrMarginAtuR
      GET
      SET-BY-CREATE,
    upShiftSnrMarginAtuR
      GET
      SET-BY-CREATE,
    minDownShiftTimeAtuR
      GET
      SET-BY-CREATE,
    minUpShiftTimeAtuR
      GET
      SET-BY-CREATE
  REGISTERED AS { adslfNMPackage 33 };
```

B.3.34 rateChangeRatioPkg

```
rateChangeRatioPkg PACKAGE
  ATTRIBUTES
    rateChangeRatioAtuC
      GET
      SET-BY-CREATE,
    rateChangeRatioAtuR
      GET
      SET-BY-CREATE;
  REGISTERED AS { adslfNMPackage 34 };
```

B.3.35 powerManagementPkg

```
powerManagementPkg PACKAGE
  ATTRIBUTES
    lowPowerDataRateAtuC
      GET
      SET-BY-CREATE,
    lowPowerDataRateAtuR
      GET
      SET-BY-CREATE;
  REGISTERED AS { adslfNMPackage 35 };
```

B.3.36 adslChannelCodeViolationsPkg

```
adslChannelCodeViolationsPkg PACKAGE
  ATTRIBUTES
    adslChannelCodeViolations
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
  REGISTERED AS { adslfNMPackage 36 };
```

B.3.37 adslChannelCodeViolationsRecordPkg

```
adslChannelCodeViolationsRecordPkg PACKAGE
  ATTRIBUTES
    adslChannelCodeViolations
      GET;
  REGISTERED AS { adslfNMPackage 37 };
```

B.3.38 adslFecsPkg

```
adslFecsPkg PACKAGE
  ATTRIBUTES
    adslChannelCodeViolations
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
REGISTERED AS { adslfNMPackage 36 };
```

B.3.39 adslChannelCodeViolationsRecordPkg

```
adslChannelCodeViolationsRecordPkg PACKAGE
  ATTRIBUTES
    adslChannelCodeViolations
      GET;
REGISTERED AS { adslfNMPackage 37 };
```

B.4 Attributes

B.4.1 adslAvailabilityStatus

```
adslAvailabilityStatus ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslAvailabilityStatus;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR adslAvailabilityStatusBeh;
REGISTERED AS { adslfNMAttribute 1 };
```

```
adslAvailabilityStatusBeh BEHAVIOUR
  DEFINED AS
```

"This set-valued attribute further qualifies the operationState of the object instance. Valid conditions that may be included in this set-valued attribute, for an instance representing the ATU-C side of an ADSL Line are: LOF, LOS, LPR, LOL, lossOfSigQuality, dataInitFailure, configInitFailure, protocolInitFailure, noPeerPresent, and lowPowerMode. For an instance representing ATU-R side of an ADSL Line the valid values are: LOF, LOS, LPR, lossOfSigQuality, and lowPowerMode";

B.4.2 adslChannelCorrectedBlocks

```
adslChannelCorrectedBlocks ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslChannelCorrectedBlocksBeh;
REGISTERED AS { adslfNMAttribute 2 };
```

```
adslChannelCorrectedBeh BEHAVIOUR
  DEFINED AS
```

"This attribute indicates the count of all blocks received with an error and corrected.";

B.4.3 adslChannelCTPId

```
adslChannelCTPId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR adslChannelCTPIdBeh;
REGISTERED AS { adslfNMAttribute 3 };
```

```
adslChannelCTPIdBeh BEHAVIOUR
  DEFINED AS
```

"This attribute is the object instance identifier for the adslChannelCTP.";

B.4.4 adslChannelRcvBlocks

```

adslChannelRcvBlocks ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslChannelRcvBlocksBeh;
REGISTERED AS { adslfNMAttribute 4 };

adslChannelRcvBlocksBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of all received encoded blocks.";

```

B.4.5 adslChannelTxBlocks

```

adslChannelTxBlocks ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslChannelTxBlocksBeh;
REGISTERED AS { adslfNMAttribute 5 };

adslChannelTxBlocksBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of all transmitted encoded blocks.";

```

B.4.6 adslChannelUncorrectedBlocks

```

adslChannelUncorrectedBlocks ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslChannelUncorrectedBlocksBeh;
REGISTERED AS { adslfNMAttribute 6 };

adslChannelUncorrectedBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of all blocks received with uncorrectable errors.";

```

B.4.7 adslConfigurationProfileId

```

adslConfigurationProfileId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR adslConfigurationProfileIdBeh;
REGISTERED AS { adslfNMAttribute 7 };

adslConfigurationProfileIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is the object instance identifier for the adslConfigurationProfile.";

```

B.4.8 adslConfigurationProfilePointer

```

adslConfigurationProfilePointer ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.ObjectInstance;
  MATCHES FOR EQUALITY;
  BEHAVIOUR adslConfigurationProfilePointerBeh;
REGISTERED AS { adslfNMAttribute 8 };

adslConfigurationProfilePointerBeh BEHAVIOUR
  DEFINED AS
    "This attribute is a pointer to the applicable ADSL Configuration Profile.";

```

B.4.9 adslEss

```

adslEss ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslEssBeh;
REGISTERED AS { adslfNMAttribute 9 };

adslEssBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of errored seconds (one ore more crc, one or more los or
    sef defects).";

```

B.4.10 adslFailedFastRetrains

```
adslFailedFastRetrains ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslFailedFastRetrainsBeh;
REGISTERED AS { adslfNMAttribute 10 };

adslFailedFastRetrainsBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of failed fast-retrain attempts.";
```

B.4.11 adslLineTTPId

```
adslLineTTPId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR adslLineTTPIdBeh;
REGISTERED AS { adslfNMAttribute 11 };

adslLineTTPIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is the object instance identifier for the adslLineTTP.";
```

B.4.12 adslLofs

```
adslLofs ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslLofsBeh;
REGISTERED AS { adslfNMAttribute 12 };

adslLofsBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of seconds where there was a Loss of Frame.";
```

B.4.13 adslLols

```
adslLols ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslLolsBeh;
REGISTERED AS { adslfNMAttribute 13 };

adslLolsBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of seconds where there was a Loss of Link.";
```

B.4.14 adslLoss

```
adslLoss ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslLossBeh;
REGISTERED AS { adslfNMAttribute 14 };

adslLossBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of seconds where there was a Loss of Signal.";
```

B.4.15 adslLprs

```
adslLprs ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslLprsBeh;
REGISTERED AS { adslfNMAttribute 15 };

adslLprsBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of seconds where there was a Loss of Power.";
```

B.4.16 adslNumFastRetrains

```
adslNumFastRetrains ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
    BEHAVIOUR adslNumFastRetrainsBeh;
REGISTERED AS { adslfNMAttribute 16 };

adslNumFastRetrainsBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the count of modem fast-retrain attempts.";
```

B.4.17 adslSess

```
adslSess ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
    BEHAVIOUR adslSessBeh;
REGISTERED AS { adslfNMAttribute 17 };

adslSessBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the count of Severely Errored Seconds (SES).";
```

B.4.18 adslUass

```
adslUass ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
    BEHAVIOUR adslUassBeh;
REGISTERED AS { adslfNMAttribute 18 };

adslUassBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the count of Unavailable Seconds (UAS).";
```

B.4.19 allowedOperationalModes

```
allowedOperationalModes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslOperationalModes;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
    BEHAVIOUR allowedOperationalModesBeh;
REGISTERED AS { adslfNMAttribute 19 };

allowedOperationalModesBeh BEHAVIOUR
    DEFINED AS
        "This set-valued attribute configures the modem Operational Modes that should be allowed by the ATU-C. The allowed Modes should be a subset of the Modes supported by the ATU-C (as per the supportedOperationalModes attribute).";
```

B.4.20 channelType

```
channelType ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslChannelType;
    MATCHES FOR EQUALITY;
    BEHAVIOUR channelTypeBeh;
REGISTERED AS { adslfNMAttribute 20 };

channelTypeBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the channel type (Fast, Interleaved, other).";
```

B.4.21 currentAttainableRate

```
currentAttainableRate ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
    BEHAVIOUR currentAttainableRateBeh;
REGISTERED AS { adslfNMAttribute 21 };

currentAttainableRateBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the current maximum attainable transmit rate for the ATU in kbps. This value is greater than or equal to the current line rate.";
```

B.4.22 currentAttenuation

```
currentAttenuation ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
    BEHAVIOUR currentAttenuationBeh;
REGISTERED AS { adslfNMAttribute 22 };
```

```
currentAttenuationBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the measured difference in the total power transmitted by peer ATU
and the total power received by this ATU in 1/10th of a dB.";
```

B.4.23 currentChannelRate

```
currentChannelRate ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
    BEHAVIOUR currentChannelRateBeh;
REGISTERED AS { adslfNMAttribute 23 };
```

```
currentChannelRateBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the current transmit rate in kbps for the associated ADSL
channel.";
```

B.4.24 currentCrcBL

```
currentCrcBL ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
    BEHAVIOUR currentCrcBLBeh;
REGISTERED AS { adslfNMAttribute 24 };
```

```
currentCrcBLBeh BEHAVIOUR
    DEFINED AS
        "This attribute represents the current length of the channel data-block on which the CRC is
calculated in bytes.";
```

B.4.25 currentLineRate

```
currentLineRate ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
    BEHAVIOUR currentLineRateBeh;
REGISTERED AS { adslfNMAttribute 25 };
```

```
currentLineRateBeh BEHAVIOUR
    DEFINED AS
        "This attribute represents the current data rate for the ADSL line in kbps.";
```

B.4.26 currentOperationalMode

```
currentOperationalMode ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslOperationalMode;
    MATCHES FOR EQUALITY;
    BEHAVIOUR currentOperationalModeBeh;
REGISTERED AS { adslfNMAttribute 26 };
```

```
currentOperationalModeBeh BEHAVIOUR
    DEFINED AS
        "This attribute represents the currently selected modem Operational Mode.";
```

B.4.27 currentOutputPower

```
currentOutputPower ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
    BEHAVIOUR currentOutputPowerBeh;
REGISTERED AS { adslfNMAttribute 27 };
```

```
currentOutputPowerBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the measured total output power transmitted by the associated ATU
in 1/10th dBm.";
```


B.4.28 currentSnrMargin

```
currentSnrMargin ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
  BEHAVIOUR currentSnrMarginBeh;
REGISTERED AS { adslfNMAtribute 28 };

currentSnrMarginBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the current noise margin for the received signal on the associated
    ATU in 1/10th of a dB.";
```

B.4.29 downShiftSnrMarginAtuC

```
downShiftSnrMarginAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR downShiftSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAtribute 29 };

downShiftSnrMarginAtuCBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the signal/noise margin for rate downshift, in the case of a rate-
    adaptive ATU-C in 1/10th of a dB.";
```

B.4.30 downShiftSnrMarginAtuR

```
downShiftSnrMarginAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR downShiftSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAtribute 30 };

downShiftSnrMarginAtuRBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the signal/noise margin for rate downshift, in the case of a rate-
    adaptive ATU-R in 1/10th of a dB.";
```

B.4.31 downThreshold

```
downThreshold ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR downThresholdBeh;
REGISTERED AS { adslfNMAtribute 31 };

downThresholdBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the amount of decrement in the channel rate from the last time a
    rate-change notification was issued that will cause another rateChangeNotification to be sent. It is
    in kbps.";
```

B.4.32 fastMaxTxRateAtuC

```
fastMaxTxRateAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR fastMaxTxRateAtuCBeh;
REGISTERED AS { adslfNMAtribute 32 };

fastMaxTxRateAtuCBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the maximum transmit rate allowed for the fast channel for the
    associated ATU-C in kbps.";
```

B.4.33 fastMaxTxRateAtuR

```
fastMaxTxRateAtuR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR fastMaxTxRateAtuRBeh;
REGISTERED AS { adslfNMAAttribute 33 };

fastMaxTxRateAtuRBeh BEHAVIOUR
    DEFINED AS
        "This attribute configures the maximum transmit rate allowed for the fast channel for the
associated ATU-R in kbps.";
```

B.4.34 fastMinTxRateAtuC

```
fastMinTxRateAtuC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR fastMinTxRateAtuCBeh;
REGISTERED AS { adslfNMAAttribute 34 };

fastMinTxRateAtuCBeh BEHAVIOUR
    DEFINED AS
        "This attribute configures the minimum transmit rate acceptable for the fast channel in the
associated ATU-C in kbps.";
```

B.4.35 fastMinTxRateAtuR

```
fastMinTxRateAtuR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR fastMinTxRateAtuRBeh;
REGISTERED AS { adslfNMAAttribute 35 };

fastMinTxRateAtuRBeh BEHAVIOUR
    DEFINED AS
        "This attribute configures the minimum transmit rate acceptable for the fast channel in the
associated ATU-R in kbps.";
```

B.4.36 initFailedNotificationSwitch

```
initFailedNotificationSwitch ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Boolean;
    MATCHES FOR EQUALITY;
    BEHAVIOUR initFailedNotificationSwitchBeh;
REGISTERED AS { adslfNMAAttribute 36 };

initFailedNotificationSwitchBeh BEHAVIOUR
    DEFINED AS
        "This attribute is used to enable (TRUE) / disable (FALSE) the initFailedNotifications";
```

B.4.37 interleaveDelay

```
interleaveDelay ATTRIBUTE
    DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
    BEHAVIOUR interleaveDelayBeh;
REGISTERED AS { adslfNMAAttribute 37 };

interleaveDelayBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the current interleaved delay on the associated interleaved
channel in milli-seconds.";
```

B.4.38 interleavedMaxTxRateAtuC

```
interleavedMaxTxRateAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR interleavedMaxTxRateAtuCBeh;
REGISTERED AS { adslfNMAAttribute 38 };
```

```
interleavedMaxTxRateAtuCBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the maximum transmit rate allowed on the interleaved channel for
the associated ATU-C in kbps.";
```

B.4.39 interleavedMaxTxRateAtuR

```
interleavedMaxTxRateAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR interleavedMaxTxRateAtuRBeh;
REGISTERED AS { adslfNMAAttribute 39 };
```

```
interleavedMaxTxRateAtuRBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the maximum transmit rate on the interleaved channel for the
associated ATU-R in kbps.";
```

B.4.40 interleavedMinTxRateAtuC

```
interleavedMinTxRateAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR interleavedMinTxRateAtuCBeh;
REGISTERED AS { adslfNMAAttribute 40 };
```

```
interleavedMinTxRateAtuCBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the minimum transmit rate acceptable on the interleaved channel
for the associated ATU-C in kbps.";
```

B.4.41 interleavedMinTxRateAtuR

```
interleavedMinTxRateAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR interleavedMinTxRateAtuRBeh;
REGISTERED AS { adslfNMAAttribute 41 };
```

```
interleavedMinTxRateAtuRBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the minimum transmit rate acceptable on the interleaved channel
for the associated ATU-R in kbps.";
```

B.4.42 lineCodeSpecificProfilePointer

```
lineCodeSpecificProfilePointer ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.PointerOrNull;
  MATCHES FOR EQUALITY ;
  BEHAVIOUR lineCodeSpecificProfilePointerBeh;
REGISTERED AS { adslfNMAAttribute 42 };
```

```
lineCodeSpecificProfilePointerBeh BEHAVIOUR
  DEFINED AS
    "This attribute is a pointer to an optional line-code / vendor specific Configuration
Profile. If the value is NULL, no profile is specified.";
```

B.4.43 lineCoding

```
lineCoding ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslLineCoding;
  MATCHES FOR EQUALITY;
  BEHAVIOUR lineCodingBeh;
REGISTERED AS { adslfNMAAttribute 43 };

lineCodingBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the supported line coding for the ADSL Line (DMT, CAP, QAM,
other).";
```

B.4.44 maxInterleaveDelayAtuC

```
maxInterleaveDelayAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR maxInterleaveDelayAtuCBeh;
REGISTERED AS { adslfNMAAttribute 44 };

maxInterleaveDelayAtuCBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the maximum Interleave delay acceptable for the interleaved
channel on the associated ATU-C in milli-seconds.";
```

B.4.45 maxInterleaveDelayAtuR

```
maxInterleaveDelayAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR maxInterleaveDelayAtuRBeh;
REGISTERED AS { adslfNMAAttribute 45 };

maxInterleaveDelayAtuRBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the maximum acceptable Interleave delay for the interleaved
channel on the associated ATU-R in milli-seconds.";
```

B.4.46 maxSnrMarginAtuC

```
maxSnrMarginAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR maxSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAAttribute 46 };

maxSnrMarginAtuCBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the maximum signal/noise margin the ATU-C should try to maintain
before increasing the data-rate. The units are 1/10th of a dB";
```

B.4.47 maxSnrMarginAtuR

```
maxSnrMarginAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR maxSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAAttribute 47 };

maxSnrMarginAtuRBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the maximum signal/noise margin the ATU-R should attempt to
maintain before increasing the data-rate. The units are 1/10th of a dB.";
```

B.4.48 minDownShiftTimeAtuC

```
minDownShiftTimeAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR minDownShiftTimeAtuCBeh;
REGISTERED AS { adslfNMAAttribute 48 };
```

```
minDownShiftTimeAtuCBeh BEHAVIOUR
  DEFINED AS
```

"This attribute configures the minimum time for which the noise margin should be below the downShiftSnrMargin before the ATU-C should attempt a rate downshift. Only applicable to rate-adaptive modems. The unit is seconds.";

B.4.49 minDownShiftTimeAtuR

```
minDownShiftTimeAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR minDownShiftTimeAtuRBeh;
REGISTERED AS { adslfNMAAttribute 49 };
```

```
minDownShiftTimeAtuRBeh BEHAVIOUR
  DEFINED AS
```

"This attribute configures the minimum time for which current margin should be below the downShiftSnrMargin before the ATU-R should attempt a rate downshift. Only applicable to rate-adaptive modems. The unit is seconds.";

B.4.50 minSnrMarginAtuC

```
minSnrMarginAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR minSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAAttribute 50 };
```

```
minSnrMarginAtuCBeh BEHAVIOUR
  DEFINED AS
```

"This attribute configures the minimum acceptable signal/noise margin in $1/10^{\text{th}}$ of a dB for the associated ATU-C.";

B.4.51 minSnrMarginAtuR

```
minSnrMarginAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR minSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAAttribute 51 };
```

```
minSnrMarginAtuRBeh BEHAVIOUR
  DEFINED AS
```

"This attribute indicates the minimum acceptable signal/noise margin in $1/10^{\text{th}}$ of a dB for the associated ATU-R.";

B.4.52 minUpShiftTimeAtuC

```
minUpShiftTimeAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR minUpShiftTimeAtuCBeh;
REGISTERED AS { adslfNMAAttribute 52 };
```

```
minUpShiftTimeAtuCBeh BEHAVIOUR
  DEFINED AS
```

"This attribute indicates the minimum time that the noise margin for the associated ATU-C should remain above the upShiftSnrMargin, before it should attempt a rate upshift. Only applicable to rate adaptive modems. Units are seconds";

B.4.53 minUpShiftTimeAtuR

```
minUpShiftTimeAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR minUpShiftTimeAtuRBeh;
REGISTERED AS { adslfNMAAttribute 53 };
```

```
minUpShiftTimeAtuRBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the minimum time that the noise margin for the associated ATU-C
  should remain above the upShiftSnrMargin, before it should attempt a rate upshift. Only applicable
  to rate adaptive modems. Units are seconds";
```

B.4.54 previousChannelRate

```
previousChannelRate ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
  BEHAVIOUR previousChannelRateBeh;
REGISTERED AS { adslfNMAAttribute 54 };
```

```
previousChannelRateBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the previous rate of the associated ADSL channel in kbps for a
  rate-adaptive ATU following rate-change.";
```

B.4.55 previousLineRate

```
previousLineRate ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":gauge;
  BEHAVIOUR previousLineRateBeh;
REGISTERED AS { adslfNMAAttribute 55 };
```

```
previousLineRateBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the previous rate of the ADSL line in kbps for the associated
  rate-adaptive ATU following rate-change.";
```

B.4.56 rateChangeRatioAtuC

```
rateChangeRatioAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR rateChangeRatioAtuCBeh;
REGISTERED AS { adslfNMAAttribute 56 };
```

```
rateChangeRatioAtuCBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the allocation ratio of excess transmit bandwidth between fast and
  interleaved channels, in the case where rate adaptive ADSL mode is available and both fast and
  interleaved channels are supported at the same time. The value is between 0..100 and is computed as
  follows:
    rateChangeRatio = [Fast / (Fast + Interleaved)] * 100.";
```

B.4.57 rateChangeRatioAtuR

```
rateChangeRatioAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR rateChangeRatioAtuRBeh;
REGISTERED AS { adslfNMAAttribute 57 };
```

```
rateChangeRatioAtuRBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the allocation ratio of excess transmit bandwidth between fast and
  interleaved channels, in the case where rate adaptive ADSL mode is available and both fast and
  interleaved channels are supported at the same time. The value is between 0..100 and is computed as
  follows:
    rateChangeRatio = [Fast / (Fast + Interleaved)] * 100.";
```

B.4.58 rateModeAtuC

```
rateModeAtuC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslRateMode;
    MATCHES FOR EQUALITY;
    BEHAVIOUR rateModeAtuCBeh;
REGISTERED AS { adslfNMAAttribute 58 };

rateModeAtuCBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates what type of rate adaptation mode is supported. (Fixed, Adapt-At-Start, Adapt-At-Runtime)";
```

B.4.59 rateModeAtuR

```
rateModeAtuR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslRateMode;
    MATCHES FOR EQUALITY;
    BEHAVIOUR rateModeAtuRBeh;
REGISTERED AS { adslfNMAAttribute 59 };

rateModeAtuRBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates what type of rate adaptation mode is supported. (Fixed, Adapt-At-Start, Adapt-At-Runtime)";
```

B.4.60 supportedChannelTypes

```
supportedChannelTypes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslChannelOptions;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
    BEHAVIOUR supportedChannelTypesBeh;
REGISTERED AS { adslfNMAAttribute 60 };

supportedChannelTypesBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates supported channel types over an ADSL Line. (noChanne, fastOnly, interleavedOnly, fastAndInterleaved, fastOrInterleaved)";
```

B.4.61 supportedOperationalModes

```
supportedOperationalModes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslOperationalModes;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
    BEHAVIOUR supportedOperationalModesBeh;
REGISTERED AS { adslfNMAAttribute 61 };

supportedOperationalModesBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates which ADSL Operational Modes are supported by the modem.";
```

B.4.62 targetSnrMarginAtuC

```
targetSnrMarginAtuC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR targetSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAAttribute 62 };

targetSnrMarginAtuCBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the signal/noise margin (in 1/10th of dB) the modem must achieve with a BER of 10-7 or better.";
```

B.4.63 targetSnrMarginAtuR

```
targetSnrMarginAtuR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR targetSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAAttribute 63 };

targetSnrMarginAtuRBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the signal/noise margin (in 1/10th of dB) the modem must achieve
        with a BER of 10-7 or better.";
```

B.4.64 upShiftSnrMarginAtuC

```
upShiftSnrMarginAtuC ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR upShiftSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAAttribute 64 };

upShiftSnrMarginAtuCBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the signal/noise margin for rate upshift, in the case of rate
        adaptive ADSL in 1/10th of a dB.";
```

B.4.65 upShiftSnrMarginAtuR

```
upShiftSnrMarginAtuR ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR upShiftSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAAttribute 65 };

upShiftSnrMarginAtuRBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the signal/noise margin for rate upshift, in the case of rate
        adaptive ADSL in 1/10th of a dB.";
```

B.4.66 upThreshold

```
upThreshold ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
    MATCHES FOR EQUALITY, ORDERING;
    BEHAVIOUR upThresholdBeh;
REGISTERED AS { adslfNMAAttribute 66 };

upThresholdBeh BEHAVIOUR
    DEFINED AS
        "This attribute indicates the minimum amount by which the rate must increase since the last
        notification in order to issue a new rate change notification. It is specified in kbps.";
```

B.4.67 configuredChannelTypes

```
configuredChannelTypes ATTRIBUTE
    WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslChannelOptions;
    MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
    BEHAVIOUR configuredChannelTypesBeh;
REGISTERED AS { adslfNMAAttribute 67 };

configuredChannelTypesBeh BEHAVIOUR
    DEFINED AS
        "This attribute controls which channel type(s) are to be configured.      (noChannel,
        fastOnly, interleavedOnly, fastAndInterleaved)";
```


B.4.68 lowPowerDataRateAtuC

```
lowPowerDataRateAtuC ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR lowPowerDataRateAtuCBeh;
REGISTERED AS { adslfNMAttribute 68 };

lowPowerDataRateAtuCBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the L1 (low-power/power-down) state transmit bit-rate for the
    ATU-C in kbps.";
```

B.4.69 lowPowerDataRateAtuR

```
lowPowerDataRateAtuR ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
  MATCHES FOR EQUALITY, ORDERING;
  BEHAVIOUR lowPowerDataRateAtuRBeh;
REGISTERED AS { adslfNMAttribute 69 };

lowPowerDataRateAtuRBeh BEHAVIOUR
  DEFINED AS
    "This attribute configures the L1 (low-power/power-down) state transmit bit-rate for the
    ATU-R in kbps.";
```

B.4.70 adslChannelCodeViolations

```
adslChannelCodeViolations ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslChannelCodeViolationsBeh;
REGISTERED AS { adslfNMAttribute 70 };

adslChannelCodeViolationsBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of crc-8 anomalies occurring in the data stream
    associated with this channel.";
```

B.4.71 adslChannelTTPId

```
adslChannelTTPId ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.NameType;
  MATCHES FOR EQUALITY;
  BEHAVIOUR adslChannelTTPIdBeh;
REGISTERED AS { adslfNMAttribute 71 };

adslChannelTTPIdBeh BEHAVIOUR
  DEFINED AS
    "This attribute is the object instance identifier for the adslChannelTTP.";
```

B.5 Notifications

B.5.1 initFailedNotification

```
initFailedNotification NOTIFICATION
  BEHAVIOUR initFailedNotificationBeh;
  WITH INFORMATION SYNTAX AdslfMIBMod.AdslInitFailedInfo
  AND ATTRIBUTE IDS
    probableCause ProbableCause,
    notificationIdentifier NotificationIdentifier;
REGISTERED AS { adslfNMNotification 1 };

initFailedNotificationBeh BEHAVIOUR
  DEFINED AS
    "This notification is sent when the ATU-C cannot initialize the ATU-R, and the value of the
    initFailedNotificationSwitch attribute is TRUE (on). The probableCause attribute indicates reason
    for initialization failure.";
```

B.5.2 rateChangeNotification

```

rateChangeNotification NOTIFICATION
  BEHAVIOUR rateChangeNotificationBeh;
  WITH INFORMATION SYNTAX AdslfMIBMod.AdslfRateChangeInfo
  AND ATTRIBUTE IDS
    oldRate      Integer,
    newRate      Integer,
    notificationIdentifier NotificationIdentifier;
REGISTERED AS { adslfNMNotification 2 };

rateChangeNotificationBeh BEHAVIOUR
  DEFINED AS
    "This notification is sent for Fast and Interleaved channels in the following cases:
    Rate increased since last notification by more than the 'upThreshold' value.
    Rate decreased since last notification by more than the 'downThreshold' value.";

```

B.6 Type definitions

```

AdslfMIBMod {1 3 6 1 4 1 adslForum(3561) adslForumNetworkManagement(1) adslfLineMIB(1)
informationModel(0) asn1Module(2) adslfMIBMod(0)}

DEFINITIONS IMPLICIT TAGS ::= BEGIN

-- exports everything

IMPORTS
Boolean,
NameType,
PointerOrNull,
ProblemCause
FROM ASN1DefinedTypesModule {ccitt recommendation m(13) gnm(3100) informationModel(0) asn1Modules(2)
asn1DefinedTypesModule(0) }
DistinguishedName,
RelativeDistinguishedName
FROM InformationFramework {joint-iso-ccitt ds(5) modules(1) informationFramework(1)}
EventTypeId,
ObjectInstance
FROM CMIP-1 {joint-iso-ccitt ms(9) cmip(1) modules(0) protocol(3)}
AdministrativeState,
AttributeList,
ProbableCause,
SimpleNameType
FROM Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2(2) asn1Module(2) 1};

adslfNMInformationModel
OBJECT IDENTIFIER ::= {1 3 6 1 4 1 adslForum(3561) adslForumNetworkManagement(1) adslfLineMIB(1)
informationModel(0)}
adslfNMStandardSpecificExtension
  OBJECT IDENTIFIER ::= {adslfNMInformationModel 0}
adslfNMObjectClass
  OBJECT IDENTIFIER ::= {adslfNMInformationModel 3}
adslfNMPackage
  OBJECT IDENTIFIER ::= {adslfNMInformationModel 4}
adslfNMAttribute
  OBJECT IDENTIFIER ::= {adslfNMInformationModel 5}
adslfNMNameBinding
  OBJECT IDENTIFIER ::= {adslfNMInformationModel 6}
adslfNMAction
  OBJECT IDENTIFIER ::= {adslfNMInformationModel 7}
adslfNMNotification
  OBJECT IDENTIFIER ::= {adslfNMInformationModel 8}

-- default value definitions
booleanFalseDefault Boolean ::= FALSE
booleanTrueDefault Boolean ::= TRUE
integerZero INTEGER ::= 0

-- Additional probableCause Definitions
adslfNMProbableCause
  OBJECT IDENTIFIER ::= {adslfNMStandardSpecificExtension 0}
lossOfPower
  ProbableCause ::= globalValue : {adslfNMProbableCause 1}
lossOfLink
  ProbableCause ::= globalValue : {adslfNMProbableCause 2}

```

```

lossOfSignalQuality
    ProbableCause ::= globalValue : {adslfNMProbableCause 3}
dataInitFailure
    ProbableCause ::= globalValue : {adslfNMProbableCause 4}
configInitFailure
    ProbableCause ::= globalValue : {adslfNMProbableCause 5}
protocolInitFailure
    ProbableCause ::= globalValue : {adslfNMProbableCause 6}
noPeerAtuPresent
    ProbableCause ::= globalValue : {adslfNMProbableCause 7}

-- Additional eventTypes Definitions
adslfNMEventTypes
    OBJECT IDENTIFIER ::= {adslfNMStandardSpecificExtension 1}

-- Supporting productions

AdslAvailabilityStatus ::= SET OF AdslLineCondition

AdslChannelOptions ::= ENUMERATED {
    noChannels      (0),
    fastOnly        (1),
    interleavedOnly (2),
    fastOrInterleaved (3),
    fastAndInterleaved (4)}

AdslChannelType ::= ENUMERATED {
    fast      (0),
    interleaved (1)}

AdslInitFailedInfo ::= SEQUENCE {
    probableCause      ProbableCause,
    notificationIdentifier NotificationIdentifier OPTIONAL}

AdslLineCoding ::= ENUMERATED {
    other      (0),
    dmt (1),
    cap (2),
    qam (3)}

AdslLineCondition ::= ENUMERATED {
    lossOfFraming      (0),
    lossOfSignal       (1),
    lossOfPower        (2),
    lossOfLink         (3),
    lossOfSignalQuality (4),
    dataInitFailure    (5),
    configInitFailure  (6),
    protocolInitFailure (8),
    noPeerAtuPresent   (9),
    lowPowerMode       (10)}

-- ADSL modem Operational Mode
AdslOperationalMode ::= ENUMERATED {
    ansi      (0), -- ANSI T1.413
    etsi      (1), -- ETSI DTS/TM06006
    potsNonOverlapped (2), -- ITU G.992.1 POTS non-overlapped
    potsOverlapped (3), -- ITU G.992.1 POTS overlapped
    isdnNonOverlapped (4), -- ITU G.992.1 ISDN non-overlapped
    isdnOverlapped (5), -- ITU G.992.1 ISDN overlapped
    isdnTcm (6), -- ITU G.992.1 with TCM-ISDN
    potsNonOverlappedLite (7), -- ITU G.992.2 POTS non-overlapped
    potsOverlappedLite (8), -- ITU G.992.2 POTS overlapped
    isdnTcmLite (9)} -- ITU G.992.2 with TCM-ISDN

AdslOperationalModes ::= SET OF AdslOperationalMode

AdslRateChangeInfo ::= SEQUENCE {
    oldRate      Integer,
    newRate      Integer,
    notificationIdentifier NotificationIdentifier OPTIONAL}

AdslRateMode ::= ENUMERATED {
    fixed      (0),
    adaptAtStartup (1),
    adaptAtRuntime (2)}

Integer ::= INTEGER

```

NotificationIdentifier ::= INTEGER

END

B.7 Required GDMO/ASN.1 syntax corrections

The corrections listed hereafter should be performed on the GDMO and ASN.1 definitions specified in ADSL Forum TR-028 [1] in order to guarantee a right syntactic compilation.

B.7.1 General

- Replace the quotation marks style ' " ' with the style ' " ' in all the GDMO/ASN.1
- Replace 'Recommendation Q.822 ' with 'Rec. Q.822 ' in all the GDMO/ASN.1
- Replace 'Recommendation X.739 ' with 'Rec. X.739 ' in all the GDMO/ASN.1
- Replace '"Rec. M.3100":attributeValueChangeNotificationsPackage ' with '"Rec. M.3100":attributeValueChangeNotificationPackage ' in all the GDMO/ASN.1
- Define the following missing attribute:

```
adslFecs ATTRIBUTE
  DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2":counter;
  BEHAVIOUR adslFecsBeh;
REGISTERED AS { adslfNMAAttribute 72 };
```

```
adslFecsBeh BEHAVIOUR
  DEFINED AS
    "This attribute indicates the count of FEC events.";
```

- The package adslChannelCodeViolationsRecordPkg is duplicated and the package adslFecsRecordPkg is missing. Redefine one of the adslChannelCodeViolationsRecordPkg as:

```
adslFecsRecordPkg PACKAGE
  ATTRIBUTES
    adslFecs
  GET;
REGISTERED AS { adslfNMPackage 39 };
```

B.7.2 Managed object class adslChannelTTPCurrentData

- Replace '"Rec. Q822":thresholdPkg, ' with '"Rec. Q.822":thresholdPkg, '
- Replace 'adslChannelRvcBlocksPkg ' with 'adslChannelRvcBlocksPkg '

B.7.3 Managed object class adslChannelTTPHistoryData

- Replace '"Rec. X.721 | ISO/IEC 10165-2":objectDeleteNotificationPkg, ' with '"Rec. Q.822":objectDeleteNotificationPkg, '
- Replace 'adslChannelRvcBlocksRecordPkg ' with 'adslChannelRvcBlocksRecordPkg '

B.7.4 Managed object class adslConfigurationProfile

- Add a comma at the end of the sentence:

```
rateChangeRatioPkg
  PRESENT IF "Rate adaptive ADSL mode is available , and, both Fast and Interleaved channels are supported at the same time"
```

B.7.5 Managed object class adslLineTTP

- Replace '"Rec. M.3100":stateChangeNotificationsPackage ' with '"Rec. M.3100":stateChangeNotificationPackage '

B.7.6 Managed object class adslLineTTPHistoryData

- Replace '"Rec. X.721 | ISO/IEC 10165-2":objectDeleteNotificationPkg, ' with '"Rec. Q.822":objectDeleteNotificationPkg, '

B.7.7 Name binding adslConfigurationProfile-managedElementR1

- Replace 'NAMED BY SUPERIOR OBJECT CLASS managedElementR1; ' with 'NAMED BY SUPERIOR OBJECT CLASS "Rec. M.3100":managedElementR1; '

B.7.8 Package adslFecsPkg

- Redefine it as:

```
adslFecsPkg PACKAGE
  ATTRIBUTES
    adslFecs
      REPLACE-WITH-DEFAULT
      DEFAULT VALUE AdslfMIBMod.integerZero
      GET;
  REGISTERED AS { adslfNMPackage 38 };
```

B.7.9 Attribute adslChannelCorrectedBlocks

- Replace 'adslChannelCorrectedBeh ' with 'adslChannelCorrectedBlocksBeh '

B.7.10 Attribute adslChannelUncorrectedBlocks

- Replace 'adslChannelUncorrectedBeh ' with 'adslChannelUncorrectedBlocksBeh '

B.7.11 Attribute configuredChannelTypes

- Remove the properties **SET-COMPARISON** and **SET-INTERSECTION** as they do not match with the ASN.1 syntax of this attribute

B.7.12 Attribute supportedChannelTypes

- Remove the properties **SET-COMPARISON** and **SET-INTERSECTION** as they do not match with the ASN.1 syntax of this attribute

B.7.13 Notification initFailedNotification

- Replace:

```
AND ATTRIBUTE IDS
  probableCause      ProbableCause,
  notificationIdentifier  NotificationIdentifier;
```

with:

```
AND ATTRIBUTE IDS
  probableCause      "Rec. X.721 | ISO/IEC 10165-2":probableCause,
  notificationIdentifier  "Rec. X.721 | ISO/IEC 10165-2":notificationIdentifier;
```

B.7.14 Notification rateChangeNotification

- Replace:

```
AND ATTRIBUTE IDS
  oldRate      Integer,
  newRate      Integer,
  notificationIdentifier  NotificationIdentifier;
```

with:

```
AND ATTRIBUTE IDS
  oldRate      integer,
  newRate      integer,
  notificationIdentifier "Rec. X.721 | ISO/IEC 10165-2":notificationIdentifier;
```

- And define the new attribute:

```
integer ATTRIBUTE
  WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
REGISTERED AS { adslfNMAttribute 73 };
```

B.7.15 Type definitions

- Delete the following ASN.1 type:

```
NotificationIdentifier ::= INTEGER
```

- Add the ASN.1 type NotificationIdentifier to the imports from Attribute-ASN1Module, remaining:

```
AdministrativeState,
AttributeList,
NotificationIdentifier,
ProbableCause,
SimpleNameType
FROM Attribute-ASN1Module {joint-iso-ccitt ms(9) smi(3) part2(2) asn1Module(2) 1};
```

Annex C (informative): Bibliography

- ITU-T Recommendation G.992.1: "Asymmetric digital subscriber line (ADSL) transceivers".
- ITU-T Recommendation G.997.1: "Physical layer management for digital subscriber line (DSL) transceivers".
- ITU-T Recommendation M.3100: "Generic network information model".
- ITU-T Recommendation M.3200: "TMN management services and telecommunications managed areas: Overview".
- ITU-T Recommendation M.3400: "TMN Management Functions".
- ITU-T Recommendation Q.821: "Stage 2 and Stage 3 description for the Q3 interface - Alarm Surveillance".
- ITU-T Recommendation Q.822: "Stage 1, stage 2 and stage 3 description for the Q3 interface - Performance management".
- ITU-T Recommendation X.680: "Information technology - Abstract Syntax Notification One (ASN.1): Specification of basic notation".
- ITU-T Recommendation X.701: "Information technology - Open Systems Interconnection - System management overview".
- ITU-T Recommendation X.721: "Information technology - Open Systems Interconnection - Structure of management information: Definition of management information".
- ITU-T Recommendation X.722: "Information technology - Open systems interconnection - Structure of Management Information: Guidelines for definition of managed objects".
- ITU-T Recommendation X.733: "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".
- ITU-T Recommendation X.734: "Information technology - Open Systems Interconnection - Systems Management: Event report management function".
- ITU-T Recommendation X.735: "Information technology - Open Systems Interconnection - Systems Management: Log control functions".
- ITU-T Recommendation X.737: "Information technology - Open Systems Interconnection - Systems management: Confidence and diagnostic test function".
- ITU-T Recommendation X.738: "Information technology - Open Systems Interconnection - Systems management: Summarization function".
- ITU-T Recommendation X.739: "Information technology - Open Systems Interconnection - Systems Management: Metric objects and attributes".
- ITU-T Recommendation X.745: "Information technology - Open Systems Interconnection - Systems Management: Test management function".
- ITU-T Recommendation X.746: "Information technology - Open Systems Interconnection - Systems Management: Scheduling function".
- ISO/IEC 10165-2: "Information technology - Open Systems Interconnection - Structure of management information: Definition of management information".
- ANSI T1.413: "Network to Customer Installation Interfaces - Asymmetric Digital Subscriber Line (ADSL) Metallic Interface".
- ITU-T Recommendation G.992.2: "Splitterless asymmetric digital subscriber line (ADSL) transceivers".

- ETSI 101 388: "Transmission and Multiplexing (TM); Access transmission systems on metallic access cables; Asymmetric Digital Subscriber Line (ADSL) - Coexistence of ADSL and ISDN-BA on the same pair [ANSI T1.413 - 1998, modified]".

History

Document history		
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