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SECTOR DE NORMALIZACIÓN
DE LAS TELECOMUNICACIONES
DE LA UIT

SERIE Q: CONMUTACIÓN Y SEÑALIZACIÓN

Interfaz Q3

Línea de abonado digital asimétrica – Gestión de elementos de red: Modelo de protocolo común de información de gestión

Recomendación UIT-T Q.833.1

RECOMENDACIONES UIT-T DE LA SERIE Q

CONMUTACIÓN Y SEÑALIZACIÓN

SEÑALIZACIÓN EN EL SERVICIO MANUAL INTERNACIONAL	Q.1–Q.3
EXPLOTACIÓN INTERNACIONAL SEMIAUTOMÁTICA Y AUTOMÁTICA	Q.4–Q.59
FUNCIONES Y FLUJOS DE INFORMACIÓN PARA SERVICIOS DE LA RDSI	Q.60–Q.99
CLÁUSULAS APLICABLES A TODOS LOS SISTEMAS NORMALIZADOS DEL UIT-T	Q.100–Q.119
ESPECIFICACIONES DE LOS SISTEMAS DE SEÑALIZACIÓN N.° 4 Y N.° 5	Q.120–Q.249
ESPECIFICACIONES DEL SISTEMA DE SEÑALIZACIÓN N.° 6	Q.250–Q.309
ESPECIFICACIONES DEL SISTEMA DE SEÑALIZACIÓN R1	Q.310–Q.399
ESPECIFICACIONES DEL SISTEMA DE SEÑALIZACIÓN R2	Q.400–Q.499
CENTRALES DIGITALES	Q.500–Q.599
INTERFUNCIONAMIENTO DE LOS SISTEMAS DE SEÑALIZACIÓN	Q.600–Q.699
ESPECIFICACIONES DEL SISTEMA DE SEÑALIZACIÓN N.° 7	Q.700–Q.799
INTERFAZ Q3	**Q.800–Q.849**
SISTEMA DE SEÑALIZACIÓN DIGITAL DE ABONADO N.° 1	Q.850–Q.999
RED MÓVIL TERRESTRE PÚBLICA	Q.1000–Q.1099
INTERFUNCIONAMIENTO CON SISTEMAS MÓVILES POR SATÉLITE	Q.1100–Q.1199
RED INTELIGENTE	Q.1200–Q.1699
REQUISITOS Y PROTOCOLOS DE SEÑALIZACIÓN PARA IMT-2000	Q.1700–Q.1799
RED DIGITAL DE SERVICIOS INTEGRADOS DE BANDA ANCHA (RDSI-BA)	Q.2000–Q.2999

Para más información, véase la Lista de Recomendaciones del UIT-T.

Recomendación UIT-T Q.833.1

Línea de abonado digital asimétrica – Gestión de elementos de red: Modelo de protocolo común de información de gestión

Resumen

Esta Recomendación especifica la interfaz Q3 entre una red de acceso de banda ancha basada en la tecnología de línea de abonado digital asimétrica (ADSL) y la red de gestión de las telecomunicaciones.

Orígenes

La Recomendación UIT-T Q.833.1, preparada por la Comisión de Estudio 4 (2001-2004) del UIT-T, fue aprobada por el procedimiento de la Resolución 1 de la AMNT el 19 de enero de 2001.

PREFACIO

La UIT (Unión Internacional de Telecomunicaciones) es el organismo especializado de las Naciones Unidas en el campo de las telecomunicaciones. El UIT-T (Sector de Normalización de las Telecomunicaciones de la UIT) es un órgano permanente de la UIT. Este órgano estudia los aspectos técnicos, de explotación y tarifarios y publica Recomendaciones sobre los mismos, con miras a la normalización de las telecomunicaciones en el plano mundial.

La Asamblea Mundial de Normalización de las Telecomunicaciones (AMNT), que se celebra cada cuatro años, establece los temas que han de estudiar las Comisiones de Estudio del UIT-T, que a su vez producen Recomendaciones sobre dichos temas.

La aprobación de Recomendaciones por los Miembros del UIT-T es el objeto del procedimiento establecido en la Resolución 1 de la AMNT.

En ciertos sectores de la tecnología de la información que corresponden a la esfera de competencia del UIT-T, se preparan las normas necesarias en colaboración con la ISO y la CEI.

NOTA

En esta Recomendación, la expresión "Administración" se utiliza para designar, en forma abreviada, tanto una administración de telecomunicaciones como una empresa de explotación reconocida de telecomunicaciones.

PROPIEDAD INTELECTUAL

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ÍNDICE

Recomendación UIT-T Q.833.1

Línea de abonado digital asimétrica – Gestión de elementos de red: Modelo de protocolo común de información de gestión

1 Introducción

1.1 Objetivo y alcance

La presente Recomendación especifica la interfaz Q3 entre una red de acceso de banda ancha basada en la tecnología de línea de abonado digital asimétrica (ADSL, *asymmetric digital subscriber line*) y la red de gestión de las telecomunicaciones (RGT). La interfaz especificada se halla entre elementos de red de la RGT o adaptadores Q que hacen interfaz con sistemas de operaciones (OS, *operations systems*) de la RGT sin que nada intervenga entre los OS y los dispositivos de mediación, definidos en UIT-T M.3010 [4].

Donde es posible, se utilizan los protocolos existentes, y el trabajo se centra sobre todo en la definición del modelo de objeto. La definición de la funcionalidad de los sistemas de operaciones de la RGT queda fuera del alcance de la presente Recomendación.

También queda fuera del ámbito de aplicación de esta Recomendación la gestión de la seguridad.

2 Referencias

Las siguientes Recomendaciones del UIT-T y otras referencias contienen disposiciones que, mediante su referencia en este texto, constituyen disposiciones de la presente Recomendación. Al efectuar esta publicación, estaban en vigor las ediciones indicadas. Todas las Recomendaciones y otras referencias son objeto de revisiones por lo que se preconiza que los usuarios de esta Recomendación investiguen la posibilidad de aplicar las ediciones más recientes de las Recomendaciones y otras referencias citadas a continuación. Se publica periódicamente una lista de las Recomendaciones UIT-T actualmente vigentes.

[1] UIT-T G.992.1 (1999), *Transceptores de línea de abonado digital asimétrica.*

[2] UIT-T G.997.1 (1999), *Gestión de capa física para transceptores de línea de abonado digital.*

[3] UIT-T I.751 (1996), *Gestión desde el punto de vista del elemento de red en el modo de transferencia asíncrono.*

[4] UIT-T M.3010 (2000), *Principios para una red de gestión de las telecomunicaciones.*

[5] UIT-T M.3100 (1995), *Modelo genérico de información de red.*

[6] UIT-T X.733 (1992) | ISO/CEI 10164-4: 1992, *Tecnología de la información – Interconexión de sistemas abiertos – Gestión de sistemas: Función señaladora de alarmas.*

[7] Informe Técnico del Foro ADSL, TR-028 (1999), *CMIP Specification for ADSL Network Element Management*.

3 Definiciones, abreviaturas y convenios

3.1 Definiciones

En esta Recomendación se definen los términos siguientes:

3.1.1 red de acceso: Conjunto de equipos de red que proporcionan capacidad de transporte para la prestación de servicios de telecomunicaciones entre una interfaz de nodo de servicio (SNI) y una o más interfaces usuario-red (UNI) asociadas. La señalización de usuario la lleva de manera transparente la AN.

3.1.2 cliente: Persona u organización que utiliza los servicios prestados por el proveedor de red o el proveedor de servicio. Un cliente puede ser también un proveedor de servicio.

3.1.3 red de comunicaciones de datos: Se refiere a la red de comunicaciones de gestión que se necesita para transferir información de gestión entre funciones de sistemas de operaciones (OSF) y entre las OSF y los elementos de red (NE).

3.1.4 medio de derivación: Se refiere a la red utilizada para transportar servicios en un formato común del nodo distante a la terminación de red.

3.1.5 capa de gestión de elementos: Funciones de gestión de elementos (EM) que gestionan los recursos físicos que residen en la red de acceso. Funciones de gestión típicas a este nivel son la configuración, la gestión de averías y la supervisión de la calidad de funcionamiento. De las funciones EM depende la comprensión de los detalles de la tecnología y los equipos de transmisión, eliminando así la necesidad de que esta compleja información sea retenida por funciones de gestión de capa más altas.

3.1.6 sistema de gestión de elementos/red/servicios: Conjunto de funciones de una capa determinada implementadas en una plataforma física.

3.1.7 alimentador ampliado: Proporciona los recursos físicos que permiten ampliar la AN a distancias mayores. Los recursos físicos no alterarán la transmisión por la SNI y requerirán una gestión mínima. No se considera que forme parte del elemento de red.

3.1.8 capa de elementos de red: Se refiere a los recursos físicos que residen en la red de acceso.

3.1.9 capa de gestión de red: Funciones de gestión de red (NM) que coordinan la gestión de los elementos de red para proporcionar un trayecto de usuario a usuario o de nodo de servicio a usuario que permita el transporte de servicios de telecomunicaciones. Las funciones NM coordinan múltiples OSF de gestión de elementos (EM) haciendo posible así una supervisión de red global.

3.1.10 terminación de red: Recurso físico que reside en las instalaciones del cliente y constituye la frontera de la red de acceso (UNI). Permite la transmisión de servicios por el cableado de los edificios hasta el equipo situado en las instalaciones del cliente.

3.1.11 función de sistema de operaciones: Conjunto de funciones similares que proporcionan niveles diferentes de capacidad de gestión. Se definen cuatro capas de capacidad de gestión: la de elemento de red (NE, *network element*), la de gestión de elementos (EM, *element management*), la de gestión de red (NM, *network management*) y la de gestión de servicios (SM, *service management*). Cada una de esas capas proporciona servicios de gestión a la capa situada por encima de ella.

3.1.12 capa de gestión de servicios: Las funciones de gestión de servicios (SM) gestionan los servicios que soporta la red. A estas funciones no les afecta la naturaleza física de la red. Funciones típicas de esta capa son la creación y prestación de servicios, la cesación de esa prestación y la provisión de información sobre facturación y contabilidad al respecto.

3.1.13 nodo de servicio: Elemento de red que permite el acceso a diversos servicios de telecomunicaciones conmutados y/o permanentes. En el caso de servicios conmutados, el nodo de

servicio proporciona funciones de control de llamada, control de conexión, y tratamiento de recursos.

3.1.14 usuario: Persona experta que interactúa con el sistema de gestión.

3.2 Abreviaturas

En esta Recomendación se utilizan las siguientes siglas:

AAL Capa de adaptación ATM *(ATM adaptation layer)*

ADSL Línea de abonado digital asimétrica *(asymmetric digital subscriber line)*

AIS Señal de indicación de alarma *(alarm indication signal)*

AN Red de acceso *(access network)*

ASN.1 Notación de sintaxis abstracta uno *(abstract syntax notation one)*

ATM Modo de transferencia asíncrono *(asynchronous transfer mode)*

EML Capa de gestión de elemento *(element management layer)*

ERD Diagrama de relaciones entre entidades *(entity relationship diagram)*

GDMO Directrices para la definición de objetos gestionados *(guidelines for the definition of managed objects)*

MIB Base de información de gestión *(management information base)*

MOC Clase de objeto gestionado *(managed object class)*

NEL Capa de elemento de red *(network element layer)*

NML Capa de gestión de red *(network management layer)*

NT Terminación de red *(network termination)*

OAM Operaciones, administración y mantenimiento *(operations, administration and maintenance)*

OS Sistema de operaciones *(operations system)*

OSF Función de sistema de operaciones *(operations system function)*

RCD Red de comunicación de datos

RDI Indicación de defecto distante *(remote defect indication)*

RDN Nombre distinguido relativo *(relative distinguished name)*

RGT Red de gestión de las telecomunicaciones

SDH Jerarquía digital síncrona *(synchronous digital hierarchy)*

SML Capa de gestión de servicios *(service management layer)*

SN Nodo de servicio *(service node)*

SNI Interfaz de nodo de servicio *(service node interface)*

TTP Punto de terminación de camino *(trail termination point)*

UNI Interfaz usuario-red *(user network interface)*

VC Canal virtual *(virtual channel)*

VDSL Línea de abonado digital de velocidad muy alta *(very high speed digital subscriber line)*

VP Trayecto virtual *(virtual path)*

VPC Conexión de trayecto virtual *(virtual path connection)*

VPCI Identificador de conexión de trayecto virtual *(virtual path connection identifier)*

3.3 Convenios

Los nombres de los objetos y sus características y la ASN.1 asociada que aquí se definen se escriben con su letra inicial en mayúscula para indicar el comienzo de la palabra siguiente, y los acrónimos se tratan como si fueran palabras.

En toda esta Recomendación, la denominación de los nuevos atributos se efectúa de acuerdo con las siguientes directrices:

- El nombre de un atributo finaliza con la cadena "Ptr" si, y solamente si, el valor del atributo está destinado a identificar un sólo objeto.
- El nombre de un atributo termina con la cadena "PtrList" si, y solamente si, el valor del atributo está destinado a identificar uno o más objetos.
- El nombre de un atributo se compone del nombre de una clase de objeto seguido de la cadena "Ptr" si, y solamente si, el valor del atributo está destinado a identificar una determinada clase de objeto.
- Si un atributo está destinado a identificar diferentes clases de objetos, se le da un nombre descriptivo y en el comportamiento del atributo se proporciona una descripción.
- El nombre de un atributo finaliza con la cadena "Id" si, y solamente si, el valor del atributo está destinado a identificar el nombre de un objeto, en cuyo caso este atributo deberá ser el primer indicado, deberá utilizar el NameType de la ASN.1, y no se deberá utilizar para llevar otra información.
- El nombre de un atributo se compone del nombre de una clase de objeto seguido de la cadena "Id" si, y solamente si, el valor del atributo está destinado a identificar el nombre de la clase de objeto que tiene ese atributo.

4 Visión general

Los siguientes diagramas del modelo de información tienen por finalidad aclarar las relaciones entre las diferentes clases de objeto del modelo:

1) Diagramas de modelo de relaciones entre entidades, que muestran las relaciones entre los diferentes objetos gestionados.
2) Diagramas de jerarquía de herencia, que muestran la forma en que los objetos gestionados se derivan unos de otros (es decir, los diferentes trayectos y las características de los diferentes objetos gestionados que han sido heredados).

Los diagramas sólo tienen por cometido aclarar la exposición. La especificación formal mediante plantillas de las directrices para la definición de objetos gestionados (GDMO) y las definiciones de tipo ASN.1 constituyen la información que interesa a efectos de las implementaciones.

4.1 Modelos de relaciones entre entidades

En los diagramas se utilizan los convenios siguientes (véase la figura 1).

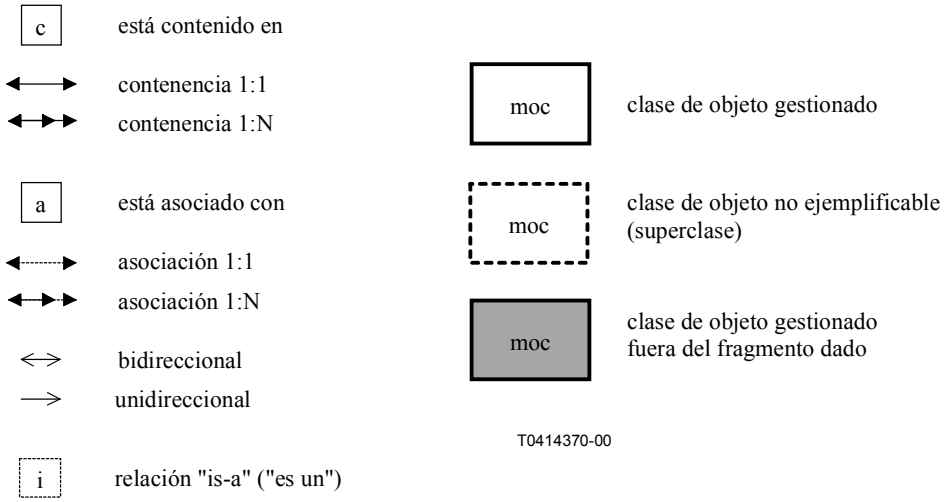

Figura 1/Q.833.1 – Convenios utilizados en los diagramas para los modelos de relaciones entre entidades

Cuando la direccionalidad de la contenencia no esté clara, se puede identificar por implicaciones ya que la clase de raíz es única.

4.1.1 Diagrama de relaciones entre entidades para el fragmento de ADSL

Véase la figura 2.

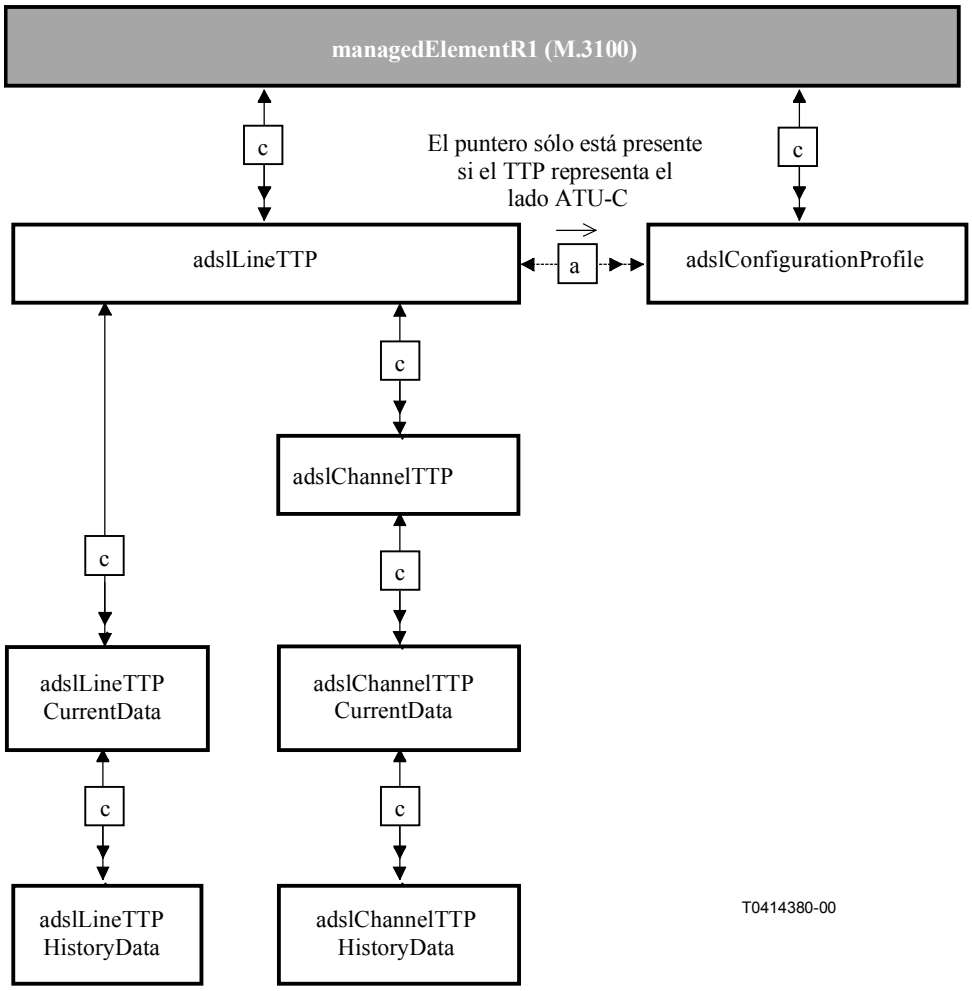

Figura 2/Q.833.1 – Diagrama de relaciones entre entidades – Fragmento de ADSL

4.2 Jerarquía de herencia

Véase la figura 3.

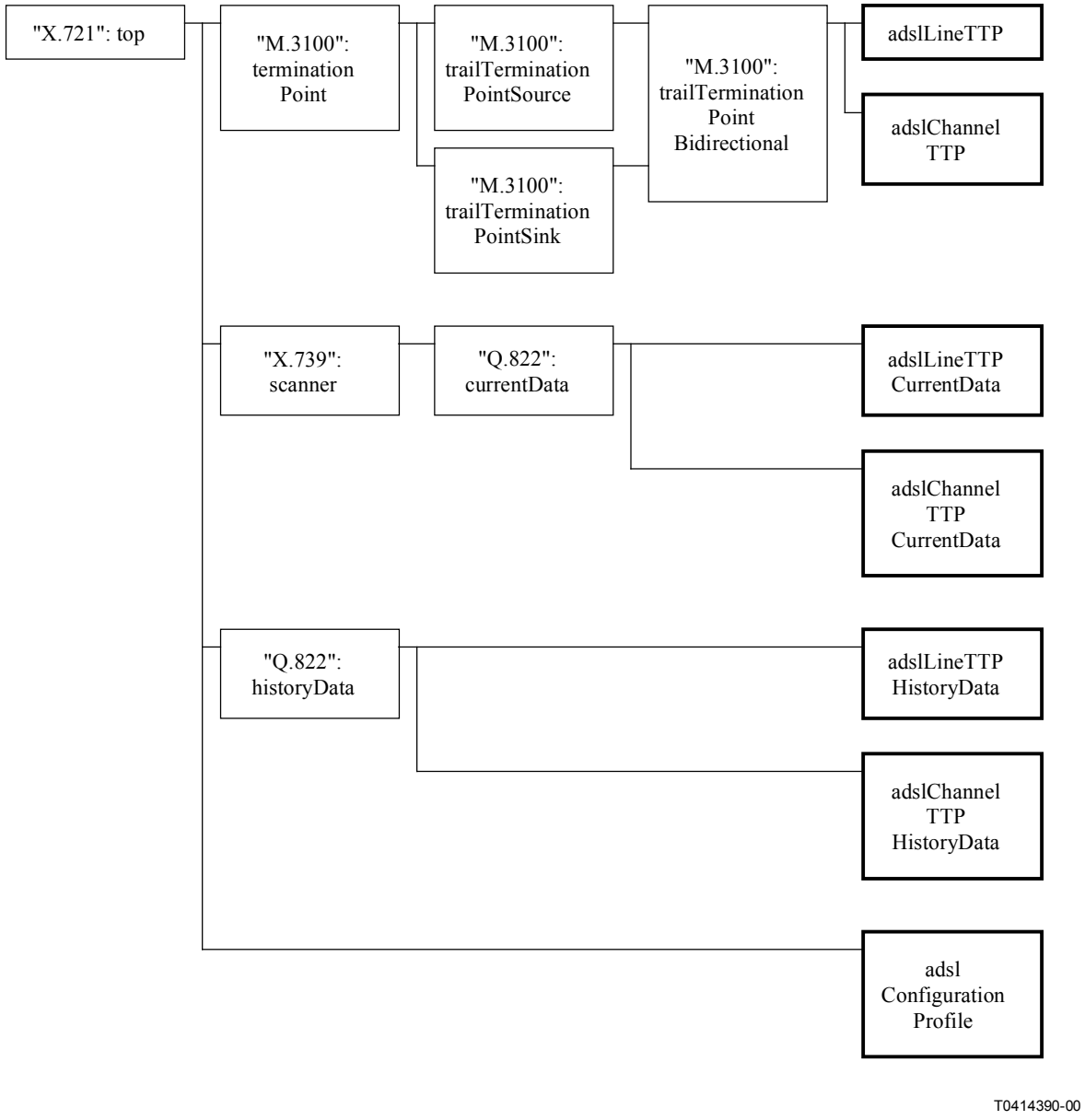

Figura 3/Q.833.1 – Jerarquía de herencia

5 Definiciones formales

En esta cláusula se dan las definiciones formales de las clases de objeto gestionado, vinculaciones de nombre, lotes generales, comportamientos, atributos, acciones y notificaciones.

5.1 Clases de objeto

En esta cláusula se especifican las clases de objeto de todos los objetos gestionados utilizados en el modelo de información de gestión. Esas clases de objeto se definen aquí o bien por referencia a otras especificaciones. Las clases de objeto gestionado que se definen en otro lugar y que sólo se utilizan para contenencia no se incluyen, pero se identifican mediante las vinculaciones de nombre de las clases aquí especificadas.

La siguiente clase, definida en UIT-T M.3100 [5], puede ser ejemplificada:

– managedElementR1.

Todas las clases definidas en el Informe Técnico del Foro ADSL, TR-028 [7] pueden ser ejemplificadas. Son las siguientes:

– adslChannelTTP.
– adslChannelTTPCurrentData.
– adslChannelTTPHistoryData.
– adslConfigurationProfile.
– adslLineTTP.
– adslLineTTPCurrentData.
– adslLineTTPHistoryData.

6 Definiciones de tipos

No se definen tipos adicionales de la ASN.1.

7 Pilas de protocolos

Las pilas de protocolos especificadas en UIT-T Q.811, Q.812 y G.773 y la parte transconexión digital SDH de UIT-T G.784 se pueden utilizar como parte de la pila de protocolos de esta Recomendación. Las Recomendaciones que se indican a continuación deberán utilizarse para ampliar esas pilas para incluir ATM:

– Recomendación Q.2811, interfaces Q3 y X de banda ancha – Protocolos de capa más baja.
– Recomendación Q.2812, interfaces Q3 y X de banda ancha – Protocolos de capa más alta.

ANEXO A

Requisitos de gestión

Este anexo define los requisitos de gestión de alto nivel de la ADSL.

A.1 Configuración

A.1.1 Configuración física

En esta cláusula se definen los requisitos para la configuración de los equipos físicos.

Deberá ser posible añadir, modificar y eliminar los equipos físicos siguientes:

1) un multiplexor ADSL;
2) una bandeja dentro de un multiplexor;
3) una tarjeta en una bandeja;
4) una línea ADSL.

A.1.2 Configuración lógica

En esta cláusula se definen los requisitos para la configuración de las entidades lógicas que tienen características gestionables.

Deberá ser posible añadir, modificar y eliminar las entidades lógicas siguientes:

1) una interfaz de nodo de red;
2) un ATU-C;
3) un ATU-R;
4) un puerto ATM en un ATU-R;
5) una conexión ATM.

A.2 Supervisión de la calidad de funcionamiento

En esta cláusula se definen los requisitos para la supervisión de la calidad de funcionamiento de una ADSL.

A.2.1 Terminaciones de línea ADSL

Deberá ser posible medir y registrar lo siguiente:

1) El número de segundos con una pérdida de trama.
2) El número de segundos con una pérdida de enlace.
3) El número de segundos con una pérdida de señal.
4) El número de segundos con una pérdida de potencia.
5) El número de segundos con errores.
6) El número de segundos con muchos errores.
7) El número de segundos no disponibles.
8) El número de intentos de reacondicionamiento rápido.
9) El número de intentos de reacondicionamiento fallido.
10) El número de segundos con fallo de conexión de error de retransmisión.

A.2.2 Terminaciones de canal ADSL

Deberá ser posible medir y registrar lo siguiente:

1) El número de bloques codificados recibidos.
2) El número de bloques codificados transmitidos.
3) El número de bloques recibidos con errores que fueron corregidos.
4) El número de bloques recibidos con errores no corregibles.
5) El número de anomalías CRC-8 en el canal.

APÉNDICE I

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– Especificación del Foro ATM, *M4 Interface Requirements and Logical MIB: ATM Network Element View, Version 1.0*.

– Especificación del Foro ATM, *CMIP Specification for the M4 Interface, Version 1.0*.

– Especificación del Foro ATM, *ATM User-Network Interface Specification, Version 3.0*.

– Especificación del Foro ATM, *ATM User-Network Interface Specification, Version 3.1*.

– Especificación del Foro ATM, *ATM User-Network Interface Specification, Version 4.0*.

APÉNDICE II

Definiciones referenciadas

Este apéndice contiene las definiciones formales que son importadas de TR-028 [7]. Se indican únicamente por conveniencia y, para el texto normativo, deberá consultarse el TR-028.

II.1 Definiciones de objetos gestionados

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":attributeValueChangeNotificationPackage,
          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).";
```

adslChannelTTPCurrentData

```
adslChannelTTPCurrentData MANAGED OBJECT CLASS
     DERIVED FROM "Rec. Q.822":currentData;
     CHARACTERIZED BY
          "Rec. M.3100":createDeleteNotificationsPackage,
          "Rec. M.3100":attributeValueChangeNotificationPackage,
          "Rec. Q.822":thresholdPkg,
          adslChannelTTPCurrentDataPkg PACKAGE
               BEHAVIOUR adslChannelTTPCurrentDataBeh;;;
          CONDITIONAL PACKAGES
               adslChannelRcvBlocksPkg 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";
```

adslChannelTTPHistoryData

```
adslChannelTTPHistoryData MANAGED OBJECT CLASS
     DERIVED FROM "Rec. Q.822":historyData;
     CHARACTERIZED BY
          "Rec. Q.822":objectDeleteNotificationPkg,
          "Rec. Q.822":historyDataSuspectIntervalFlagPkg,
          adslChannelTTPHistoryDataPkg PACKAGE
               BEHAVIOUR adslChannelTTPHistoryDataBeh;;;
          CONDITIONAL PACKAGES
               adslChannelRcvBlocksRecordPkg 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.";
```

adslConfigurationProfile

```
adslConfigurationProfile MANAGED OBJECT CLASS
     DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2" top;
     CHARACTERIZED BY
          "Rec. M.3100":createDeleteNotificationsPackage,
          "Rec. M.3100":attributeValueChangeNotificationPackage,
          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.";
```

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":attributeValueChangeNotificationPackage,
          "Rec. M.3100":stateChangeNotificationPackage,
          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";
```

adslLineTTPCurrentData

```
adslLineTTPCurrentData MANAGED OBJECT CLASS
     DERIVED FROM "Rec. Q.822":currentData;
     CHARACTERIZED BY
          "Rec. M.3100":createDeleteNotificationsPackage,
          "Rec. M.3100":attributeValueChangeNotificationPackage,
          "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";
```

adslLineTTPHistoryData

```
adslLineTTPHistoryData MANAGED OBJECT CLASS
     DERIVED FROM "Rec. Q.822":historyData;
     CHARACTERIZED BY
          "Rec. Q.822":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.";
```

II.2 Vinculaciones de nombre

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 };
```

adslChannelTTPCurrentData-adslChannelTTP

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

adslChannelTTPHistoryData-adslChannelTTPCurrentData

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

adslConfigurationProfile-managedElementR1

```
adslConfigurationProfile-managedElementR1 NAME BINDING
     SUBORDINATE OBJECT CLASS adslConfigurationProfile;
     NAMED BY SUPERIOR OBJECT CLASS "Rec. M.3100":managedElementR1;
     WITH ATTRIBUTE adslConfigurationProfileId;
     CREATE
          WITH-REFERENCE-OBJECT,
          WITH-AUTOMATIC-INSTANCE-NAMING;
     DELETE
          DELETES-CONTAINED-OBJECTS ;
REGISTERED AS { adslfNMNameBinding 4 };
```

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 };
```

adslLineTTPCurrentData-adslLineTTP

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

adslLineTTPHistoryData-adslLineTTPCurrentData

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

II.3 Lotes

adslChannelCorrectedBlocksPkg

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

adslChannelCorrectedBlocksRecordPkg

```
adslChannelCorrectedBlocksRecordPkg PACKAGE
     ATTRIBUTES
          adslChannelCorrectedBlocks
```

```
               GET;
REGISTERED AS { adslfNMPackage 2 };
```

adslChannelRcvBlocksPkg

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

adslChannelRcvBlocksRecordPkg

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

adslChannelTxBlocksPkg

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

adslChannelTxBlocksRecordPkg

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

adslChannelUncorrectedBlocksPkg

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

adslChannelUncorrectedBlocksRecordPkg

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

adslConfigurationProfilePointerPkg

```
adslConfigurationProfilePointerPkg PACKAGE
     ATTRIBUTES
          adslConfigurationProfilePointer
               GET-REPLACE,
          lineCodeSpecificProfilePointer
               GET-REPLACE;
```

```
REGISTERED AS { adslfNMPackage 9 };
```

adslEssPkg

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

adslEssRecordPkg

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

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 };
```

adslFastRetrainRecordPkg

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

adslLofsPkg

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

adslLofsRecordPkg

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

adslLolsPkg

```
adslLolsPkg PACKAGE
```

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

adslLolsRecordPkg

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

adslLossPkg

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

adslLossRecordPkg

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

adslLprsPkg

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

adslLprsRecordPkg

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

adslSessPkg

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

adslSessRecordPkg

```
adslSessRecordPkg PACKAGE
     ATTRIBUTES
```

```
          adslSess
               GET;
REGISTERED AS { adslfNMPackage 23 };
```

adslUassPkg

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

adslUassRecordPkg

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

allowedOperationalModesPkg

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

currentCrcBLPkg

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

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 };
```

initFailurePkg

```
initFailurePkg PACKAGE
     ATTRIBUTES
          initFailedNotificationSwitch
               GET-REPLACE;
     NOTIFICATIONS
          initFailedNotification;
```

```
REGISTERED AS { adslfNMPackage  29 };
```

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 };
```

interleaveDelayPkg

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

rateAdaptationNotificationPkg

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

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 };
```

rateChangeRatioPkg

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

powerManagementPkg

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

adslChannelCodeViolationsPkg

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

adslChannelCodeViolationsRecordPkg

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

adslFecsPkg

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

adslFecsRecordPkg

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

II.4 Atributos

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";
```

adslChannelCorrectedBlocks

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

adslChannelCorrectedBlocksBeh BEHAVIOUR
     DEFINED AS
          "This attribute indicates the count of all blocks received with an
          error and corrected.";
```

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.";
```

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.";
```

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.";
```

adslChannelUncorrectedBlocks

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

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

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.";
```

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.";
```

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 or more
          crc, one or more los or sef defects).";
```

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.";
```

adslFecs

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

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

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.";
```

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.";
```

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.";
```

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.";
```

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.";
```

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.";
```

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).";
```

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).";
```

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).";
```

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).";
```

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.";
```

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.";
```

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.";
```

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.";
```

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.";
```

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.";
```

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.";
```

currentSnrMargin

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

downShiftSnrMarginAtuC

```
downShiftSnrMarginAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR downShiftSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

downShiftSnrMarginAtuR

```
downShiftSnrMarginAtuR ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR downShiftSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

downThreshold

```
downThreshold ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR downThresholdBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

fastMaxTxRateAtuC

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

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

fastMaxTxRateAtuR

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

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

fastMinTxRateAtuC

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

fastMinTxRateAtuCBeh BEHAVIOUR
     DEFINED AS
          "This attribute configures the minimum transmit rate acceptable for the
```

```
          fast channel in the associated ATU-C in kbps.";
```

fastMinTxRateAtuR

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

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

initFailedNotificationSwitch

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

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

integer

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

interleaveDelay

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

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

interleavedMaxTxRateAtuC

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

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

interleavedMaxTxRateAtuR

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

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

interleavedMinTxRateAtuC

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

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

interleavedMinTxRateAtuR

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

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

lineCodeSpecificProfilePointer

```
lineCodeSpecificProfilePointer ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.PointerOrNull;
     MATCHES FOR EQUALITY ;
     BEHAVIOUR lineCodeSpecificProfilePointerBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

lineCoding

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

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

maxInterleaveDelayAtuC

```
maxInterleaveDelayAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR maxInterleaveDelayAtuCBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

maxInterleaveDelayAtuR

```
maxInterleaveDelayAtuR ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR maxInterleaveDelayAtuRBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

maxSnrMarginAtuC

```
maxSnrMarginAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR maxSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAttribute 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";
```

maxSnrMarginAtuR

```
maxSnrMarginAtuR ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR maxSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

minDownShiftTimeAtuC

```
minDownShiftTimeAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR minDownShiftTimeAtuCBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

minDownShiftTimeAtuR

```
minDownShiftTimeAtuR ATTRIBUTE
```

```
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR minDownShiftTimeAtuRBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

minSnrMarginAtuC

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

minSnrMarginAtuCBeh BEHAVIOUR
     DEFINED AS
          "This attribute configures the minimum acceptable signal/noise margin
          in 1/10th of a dB for the associated ATU-C.";
```

minSnrMarginAtuR

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

minSnrMarginAtuRBeh BEHAVIOUR
     DEFINED AS
          "This attribute indicates the minimum acceptable signal/noise margin in
          1/10th of a dB for the associated ATU-R.";
```

minUpShiftTimeAtuC

```
minUpShiftTimeAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR minUpShiftTimeAtuCBeh;
REGISTERED AS { adslfNMAttribute 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";
```

minUpShiftTimeAtuR

```
minUpShiftTimeAtuR ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR minUpShiftTimeAtuRBeh;
REGISTERED AS { adslfNMAttribute 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";
```

previousChannelRate

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

previousLineRate

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

rateChangeRatioAtuC

```
rateChangeRatioAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR rateChangeRatioAtuCBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

rateChangeRatioAtuR

```
rateChangeRatioAtuR ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR rateChangeRatioAtuRBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

rateModeAtuC

```
rateModeAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslRateMode;
```

```
     MATCHES FOR EQUALITY;
     BEHAVIOUR rateModeAtuCBeh;
REGISTERED AS { adslfNMAttribute 58 };

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

rateModeAtuR

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

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

supportedChannelTypes

```
supportedChannelTypes ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslChannelOptions;
     MATCHES FOR EQUALITY;
     BEHAVIOUR supportedChannelTypesBeh;
REGISTERED AS { adslfNMAttribute 60 };

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

supportedOperationalModes

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

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

targetSnrMarginAtuC

```
targetSnrMarginAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR targetSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

targetSnrMarginAtuR

```
targetSnrMarginAtuR ATTRIBUTE
```

```
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR targetSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

upShiftSnrMarginAtuC

```
upShiftSnrMarginAtuC ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR upShiftSnrMarginAtuCBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

upShiftSnrMarginAtuR

```
upShiftSnrMarginAtuR ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR upShiftSnrMarginAtuRBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

upThreshold

```
upThreshold ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.Integer;
     MATCHES FOR EQUALITY, ORDERING;
     BEHAVIOUR upThresholdBeh;
REGISTERED AS { adslfNMAttribute 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.";
```

configuredChannelTypes

```
configuredChannelTypes ATTRIBUTE
     WITH ATTRIBUTE SYNTAX AdslfMIBMod.AdslChannelOptions;
     MATCHES FOR EQUALITY;
     BEHAVIOUR configuredChannelTypesBeh;
REGISTERED AS { adslfNMAttribute 67 };

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

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.";
```

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.";
```

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.";
```

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.";
```

II.5 Acciones

No hay ninguna definida en la actualidad.

II.6 Notificaciones

initFailedNotification

```
initFailedNotification NOTIFICATION
     BEHAVIOUR initFailedNotificationBeh;
```

```
     WITH INFORMATION SYNTAX AdslfMIBMod.AdslInitFailedInfo
     AND ATTRIBUTE IDS
          probableCause          "Rec. X.721 | ISO/IEC 10165-2":probableCause,
          notificationIdentifier  "Rec. X.721 | ISO/IEC 10165-2":
                                       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 initialzation
          failure.";
```

rateChangeNotification

```
rateChangeNotification NOTIFICATION
     BEHAVIOUR rateChangeNotificationBeh;
     WITH INFORMATION SYNTAX AdslfMIBMod.AdslRateChangeInfo
     AND ATTRIBUTE IDS
          oldRate                integer,
          newRate                integer,
          notificationIdentifier  "Rec. X.721 | ISO/IEC 10165-2":
                                       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.";
```

II.7 Producciones soportadoras

```
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 {uit-t recommendation m(13) gnm(3100)
informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0) }

     DistinguishedName,
     RelativeDistinguishedName
     FROM InformationFramework {joint-iso-uit-t ds(5) modules(1)
informationFramework(1)}

     EventTypeId,
     ObjectInstance
     FROM CMIP-1 {joint-iso-uit-t ms(9) cmip(1) modules(0) protocol(3)}

     AdministrativeState,
     AttributeList,
     NotificationIdentifier,
```

```
     ProbableCause,
     SimpleNameType
     FROM Attribute-ASN1Module {joint-iso-uit-t 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

END
```

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Serie A	Organización del trabajo del UIT-T
Serie B	Medios de expresión: definiciones, símbolos, clasificación
Serie C	Estadísticas generales de telecomunicaciones
Serie D	Principios generales de tarificación
Serie E	Explotación general de la red, servicio telefónico, explotación del servicio y factores humanos
Serie F	Servicios de telecomunicación no telefónicos
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Serie H	Sistemas audiovisuales y multimedios
Serie I	Red digital de servicios integrados
Serie J	Transmisiones de señales radiofónicas, de televisión y de otras señales multimedios
Serie K	Protección contra las interferencias
Serie L	Construcción, instalación y protección de los cables y otros elementos de planta exterior
Serie M	RGT y mantenimiento de redes: sistemas de transmisión, circuitos telefónicos, telegrafía, facsímil y circuitos arrendados internacionales
Serie N	Mantenimiento: circuitos internacionales para transmisiones radiofónicas y de televisión
Serie O	Especificaciones de los aparatos de medida
Serie P	Calidad de transmisión telefónica, instalaciones telefónicas y redes locales
Serie Q	**Conmutación y señalización**
Serie R	Transmisión telegráfica
Serie S	Equipos terminales para servicios de telegrafía
Serie T	Terminales para servicios de telemática
Serie U	Conmutación telegráfica
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