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Definitions of Managed Objects for Very High Speed Digital Subscriber Lines (VDSL) draft-ietf-adslmib-vdsl-08.txt

Status of this Memo

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Abstract

This document defines a Management Information Base (MIB) module for use with network management protocols in the Internet community. In particular, it describes objects used for managing Very high speed Digital Subscriber Line (VDSL) interfaces [T1E1311, T1E1011, T1E1013, ETSI2701, ETSI2702, ITU9931, ITU9971].

This document specifies a MIB module in a manner that is compliant to the SMIv2 (STD 58 [RFC2578, RFC2579, RFC2580]).

Table of Contents

1. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- An overall architecture, described in RFC 2571 [RFC2571].

- Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIv1 and described in STD 16 [RFC1155, RFC1212] and RFC 1215 [RFC1215]. The second version, called SMIv2, is described in STD 58 [RFC2578, RFC2579, RFC2580].

- Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15 [RFC1157]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in RFC 1901 [RFC1901] and RFC 1906 [RFC1906]. The third version of the message protocol is called SNMPv3 and described in RFC 1906 [RFC1906], RFC 2572 [RFC2572] and RFC 2574 [RFC2574].

- Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15 [RFC1157]. A second set of protocol operations and associated PDU formats is described in RFC 1905

[RFC1905].

- A set of fundamental applications described in RFC 2573 [RFC2573] and the view-based access control mechanism described in RFC 2575 [RFC2575].

A more detailed introduction to the current SNMP Management Framework can be found in RFC 2570 [RFC2570].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIv2. The textual conventions used in this MIB module cannot be translated to SMIv1 since the Counter64 type does not exist in SMIv1.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

2. Overview

This document describes an SNMP MIB for managing VDSL Lines. These definitions are based upon the specifications for VDSL as defined in T1E1, ETSI, and ITU documentation [T1E1311, T1E1011, T1E1013, ETSI2701, ETSI2702, ITU9931, ITU9971].

The MIB is located in the MIB tree under MIB 2 transmission, as discussed in the MIB-2 Integration (RFC 2863 [RFC2863]) section of this document.

2.1 Relationship of the VDSL Line MIB to other MIBs

This section outlines the relationship of this MIB with other MIBs described in RFCs. Specifically, IF-MIB as presented RFC 2863 [RFC2863] is discussed.

2.1.1 General IF-MIB Integration (RFC 2863)

The VDSL Line MIB specifies the detailed attributes of a data interface. As such, it needs to integrate with RFC 2863 [RFC2863]. The IANA has assigned the following ifType to VDSL:

```
IANAifType ::= TEXTUAL-CONVENTION
    ...

SYNTAX INTEGER {
    ...
    vdsl(97), -- Very H-speed Digital Subscrib. Loop
    ...
```

```
}
```

Additionally, a VDSL line may contain an optional fast channel and an optional interleaved channel which also integrate into RFC 2863 [RFC2863]. The IANA has assigned the following ifTypes to these channels:

```
IANAifType ::= TEXTUAL-CONVENTION
    ...
SYNTAX INTEGER {
    ...
    interleave (124), -- Interleave channel
    fast (125),       -- Fast channel
    ...
    }
```

2.1.2 Usage of ifTable

The MIB branch identified by this ifType contains tables appropriate for this interface type. Most such tables extend the ifEntry table, and are indexed by ifIndex. For interfaces in systems implementing this MIB, those table entries indexed by ifIndex MUST be persistent.

The following attributes are part of the mandatory ifGeneral group in RFC 2863 [RFC2863], and are not duplicated in the VDSL Line MIB.

ifIndex	Interface index.
ifDescr	See interfaces MIB [RFC2863].
ifType	vdsl(97), interleaved(124), or fast(125)
ifSpeed	Set as appropriate.
ifPhysAddress	This object MUST have an octet string with zero length.
ifAdminStatus	See interfaces MIB [RFC2863].
ifOperStatus	See interfaces MIB [RFC2863].
ifLastChange	See interfaces MIB [RFC2863].
ifName	See interfaces MIB [RFC2863].
ifHighSpeed	Set as appropriate.
ifConnectorPresent	Set as appropriate.

ifLinkUpDownTrapEnable Default to enabled(1).

==========

Figure 1: Use of ifTable Objects

Section 2.3, below, describes the structure of this MIB in relation to ifEntry in greater detail.

2.2 Conventions used in the MIB

2.2.1 Naming Conventions

A. Vtuc -- (VTUC) modem at near (Central) end of line
B. Vtur -- (VTUR) modem at Remote end of line
C. Vtu -- One of either Vtuc or Vtur
D. Curr -- Current
E. Prev -- Previous
F. Atn -- Attenuation
G. ES -- Errored Second
H. SES -- Severely Errored Second
I. UAS -- Unavailable Second
J. LCS -- Line Code Specific
K. Lof -- Loss of Frame
L. Lol -- Loss of Link
M. Los -- Loss of Signal
N. Lpr -- Loss of Power
O. xxxs -- interval of Seconds in which xxx occurs
(e.g., xxx=Lof, Los, Lpr, Lol)
P. Max -- Maximum
Q. Mgn -- Margin
R. Min -- Minimum
S. Psd -- Power Spectral Density
T. Snr -- Signal to Noise Ratio
U. Tx -- Transmit
V. Blks -- Blocks

2.2.2 Textual Conventions

The following textual conventions are defined to reflect the line topology in the MIB (further discussed in the following section) and to define the behavior of the statistics to be maintained by an agent.

o VdslLineCodingType :

Attributes with this syntax identify the line coding used. Specified as an INTEGER, the three values are:

other(1) -- none of the following
mcm(2) -- Multiple Carrier Modulation
scm(3) -- Single Carrier Modulation

- VdslLineEntity :

Attributes with this syntax reference the two sides of a line. Specified as an INTEGER, the two values are:

```
vtuc(1)  -- central site modem
vtur(2)  -- remote site modem
```

2.3 Structure

The MIB is structured into following MIB groups:

o vdslGroup :

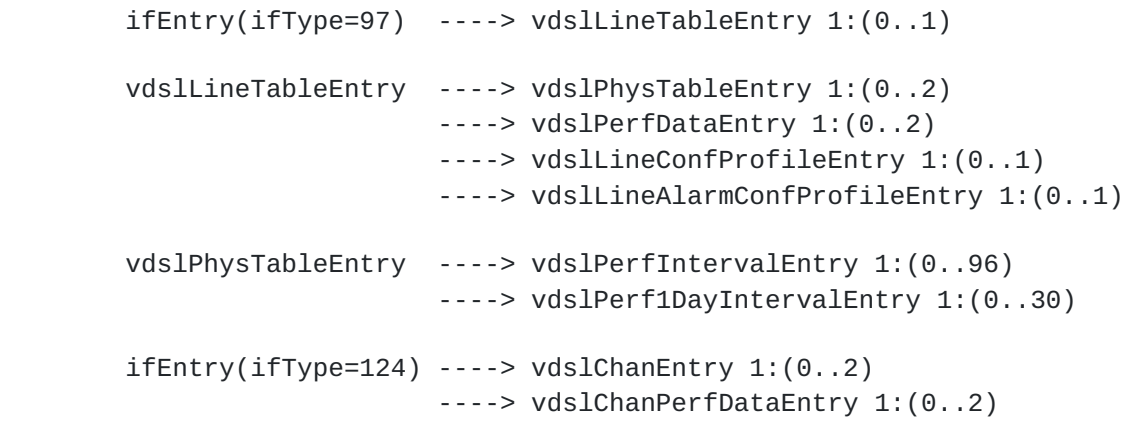
This group supports all line code independent MIB objects found in this MIB. The following tables contain objects permitted for ifType vdsl(97):

- vdslLineTable
- vdslPhysTable
- vdslPerfDataTable
- vdslPerfIntervalTable
- vdslPerf1DayIntervalTable
- vdslLineConfProfileTable
- vdslLineAlarmConfProfileTable

The following tables contain objects permitted for ifTypes interleaved(124) and (fast):

- vdslChanTable
- vdslChanPerfDataTable
- vdslChanPerfIntervalTable
- vdslChanPerf1DayIntervalTable

Figure 2, below, displays the relationship of the tables in the vdslGroup to ifEntry (and each other):



```
      ifEntry(ifType=125) ----> vdslChanEntry 1:(0..2)
                          ----> vdslChanPerfDataEntry 1:(0..2)
```

```
vdslChanEntry      ----> vdslchanPerfIntervalEntry 1:(0..96)
                   ----> vdslchan1DayPerfIntervalEntry 1:(0..30)
```

Figure 2: Table Relationships

2.3.1 Line Topology

A VDSL Line consists of a two units - Vtuc (the central termination unit) and a Vtur (the remote termination unit).

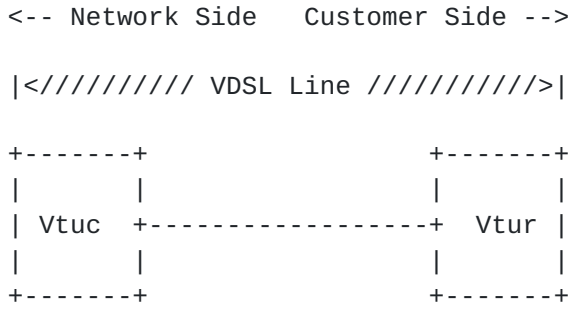


Figure 3: General topology for a VDSL Line

2.4 Counters, Interval Buckets and Thresholds

For Loss of Frame (lof), Loss of Link (lol), Loss of Signal (los), and Loss of Power (lpr), Errored Seconds (ES), Severely Errored Seconds (SES), and Unavailable Seconds (UAS) there are event counters, current 15-minute, 0 to 96 15-minute history bucket(s), and 0 to 30 1-day history bucket(s) of "interval-counters". Each current 15-minute event bucket has an associated threshold notification.

Each of these counters uses the textual conventions defined in the HC-PerfHist-TC-MIB. The HC-PerfHist-TC-MIB is a work-in-progress, but simply defines 64-bit versions of the textual conventions found in RFC 2493 [RFC2493].

There is no requirement for an agent to ensure a fixed relationship between the start of a fifteen minute and any wall clock; however some implementations may align the fifteen minute intervals with quarter hours. Likewise, an implementation may choose to align one day intervals with the start of a day.

Counters are not reset when an Vtu is reinitialized, only when the agent is reset or reinitialized (or under specific request outside the scope of this MIB).

2.5 Profiles

As a managed node can handle a large number of Vtus, (e.g., hundreds or perhaps thousands of lines), provisioning every parameter on every

Vtu may become burdensome. Moreover, most lines are provisioned identically with the same set of parameters. To simplify the provisioning process, this MIB makes use of profiles. A profile is a set of parameters that can be shared by multiple lines using the same configuration.

The following profiles are used in this MIB:

- Line Configuration Profiles - Line configuration profiles contain parameters for configuring VDSL lines. They are defined in the vdslLineConfProfileTable.

- Alarm Configuration Profiles - These profiles contain parameters for configuring alarm thresholds for VDSL modems. These profiles are defined in the vdslLineAlarmConfProfileTable.

One or more lines may be configured to share parameters of a single profile by setting its vdslLineConfProfile objects to the value of this profile. If a change is made to the profile, all lines that refer to it will be reconfigured to the changed parameters. Before a profile can be deleted or taken out of service it must be first unreferenced from all associated lines.

Implementations MUST provide a default profile with an index value of `DEFVAL' for each profile type. The values of the associated parameters will be vendor specific unless otherwise indicated in this document. Before a line's profiles have been set, these profiles will be automatically used by setting vdslLineConfProfile and vdslLineAlarmConfProfile to `DEFVAL' where appropriate. This default profile name, 'DEFVAL', is considered reserved in the context of profiles defined in this MIB.

Profiles are created, assigned, and deleted dynamically using the profile name and profile row status in each of the ten profile tables (nine line configuration tables and one alarm configuration table).

Profile changes MUST take effect immediately. These changes MAY result in a restart (hard reset or soft restart) of the units on the line.

2.6 Notifications

The ability to generate the SNMP notifications coldStart/WarmStart (per [RFC2863]) which are per agent (e.g., per Digital Subscriber Line Access Multiplexer, or DSLAM, in such a device), and linkUp/linkDown (per [RFC2863]) which are per interface (i.e., VDSL line) is required.

The notifications defined in this MIB are for initialization failure

and for the threshold crossings associated with the following events: lof, lol, los, lpr, ES, SES, and UAS. Each threshold has its own

enable/threshold value. When that value is 0, the notification is disabled.

A linkDown notification MAY be generated whenever any of lof, lol, los, lpr, ES, SES, or UAS threshold crossing event (as defined in this MIB) occurs. The corresponding linkUp notification MAY be sent when all link failure conditions are cleared.

The vdslCurrStatus is a bitmask representing all outstanding error conditions associated with a particular VDSL modem. Note that since status of remote modems is obtained via the EOC, this information may be unavailable for units that are unreachable via EOC during a line error condition. Therefore, not all conditions may always be included in its current status. Notifications corresponding to the bit fields in this object are defined.

A threshold notification occurs whenever the corresponding current 15-minute interval error counter becomes equal to, or exceeds the threshold value. One notification may be sent per interval per interface. Since the current 15-minute counter are reset to 0 every 15 minutes, if the condition persists, the notification may recur as often as every 15 minutes. For example, to get a notification whenever a "loss of" event occurs (but at most once every 15 minutes), set the corresponding threshold to 1. The agent will generate a notification when the event originally occurs.

Note that the Network Management System, or NMS, may receive a linkDown notification, as well, if enabled (via ifLinkUpDownTrapEnable [RFC2863]). At the beginning of the next 15 minute interval, the counter is reset. When the first second goes by and the event occurs, the current interval bucket will be 1, which equals the threshold and the notification will be sent again.

2.7 Persistence

All objects defined in this MIB which may be set (read-write or read-create), should be stored persistently. Following is an exhaustive list of these persistent objects:

- vdslLineConfProfile
- vdslLineAlarmConfProfile
- vdslLineConfProfileName
- vdslLineConfDownstreamRateMode
- vdslLineConfUpstreamRateMode
- vdslLineConfDownstreamMaxPwr
- vdslLineConfUpstreamMaxPwr
- vdslLineConfDownstreamMaxSnrMgn
- vdslLineConfDownstreamMinSnrMgn
- vdslLineConfDownstreamTargetSnrMgn

vdslLineConfUpstreamMaxSnrMgn
vdslLineConfUpstreamMinSnrMgn
vdslLineConfUpstreamTargetSnrMgn

vdslLineConfDownstreamFastMaxDataRate
vdslLineConfDownstreamFastMinDataRate
vdslLineConfDownstreamSlowMaxDataRate
vdslLineConfDownstreamSlowMinDataRate
vdslLineConfUpstreamFastMaxDataRate
vdslLineConfUpstreamFastMinDataRate
vdslLineConfUpstreamSlowMaxDataRate
vdslLineConfUpstreamSlowMinDataRate
vdslLineConfDownstreamRateRatio
vdslLineConfUpstreamRateRatio
vdslLineConfDownstreamMaxInterDelay
vdslLineConfUpstreamMaxInterDelay
vdslLineConfDownstreamPboControl
vdslLineConfUpstreamPboControl
vdslLineConfDownstreamPboLevel
vdslLineConfUpstreamPboLevel
vdslLineConfDeploymentScenario
vdslLineConfAdslPresence
vdslLineConfApplicableStandard
vdslLineConfBandPlan
vdslLineConfBandPlanFx
vdslLineConfBandU0Usage
vdslLineConfUpstreamPsdTemplate
vdslLineConfDownstreamPsdTemplate
vdslLineConfHamBandMask
vdslLineConfCustomNotch1Start
vdslLineConfCustomNotch1Stop
vdslLineConfCustomNotch2Start
vdslLineConfCustomNotch2Stop
vdslLineConfProfileRowStatus
vdslLineAlarmConfProfileName
vdslThresh15MinLofs
vdslThresh15MinLoss
vdslThresh15MinLprs
vdslThresh15MinLols
vdslThresh15MinESs
vdslThresh15MinSESs
vdslThresh15MinUASs
vdslInitFailureNotificationEnable
vdslLineAlarmConfProfileRowStatus

It should also be noted that interface indices in this MIB are maintained persistently. VACM data relating to these should be stored persistently as well.

3. Conformance and Compliance

For VDSL lines, the following group is mandatory:

- vdslGroup

4. Definitions

```
    VDSL-LINE-MIB DEFINITIONS ::= BEGIN

    IMPORTS

    MODULE-IDENTITY,
    OBJECT-TYPE,
    Counter64,
    Gauge32,
    Integer32,
    Unsigned32,
    NOTIFICATION-TYPE,
    transmission                    FROM SNMPv2-SMI
    TEXTUAL-CONVENTION,
    RowStatus,
    TruthValue                      FROM SNMPv2-TC
    HCPerfValidIntervals,
    HCPerfInvalidIntervals,
    HCPerfTimeElapsed,
    HCPerfIntervalThreshold,
    HCPerfCurrentCount,
    HCPerfIntervalCount             FROM HC-PerfHist-TC-MIB
    MODULE-COMPLIANCE,
    OBJECT-GROUP,
    NOTIFICATION-GROUP              FROM SNMPv2-CONF
    ifIndex                         FROM IF-MIB
    SnmpAdminString                 FROM SNMP-FRAMEWORK-MIB;

    vdslMIB MODULE-IDENTITY
       LAST-UPDATED "200304180000Z" -- April 18, 2003
       ORGANIZATION "ADSLMIB Working Group"
       CONTACT-INFO "WG-email:  adslmib@ietf.org
                     Info:      https://www1.ietf.org/mailman/listinfo/adslmib

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```
            "
        DESCRIPTION
            "The MIB module defining objects for the management of a pair of
            VDSL modems at each end of the VDSL line.  Each such line has
            an entry in an ifTable which may include multiple modem lines.
            An agent may reside at either end of the VDSL line however the
            MIB is designed to require no management communication between
            them beyond that inherent in the low-level VDSL line protocol.
            The agent may monitor and control this protocol for its needs.

            VDSL lines may support optional Fast or Interleaved channels.
            If these are supported, additional entries corresponding to the
            supported channels must be created in the ifTable. Thus a VDSL
            line that supports both channels will have three entries in the
            ifTable, one for each physical, fast, and interleaved, whose
            ifType values are equal to vdsl(97), fast(125), and
            interleaved(124), respectively. The ifStackTable is used to
            represent the relationship between the entries.

            Naming Conventions:
                Vtuc -- (VTUC) modem at near (Central) end of line
                Vtur -- (VTUR) modem at Remote end of line
                Vtu  -- One of either Vtuc or Vtur
                Curr -- Current
                Prev -- Previous
                Atn  -- Attenuation
                ES   -- Errored Second.
                LCS  -- Line Code Specific
                Lof  -- Loss of Frame
                Lol  -- Loss of Link
                Los  -- Loss of Signal
                Lpr  -- Loss of Power
                xxxs -- interval of Seconds in which xxx occurs
                        (e.g., xxx=Lof, Los, Lpr)
                Max  -- Maximum
                Mgn  -- Margin
                Min  -- Minimum
                Psd  -- Power Spectral Density
                Snr  -- Signal to Noise Ratio
                Tx   -- Transmit
                Blks -- Blocks
                "
        REVISION "200111010000Z" -- November 1, 2001
        DESCRIPTION "Initial draft."

        REVISION "200203310000Z" -- March 31, 2002
```

```
    DESCRIPTION "Added R. Abbi as co-author."

    REVISION "200204090000Z" -- April 9, 2002
```

```
    DESCRIPTION "Removed use of IMPLIED profile indices."

    REVISION "200206160000Z" -- June 16, 2002
    DESCRIPTION "Revised per input from DSL Forum."

    REVISION "200209230000Z" -- September 23, 2002
    DESCRIPTION "Revised per more input from DSL Forum."

    REVISION "200210150000Z" -- October 15, 2002
    DESCRIPTION "Modified per input from Randy Presuhn and
                 Moti Morgenstern."

    REVISION "200210300000Z" -- October 30, 2002
    DESCRIPTION "Modified per input from Umberto Bonollo
                 and Travis Levin."

    REVISION "200212300000Z" -- December 30, 2002
    DESCRIPTION "Changed profile indices to strings."

    REVISION "200304180000Z" -- April 18, 2003
    DESCRIPTION "Brought into conformance with DSLF TR-057."

    ::= { transmission xxxx }

    vdslLineMib    OBJECT IDENTIFIER ::= { vdslMIB 1 }
    vdslMibObjects OBJECT IDENTIFIER ::= { vdslLineMib 1 }

    --
    -- textual conventions used in this MIB
    --

    VdslLineCodingType ::= TEXTUAL-CONVENTION
        STATUS       current
        DESCRIPTION
            "This data type is used as the syntax for the VDSL
             Line Code."
        SYNTAX  INTEGER
            {
            other(1), -- none of the following
            mcm(2),   -- Multiple Carrier Modulation
            scm(3)    -- Single Carrier Modulation
            }

    VdslLineEntity ::= TEXTUAL-CONVENTION
        STATUS       current
        DESCRIPTION
            "Identifies a modem as being either Vtuc or Vtur.  A
            VDSL line consists of two modems, a Vtuc and a Vtur."
        SYNTAX  INTEGER
            {
```

```
            vtuc(1), -- central site modem
            vtur(2)  -- remote site modem
```

```
            }

    --
    -- objects
    --

    vdslLineTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslLineEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table includes common attributes describing
            both ends of the line.  It is required for all VDSL
            physical interfaces.  VDSL physical interfaces are
            those ifEntries where ifType is equal to vdsl(97)."
        ::= { vdslMibObjects 1 }

    vdslLineEntry OBJECT-TYPE
        SYNTAX       VdslLineEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION  "An entry in the vdslLineTable."
        INDEX { ifIndex }
        ::= { vdslLineTable 1 }

    VdslLineEntry ::=
        SEQUENCE
            {
            vdslLineCoding                      VdslLineCodingType,
            vdslLineType                        INTEGER,
            vdslLineConfProfile                 SnmpAdminString,
            vdslLineAlarmConfProfile            SnmpAdminString
            }

    vdslLineCoding OBJECT-TYPE
        SYNTAX       VdslLineCodingType
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Specifies the VDSL coding type used on this line."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineEntry 1 }

    vdslLineType OBJECT-TYPE
        SYNTAX       INTEGER
            {
            noChannel(1),         -- no channels exist
            fastOnly(2),          -- fast channel only
            slowOnly(3),          -- slow channel only
```

```
            either(4),          -- either fast or slow channel exist
            both(5)             -- both fast and slow channels exist
            }
```

```
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Defines the type of VDSL physical line
            entity that exists, by defining whether and how
            the line is channelized.  If the line is channelized,
            the value will be other than noChannel(1).  This
            object defines which channel type(s) are supported.

            In the case that the line is channelized, the manager
            can use the ifStackTable to determine the ifIndex for
            the associated channel(s).

            Note that slow and interleaved refer to the same
            channel."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineEntry 2 }

    vdslLineConfProfile OBJECT-TYPE
        SYNTAX       SnmpAdminString (SIZE(1..32))
        MAX-ACCESS   read-write
        STATUS       current
        DESCRIPTION
            "The value of this object identifies the row
            in the VDSL Line Configuration Profile Table,
            ( vdslLineConfProfileTable ), which applies for this
            VDSL line, and channels if applicable."
        ::= { vdslLineEntry 3 }

    vdslLineAlarmConfProfile OBJECT-TYPE
        SYNTAX       SnmpAdminString (SIZE(1..32))
        MAX-ACCESS   read-write
        STATUS       current
        DESCRIPTION
            "The value of this object identifies the row in the VDSL
            Line Alarm Configuration Profile Table,
            ( vdslLineAlarmConfProfileTable ), which applies to this
            VDSL line, and channels if applicable."
        ::= { vdslLineEntry 4 }

    vdslPhysTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslPhysEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table provides one row for each Vtu.  Each row
            contains the Physical Layer Parameters table for that
            Vtu.  VDSL physical interfaces are those ifEntries where
            ifType is equal to vdsl(97)."
```

```
        ::= { vdslMibObjects 2 }

    vdslPhysEntry OBJECT-TYPE
```

```
        SYNTAX       VdslPhysEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION  "An entry in the vdslPhysTable."
        INDEX { ifIndex,
                vdslPhysSide }
        ::= { vdslPhysTable 1 }

    VdslPhysEntry ::=
        SEQUENCE
            {
            vdslPhysSide                        VdslLineEntity,
            vdslInvSerialNumber                 SnmpAdminString,
            vdslInvVendorID                     SnmpAdminString,
            vdslInvVersionNumber                SnmpAdminString,
            vdslCurrSnrMgn                      Integer32,
            vdslCurrAtn                         Gauge32,
            vdslCurrStatus                      BITS,
            vdslCurrOutputPwr                   Integer32,
            vdslCurrAttainableRate              Gauge32,
            vdslCurrLineRate                    Gauge32
            }

    vdslPhysSide OBJECT-TYPE
        SYNTAX       VdslLineEntity
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "Identifies whether the modem is the Vtuc or Vtur."
        ::= { vdslPhysEntry 1 }

    vdslInvSerialNumber OBJECT-TYPE
        SYNTAX       SnmpAdminString(SIZE (0..32))
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The vendor specific string that identifies the
            vendor equipment."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPhysEntry 2 }

    vdslInvVendorID OBJECT-TYPE
        SYNTAX       SnmpAdminString (SIZE (0..16))
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The vendor ID code is a copy of the binary vendor
            identification field expressed as readable characters."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
```

```
        ::= { vdslPhysEntry 3 }

    vdslInvVersionNumber OBJECT-TYPE
```

```
        SYNTAX       SnmpAdminString (SIZE (0..16))
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The vendor specific version number sent by this Vtu
            as part of the initialization messages.  It is a copy
            of the binary version number field expressed as
            readable characters."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPhysEntry 4 }

    vdslCurrSnrMgn OBJECT-TYPE
        SYNTAX       Integer32 (-127..127)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Noise Margin as seen by this Vtu with respect to its
            received signal in 0.25dB.  The effective range is
            -31.75 to +31.75dB."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
         ::= { vdslPhysEntry 5 }

    vdslCurrAtn OBJECT-TYPE
        SYNTAX       Gauge32 (0..255)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Measured difference in the total power transmitted by
            the peer Vtu and the total power received by this Vtu.
            The effective range is 0 to +63.75dB."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
         ::= { vdslPhysEntry 6 }

    vdslCurrStatus OBJECT-TYPE
        SYNTAX       BITS
            {
            noDefect(0),
            lossOfFraming(1),
            lossOfSignal(2),
            lossOfPower(3),
            lossOfSignalQuality(4),
            lossOfLink(5),
            dataInitFailure(6),
            configInitFailure(7),
            protocolInitFailure(8),
            noPeerVtuPresent(9)
            }
```

```
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
```

```
            "Indicates current state of the Vtu line.  This is a
            bit-map of possible conditions.  The various bit
            positions are:

            0   noDefect             There no defects on the line

            1   lossOfFraming        Vtu failure due to not receiving
                                     a valid frame.

            2   lossOfSignal         Vtu failure due to not receiving
                                     signal.

            3   lossOfPower          Vtu failure due to loss of power.

            4   lossOfSignalQuality  Loss of Signal Quality is declared
                                     when the Noise Margin falls below
                                     the Minimum Noise Margin, or the
                                     bit-error-rate exceeds 10^-7.

            5   lossOfLink           Vtu failure due to inability to
                                     link with peer Vtu.  Set whenever
                                     the transceiver is in the 'Warm
                                     Start' state.

            6   dataInitFailure      Vtu failure during initialization
                                     due to bit errors corrupting
                                     startup exchange data.

            7   configInitFailure    Vtu failure during initialization
                                     due to peer Vtu not able to support
                                     requested configuration.

            8   protocolInitFailure  Vtu failure during initialization
                                     due to incompatible protocol used
                                     by the peer Vtu.

            9   noPeerVtuPresent     Vtu failure during initialization
                                     due to no activation sequence
                                     detected from peer Vtu.

            This is intended to supplement ifOperStatus."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
         ::= { vdslPhysEntry 7 }

    vdslCurrOutputPwr OBJECT-TYPE
        SYNTAX       Integer32 (0..160)
        UNITS        "0.1dBm"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
```

"Measured total output power transmitted by this VTU.
This is the measurement that was reported during

```
            the last activation sequence."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPhysEntry 8 }

    vdslCurrAttainableRate OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "kbps"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Indicates the maximum currently attainable data rate
            in steps of 1024 bits/second by the Vtu.  This value
            will be equal to or greater than vdslCurrLineRate.
            Note that for SCM, the minimum and maximum data rates
            are equal."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPhysEntry 9 }

    vdslCurrLineRate OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "kbps"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Indicates the current data rate in steps of 1024
            bits/second by the Vtu.  This value will be less than
            or equal to vdslCurrAttainableRate."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPhysEntry 10 }

    vdslChanTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslChanEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table provides one row for each Vtu channel.
            VDSL channel interfaces are those ifEntries where
            ifType is equal to interleave(124) or fast(125)."
        ::= { vdslMibObjects 3 }

    vdslChanEntry OBJECT-TYPE
        SYNTAX       VdslChanEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "An entry in the vdslChanTable."
        INDEX { ifIndex,
                vdslPhysSide }
        ::= { vdslChanTable 1 }
```

```
    VdslChanEntry ::=
        SEQUENCE
```

```
            {
            vdslChanInterleaveDelay                Gauge32,
            vdslChanCrcBlockLength                 Gauge32,
            vdslChanCurrTxRate                     Gauge32,
            vdslChanOverhead                       Gauge32,
            vdslChanBurstProtection                Gauge32
            }

    vdslChanInterleaveDelay OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "ms"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Interleave Delay for this channel.

            Interleave delay applies only to the interleave
            (slow) channel and defines the mapping (relative
            spacing) between subsequent input bytes at the
            interleaver input and their placement in the bit
            stream at the interleaver output.  Larger numbers
            provide greater separation between consecutive
            input bytes in the output bit stream allowing for
            improved impulse noise immunity at the expense of
            payload latency.

            In the case where the ifType is fast(125), use
            noSuchObject."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanEntry 1 }

    vdslChanCrcBlockLength OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "byte"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Indicates the length of the channel data-block
            on which the CRC operates."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanEntry 2 }

    vdslChanCurrTxRate OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "kbps"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Actual transmit data rate on this channel."
```

```
        ::= { vdslChanEntry 3 }

    vdslChanOverhead OBJECT-TYPE
```

```
        SYNTAX       Gauge32
        UNITS        "%"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "TBD"
        ::= { vdslChanEntry 4 }

    vdslChanBurstProtection OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "ms"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "TBD"
        ::= { vdslChanEntry 5 }

    vdslPerfDataTable       OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslPerfDataEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table provides one row for each VDSL physical
            interface.  VDSL physical interfaces are those ifEntries
            where ifType is equal to vdsl(97)."
        ::= { vdslMibObjects 4 }

    vdslPerfDataEntry       OBJECT-TYPE
        SYNTAX        VdslPerfDataEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "An entry in the vdslPerfDataTable."
        INDEX { ifIndex,
                vdslPhysSide }
        ::= { vdslPerfDataTable 1 }

    VdslPerfDataEntry ::=
        SEQUENCE
            {
            vdslPerfValidIntervals            HCPerfValidIntervals,
            vdslPerfInvalidIntervals          HCPerfInvalidIntervals,
            vdslPerfLofs                      Counter64,
            vdslPerfLoss                      Counter64,
            vdslPerfLprs                      Counter64,
            vdslPerfLols                      Counter64,
            vdslPerfESs                       Counter64,
            vdslPerfSESs                      Counter64,
            vdslPerfUASs                      Counter64,
```

```
            vdslPerfInits                       Counter64,
            vdslPerfCurr15MinTimeElapsed        HCPerfTimeElapsed,
            vdslPerfCurr15MinLofs               HCPerfCurrentCount,
```

```
            vdslPerfCurr15MinLoss             HCPerfCurrentCount,
            vdslPerfCurr15MinLprs             HCPerfCurrentCount,
            vdslPerfCurr15MinLols             HCPerfCurrentCount,
            vdslPerfCurr15MinESs              HCPerfCurrentCount,
            vdslPerfCurr15MinSESs             HCPerfCurrentCount,
            vdslPerfCurr15MinUASs             HCPerfCurrentCount,
            vdslPerfCurr15MinInits            HCPerfCurrentCount,
            vdslPerf1DayValidIntervals        HCPerfValidIntervals,
            vdslPerf1DayInvalidIntervals      HCPerfInvalidIntervals,
            vdslPerfCurr1DayTimeElapsed       HCPerfTimeElapsed,
            vdslPerfCurr1DayLofs              Counter64,
            vdslPerfCurr1DayLoss              Counter64,
            vdslPerfCurr1DayLprs              Counter64,
            vdslPerfCurr1DayLols              Counter64,
            vdslPerfCurr1DayESs               Counter64,
            vdslPerfCurr1DaySESs              Counter64,
            vdslPerfCurr1DayUASs              Counter64,
            vdslPerfCurr1DayInits             Counter64
            }

    vdslPerfValidIntervals OBJECT-TYPE
        SYNTAX       HCPerfValidIntervals
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Valid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslPerfDataEntry 1 }

    vdslPerfInvalidIntervals OBJECT-TYPE
        SYNTAX       HCPerfInvalidIntervals
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Invalid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslPerfDataEntry 2 }

    vdslPerfLofs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds since the unit was last reset that there
            was Loss of Framing."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 3 }
```

```
    vdslPerfLoss OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
```

```
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds since the unit was last reset that there
            was Loss of Signal."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 4 }

    vdslPerfLprs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds since the unit was last reset that there
            was Loss of Power."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 5 }

    vdslPerfLols OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds since the unit was last reset that there
            was Loss of Link."
        ::= { vdslPerfDataEntry 6 }

    vdslPerfESs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Errored Seconds since the unit was last reset.
            An Errored Second is a one-second interval containing one
            or more crc anomalies, or one or more los or lof defects."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 7 }

    vdslPerfSESs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Severely Errored Seconds since the unit was last
            reset."
```

```
        ::= { vdslPerfDataEntry 8 }

    vdslPerfUASs OBJECT-TYPE
```

```
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Unavailable Seconds since the unit was last
            reset."
        ::= { vdslPerfDataEntry 9 }

    vdslPerfInits OBJECT-TYPE
        SYNTAX       Counter64
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of the line initialization attempts since the unit
            was last reset.  This count includes both successful and
            failed attempts."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 10 }

    vdslPerfCurr15MinTimeElapsed OBJECT-TYPE
        SYNTAX       HCPerfTimeElapsed
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Total elapsed seconds in this interval."
        ::= { vdslPerfDataEntry 11 }

    vdslPerfCurr15MinLofs OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds during this interval that there
            was Loss of Framing."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 12 }

    vdslPerfCurr15MinLoss OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds during this interval that there
            was Loss of Signal."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
```

```
        ::= { vdslPerfDataEntry 13 }

    vdslPerfCurr15MinLprs OBJECT-TYPE
```

```
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds during this interval that there
            was Loss of Power."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 14 }

    vdslPerfCurr15MinLols OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds during this interval that there
            was Loss of Link."
        ::= { vdslPerfDataEntry 15 }

    vdslPerfCurr15MinESs OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Errored Seconds during this interval.  An Errored
            Second is a one-second interval containing one or more crc
            anomalies, or one or more los or lof defects."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 16 }

    vdslPerfCurr15MinSESs OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Severely Errored Seconds during this interval."
        ::= { vdslPerfDataEntry 17 }

    vdslPerfCurr15MinUASs OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Unavailable Seconds during this interval."
        ::= { vdslPerfDataEntry 18 }
```

```
    vdslPerfCurr15MinInits OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
```

```
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of the line initialization attempts during this
            interval.  This count includes both successful and
            failed attempts."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfDataEntry 19 }

    vdslPerf1DayValidIntervals OBJECT-TYPE
        SYNTAX        HCPerfValidIntervals
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Valid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslPerfDataEntry 20 }

    vdslPerf1DayInvalidIntervals OBJECT-TYPE
        SYNTAX        HCPerfInvalidIntervals
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Invalid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslPerfDataEntry 21 }

    vdslPerfCurr1DayTimeElapsed OBJECT-TYPE
        SYNTAX       HCPerfTimeElapsed
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
             "Number of seconds that have elapsed since the beginning
             of the current 1-day interval."
        ::= { vdslPerfDataEntry 22 }

    vdslPerfCurr1DayLofs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Loss of Framing (LOF) Seconds since the
            beginning of the current 1-day interval."
        ::= { vdslPerfDataEntry 23 }

    vdslPerfCurr1DayLoss OBJECT-TYPE
        SYNTAX       Counter64
```

```
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
```

```
        DESCRIPTION
            "Count of Loss of Signal (LOS) Seconds since the beginning
            of the current 1-day interval."
        ::= { vdslPerfDataEntry 24 }

    vdslPerfCurr1DayLprs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Loss of Power (LPR) Seconds since the beginning
            of the current 1-day interval."
        ::= { vdslPerfDataEntry 25 }

    vdslPerfCurr1DayLols OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Loss of Link (LOL) Seconds since the beginning
            of the current 1-day interval."
        ::= { vdslPerfDataEntry 26 }

    vdslPerfCurr1DayESs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Errored Seconds (ES) since the beginning
            of the current 1-day interval."
        ::= { vdslPerfDataEntry 27 }

    vdslPerfCurr1DaySESs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Severely Errored Seconds (SES) since the
            beginning of the current 1-day interval."
        ::= { vdslPerfDataEntry 28 }

    vdslPerfCurr1DayUASs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
```

```
        STATUS       current
        DESCRIPTION
            "Count of Unavailable Seconds (UAS) since the beginning
```

```
            of the current 1-day interval."
        ::= { vdslPerfDataEntry 29 }

    vdslPerfCurr1DayInits OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of the line initialization attempts since the
            beginning of the current 1-day interval.  This count
            includes both successful and failed attempts."
        ::= { vdslPerfDataEntry 30 }

    vdslPerfIntervalTable       OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslPerfIntervalEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table provides one row for each Vtu performance
            data collection interval.  VDSL physical interfaces are
            those ifEntries where ifType is equal to vdsl(97)."
        ::= { vdslMibObjects 5 }

    vdslPerfIntervalEntry       OBJECT-TYPE
        SYNTAX        VdslPerfIntervalEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "An entry in the vdslPerfIntervalTable."
        INDEX { ifIndex,
                vdslPhysSide,
                vdslIntervalNumber }
        ::= { vdslPerfIntervalTable 1 }

    VdslPerfIntervalEntry ::=
        SEQUENCE
            {
            vdslIntervalNumber                  Unsigned32,
            vdslIntervalLofs                    HCPerfIntervalCount,
            vdslIntervalLoss                    HCPerfIntervalCount,
            vdslIntervalLprs                    HCPerfIntervalCount,
            vdslIntervalLols                    HCPerfIntervalCount,
            vdslIntervalESs                     HCPerfIntervalCount,
            vdslIntervalSESs                    HCPerfIntervalCount,
            vdslIntervalUASs                    HCPerfIntervalCount,
            vdslIntervalInits                   HCPerfIntervalCount
            }
```

```
    vdslIntervalNumber OBJECT-TYPE
        SYNTAX       Unsigned32 (1..96)
        MAX-ACCESS   not-accessible
```

```
        STATUS       current
        DESCRIPTION
            "Performance Data Interval number 1 is the the most
            recent previous interval; interval 96 is 24 hours ago.
            Intervals 2..96 are optional."
        ::= { vdslPerfIntervalEntry 1 }

    vdslIntervalLofs OBJECT-TYPE
        SYNTAX       HCPerfIntervalCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds in the interval when there was Loss
            of Framing."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfIntervalEntry 2 }

    vdslIntervalLoss OBJECT-TYPE
        SYNTAX       HCPerfIntervalCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds in the interval when there was Loss
            of Signal."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfIntervalEntry 3 }

    vdslIntervalLprs OBJECT-TYPE
        SYNTAX       HCPerfIntervalCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds in the interval when there was Loss
            of Power."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfIntervalEntry 4 }

    vdslIntervalLols OBJECT-TYPE
        SYNTAX       HCPerfIntervalCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds in the interval when there was Loss
            of Link."
        ::= { vdslPerfIntervalEntry 5 }
```

```
    vdslIntervalESs OBJECT-TYPE
        SYNTAX       HCPerfIntervalCount
```

```
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Errored Seconds (ES) in the interval.  An Errored
            Second is a one-second interval containing one or more crc
            anomalies, one or more los or lof defects."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfIntervalEntry 6 }

    vdslIntervalSESs OBJECT-TYPE
        SYNTAX       HCPerfIntervalCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Severely Errored Seconds in the interval."
        ::= { vdslPerfIntervalEntry 7 }

    vdslIntervalUASs OBJECT-TYPE
        SYNTAX       HCPerfIntervalCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Unavailable Seconds in the interval."
        ::= { vdslPerfIntervalEntry 8 }

    vdslIntervalInits OBJECT-TYPE
        SYNTAX       HCPerfIntervalCount
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of the line initialization attempts during this
            interval.  This count includes both successful and
            failed attempts."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslPerfIntervalEntry 9 }

    vdsl1DayIntervalTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF Vdsl1DayIntervalEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table provides one row for each VDSL performance
            data collection interval.  This table contains live data
            from equipment.  As such, it is NOT persistent."
        ::= { vdslMibObjects 6 }
```

```
    vdsl1DayIntervalEntry OBJECT-TYPE
        SYNTAX       Vdsl1DayIntervalEntry
        MAX-ACCESS   not-accessible
```

```
        STATUS       current
        DESCRIPTION
            "An entry in the vdsl1DayIntervalTable."
        INDEX { ifIndex,
                vdslPhysSide,
                vdsl1DayIntervalNumber }
        ::= { vdsl1DayIntervalTable 1 }

    Vdsl1DayIntervalEntry ::=
        SEQUENCE
        {
        vdsl1DayIntervalNumber                Unsigned32,
        vdsl1DayIntervalMoniSecs              HCPerfTimeElapsed,
        vdsl1DayIntervalLofs                  Counter64,
        vdsl1DayIntervalLoss                  Counter64,
        vdsl1DayIntervalLprs                  Counter64,
        vdsl1DayIntervalLols                  Counter64,
        vdsl1DayIntervalESs                   Counter64,
        vdsl1DayIntervalSESs                  Counter64,
        vdsl1DayIntervalUASs                  Counter64,
        vdsl1DayIntervalInits                 Counter64
        }

    vdsl1DayIntervalNumber OBJECT-TYPE
        SYNTAX       Unsigned32 (1..30)
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "History Data Interval number. Interval 1 is the the most
            recent previous day; interval 30 is 30 days ago. Intervals
            2..30 are optional."
        ::= { vdsl1DayIntervalEntry 1 }

    vdsl1DayIntervalMoniSecs OBJECT-TYPE
        SYNTAX       HCPerfTimeElapsed
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The amount of time in the 1-day interval over which the
            performance monitoring information is actually counted.
            This value will be the same as the interval duration except
            in a situation where performance monitoring data could not
            be collected for any reason."
        ::= { vdsl1DayIntervalEntry 2 }

    vdsl1DayIntervalLofs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
```

```
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
```

```
            "Count of Loss of Frame (LOF) Seconds during the 1-day
            interval as measured by vdsl1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdsl1DayIntervalEntry 3 }

    vdsl1DayIntervalLoss OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Loss of Signal (LOS) Seconds during the 1-day
            interval as measured by vdsl1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdsl1DayIntervalEntry 4 }

    vdsl1DayIntervalLprs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Loss of Power (LPR) Seconds during the 1-day
            interval as measured by vdsl1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdsl1DayIntervalEntry 5 }

    vdsl1DayIntervalLols OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Loss of Link (LOL) Seconds during the 1-day
            interval as measured by vdsl1DayIntervalMoniSecs."
        ::= { vdsl1DayIntervalEntry 6 }

    vdsl1DayIntervalESs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Errored Seconds (ES) during the 1-day
            interval as measured by vdsl1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdsl1DayIntervalEntry 7 }

    vdsl1DayIntervalSESs OBJECT-TYPE
```

```
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
```

```
        STATUS       current
        DESCRIPTION
             "Count of Severely Errored Seconds (SES) during the 1-day
             interval as measured by vdsl1DayIntervalMoniSecs."
        ::= { vdsl1DayIntervalEntry 8 }

    vdsl1DayIntervalUASs OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
             "Count of Unavailable Seconds (UAS) during the 1-day
             interval as measured by vdsl1DayIntervalMoniSecs."
        ::= { vdsl1DayIntervalEntry 9 }

    vdsl1DayIntervalInits OBJECT-TYPE
        SYNTAX       Counter64
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of the line initialization attempts during the
            1-day interval as measured by vdsl1DayIntervalMoniSecs.
            This count includes both successful and failed attempts."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdsl1DayIntervalEntry 10 }

    vdslChanPerfDataTable       OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslChanPerfDataEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table provides one row for each Vtu channel.
            VDSL channel interfaces are those ifEntries where
            ifType is equal to interleave(124) or fast(125)."
        ::= { vdslMibObjects 7 }

    vdslChanPerfDataEntry OBJECT-TYPE
        SYNTAX        VdslChanPerfDataEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "An entry in the vdslChanPerfDataTable."
        INDEX { ifIndex,
                vdslPhysSide }
        ::= { vdslChanPerfDataTable 1 }

    VdslChanPerfDataEntry ::=
```

```
        SEQUENCE
            {
            vdslChanPerfValidIntervals          HCPerfValidIntervals,
```

```
            vdslChanPerfInvalidIntervals         HCPerfInvalidIntervals,
            vdslChanCorrectedOctets                Counter64,
            vdslChanUncorrectableBlks              Counter64,
            vdslChanPerfCurr15MinTimeElapsed       HCPerfTimeElapsed,
            vdslChanPerfCurr15MinCorrectedOctets   HCPerfCurrentCount,
            vdslChanPerfCurr15MinUncorrectableBlks HCPerfCurrentCount,
            vdslChanPerf1DayValidIntervals         HCPerfValidIntervals,
            vdslChanPerf1DayInvalidIntervals     HCPerfInvalidIntervals,
            vdslChanPerfCurr1DayTimeElapsed      HCPerfTimeElapsed,
            vdslChanPerfCurr1DayCorrectedOctets  HCPerfCurrentCount,
            vdslChanPerfCurr1DayUncorrectableBlks    HCPerfCurrentCount
            }

    vdslChanPerfValidIntervals OBJECT-TYPE
        SYNTAX        HCPerfValidIntervals
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Valid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslChanPerfDataEntry 1 }

    vdslChanPerfInvalidIntervals OBJECT-TYPE
        SYNTAX        HCPerfInvalidIntervals
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Invalid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslChanPerfDataEntry 2 }

    vdslChanCorrectedOctets OBJECT-TYPE
        SYNTAX        Counter64
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of corrected octets since the unit was last reset."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanPerfDataEntry 3 }

    vdslChanUncorrectableBlks OBJECT-TYPE
        SYNTAX        Counter64
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of uncorrectable blocks since the unit was last
            reset."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanPerfDataEntry 4 }
```

```
    vdslChanPerfCurr15MinTimeElapsed OBJECT-TYPE
        SYNTAX        HCPerfTimeElapsed
```

```
        UNITS         "seconds"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Total elapsed seconds in this interval."
        ::= { vdslChanPerfDataEntry 5 }

    vdslChanPerfCurr15MinCorrectedOctets OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of corrected octets in this interval."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanPerfDataEntry 6 }

    vdslChanPerfCurr15MinUncorrectableBlks OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of uncorrectable blocks in this interval."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanPerfDataEntry 7 }

    vdslChanPerf1DayValidIntervals OBJECT-TYPE
        SYNTAX        HCPerfValidIntervals
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Valid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslChanPerfDataEntry 8 }

    vdslChanPerf1DayInvalidIntervals OBJECT-TYPE
        SYNTAX        HCPerfInvalidIntervals
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Invalid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslChanPerfDataEntry 9 }

    vdslChanPerfCurr1DayTimeElapsed OBJECT-TYPE
        SYNTAX       HCPerfTimeElapsed
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
```

```
            "Number of seconds that have elapsed since the beginning
            of the current 1-day interval."
        ::= { vdslChanPerfDataEntry 10 }
```

```
    vdslChanPerfCurr1DayCorrectedOctets OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of corrected octets since the beginning of the
            current 1-day interval."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanPerfDataEntry 11 }

    vdslChanPerfCurr1DayUncorrectableBlks OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of uncorrectable blocks since the beginning of the
            current 1-day interval."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanPerfDataEntry 12 }

    vdslChanIntervalTable       OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslChanIntervalEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table provides one row for each Vtu channel data
            collection interval.  VDSL channel interfaces are those
            ifEntries where ifType is equal to interleave(124) or
            fast(125)."
        ::= { vdslMibObjects 8 }

    vdslChanIntervalEntry OBJECT-TYPE
        SYNTAX        VdslChanIntervalEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "An entry in the vdslChanIntervalTable."
        INDEX { ifIndex,
                vdslPhysSide,
                vdslChanIntervalNumber }
        ::= { vdslChanIntervalTable 1 }

    VdslChanIntervalEntry ::=
        SEQUENCE
            {
            vdslChanIntervalNumber                Unsigned32,
            vdslChanIntervalCorrectedOctets       HCPerfIntervalCount,
            vdslChanIntervalUncorrectableBlks     HCPerfIntervalCount
```

```
            }

    vdslChanIntervalNumber OBJECT-TYPE
```

```
        SYNTAX        Unsigned32 (0..96)
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "Performance Data Interval number 1 is the the most
            recent previous interval; interval 96 is 24 hours ago.
            Intervals 2..96 are optional."
        ::= { vdslChanIntervalEntry 1 }

    vdslChanIntervalCorrectedOctets OBJECT-TYPE
        SYNTAX        HCPerfIntervalCount
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of corrected octets in this interval."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanIntervalEntry 2 }

    vdslChanIntervalUncorrectableBlks OBJECT-TYPE
        SYNTAX        HCPerfIntervalCount
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of uncorrectable blocks in this interval."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChanIntervalEntry 3 }

    vdslChan1DayIntervalTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslChan1DayIntervalEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table provides one row for each VDSL performance
            data collection interval.  This table contains live data
            from equipment.  As such, it is NOT persistent."
        ::= { vdslMibObjects 9 }

    vdslChan1DayIntervalEntry OBJECT-TYPE
        SYNTAX       VdslChan1DayIntervalEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "An entry in the vdslChan1DayIntervalTable."
        INDEX { ifIndex,
                vdslPhysSide,
                vdslChan1DayIntervalNumber }
        ::= { vdslChan1DayIntervalTable 1 }

    VdslChan1DayIntervalEntry ::=
```

```
        SEQUENCE
        {
        vdslChan1DayIntervalNumber              Unsigned32,
```

```
        vdslChan1DayIntervalMoniSecs           HCPerfTimeElapsed,
        vdslChan1DayIntervalCorrectedOctets    HCPerfCurrentCount,
        vdslChan1DayIntervalUncorrectableBlks  HCPerfCurrentCount
        }

    vdslChan1DayIntervalNumber OBJECT-TYPE
        SYNTAX       Unsigned32 (1..30)
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "History Data Interval number. Interval 1 is the the most
            recent previous day; interval 30 is 30 days ago. Intervals
            2..30 are optional."
        ::= { vdslChan1DayIntervalEntry 1 }

    vdslChan1DayIntervalMoniSecs OBJECT-TYPE
        SYNTAX       HCPerfTimeElapsed
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The amount of time in the 1-day interval over which the
            performance monitoring information is actually counted.
            This value will be the same as the interval duration except
            in a situation where performance monitoring data could not
            be collected for any reason."
        ::= { vdslChan1DayIntervalEntry 2 }

    vdslChan1DayIntervalCorrectedOctets OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of corrected octets in this interval."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChan1DayIntervalEntry 3 }

    vdslChan1DayIntervalUncorrectableBlks OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Count of uncorrectable blocks in this interval."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslChan1DayIntervalEntry 4 }

    --
    -- profile tables
    --
```

```
    vdslLineConfProfileTable OBJECT-TYPE
        SYNTAX         SEQUENCE OF VdslLineConfProfileEntry
```

```
        MAX-ACCESS     not-accessible
        STATUS         current
        DESCRIPTION
            "This table contains information on the VDSL line
            configuration.  One entry in this table reflects a
            profile defined by a manager which can be used to
            configure the VDSL line."
        ::= { vdslMibObjects 11 }

    vdslLineConfProfileEntry OBJECT-TYPE
        SYNTAX         VdslLineConfProfileEntry
        MAX-ACCESS     not-accessible
        STATUS         current
        DESCRIPTION
            "Each entry consists of a list of parameters that
            represents the configuration of a VDSL line.

            A default profile with an index of 'DEFVAL', will
            always exist and its parameters will be set to vendor
            specific values, unless otherwise specified in this
            document."
        INDEX { vdslLineConfProfileName }
        ::= { vdslLineConfProfileTable 1 }

    VdslLineConfProfileEntry ::=
        SEQUENCE
            {
            vdslLineConfProfileName                SnmpAdminString,
            vdslLineConfDownstreamRateMode         INTEGER,
            vdslLineConfUpstreamRateMode           INTEGER,
            vdslLineConfDownstreamMaxPwr           Unsigned32,
            vdslLineConfUpstreamMaxPwr             Unsigned32,
            vdslLineConfDownstreamMaxSnrMgn        Unsigned32,
            vdslLineConfDownstreamMinSnrMgn        Unsigned32,
            vdslLineConfDownstreamTargetSnrMgn     Unsigned32,
            vdslLineConfUpstreamMaxSnrMgn          Unsigned32,
            vdslLineConfUpstreamMinSnrMgn          Unsigned32,
            vdslLineConfUpstreamTargetSnrMgn       Unsigned32,
            vdslLineConfDownstreamFastMaxDataRate  Unsigned32,
            vdslLineConfDownstreamFastMinDataRate  Unsigned32,
            vdslLineConfDownstreamSlowMaxDataRate  Unsigned32,
            vdslLineConfDownstreamSlowMinDataRate  Unsigned32,
            vdslLineConfUpstreamFastMaxDataRate    Unsigned32,
            vdslLineConfUpstreamFastMinDataRate    Unsigned32,
            vdslLineConfUpstreamSlowMaxDataRate    Unsigned32,
            vdslLineConfUpstreamSlowMinDataRate    Unsigned32,
            vdslLineConfDownstreamRateRatio        Unsigned32,
            vdslLineConfUpstreamRateRatio          Unsigned32,
            vdslLineConfDownstreamMaxInterDelay    Unsigned32,
```

```
            vdslLineConfUpstreamMaxInterDelay      Unsigned32,
            vdslLineConfDownstreamPboControl       INTEGER,
            vdslLineConfUpstreamPboControl         INTEGER,
```

```
            vdslLineConfDownstreamPboLevel        Unsigned32,
            vdslLineConfUpstreamPboLevel          Unsigned32,
            vdslLineConfDeploymentScenario        INTEGER,
            vdslLineConfAdslPresence              INTEGER,
            vdslLineConfApplicableStandard        INTEGER,
            vdslLineConfBandPlan                  INTEGER,
            vdslLineConfBandPlanFx                Unsigned32,
            vdslLineConfBandU0Usage               INTEGER,
            vdslLineConfUpstreamPsdTemplate       INTEGER,
            vdslLineConfDownstreamPsdTemplate     INTEGER,
            vdslLineConfHamBandMask               BITS,
            vdslLineConfCustomNotch1Start         Unsigned32,
            vdslLineConfCustomNotch1Stop          Unsigned32,
            vdslLineConfCustomNotch2Start         Unsigned32,
            vdslLineConfCustomNotch2Stop          Unsigned32,
            vdslLineConfProfileRowStatus          RowStatus
            }

    vdslLineConfProfileName OBJECT-TYPE
        SYNTAX       SnmpAdminString (SIZE (1..32))
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This object identifies a row in this table.

            A default profile with an index of 'DEFVAL', will
            always exist and its parameters will be set to vendor
            specific values, unless otherwise specified in this
            document."
        ::= { vdslLineConfProfileEntry 1 }

    vdslLineConfDownstreamRateMode OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     manual(1),
                     adaptAtInit(2)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the rate selection behaviour for the line
            in the downstream direction."
        ::= { vdslLineConfProfileEntry 2 }

    vdslLineConfUpstreamRateMode OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     manual(1),
                     adaptAtInit(2)
```

```
                }
        MAX-ACCESS   read-create
        STATUS       current
```

```
        DESCRIPTION
            "Specifies the rate selection behaviour for the line
            in the upstream direction."
        ::= { vdslLineConfProfileEntry 3 }

    vdslLineConfDownstreamMaxPwr OBJECT-TYPE
        SYNTAX       Unsigned32 (0..58)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum aggregate downstream power
            level in the range 0..14.5dBm."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineConfProfileEntry 4 }

    vdslLineConfUpstreamMaxPwr OBJECT-TYPE
        SYNTAX       Unsigned32 (0..58)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum aggregate upstream power
            level in the range 0..14.5dBm."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineConfProfileEntry 5 }

    vdslLineConfDownstreamMaxSnrMgn OBJECT-TYPE
        SYNTAX       Unsigned32 (0..127)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum downstream Signal/Noise Margin
            in units of 0.25 dB, for a range of 0..31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineConfProfileEntry 6 }

    vdslLineConfDownstreamMinSnrMgn OBJECT-TYPE
        SYNTAX       Unsigned32 (0..127)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum downstream Signal/Noise Margin
            in units of 0.25 dB, for a range of 0..31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineConfProfileEntry 7 }
```

```
    vdslLineConfDownstreamTargetSnrMgn OBJECT-TYPE
        SYNTAX       Unsigned32 (0..127)
        UNITS        "0.25dBm"
```

```
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the target downstream Signal/Noise Margin
            in units of 0.25 dB, for a range of 0..31.75 dB.
            This is the Noise Margin the modems must achieve with a
            BER of 10-7 or better to successfully complete
            initialization."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineConfProfileEntry 8 }

    vdslLineConfUpstreamMaxSnrMgn OBJECT-TYPE
        SYNTAX       Unsigned32 (0..127)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum upstream Signal/Noise Margin
            in units of 0.25 dB, for a range of 0..31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineConfProfileEntry 9 }

    vdslLineConfUpstreamMinSnrMgn OBJECT-TYPE
        SYNTAX       Unsigned32 (0..127)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum upstream Signal/Noise Margin
            in units of 0.25 dB, for a range of 0..31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineConfProfileEntry 10 }

    vdslLineConfUpstreamTargetSnrMgn OBJECT-TYPE
        SYNTAX       Unsigned32 (0..127)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the target upstream Signal/Noise Margin in
            units of 0.25 dB, for a range of 0..31.75 dB.  This
            is the Noise Margin the modems must achieve with a BER of
            10-7 or better to successfully complete initialization."
        REFERENCE    "T1E1.4/2000-009R3"    -- Part 1, common spec
        ::= { vdslLineConfProfileEntry 11 }

    vdslLineConfDownstreamFastMaxDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
```

```
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
```

```
            "Specifies the maximum downstream fast channel
            data rate in steps of 1024 bits/second."
        ::= { vdslLineConfProfileEntry 12 }

    vdslLineConfDownstreamFastMinDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum downstream fast channel
            data rate in steps of 1024 bits/second."
        ::= { vdslLineConfProfileEntry 13 }

    vdslLineConfDownstreamSlowMaxDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum downstream slow channel
            data rate in steps of 1024 bits/second."
        ::= { vdslLineConfProfileEntry 14 }

    vdslLineConfDownstreamSlowMinDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum downstream slow channel
            data rate in steps of 1024 bits/second."
        ::= { vdslLineConfProfileEntry 15 }

    vdslLineConfUpstreamFastMaxDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum upstream fast channel
            data rate in steps of 1024 bits/second."
        ::= { vdslLineConfProfileEntry 16 }

    vdslLineConfUpstreamFastMinDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
```

```
        DESCRIPTION
            "Specifies the minimum upstream fast channel
            data rate in steps of 1024 bits/second."
```

```
        ::= { vdslLineConfProfileEntry 17 }

    vdslLineConfUpstreamSlowMaxDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum upstream slow channel
            data rate in steps of 1024 bits/second."
        ::= { vdslLineConfProfileEntry 18 }

    vdslLineConfUpstreamSlowMinDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum upstream slow channel
            data rate in steps of 1024 bits/second."
        ::= { vdslLineConfProfileEntry 19 }

    vdslLineConfDownstreamRateRatio OBJECT-TYPE
        SYNTAX       Unsigned32 (0..100)
        UNITS        "percent"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "For dynamic rate adaptation at startup, the allocation
            of data rate in excess of the minimum data rate for each
            channel is controlled by the object.  This object specifies
            the ratio of the allocation of the excess data rate between
            the fast and the slow channels.  This allocation represents
            downstream Fast Channel Allocation / Slow Channel
            Allocation."
        ::= { vdslLineConfProfileEntry 20 }

    vdslLineConfUpstreamRateRatio OBJECT-TYPE
        SYNTAX       Unsigned32 (0..100)
        UNITS        "percent"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "For dynamic rate adaptation at startup, the allocation
            of data rate in excess of the minimum data rate for each
            channel is controlled by the object.  This object specifies
            the ratio of the allocation of the excess data rate between
            the fast and the slow channels.  This allocation represents
            upstream Fast Channel Allocation / Slow Channel Allocation."
```

```
        ::= { vdslLineConfProfileEntry 21 }

    vdslLineConfDownstreamMaxInterDelay OBJECT-TYPE
```

```
        SYNTAX       Unsigned32 (0..255)
        UNITS        "ms"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum interleave delay for the
            downstream slow channel."
        ::= { vdslLineConfProfileEntry 22 }

    vdslLineConfUpstreamMaxInterDelay OBJECT-TYPE
        SYNTAX       Unsigned32 (0..255)
        UNITS        "ms"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum interleave delay for the
            upstream slow channel."
        ::= { vdslLineConfProfileEntry 23 }

    vdslLineConfDownstreamPboControl OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     disabled(1),
                     auto(2),
                     manual(3)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Downstream power backoff (PBO) control for this
            line.  For modems which do not support downstream
            PBO control, this object MUST be fixed at disabled(1)."
        ::= { vdslLineConfProfileEntry 24 }

    vdslLineConfUpstreamPboControl OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     disabled(1),
                     auto(2),
                     manual(3)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Upstream power backoff (PBO) control for this
            line.  For modems which do not support upstream
            PBO control, this object MUST be fixed at disabled(1)."
        ::= { vdslLineConfProfileEntry 25 }
```

```
    vdslLineConfDownstreamPboLevel OBJECT-TYPE
        SYNTAX       Unsigned32 (0..160)
        UNITS        "0.25dB"
```

```
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the downstream backoff level to be used
            when vdslLineConfDownstreamPboControl = manual(3)."
        ::= { vdslLineConfProfileEntry 26 }

    vdslLineConfUpstreamPboLevel OBJECT-TYPE
        SYNTAX       Unsigned32 (0..160)
        UNITS        "0.25dB"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the upstream backoff level to be used
            when vdslLineConfUpstreamPboControl = manual(3)."
        ::= { vdslLineConfProfileEntry 27 }

    vdslLineConfDeploymentScenario OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     fttCab(1),
                     fttEx(2),
                     other(3)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "The VDSL line deployment scenario.  When using
            fttCab(1), the VTU-C is located in a street cabinet.
            When using fttEx(2), the VTU-C is located at the
            central office."
        ::= { vdslLineConfProfileEntry 28 }

    vdslLineConfAdslPresence OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     none(1),
                     adslOverPots(2),
                     adslOverISDN(3)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Indicates presence of ADSL service in the associated
            cable bundle/binder."
        ::= { vdslLineConfProfileEntry 29 }

    vdslLineConfApplicableStandard OBJECT-TYPE
        SYNTAX       INTEGER
```

```
                    {
                    ansi(1),
                    etsi(2),
```

```
                    itu(3),
                    other(4)
                    }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "The VDSL standard to be used for the line."
        ::= { vdslLineConfProfileEntry 30 }

    vdslLineConfBandPlan OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     bandPlan997(1),
                     bandPlan998(2),
                     bandPlanFx(3),
                     other(4)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "The VDSL band plan to be used for the line.

             bandPlan997(1) is to be used for
                  ITU-T G.993.1 Bandplan-B
                  ETSI Bandplan
                  ANSI Plan 997

             bandPlan998(2) is to be used for
                  ITU-T G.993.1 Bandplan-A
                  ANSI Plan 998

             bandPlanFx(3) is to be used for
                  ITU-T G.993.1 Bandplan-C.

             other(4) is to be used for
                  non-standard bandplans.

             If this object is set to bandPlanFx(3), then
             the object vdslLineConfBandPlanFx MUST also be
             set."
        ::= { vdslLineConfProfileEntry 31 }

    vdslLineConfBandPlanFx OBJECT-TYPE
        SYNTAX       Unsigned32 (3750..12000)
        UNITS        "kHz"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "The frequency limit between bands D2 and U2 when
```

```
            vdslLineConfBandPlan is set to bandPlanFx(3)."
        ::= { vdslLineConfProfileEntry 32 }
```

```
    vdslLineConfBandU0Usage OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     unused(1),
                     upstream(2),
                     downstream(3)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Defines the VDSL link use of the frequency range
            [25kHz - 138kHz] (U0)."
        ::= { vdslLineConfProfileEntry 33 }

    vdslLineConfUpstreamPsdTemplate OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     templateMask1(1),
                     templateMask2(2)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "The upstream PSD template to be used for the line."
        ::= { vdslLineConfProfileEntry 34 }

    vdslLineConfDownstreamPsdTemplate OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     templateMask1(1),
                     templateMask2(2)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "The downstream PSD template to be used for the line."
        ::= { vdslLineConfProfileEntry 35 }

    vdslLineConfHamBandMask OBJECT-TYPE
        SYNTAX       BITS
            {
            customNotch1(0),     -- custom (region-specific) notch
            customNotch2(1),     -- custom (region-specific) notch
            amateurBand30m(2),   -- amateur radio band notch
            amateurBand40m(3),   -- amateur radio band notch
            amateurBand80m(4),   -- amateur radio band notch
            amateurBand160m(5)   -- amateur radio band notch
            }
        MAX-ACCESS   read-create
```

```
        STATUS       current
        DESCRIPTION
            "The transmit power spectral density mask code.
```

```
            Amateur radio band notching is defined in the VDSL
            spectrum as follows:

            Band  Start Frequency     Stop Frequecy
            ----  ------------------  --------------------------------
            30m   1810 kHz            2000 kHz
            40m   3500 kHz            3800 kHz (ETSI); 4000 kHz (ANSI)
            80m   7000 kHz            7100 kHz (ETSI); 7300 kHz (ANSI)
            160m  10100 kHz           10150 kHz

            Notching for each standard band can be enabled or disabled
            via the bit mask.

            Two custom notches may be specified.  If either of these
            are enabled via the bit mask, then the following objects
            MUST be specified:

            If customNotch1 is enabled, then both
                vdslLineConfCustomNotch1Start
                vdslLineConfCustomNotch1Stop
            MUST be specified.

            If customNotch2 is enabled, then both
                vdslLineConfCustomNotch2Start
                vdslLineConfCustomNotch2Stop
            MUST be specified."
        ::= { vdslLineConfProfileEntry 36 }

    vdslLineConfCustomNotch1Start OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kHz"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the start frequency of amateur radio notch 1."
        ::= { vdslLineConfProfileEntry 37 }

    vdslLineConfCustomNotch1Stop OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kHz"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the stop frequency of amateur radio notch 1."
        ::= { vdslLineConfProfileEntry 38 }

    vdslLineConfCustomNotch2Start OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kHz"
```

```
        MAX-ACCESS   read-create
        STATUS       current
```

```
        DESCRIPTION
            "Specifies the start frequency of amateur radio notch 2."
        ::= { vdslLineConfProfileEntry 39 }

    vdslLineConfCustomNotch2Stop OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kHz"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the stop frequency of amateur radio notch 2."
        ::= { vdslLineConfProfileEntry 40 }

    vdslLineConfProfileRowStatus OBJECT-TYPE
        SYNTAX       RowStatus
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object is used to create a new row or modify or
            delete an existing row in this table.

            A profile activated by setting this object to `active'.
            When `active' is set, the system will validate the profile.

            Before a profile can be deleted or taken out of
            service, (by setting this object to `destroy' or
            `outOfService') it must be first unreferenced
            from all associated lines."
        ::= { vdslLineConfProfileEntry 41 }

    --
    -- Alarm configuration profile table
    --

    vdslLineAlarmConfProfileTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslLineAlarmConfProfileEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "This table contains information on the VDSL line alarm
            configuration.  One entry in this table reflects a profile
            defined by a manager which can be used to configure the
            VDSL line alarm thresholds."
        ::= { vdslMibObjects 20 }

    vdslLineAlarmConfProfileEntry OBJECT-TYPE
        SYNTAX       VdslLineAlarmConfProfileEntry
        MAX-ACCESS   not-accessible
        STATUS       current
```

```
        DESCRIPTION
            "Each entry consists of a list of parameters that
            represents the configuration of a VDSL line alarm
```

```
            profile.

            A default profile with an index of 'DEFVAL', will
            always exist and its parameters will be set to vendor
            specific values, unless otherwise specified in this
            document."
        INDEX { vdslLineAlarmConfProfileName }
        ::= { vdslLineAlarmConfProfileTable 1 }

    VdslLineAlarmConfProfileEntry ::=
        SEQUENCE
            {
            vdslLineAlarmConfProfileName       SnmpAdminString,
            vdslThresh15MinLofs                HCPerfIntervalThreshold,
            vdslThresh15MinLoss                HCPerfIntervalThreshold,
            vdslThresh15MinLprs                HCPerfIntervalThreshold,
            vdslThresh15MinLols                HCPerfIntervalThreshold,
            vdslThresh15MinESs                 HCPerfIntervalThreshold,
            vdslThresh15MinSESs                HCPerfIntervalThreshold,
            vdslThresh15MinUASs                HCPerfIntervalThreshold,
            vdslInitFailureNotificationEnable  TruthValue,
            vdslLineAlarmConfProfileRowStatus  RowStatus
            }

    vdslLineAlarmConfProfileName OBJECT-TYPE
        SYNTAX       SnmpAdminString (SIZE (1..32))
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "The name for this profile as specified by a user."
        ::= { vdslLineAlarmConfProfileEntry 1 }

    vdslThresh15MinLofs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
             loss of frame seconds (lofs) within any given 15-minute
             performance data collection interval.  If the value of
             loss of frame seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfLofsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
        ::= { vdslLineAlarmConfProfileEntry 2 }

    vdslThresh15MinLoss OBJECT-TYPE
```

```
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
```

```
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
             loss of signal seconds (loss) within any given 15-minute
             performance data collection interval.  If the value of
             loss of signal seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfLossThreshNotification notification will be
             generated.  One notification will be sent per interval
             per endpoint."
        ::= { vdslLineAlarmConfProfileEntry 3 }

    vdslThresh15MinLprs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
             loss of power seconds (lprs) within any given 15-minute
             performance data collection interval.  If the value of
             loss of power seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfLprsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
        ::= { vdslLineAlarmConfProfileEntry 4 }

    vdslThresh15MinLols OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
             loss of link seconds (lols) within any given 15-minute
             performance data collection interval.  If the value of
             loss of power seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfLolsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
        ::= { vdslLineAlarmConfProfileEntry 5 }

    vdslThresh15MinESs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
```

```
        DESCRIPTION
            "This object configures the threshold for the number of
             errored seconds (ESs) within any given 15-minute
```

```
            performance data collection interval.  If the value of
            errored seconds in a particular 15-minute collection
            interval reaches/exceeds this value, a
            vdslPerfESsThreshNotification notification will be
            generated.  No more than one notification will be sent
            per interval."
        ::= { vdslLineAlarmConfProfileEntry 6 }

    vdslThresh15MinSESs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
            severely errored seconds (SESs) within any given 15-minute
            performance data collection interval.  If the value of
            severely errored seconds in a particular 15-minute
            collection interval reaches/exceeds this value, a
            vdslPerfSESsThreshNotification notification will be
            generated.  No more than one notification will be sent
            per interval."
        ::= { vdslLineAlarmConfProfileEntry 7 }

    vdslThresh15MinUASs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
            unavailable seconds (UASs) within any given 15-minute
            performance data collection interval.  If the value of
            unavailable seconds in a particular 15-minute collection
            interval reaches/exceeds this value, a
            vdslPerfUASsThreshNotification notification will be
            generated.  No more than one notification will be sent
            per interval."
        ::= { vdslLineAlarmConfProfileEntry 8 }

    vdslInitFailureNotificationEnable OBJECT-TYPE
        SYNTAX       TruthValue
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object specifies if a vdslInitFailureNotification
            notification will be generated if an initialization
            failure occurs."
        ::= { vdslLineAlarmConfProfileEntry 9 }
```

```
    vdslLineAlarmConfProfileRowStatus OBJECT-TYPE
        SYNTAX       RowStatus
```

```
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object is used to create a new row or modify or
            delete an existing row in this table.

            A profile activated by setting this object to `active'.
            When `active' is set, the system will validate the profile.

            Before a profile can be deleted or taken out of service,
            (by setting this object to `destroy' or `outOfService') it
            must be first unreferenced from all associated lines."
        ::= { vdslLineAlarmConfProfileEntry 10 }

    -- Notification definitions

    vdslNotifications OBJECT IDENTIFIER ::= { vdslLineMib 0 }

    vdslPerfLofsThreshNotification NOTIFICATION-TYPE
        OBJECTS      {
                     vdslPerfCurr15MinLofs,
                     vdslThresh15MinLofs
                     }
        STATUS       current
        DESCRIPTION
            "Loss of Framing 15-minute interval threshold reached."
        ::= { vdslNotifications 1 }

    vdslPerfLossThreshNotification NOTIFICATION-TYPE
        OBJECTS       {
                      vdslPerfCurr15MinLoss,
                      vdslThresh15MinLoss
                      }
        STATUS        current
        DESCRIPTION
            "Loss of Signal 15-minute interval threshold reached."
        ::= { vdslNotifications 2 }

    vdslPerfLprsThreshNotification NOTIFICATION-TYPE
        OBJECTS       {
                      vdslPerfCurr15MinLprs,
                      vdslThresh15MinLprs
                      }
        STATUS        current
        DESCRIPTION
            "Loss of Power 15-minute interval threshold reached."
        ::= { vdslNotifications 3 }

    vdslPerfLolsThreshNotification NOTIFICATION-TYPE
```

```
        OBJECTS       {
                      vdslPerfCurr15MinLols,
                      vdslThresh15MinLols
```

```
                    }
        STATUS      current
        DESCRIPTION
            "Loss of Link 15-minute interval threshold reached."
        ::= { vdslNotifications 4 }

    vdslPerfESsThreshNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslPerfCurr15MinESs,
                    vdslThresh15MinESs
                    }
        STATUS      current
        DESCRIPTION
            "Errored Seconds 15-minute interval threshold reached."
        ::= { vdslNotifications 5 }

    vdslPerfSESsThreshNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslPerfCurr15MinSESs,
                    vdslThresh15MinSESs
                    }
        STATUS      current
        DESCRIPTION
            "Severely Errored Seconds 15-minute interval threshold
            reached."
        ::= { vdslNotifications 6 }

    vdslPerfUASsThreshNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslPerfCurr15MinUASs,
                    vdslThresh15MinUASs
                    }
        STATUS      current
        DESCRIPTION
            "Unavailable Seconds 15-minute interval threshold reached."
        ::= { vdslNotifications 7 }

    vdslDownMaxSnrMgnExceededNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslCurrSnrMgn,
                    vdslLineConfDownstreamMaxSnrMgn
                    }
        STATUS      current
        DESCRIPTION
            "The downstream Signal to Noise Margin exceeded
            vdslLineConfDownstreamMaxSnrMgn.  The object
            vdslCurrSnrMgn will contain the Signal to Noise
            margin as measured by the VTU-R."
        ::= { vdslNotifications 8 }
```

```
    vdslDownMinSnrMgnExceededNotification NOTIFICATION-TYPE
        OBJECTS       {
```

```
                    vdslCurrSnrMgn,
                    vdslLineConfDownstreamMinSnrMgn
                    }
        STATUS      current
        DESCRIPTION
            "The downstream Signal to Noise Margin fell below
            vdslLineConfDownstreamMinSnrMgn.    The object
            vdslCurrSnrMgn will contain the Signal to Noise
            margin as measured by the VTU-R."
        ::= { vdslNotifications 9 }

    vdslUpMaxSnrMgnExceededNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslCurrSnrMgn,
                    vdslLineConfUpstreamMaxSnrMgn
                    }
        STATUS      current
        DESCRIPTION
            "The upstream Signal to Noise Margin exceeded
            vdslLineConfDownstreamMaxSnrMgn.    The object
            vdslCurrSnrMgn will contain the Signal to Noise
            margin as measured by the VTU-C."
        ::= { vdslNotifications 10 }

    vdslUpMinSnrMgnExceededNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslCurrSnrMgn,
                    vdslLineConfUpstreamMinSnrMgn
                    }
        STATUS      current
        DESCRIPTION
            "The upstream Signal to Noise Margin fell below
            vdslLineConfDownstreamMinSnrMgn.    The object
            vdslCurrSnrMgn will contain the Signal to Noise
            margin as measured by the VTU-C."
        ::= { vdslNotifications 11 }

    vdslInitFailureNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslCurrStatus
                    }
        STATUS      current
        DESCRIPTION
            "Vtu initialization failed.  See vdslCurrStatus for
            potential reasons."
        ::= { vdslNotifications 12 }

    -- conformance information
```

```
    vdslConformance OBJECT IDENTIFIER ::= { vdslLineMib 3 }
    vdslGroups OBJECT IDENTIFIER ::= { vdslConformance 1 }
    vdslCompliances OBJECT IDENTIFIER ::= { vdslConformance 2 }
```

```
    vdslLineMibCompliance MODULE-COMPLIANCE
        STATUS  current
        DESCRIPTION
            "The compliance statement for SNMP entities which
            manage VDSL interfaces."

        MODULE  -- this module
        MANDATORY-GROUPS
            {
            vdslGroup
            }

        ::= { vdslCompliances 1 }

    -- units of conformance

        vdslGroup OBJECT-GROUP
            OBJECTS
                {
                vdslLineCoding,
                vdslLineType,
                vdslLineConfProfile,
                vdslLineAlarmConfProfile,
                vdslInvSerialNumber,
                vdslInvVendorID,
                vdslInvVersionNumber,
                vdslCurrSnrMgn,
                vdslCurrAtn,
                vdslCurrStatus,
                vdslCurrOutputPwr,
                vdslCurrAttainableRate,
                vdslCurrLineRate,
                vdslChanInterleaveDelay,
                vdslChanCrcBlockLength,
                vdslChanCurrTxRate,
                vdslChanOverhead,
                vdslChanBurstProtection,
                vdslPerfValidIntervals,
                vdslPerfInvalidIntervals,
                vdslPerfLofs,
                vdslPerfLoss,
                vdslPerfLprs,
                vdslPerfLols,
                vdslPerfESs,
                vdslPerfSESs,
                vdslPerfUASs,
                vdslPerfInits,
                vdslPerfCurr15MinTimeElapsed,
```

```
                vdslPerfCurr15MinLofs,
                vdslPerfCurr15MinLoss,
                vdslPerfCurr15MinLprs,
```

```
                vdslPerfCurr15MinLols,
                vdslPerfCurr15MinESs,
                vdslPerfCurr15MinSESs,
                vdslPerfCurr15MinUASs,
                vdslPerfCurr15MinInits,
                vdslPerf1DayValidIntervals,
                vdslPerf1DayInvalidIntervals,
                vdslPerfCurr1DayTimeElapsed,
                vdslPerfCurr1DayLofs,
                vdslPerfCurr1DayLoss,
                vdslPerfCurr1DayLprs,
                vdslPerfCurr1DayLols,
                vdslPerfCurr1DayESs,
                vdslPerfCurr1DaySESs,
                vdslPerfCurr1DayUASs,
                vdslPerfCurr1DayInits,
                vdslIntervalLofs,
                vdslIntervalLoss,
                vdslIntervalLprs,
                vdslIntervalLols,
                vdslIntervalESs,
                vdslIntervalSESs,
                vdslIntervalUASs,
                vdslIntervalInits,
                vdsl1DayIntervalMoniSecs,
                vdsl1DayIntervalLofs,
                vdsl1DayIntervalLoss,
                vdsl1DayIntervalLprs,
                vdsl1DayIntervalLols,
                vdsl1DayIntervalESs,
                vdsl1DayIntervalSESs,
                vdsl1DayIntervalUASs,
                vdsl1DayIntervalInits,
                vdslChanPerfValidIntervals,
                vdslChanPerfInvalidIntervals,
                vdslChanCorrectedOctets,
                vdslChanUncorrectableBlks,
                vdslChanPerfCurr15MinTimeElapsed,
                vdslChanPerfCurr15MinCorrectedOctets,
                vdslChanPerfCurr15MinUncorrectableBlks,
                vdslChanPerf1DayValidIntervals,
                vdslChanPerf1DayInvalidIntervals,
                vdslChanPerfCurr1DayTimeElapsed,
                vdslChanPerfCurr1DayCorrectedOctets,
                vdslChanPerfCurr1DayUncorrectableBlks,
                vdslChanIntervalCorrectedOctets,
                vdslChanIntervalUncorrectableBlks,
                vdslChan1DayIntervalMoniSecs,
                vdslChan1DayIntervalCorrectedOctets,
```

```
                vdslChan1DayIntervalUncorrectableBlks,
                vdslLineConfDownstreamRateMode,
                vdslLineConfUpstreamRateMode,
```

```
                vdslLineConfDownstreamMaxPwr,
                vdslLineConfUpstreamMaxPwr,
                vdslLineConfDownstreamMaxSnrMgn,
                vdslLineConfDownstreamMinSnrMgn,
                vdslLineConfDownstreamTargetSnrMgn,
                vdslLineConfUpstreamMaxSnrMgn,
                vdslLineConfUpstreamMinSnrMgn,
                vdslLineConfUpstreamTargetSnrMgn,
                vdslLineConfDownstreamFastMaxDataRate,
                vdslLineConfDownstreamFastMinDataRate,
                vdslLineConfDownstreamSlowMaxDataRate,
                vdslLineConfDownstreamSlowMinDataRate,
                vdslLineConfUpstreamFastMaxDataRate,
                vdslLineConfUpstreamFastMinDataRate,
                vdslLineConfUpstreamSlowMaxDataRate,
                vdslLineConfUpstreamSlowMinDataRate,
                vdslLineConfDownstreamRateRatio,
                vdslLineConfUpstreamRateRatio,
                vdslLineConfDownstreamMaxInterDelay,
                vdslLineConfUpstreamMaxInterDelay,
                vdslLineConfDownstreamPboControl,
                vdslLineConfUpstreamPboControl,
                vdslLineConfDownstreamPboLevel,
                vdslLineConfUpstreamPboLevel,
                vdslLineConfDeploymentScenario,
                vdslLineConfAdslPresence,
                vdslLineConfApplicableStandard,
                vdslLineConfBandPlan,
                vdslLineConfBandPlanFx,
                vdslLineConfBandU0Usage,
                vdslLineConfUpstreamPsdTemplate,
                vdslLineConfDownstreamPsdTemplate,
                vdslLineConfHamBandMask,
                vdslLineConfCustomNotch1Start,
                vdslLineConfCustomNotch1Stop,
                vdslLineConfCustomNotch2Start,
                vdslLineConfCustomNotch2Stop,
                vdslLineConfProfileRowStatus,
                vdslThresh15MinLofs,
                vdslThresh15MinLoss,
                vdslThresh15MinLprs,
                vdslThresh15MinLols,
                vdslThresh15MinESs,
                vdslThresh15MinSESs,
                vdslThresh15MinUASs,
                vdslInitFailureNotificationEnable,
                vdslLineAlarmConfProfileRowStatus
                }
            STATUS     current
```

```
            DESCRIPTION
                "A collection of objects providing information about
                 a VDSL Line."
```

```
            ::= { vdslGroups 1 }

        vdslNotificationGroup    NOTIFICATION-GROUP
            NOTIFICATIONS
                {
                vdslPerfLofsThreshNotification,
                vdslPerfLossThreshNotification,
                vdslPerfLprsThreshNotification,
                vdslPerfLolsThreshNotification,
                vdslPerfESsThreshNotification,
                vdslPerfSESsThreshNotification,
                vdslPerfUASsThreshNotification,
                vdslDownMaxSnrMgnExceededNotification,
                vdslDownMinSnrMgnExceededNotification,
                vdslUpMaxSnrMgnExceededNotification,
                vdslUpMinSnrMgnExceededNotification,
                vdslInitFailureNotification
                }
            STATUS      current
            DESCRIPTION
                 "This group supports notifications of significant
                 conditions associated with VDSL Lines."
        ::= { vdslGroups 2 }

    END
```

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Security Considerations

There are a number of management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

VDSL layer connectivity from the Vtur will permit the subscriber to manipulate both the VDSL link directly and the VDSL embedded operations channel (EOC) for their own loop. For example, unchecked or unfiltered fluctuations initiated by the subscriber could generate sufficient notifications to potentially overwhelm either the management interface to the network or the element manager.

For this reason, there are a number of managed objects in this MIB that may contain sensitive information. These are:

vdslThresh15MinLofs
vdslThresh15MinLoss

vdslThresh15MinLprs
vdslThresh15MinLols

vdslThresh15MinESs
vdslThresh15MinSESs
vdslThresh15MinUASs

It is thus important to control even GET access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. Not all versions of SNMP provide features for such a secure environment.

Further, notifications generated by agents implementing this MIB will contain the above threshold information.

SNMPv1 by itself is not a secure environment. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB.

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model RFC 2574 [12] and the View-based Access Control Model RFC 2575 [15] is recommended.

It is then a customer/user responsibility to ensure that the SNMP entity giving access to an instance of this MIB, is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

IANA Considerations

The VDSL-LINE-MIB MIB module requires the allocation of a single object identifier for its MODULE-IDENTITY. IANA should allocate this object identifier in the transmission subtree.

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