Network Working Group
Request for Comments: 3728
Category: Standards Track

B. Ray
PESA Switching Systems
R. Abbi
Alcatel

February 2004

Definitions of Managed Objects for Very High Speed Digital Subscriber Lines (VDSL)

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Copyright Notice

Copyright (C) The Internet Society (2004). All Rights Reserved.

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.

Table of Contents

1. The Internet-Standard Management Framework 2
2. Overview 2
   2.1. Relationship of the VDSL Line MIB Module to other MIB Modules. 2
   2.2. Conventions used in the MIB Module 4
   2.3. Structure. 5
   2.4. Counters, Interval Buckets and Thresholds. 7
   2.5. Profiles 8
   2.6. Notifications. 9
   2.7. Persistence. 10
3. Conformance and Compliance 11
4. Definitions. 11
5. Security Considerations. 71
6. References 72
   6.1. Normative References 72
   6.2. Informative References 74
7. Acknowledgements 74

8. Authors' Addresses 75
9. Full Copyright Statement 76

1. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

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 [RFC2119].

2. Overview

This document describes an SNMP MIB module 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 module 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 Module to other MIB Modules

This section outlines the relationship of this MIB with other MIBs described in RFCs. Specifically, IF-MIB as presented in 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 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), interleave(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 Module

2.2.1. Naming Conventions

A. Vtuc -- (VTUC) transceiver at near (Central) end of line
B. Vtur -- (VTUR) transceiver 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 -- Sum of Seconds in which xxx has occured
(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
```

o VdslLineEntity :

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

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

2.3 Structure

The MIB is structured into the 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 interleave(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=97)  ---> vdslLineTableEntry 1:(0 to 1)

  vdslLineTableEntry  ---> vdslPhysTableEntry 1:(0 to 2)
                      ---> vdslPerfDataEntry 1:(0 to 2)
                      ---> vdslLineConfProfileEntry 1:(0 to 1)
                      ---> vdslLineAlarmConfProfileEntry 1:(0 to 1)

  vdslPhysTableEntry  ---> vdslPerfIntervalEntry 1:(0 to 96)
                      ---> vdslPerf1DayIntervalEntry 1:(0 to 30)

  ifEntry(ifType=124) ---> vdslChanEntry 1:(0 to 2)
                      ---> vdslChanPerfDataEntry 1:(0 to 2)

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

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

Figure 2: Table Relationships

o vdslNotificationGroup :

This group contains definitions of VDSL line notifications. Section 2.6, below, presents greater detail on the notifications defined within the MIB module.

2.3.1. Line Topology

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

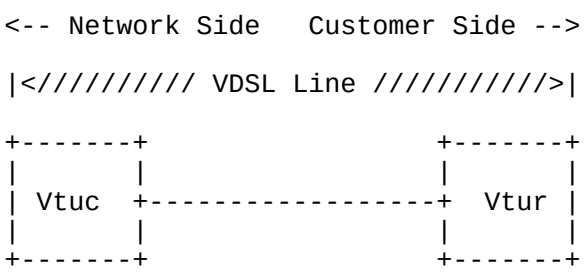

Figure 3: General topology for a VDSL Line

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 [RFC3705]. The HC-PerfHist-TC-MIB defines 64-bit versions of the textual conventions found in RFC 3593 [RFC3593].

There is no requirement for an agent to ensure a fixed relationship between the start of a fifteen minute interval 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 a Vtu is reinitialized, only when the agent is reset or reinitialized (or under specific request outside the scope of this MIB module).

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 module:

- 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 transceivers. These profiles are defined in the vdslLineAlarmConfProfileTable.

One or more lines may be configured to share parameters of a single profile by setting their 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 module.

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 [RFC3418]) 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 module) occurs. The corresponding linkUp notification MAY be sent when all link failure conditions are cleared.

The vdslPhysCurrStatus is a bitmask representing all outstanding error conditions associated with a particular VDSL transceiver. Note that since status of remote transceivers is obtained via the EOC, this information may be unavailable for units that are unreachable via the 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 counters 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 read-write and read-create objects defined in this MIB module SHOULD be stored persistently. Following is an exhaustive list of these persistent objects:

- vdslLineConfProfile
- vdslLineAlarmConfProfile
- vdslLineConfProfileName
- vdslLineConfDownRateMode
- vdslLineConfUpRateMode
- vdslLineConfDownMaxPwr
- vdslLineConfUpMaxPwr
- vdslLineConfDownMaxSnrMgn
- vdslLineConfDownMinSnrMgn
- vdslLineConfDownTargetSnrMgn
- vdslLineConfUpMaxSnrMgn
- vdslLineConfUpMinSnrMgn
- vdslLineConfUpTargetSnrMgn
- vdslLineConfDownFastMaxDataRate
- vdslLineConfDownFastMinDataRate
- vdslLineConfDownSlowMaxDataRate
- vdslLineConfDownSlowMinDataRate
- vdslLineConfUpFastMaxDataRate
- vdslLineConfUpFastMinDataRate
- vdslLineConfUpSlowMaxDataRate
- vdslLineConfUpSlowMinDataRate
- vdslLineConfDownRateRatio
- vdslLineConfUpRateRatio
- vdslLineConfDownMaxInterDelay
- vdslLineConfUpMaxInterDelay
- vdslLineConfDownPboControl
- vdslLineConfUpPboControl
- vdslLineConfDownPboLevel
- vdslLineConfUpPboLevel
- vdslLineConfDeploymentScenario
- vdslLineConfAdslPresence
- vdslLineConfApplicableStandard
- vdslLineConfBandPlan
- vdslLineConfBandPlanFx
- vdslLineConfBandOptUsage
- vdslLineConfUpPsdTemplate
- vdslLineConfDownPsdTemplate
- vdslLineConfHamBandMask
- vdslLineConfCustomNotch1Start
- vdslLineConfCustomNotch1Stop
- vdslLineConfCustomNotch2Start
- vdslLineConfCustomNotch2Stop

- vdslLineConfDownTargetSlowBurst
- vdslLineConfUpTargetSlowBurst
- vdslLineConfDownMaxFastFec
- vdslLineConfUpMaxFastFec
- vdslLineConfLineType
- vdslLineConfProfRowStatus
- vdslLineAlarmConfProfileName
- vdslLineAlarmConfThresh15MinLofs
- vdslLineAlarmConfThresh15MinLoss
- vdslLineAlarmConfThresh15MinLprs
- vdslLineAlarmConfThresh15MinLols
- vdslLineAlarmConfThresh15MinESs
- vdslLineAlarmConfThresh15MinSESs
- vdslLineAlarmConfThresh15MinUASs
- vdslLineAlarmConfInitFailure
- vdslLineAlarmConfProfRowStatus

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 [RFC3415].

3. Conformance and Compliance

For VDSL lines, the following groups are mandatory:

- vdslGroup
- vdslNotificationGroup

4. Definitions

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

IMPORTS

MODULE-IDENTITY,
OBJECT-TYPE,
Gauge32,
Integer32,
Unsigned32,
NOTIFICATION-TYPE,
transmission                    FROM SNMPv2-SMI          -- [RFC2578]
ZeroBasedCounter64              FROM HCNUM-TC            -- [RFC2856]
TEXTUAL-CONVENTION,
RowStatus,
TruthValue                      FROM SNMPv2-TC           -- [RFC2579]
HCPerfValidIntervals,
HCPerfInvalidIntervals,
HCPerfTimeElapsed,
```

```
   HCPerfIntervalThreshold,
   HCPerfCurrentCount,
   HCPerfIntervalCount             FROM HC-PerfHist-TC-MIB  -- [RFC3705]
   MODULE-COMPLIANCE,
   OBJECT-GROUP,
   NOTIFICATION-GROUP              FROM SNMPv2-CONF         -- [RFC2580]
   ifIndex                         FROM IF-MIB              -- [RFC2863]
   SnmpAdminString                 FROM SNMP-FRAMEWORK-MIB; -- [RFC3411]

   vdslMIB MODULE-IDENTITY
      LAST-UPDATED "200402190000Z" -- February 19, 2004
      ORGANIZATION "ADSLMIB Working Group"
      CONTACT-INFO "WG-email:  adslmib@ietf.org
             Info:      https://www1.ietf.org/mailman/listinfo/adslmib

             Chair:     Mike Sneed
                        Sand Channel Systems
             Postal:    P.O.  Box 37324
                        Raleigh, NC 27627-7324
                        USA
             Email:     sneedmike@hotmail.com
             Phone:     +1 206 600 7022

             Co-editor: Bob Ray
                        PESA Switching Systems, Inc.
             Postal:    330-A Wynn Drive
                        Huntsville, AL 35805
                        USA
             Email:     rray@pesa.com
             Phone:     +1 256 726 9200 ext.  142

             Co-editor: Rajesh Abbi
                        Alcatel USA
             Postal:    2301 Sugar Bush Road
                        Raleigh, NC 27612-3339
                        USA
             Email:     Rajesh.Abbi@alcatel.com
             Phone:     +1 919 850 6194
           "
   DESCRIPTION
       "The MIB module defining objects for the management of a pair
       of VDSL transceivers at each end of the VDSL line.  Each such
       line has an entry in an ifTable which may include multiple
       transceiver 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) transceiver at near (Central) end of line
          Vtur -- (VTUR) transceiver at Remote end of line
          Vtu  -- One of either Vtuc or Vtur
          Curr -- Current
          Prev -- Previous
          Atn  -- Attenuation
          ES   -- Errored Second.
          SES  -- Severely Errored Second
          UAS  -- Unavailable Second
          LCS  -- Line Code Specific
          Lof  -- Loss of Frame
          Lol  -- Loss of Link
          Los  -- Loss of Signal
          Lpr  -- Loss of Power
          xxxs -- Sum of Seconds in which xxx has occured
                  (e.g., xxx = Lof, Los, Lpr, Lol)
          Max  -- Maximum
          Mgn  -- Margin
          Min  -- Minimum
          Psd  -- Power Spectral Density
          Snr  -- Signal to Noise Ratio
          Tx   -- Transmit
          Blks -- Blocks

      Copyright (C) The Internet Society (2004).  This version
      of this MIB module is part of RFC 3728: see the RFC
      itself for full legal notices."
         REVISION "200402190000Z" -- February 19, 2004
         DESCRIPTION "Initial version, published as RFC 3728."
     ::= { transmission 97 }

  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.  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"
       SYNTAX  INTEGER
           {
           other(1),
           mcm(2),
           scm(3)
           }

   VdslLineEntity ::= TEXTUAL-CONVENTION
       STATUS       current
       DESCRIPTION
           "Identifies a transceiver as being either Vtuc or Vtur.
           A VDSL line consists of two transceivers, a Vtuc and a
           Vtur.  Attributes with this syntax reference the two sides
           of a line.  Specified as an INTEGER, the two values are:

           vtuc(1)  -- central site transceiver
           vtur(2)  -- remote site transceiver"
       SYNTAX  INTEGER
           {
           vtuc(1),
           vtur(2)
           }

   --
   -- 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),          -- only fast channel exists
           interleavedOnly(3),   -- only interleaved channel exists
           fastOrInterleaved(4), -- either fast or interleaved channel
                                 -- exist, but only one at a time
           fastAndInterleaved(5) -- both fast and interleaved 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.  Defined values are:

            noChannel(1)          -- no channels exist
            fastOnly(2)           -- only fast channel exists
            interleavedOnly(3)    -- only interleaved channel exists
            fastOrInterleaved(4)  -- either fast or interleaved channel
                                  -- exist, but only one at a time
            fastAndInterleaved(5) -- both fast and interleaved channels
                                  -- exist

            Note that 'slow' and 'interleaved' refer to the same
            channel.  In the case that the line is channelized, the
            manager can use the ifStackTable to determine the ifIndex
            for the associated channel(s)."
        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.

            This object MUST be maintained in a persistent manner."
        DEFVAL       { "DEFVAL" }
        ::= { 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.

            This object MUST be maintained in a persistent manner."
        DEFVAL       { "DEFVAL" }
        ::= { 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,
            vdslPhysInvSerialNumber         SnmpAdminString,
            vdslPhysInvVendorID             SnmpAdminString,
            vdslPhysInvVersionNumber        SnmpAdminString,
            vdslPhysCurrSnrMgn              Integer32,
            vdslPhysCurrAtn                 Gauge32,
            vdslPhysCurrStatus              BITS,
            vdslPhysCurrOutputPwr           Integer32,
            vdslPhysCurrAttainableRate      Gauge32,
            vdslPhysCurrLineRate            Gauge32
            }

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

    vdslPhysInvSerialNumber 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 }

    vdslPhysInvVendorID 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
            in hexadecimal notation."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPhysEntry 3 }

    vdslPhysInvVersionNumber 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 in hexadecimal notation."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPhysEntry 4 }

    vdslPhysCurrSnrMgn 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 +31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
         ::= { vdslPhysEntry 5 }

    vdslPhysCurrAtn 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 +63.75 dB."
```

```
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
         ::= { vdslPhysEntry 6 }

    vdslPhysCurrStatus 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 are 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 }

    vdslPhysCurrOutputPwr 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 }

    vdslPhysCurrAttainableRate OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "kbps"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Indicates the maximum currently attainable data rate
            in steps of 1000 bits/second by the Vtu.  This value
            will be equal to or greater than vdslPhysCurrLineRate.
            Note that for SCM, the minimum and maximum data rates
            are equal.  Note: 1 kbps = 1000 bps."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPhysEntry 9 }

    vdslPhysCurrLineRate OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "kbps"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
```

```
            "Indicates the current data rate in steps of 1000
            bits/second by the Vtu.  This value will be less than
            or equal to vdslPhysCurrAttainableRate.  Note: 1 kbps =
            1000 bps."
        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,
            vdslChanCurrTxSlowBurstProtect Gauge32,
            vdslChanCurrTxFastFec          Gauge32
            }

    vdslChanInterleaveDelay OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "milliseconds"
        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), return
            a value of zero."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslChanEntry 1 }

    vdslChanCrcBlockLength OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "bytes"
        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.  Note: 1
            kbps = 1000 bps."
        ::= { vdslChanEntry 3 }

    vdslChanCurrTxSlowBurstProtect OBJECT-TYPE
        SYNTAX       Gauge32 (0..1275)
        UNITS        "microseconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Actual level of impulse noise (burst) protection
            for an interleaved (slow) channel.  This parameter is
            not applicable to fast channels.  For fast channels,
            a value of zero shall be returned."
        REFERENCE    "ITU-T G.997.1, section 7.3.2.3"
        ::= { vdslChanEntry 4 }

    vdslChanCurrTxFastFec OBJECT-TYPE
        SYNTAX       Gauge32 (0..50)
```

```
        UNITS        "%"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Actual Forward Error Correction (FEC) redundancy
            related overhead for a fast channel.  This parameter
            is not applicable to an interleaved (slow) channel.
            For interleaved channels, a value of zero shall be
            returned."
        ::= { 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
            {
            vdslPerfDataValidIntervals         HCPerfValidIntervals,
            vdslPerfDataInvalidIntervals       HCPerfInvalidIntervals,
            vdslPerfDataLofs                   Unsigned32,
            vdslPerfDataLoss                   Unsigned32,
            vdslPerfDataLprs                   Unsigned32,
            vdslPerfDataLols                   Unsigned32,
            vdslPerfDataESs                    Unsigned32,
            vdslPerfDataSESs                   Unsigned32,
            vdslPerfDataUASs                   Unsigned32,
            vdslPerfDataInits                  Unsigned32,
            vdslPerfDataCurr15MinTimeElapsed   HCPerfTimeElapsed,
            vdslPerfDataCurr15MinLofs          HCPerfCurrentCount,
            vdslPerfDataCurr15MinLoss          HCPerfCurrentCount,
            vdslPerfDataCurr15MinLprs          HCPerfCurrentCount,
```

```
            vdslPerfDataCurr15MinLols          HCPerfCurrentCount,
            vdslPerfDataCurr15MinESs           HCPerfCurrentCount,
            vdslPerfDataCurr15MinSESs          HCPerfCurrentCount,
            vdslPerfDataCurr15MinUASs          HCPerfCurrentCount,
            vdslPerfDataCurr15MinInits         HCPerfCurrentCount,
            vdslPerfData1DayValidIntervals     HCPerfValidIntervals,
            vdslPerfData1DayInvalidIntervals   HCPerfInvalidIntervals,
            vdslPerfDataCurr1DayTimeElapsed    HCPerfTimeElapsed,
            vdslPerfDataCurr1DayLofs           Unsigned32,
            vdslPerfDataCurr1DayLoss           Unsigned32,
            vdslPerfDataCurr1DayLprs           Unsigned32,
            vdslPerfDataCurr1DayLols           Unsigned32,
            vdslPerfDataCurr1DayESs            Unsigned32,
            vdslPerfDataCurr1DaySESs           Unsigned32,
            vdslPerfDataCurr1DayUASs           Unsigned32,
            vdslPerfDataCurr1DayInits          Unsigned32
            }

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

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

    vdslPerfDataLofs OBJECT-TYPE
        SYNTAX       Unsigned32
        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 }
```

```
   vdslPerfDataLoss OBJECT-TYPE
       SYNTAX       Unsigned32
       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 }

   vdslPerfDataLprs OBJECT-TYPE
       SYNTAX       Unsigned32
       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 }

   vdslPerfDataLols OBJECT-TYPE
       SYNTAX       Unsigned32
       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 }

   vdslPerfDataESs OBJECT-TYPE
       SYNTAX       Unsigned32
       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 }

   vdslPerfDataSESs OBJECT-TYPE
       SYNTAX       Unsigned32
       UNITS        "seconds"
```

```
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Severely Errored Seconds since the unit was last
            reset."
        ::= { vdslPerfDataEntry 8 }

    vdslPerfDataUASs OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Unavailable Seconds since the unit was last
            reset."
        ::= { vdslPerfDataEntry 9 }

    vdslPerfDataInits OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "occurrences"
        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 }

    vdslPerfDataCurr15MinTimeElapsed OBJECT-TYPE
        SYNTAX       HCPerfTimeElapsed
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Total elapsed seconds in this interval."
        ::= { vdslPerfDataEntry 11 }

    vdslPerfDataCurr15MinLofs 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 }
```

```
   vdslPerfDataCurr15MinLoss 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 }

   vdslPerfDataCurr15MinLprs 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 }

   vdslPerfDataCurr15MinLols 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 }

   vdslPerfDataCurr15MinESs 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 }

   vdslPerfDataCurr15MinSESs OBJECT-TYPE
       SYNTAX       HCPerfCurrentCount
       UNITS        "seconds"
       MAX-ACCESS   read-only
```

```
        STATUS       current
        DESCRIPTION
            "Count of Severely Errored Seconds during this interval."
        ::= { vdslPerfDataEntry 17 }

    vdslPerfDataCurr15MinUASs OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Unavailable Seconds during this interval."
        ::= { vdslPerfDataEntry 18 }

    vdslPerfDataCurr15MinInits OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "occurrences"
        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 }

    vdslPerfData1DayValidIntervals OBJECT-TYPE
        SYNTAX       HCPerfValidIntervals
        UNITS        "intervals"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Valid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslPerfDataEntry 20 }

    vdslPerfData1DayInvalidIntervals OBJECT-TYPE
        SYNTAX       HCPerfInvalidIntervals
        UNITS        "intervals"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Invalid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslPerfDataEntry 21 }

    vdslPerfDataCurr1DayTimeElapsed 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 }

    vdslPerfDataCurr1DayLofs OBJECT-TYPE
        SYNTAX       Unsigned32
        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 }

    vdslPerfDataCurr1DayLoss OBJECT-TYPE
        SYNTAX       Unsigned32
        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 }

    vdslPerfDataCurr1DayLprs OBJECT-TYPE
        SYNTAX       Unsigned32
        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 }

    vdslPerfDataCurr1DayLols OBJECT-TYPE
        SYNTAX       Unsigned32
        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 }
```

```
   vdslPerfDataCurr1DayESs OBJECT-TYPE
       SYNTAX       Unsigned32
       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 }

   vdslPerfDataCurr1DaySESs OBJECT-TYPE
       SYNTAX       Unsigned32
       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 }

   vdslPerfDataCurr1DayUASs OBJECT-TYPE
       SYNTAX       Unsigned32
       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 }

   vdslPerfDataCurr1DayInits OBJECT-TYPE
       SYNTAX       Unsigned32
       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,
                vdslPerfIntervalNumber }
        ::= { vdslPerfIntervalTable 1 }

    VdslPerfIntervalEntry ::=
        SEQUENCE
            {
            vdslPerfIntervalNumber            Unsigned32,
            vdslPerfIntervalLofs              HCPerfIntervalCount,
            vdslPerfIntervalLoss              HCPerfIntervalCount,
            vdslPerfIntervalLprs              HCPerfIntervalCount,
            vdslPerfIntervalLols              HCPerfIntervalCount,
            vdslPerfIntervalESs               HCPerfIntervalCount,
            vdslPerfIntervalSESs              HCPerfIntervalCount,
            vdslPerfIntervalUASs              HCPerfIntervalCount,
            vdslPerfIntervalInits             HCPerfIntervalCount
            }

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

    vdslPerfIntervalLofs 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 }
```

```
   vdslPerfIntervalLoss 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 }

   vdslPerfIntervalLprs 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 }

   vdslPerfIntervalLols 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 }

   vdslPerfIntervalESs 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 }

   vdslPerfIntervalSESs OBJECT-TYPE
       SYNTAX       HCPerfIntervalCount
       UNITS        "seconds"
       MAX-ACCESS   read-only
```

```
        STATUS       current
        DESCRIPTION
            "Count of Severely Errored Seconds in the interval."
        ::= { vdslPerfIntervalEntry 7 }

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

    vdslPerfIntervalInits 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 }

    vdslPerf1DayIntervalTable OBJECT-TYPE
        SYNTAX       SEQUENCE OF VdslPerf1DayIntervalEntry
        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 }

    vdslPerf1DayIntervalEntry OBJECT-TYPE
        SYNTAX       VdslPerf1DayIntervalEntry
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "An entry in the vdslPerf1DayIntervalTable."
        INDEX { ifIndex,
                vdslPhysSide,
                vdslPerf1DayIntervalNumber }
        ::= { vdslPerf1DayIntervalTable 1 }

    VdslPerf1DayIntervalEntry ::=
        SEQUENCE
```

```
        {
        vdslPerf1DayIntervalNumber            Unsigned32,
        vdslPerf1DayIntervalMoniSecs          HCPerfTimeElapsed,
        vdslPerf1DayIntervalLofs              Unsigned32,
        vdslPerf1DayIntervalLoss              Unsigned32,
        vdslPerf1DayIntervalLprs              Unsigned32,
        vdslPerf1DayIntervalLols              Unsigned32,
        vdslPerf1DayIntervalESs               Unsigned32,
        vdslPerf1DayIntervalSESs              Unsigned32,
        vdslPerf1DayIntervalUASs              Unsigned32,
        vdslPerf1DayIntervalInits             Unsigned32
        }

    vdslPerf1DayIntervalNumber OBJECT-TYPE
        SYNTAX       Unsigned32 (1..30)
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
            "History Data Interval number.  Interval 1 is the most
            recent previous day; interval 30 is 30 days ago.  Intervals
            2 to 30 are optional."
        ::= { vdslPerf1DayIntervalEntry 1 }

    vdslPerf1DayIntervalMoniSecs 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."
        ::= { vdslPerf1DayIntervalEntry 2 }

    vdslPerf1DayIntervalLofs OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
             "Count of Loss of Frame (LOF) Seconds during the 1-day
             interval as measured by vdslPerf1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerf1DayIntervalEntry 3 }

    vdslPerf1DayIntervalLoss OBJECT-TYPE
```

```
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
             "Count of Loss of Signal (LOS) Seconds during the 1-day
             interval as measured by vdslPerf1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerf1DayIntervalEntry 4 }

    vdslPerf1DayIntervalLprs OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
             "Count of Loss of Power (LPR) Seconds during the 1-day
             interval as measured by vdslPerf1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerf1DayIntervalEntry 5 }

    vdslPerf1DayIntervalLols OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
             "Count of Loss of Link (LOL) Seconds during the 1-day
             interval as measured by vdslPerf1DayIntervalMoniSecs."
        ::= { vdslPerf1DayIntervalEntry 6 }

    vdslPerf1DayIntervalESs OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
             "Count of Errored Seconds (ES) during the 1-day
             interval as measured by vdslPerf1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerf1DayIntervalEntry 7 }

    vdslPerf1DayIntervalSESs OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
```

```
            "Count of Severely Errored Seconds (SES) during the 1-day
            interval as measured by vdslPerf1DayIntervalMoniSecs."
        ::= { vdslPerf1DayIntervalEntry 8 }

    vdslPerf1DayIntervalUASs OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of Unavailable Seconds (UAS) during the 1-day
            interval as measured by vdslPerf1DayIntervalMoniSecs."
        ::= { vdslPerf1DayIntervalEntry 9 }

    vdslPerf1DayIntervalInits OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of the line initialization attempts during the
            1-day interval as measured by vdslPerf1DayIntervalMoniSecs.
            This count includes both successful and failed attempts."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerf1DayIntervalEntry 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
```

```
            {
            vdslChanValidIntervals         HCPerfValidIntervals,
            vdslChanInvalidIntervals       HCPerfInvalidIntervals,
            vdslChanFixedOctets            ZeroBasedCounter64,
            vdslChanBadBlks                ZeroBasedCounter64,
            vdslChanCurr15MinTimeElapsed   HCPerfTimeElapsed,
            vdslChanCurr15MinFixedOctets   HCPerfCurrentCount,
            vdslChanCurr15MinBadBlks       HCPerfCurrentCount,
            vdslChan1DayValidIntervals     HCPerfValidIntervals,
            vdslChan1DayInvalidIntervals   HCPerfInvalidIntervals,
            vdslChanCurr1DayTimeElapsed    HCPerfTimeElapsed,
            vdslChanCurr1DayFixedOctets    HCPerfCurrentCount,
            vdslChanCurr1DayBadBlks        HCPerfCurrentCount
            }

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

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

   vdslChanFixedOctets OBJECT-TYPE
       SYNTAX        ZeroBasedCounter64
       UNITS         "octets"
       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 }

   vdslChanBadBlks OBJECT-TYPE
       SYNTAX        ZeroBasedCounter64
       UNITS         "blocks"
```

```
        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 }

    vdslChanCurr15MinTimeElapsed OBJECT-TYPE
        SYNTAX        HCPerfTimeElapsed
        UNITS         "seconds"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Total elapsed seconds in this interval."
        ::= { vdslChanPerfDataEntry 5 }

    vdslChanCurr15MinFixedOctets OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        UNITS         "octets"
        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 }

    vdslChanCurr15MinBadBlks OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        UNITS         "blocks"
        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 }

    vdslChan1DayValidIntervals OBJECT-TYPE
        SYNTAX        HCPerfValidIntervals
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "Valid Intervals per definition found in
            HC-PerfHist-TC-MIB."
        ::= { vdslChanPerfDataEntry 8 }

    vdslChan1DayInvalidIntervals OBJECT-TYPE
        SYNTAX        HCPerfInvalidIntervals
```

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

    vdslChanCurr1DayTimeElapsed 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 }

    vdslChanCurr1DayFixedOctets OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        UNITS         "octets"
        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 }

    vdslChanCurr1DayBadBlks OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        UNITS         "blocks"
        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,
            vdslChanIntervalFixedOctets    HCPerfIntervalCount,
            vdslChanIntervalBadBlks        HCPerfIntervalCount
            }

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

    vdslChanIntervalFixedOctets OBJECT-TYPE
        SYNTAX        HCPerfIntervalCount
        UNITS        "octets"
        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 }

    vdslChanIntervalBadBlks OBJECT-TYPE
        SYNTAX        HCPerfIntervalCount
        UNITS        "blocks"
        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,
        vdslChan1DayIntervalFixedOctets    HCPerfCurrentCount,
        vdslChan1DayIntervalBadBlks        HCPerfCurrentCount
        }

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

    vdslChan1DayIntervalFixedOctets OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        UNITS        "octets"
        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 }

    vdslChan1DayIntervalBadBlks OBJECT-TYPE
        SYNTAX        HCPerfCurrentCount
        UNITS        "blocks"
        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.

            Entries in this table MUST be maintained in a
            persistent manner."
        ::= { 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,
            vdslLineConfDownRateMode          INTEGER,
            vdslLineConfUpRateMode            INTEGER,
            vdslLineConfDownMaxPwr            Unsigned32,
            vdslLineConfUpMaxPwr              Unsigned32,
            vdslLineConfDownMaxSnrMgn         Unsigned32,
            vdslLineConfDownMinSnrMgn         Unsigned32,
            vdslLineConfDownTargetSnrMgn      Unsigned32,
            vdslLineConfUpMaxSnrMgn           Unsigned32,
            vdslLineConfUpMinSnrMgn           Unsigned32,
            vdslLineConfUpTargetSnrMgn        Unsigned32,
            vdslLineConfDownFastMaxDataRate   Unsigned32,
            vdslLineConfDownFastMinDataRate   Unsigned32,
            vdslLineConfDownSlowMaxDataRate   Unsigned32,
            vdslLineConfDownSlowMinDataRate   Unsigned32,
            vdslLineConfUpFastMaxDataRate     Unsigned32,
            vdslLineConfUpFastMinDataRate     Unsigned32,
            vdslLineConfUpSlowMaxDataRate     Unsigned32,
            vdslLineConfUpSlowMinDataRate     Unsigned32,
            vdslLineConfDownRateRatio         Unsigned32,
            vdslLineConfUpRateRatio           Unsigned32,
            vdslLineConfDownMaxInterDelay     Unsigned32,
            vdslLineConfUpMaxInterDelay       Unsigned32,
            vdslLineConfDownPboControl        INTEGER,
            vdslLineConfUpPboControl          INTEGER,
            vdslLineConfDownPboLevel          Unsigned32,
            vdslLineConfUpPboLevel            Unsigned32,
            vdslLineConfDeploymentScenario    INTEGER,
            vdslLineConfAdslPresence          INTEGER,
            vdslLineConfApplicableStandard    INTEGER,
            vdslLineConfBandPlan              INTEGER,
            vdslLineConfBandPlanFx            Unsigned32,
```

```
            vdslLineConfBandOptUsage           INTEGER,
            vdslLineConfUpPsdTemplate          INTEGER,
            vdslLineConfDownPsdTemplate        INTEGER,
            vdslLineConfHamBandMask            BITS,
            vdslLineConfCustomNotch1Start      Unsigned32,
            vdslLineConfCustomNotch1Stop       Unsigned32,
            vdslLineConfCustomNotch2Start      Unsigned32,
            vdslLineConfCustomNotch2Stop       Unsigned32,
            vdslLineConfDownTargetSlowBurst    Unsigned32,
            vdslLineConfUpTargetSlowBurst      Unsigned32,
            vdslLineConfDownMaxFastFec         Unsigned32,
            vdslLineConfUpMaxFastFec           Unsigned32,
            vdslLineConfLineType               INTEGER,
            vdslLineConfProfRowStatus          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 }

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

            manual(1)       forces the rate to the configured rate
            adaptAtInit(2)  adapts the line based upon line quality."
        DEFVAL       { adaptAtInit }
        ::= { vdslLineConfProfileEntry 2 }

    vdslLineConfUpRateMode OBJECT-TYPE
        SYNTAX       INTEGER
```

```
                    {
                    manual(1),
                    adaptAtInit(2)
                    }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the rate selection behavior for the line
            in the upstream direction.

            manual(1)       forces the rate to the configured rate
            adaptAtInit(2)  adapts the line based upon line quality."
        DEFVAL       { adaptAtInit }
        ::= { vdslLineConfProfileEntry 3 }

    vdslLineConfDownMaxPwr 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 to 14.5 dBm."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 4 }

    vdslLineConfUpMaxPwr 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 to 14.5 dBm."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 5 }

    vdslLineConfDownMaxSnrMgn 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 to 31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
```

```
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 6 }

    vdslLineConfDownMinSnrMgn 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 to 31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 7 }

    vdslLineConfDownTargetSnrMgn 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 to 31.75 dB.
            This is the Noise Margin the transceivers must achieve
            with a BER of 10^-7 or better to successfully complete
            initialization."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 8 }

    vdslLineConfUpMaxSnrMgn 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 to 31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 9 }

    vdslLineConfUpMinSnrMgn 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 to 31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 10 }

    vdslLineConfUpTargetSnrMgn 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 to 31.75 dB.  This
            is the Noise Margin the transceivers must achieve with
            a BER of 10^-7 or better to successfully complete
            initialization."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 11 }

    vdslLineConfDownFastMaxDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum downstream fast channel
            data rate in steps of 1000 bits/second."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 12 }

    vdslLineConfDownFastMinDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum downstream fast channel
            data rate in steps of 1000 bits/second."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 13 }

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

```
        DESCRIPTION
            "Specifies the maximum downstream slow channel
            data rate in steps of 1000 bits/second.

            The maximum aggregate downstream transmit speed
            of the line can be derived from the sum of maximum
            downstream fast and slow channel data rates."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 14 }

    vdslLineConfDownSlowMinDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum downstream slow channel
            data rate in steps of 1000 bits/second.

            The minimum aggregate downstream transmit speed
            of the line can be derived from the sum of minimum
            downstream fast and slow channel data rates."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 15 }

    vdslLineConfUpFastMaxDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum upstream fast channel
            data rate in steps of 1000 bits/second.

            The maximum aggregate upstream transmit speed
            of the line can be derived from the sum of maximum
            upstream fast and slow channel data rates."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 16 }

    vdslLineConfUpFastMinDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum upstream fast channel
            data rate in steps of 1000 bits/second.
```

```
            The minimum aggregate upstream transmit speed
            of the line can be derived from the sum of minimum
            upstream fast and slow channel data rates."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 17 }

    vdslLineConfUpSlowMaxDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the maximum upstream slow channel
            data rate in steps of 1000 bits/second."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 18 }

    vdslLineConfUpSlowMinDataRate OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kbps"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the minimum upstream slow channel
            data rate in steps of 1000 bits/second."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 19 }

    vdslLineConfDownRateRatio 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."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 20 }

    vdslLineConfUpRateRatio 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."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 21 }

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

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

    vdslLineConfDownPboControl 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 transceivers which do not support downstream
            PBO control, this object MUST be fixed at disabled(1).
            If auto(2) is selected, the transceiver will automatically
            adjust the power backoff.  If manual(3) is selected,
```

```
            then the transceiver will use the value from
            vdslLineConfDownPboLevel."
        DEFVAL       { disabled }
        ::= { vdslLineConfProfileEntry 24 }

    vdslLineConfUpPboControl 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 transceivers which do not support upstream
            PBO control, this object MUST be fixed at disabled(1).
            If auto(2) is selected, the transceiver will automatically
            adjust the power backoff.  If manual(3) is selected,
            then the transceiver will use the value from
            vdslLineConfUpPboLevel."
        DEFVAL       { disabled }
        ::= { vdslLineConfProfileEntry 25 }

    vdslLineConfDownPboLevel 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 vdslLineConfDownPboControl = manual(3)."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 26 }

    vdslLineConfUpPboLevel 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 vdslLineConfUpPboControl = manual(3)."
        DEFVAL       { 0 }
        ::= { 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.  Changes to this value will have
            no effect on the transceiver."
        REFERENCE    "DSL Forum TR-057"
        DEFVAL       { fttCab }
        ::= { 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.

            none(1)         indicates no ADSL service in the bundle
            adslOverPots(2) indicates ADSL service over POTS is
                            present in the bundle
            adslOverISDN(3) indicates ADSL service over ISDN is
                            present in the bundle"
        DEFVAL       { none }
        ::= { 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.

             ansi(1)      indicates ANSI standard
             etsi(2)      indicates ETSI standard
             itu(3)       indicates ITU standard
             other(4)     indicates a standard other than the above."
        DEFVAL       { ansi }
        ::= { 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."
        DEFVAL       { bandPlan997 }
        ::= { 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)."
        DEFVAL       { 3750 }
        ::= { vdslLineConfProfileEntry 32 }

       vdslLineConfBandOptUsage OBJECT-TYPE
        SYNTAX       INTEGER
                     {
                     unused(1),
                     upstream(2),
                     downstream(3)
                     }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Defines the VDSL link use of the optional frequency
            range [25kHz - 138kHz] (Opt).

            unused(1)     indicates Opt is unused
            upstream(2)   indicates Opt usage is for upstream
            downstream(3) indicates Opt usage is for downstream."
        REFERENCE    "ITU-T G.993.1, section 6.1"
        DEFVAL       { unused }
        ::= { vdslLineConfProfileEntry 33 }

    vdslLineConfUpPsdTemplate 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.
            Here, templateMask1(1) refers to a notched mask that
            limits the transmitted PSD within the internationally
            standardized HAM (Handheld Amateur Radio) radio bands,
            while templateMask2(2) refers to an unnotched mask.

            The masks themselves depend upon the applicable
            standard being used (vdslLineConfApplicableStandard)."
        REFERENCE    "DSL TR-057"
        DEFVAL       { templateMask1 }
        ::= { vdslLineConfProfileEntry 34 }
```

```
   vdslLineConfDownPsdTemplate 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.
           Here, templateMask1(1) refers to a notched mask that
           limits the transmitted PSD within the internationally
           standardized HAM (Handheld Amateur Radio) radio bands,
           while templateMask2(2) refers to an unnotched mask.

           The masks themselves depend upon the applicable
           standard being used (vdslLineConfApplicableStandard)."
       REFERENCE    "DSL TR-057"
       DEFVAL       { templateMask1 }
       ::= { 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, used
           to avoid interference with HAM (Handheld Amateur Radio)
           radio bands by introducing power control (notching) in one
           or more of these bands.

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

           Band  Start Frequency     Stop Frequency
           ----  ------------------  --------------------------------
           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."
        REFERENCE    "DSLF TR-057, section 2.6"
        DEFVAL       { { } }
        ::= { vdslLineConfProfileEntry 36 }

    vdslLineConfCustomNotch1Start OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kHz"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the start frequency of custom HAM (Handheld
            Amateur Radio) notch 1.  vdslLineConfCustomNotch1Start MUST
            be less than or equal to vdslLineConfCustomNotch1Stop."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 37 }

    vdslLineConfCustomNotch1Stop OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kHz"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the stop frequency of custom HAM (Handheld
            Amateur Radio) notch 1.  vdslLineConfCustomNotch1Stop MUST
            be greater than or equal to vdslLineConfCustomNotch1Start."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 38 }

    vdslLineConfCustomNotch2Start OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kHz"
        MAX-ACCESS   read-create
```

```
        STATUS       current
        DESCRIPTION
            "Specifies the start frequency of custom HAM (Handheld
            Amateur Radio) notch 2.  vdslLineConfCustomNotch2Start MUST
            be less than or equal to vdslLineConfCustomNotch2Stop."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 39 }

    vdslLineConfCustomNotch2Stop OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "kHz"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the stop frequency of custom HAM (Handheld
            Amateur Radio) notch 2.  vdslLineConfCustomNotch2Stop MUST
            be greater than or equal to vdslLineConfCustomNotch2Start."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 40 }

    vdslLineConfDownTargetSlowBurst OBJECT-TYPE
        SYNTAX       Unsigned32 (0..1275)
        UNITS        "microseconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the target level of impulse noise (burst)
            protection for an interleaved (slow) channel."
        REFERENCE    "ITU-T G.997.1, section 7.3.2.3"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 41 }

    vdslLineConfUpTargetSlowBurst OBJECT-TYPE
        SYNTAX       Unsigned32 (0..1275)
        UNITS        "microseconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "Specifies the target level of impulse noise (burst)
            protection for an interleaved (slow) channel."
        REFERENCE    "ITU-T G.997.1, section 7.3.2.3"
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 42 }

    vdslLineConfDownMaxFastFec OBJECT-TYPE
        SYNTAX       Unsigned32 (0..50)
        UNITS        "%"
        MAX-ACCESS   read-create
```

```
        STATUS       current
        DESCRIPTION
            "This parameter provisions the maximum level of Forward
            Error Correction (FEC) redundancy related overhead to
            be maintained for a fast channel."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 43 }

    vdslLineConfUpMaxFastFec OBJECT-TYPE
        SYNTAX       Unsigned32 (0..50)
        UNITS        "%"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This parameter provisions the maximum level of Forward
            Error Correction (FEC) redundancy related overhead to
            be maintained for a fast channel."
        DEFVAL       { 0 }
        ::= { vdslLineConfProfileEntry 44 }

    vdslLineConfLineType OBJECT-TYPE
        SYNTAX       INTEGER
            {
            noChannel(1),         -- no channels exist
            fastOnly(2),          -- only fast channel exists
            interleavedOnly(3),   -- only interleaved channel exists
            fastOrInterleaved(4), -- either fast or interleaved channel
                                  -- exist, but only one at a time
            fastAndInterleaved(5) -- both fast and interleaved channels
                                  -- exist
            }
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This parameter provisions the VDSL physical entity at
            start-up by defining whether and how the line will be
            channelized, i.e., which channel type(s) are supported.
            If the line is to be channelized, the value will be other
            than noChannel(1).

            This configuration can be activated only during start-up.
            Afterwards, the value of vdslLineType coincides with the
            value of vdslLineConfLineType.  Depending on this value,
            the corresponding entries in the ifTable for the
            interleaved and the fast channels are enabled or disabled
            according to the value of their ifOperStatus.

            Defined values are:
```

```
            noChannel(1)          -- no channels exist
            fastOnly(2)           -- only fast channel exists
            interleavedOnly(3)    -- only interleaved channel exists
            fastOrInterleaved(4)  -- either fast or interleaved channel
                                  -- exists, but only one at a time
            fastAndInterleaved(5) -- both fast and interleaved channels
                                  -- exist

            Note that 'slow' and 'interleaved' refer to the same
            channel."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        DEFVAL       { noChannel }
        ::= { vdslLineConfProfileEntry 45 }

    vdslLineConfProfRowStatus 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.

            An 'active' profile may be modified at any time.  Note
            that some changes may require that any referenced lines be
            restarted (e.g., vdslLineConfLineType)."
        ::= { vdslLineConfProfileEntry 46 }

    --
    -- 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.
```

```
            Entries in this table MUST be maintained in a
            persistent manner."
        ::= { 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,
            vdslLineAlarmConfThresh15MinLofs   HCPerfIntervalThreshold,
            vdslLineAlarmConfThresh15MinLoss   HCPerfIntervalThreshold,
            vdslLineAlarmConfThresh15MinLprs   HCPerfIntervalThreshold,
            vdslLineAlarmConfThresh15MinLols   HCPerfIntervalThreshold,
            vdslLineAlarmConfThresh15MinESs    HCPerfIntervalThreshold,
            vdslLineAlarmConfThresh15MinSESs   HCPerfIntervalThreshold,
            vdslLineAlarmConfThresh15MinUASs   HCPerfIntervalThreshold,
            vdslLineAlarmConfInitFailure       TruthValue,
            vdslLineAlarmConfProfRowStatus     RowStatus
            }

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

    vdslLineAlarmConfThresh15MinLofs 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."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 2 }

    vdslLineAlarmConfThresh15MinLoss 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."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 3 }

    vdslLineAlarmConfThresh15MinLprs 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."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 4 }

    vdslLineAlarmConfThresh15MinLols 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."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 5 }

    vdslLineAlarmConfThresh15MinESs 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."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 6 }

    vdslLineAlarmConfThresh15MinSESs 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."
        DEFVAL       { 0 }
```

```
        ::= { vdslLineAlarmConfProfileEntry 7 }

    vdslLineAlarmConfThresh15MinUASs 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."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 8 }

    vdslLineAlarmConfInitFailure 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."
        DEFVAL       { false }
        ::= { vdslLineAlarmConfProfileEntry 9 }

    vdslLineAlarmConfProfRowStatus 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.

            An 'active' profile may be modified at any time."
        ::= { vdslLineAlarmConfProfileEntry 10 }
```

```
   -- Notification definitions

   vdslNotifications OBJECT IDENTIFIER ::= { vdslLineMib 0 }

   vdslPerfLofsThreshNotification NOTIFICATION-TYPE
       OBJECTS      {
                    vdslPerfDataCurr15MinLofs
                    }
       STATUS       current
       DESCRIPTION
           "Loss of Framing 15-minute interval threshold
            (vdslLineAlarmConfThresh15MinLofs) reached."
       ::= { vdslNotifications 1 }

   vdslPerfLossThreshNotification NOTIFICATION-TYPE
       OBJECTS       {
                     vdslPerfDataCurr15MinLoss
                     }
       STATUS        current
       DESCRIPTION
           "Loss of Signal 15-minute interval threshold
           (vdslLineAlarmConfThresh15MinLoss) reached."
       ::= { vdslNotifications 2 }

   vdslPerfLprsThreshNotification NOTIFICATION-TYPE
       OBJECTS       {
                     vdslPerfDataCurr15MinLprs
                     }
       STATUS        current
       DESCRIPTION
           "Loss of Power 15-minute interval threshold
           (vdslLineAlarmConfThresh15MinLprs) reached."
       ::= { vdslNotifications 3 }

   vdslPerfLolsThreshNotification NOTIFICATION-TYPE
       OBJECTS       {
                     vdslPerfDataCurr15MinLols
                     }
       STATUS        current
       DESCRIPTION
           "Loss of Link 15-minute interval threshold
           (vdslLineAlarmConfThresh15MinLols) reached."
       ::= { vdslNotifications 4 }

   vdslPerfESsThreshNotification NOTIFICATION-TYPE
       OBJECTS       {
                     vdslPerfDataCurr15MinESs
                     }
```

```
        STATUS        current
        DESCRIPTION
            "Errored Seconds 15-minute interval threshold
            (vdslLineAlarmConfThresh15MinESs) reached."
        ::= { vdslNotifications 5 }

    vdslPerfSESsThreshNotification NOTIFICATION-TYPE
        OBJECTS       {
                      vdslPerfDataCurr15MinSESs
                      }
        STATUS        current
        DESCRIPTION
            "Severely Errored Seconds 15-minute interval threshold
            (vdslLineAlarmConfThresh15MinSESs) reached."
        ::= { vdslNotifications 6 }

    vdslPerfUASsThreshNotification NOTIFICATION-TYPE
        OBJECTS       {
                      vdslPerfDataCurr15MinUASs
                      }
        STATUS        current
        DESCRIPTION
            "Unavailable Seconds 15-minute interval threshold
            (vdslLineAlarmConfThresh15MinUASs) reached."
        ::= { vdslNotifications 7 }

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

    vdslDownMinSnrMgnNotification NOTIFICATION-TYPE
        OBJECTS       {
                      vdslPhysCurrSnrMgn
                      }
        STATUS        current
        DESCRIPTION
            "The downstream Signal to Noise Margin fell below
            vdslLineConfDownMinSnrMgn.  The object vdslPhysCurrSnrMgn
            will contain the Signal to Noise margin as measured by
            the VTU-R."
```

```
        ::= { vdslNotifications 9 }

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

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

    vdslInitFailureNotification NOTIFICATION-TYPE
        OBJECTS       {
                      vdslPhysCurrStatus
                      }
        STATUS        current
        DESCRIPTION
            "Vtu initialization failed.  See vdslPhysCurrStatus 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,
            vdslNotificationGroup
            }
        ::= { vdslCompliances 1 }

    -- units of conformance

        vdslGroup OBJECT-GROUP
            OBJECTS
                {
                vdslLineCoding,
                vdslLineType,
                vdslLineConfProfile,
                vdslLineAlarmConfProfile,
                vdslPhysInvSerialNumber,
                vdslPhysInvVendorID,
                vdslPhysInvVersionNumber,
                vdslPhysCurrSnrMgn,
                vdslPhysCurrAtn,
                vdslPhysCurrStatus,
                vdslPhysCurrOutputPwr,
                vdslPhysCurrAttainableRate,
                vdslPhysCurrLineRate,
                vdslChanInterleaveDelay,
                vdslChanCrcBlockLength,
                vdslChanCurrTxRate,
                vdslChanCurrTxSlowBurstProtect,
                vdslChanCurrTxFastFec,
                vdslPerfDataValidIntervals,
                vdslPerfDataInvalidIntervals,
                vdslPerfDataLofs,
                vdslPerfDataLoss,
                vdslPerfDataLprs,
                vdslPerfDataLols,
                vdslPerfDataESs,
                vdslPerfDataSESs,
                vdslPerfDataUASs,
                vdslPerfDataInits,
                vdslPerfDataCurr15MinTimeElapsed,
                vdslPerfDataCurr15MinLofs,
                vdslPerfDataCurr15MinLoss,
                vdslPerfDataCurr15MinLprs,
                vdslPerfDataCurr15MinLols,
                vdslPerfDataCurr15MinESs,
                vdslPerfDataCurr15MinSESs,
```

```
                vdslPerfDataCurr15MinUASs,
                vdslPerfDataCurr15MinInits,
                vdslPerfData1DayValidIntervals,
                vdslPerfData1DayInvalidIntervals,
                vdslPerfDataCurr1DayTimeElapsed,
                vdslPerfDataCurr1DayLofs,
                vdslPerfDataCurr1DayLoss,
                vdslPerfDataCurr1DayLprs,
                vdslPerfDataCurr1DayLols,
                vdslPerfDataCurr1DayESs,
                vdslPerfDataCurr1DaySESs,
                vdslPerfDataCurr1DayUASs,
                vdslPerfDataCurr1DayInits,
                vdslPerfIntervalLofs,
                vdslPerfIntervalLoss,
                vdslPerfIntervalLprs,
                vdslPerfIntervalLols,
                vdslPerfIntervalESs,
                vdslPerfIntervalSESs,
                vdslPerfIntervalUASs,
                vdslPerfIntervalInits,
                vdslPerf1DayIntervalMoniSecs,
                vdslPerf1DayIntervalLofs,
                vdslPerf1DayIntervalLoss,
                vdslPerf1DayIntervalLprs,
                vdslPerf1DayIntervalLols,
                vdslPerf1DayIntervalESs,
                vdslPerf1DayIntervalSESs,
                vdslPerf1DayIntervalUASs,
                vdslPerf1DayIntervalInits,
                vdslChanValidIntervals,
                vdslChanInvalidIntervals,
                vdslChanFixedOctets,
                vdslChanBadBlks,
                vdslChanCurr15MinTimeElapsed,
                vdslChanCurr15MinFixedOctets,
                vdslChanCurr15MinBadBlks,
                vdslChan1DayValidIntervals,
                vdslChan1DayInvalidIntervals,
                vdslChanCurr1DayTimeElapsed,
                vdslChanCurr1DayFixedOctets,
                vdslChanCurr1DayBadBlks,
                vdslChanIntervalFixedOctets,
                vdslChanIntervalBadBlks,
                vdslChan1DayIntervalMoniSecs,
                vdslChan1DayIntervalFixedOctets,
                vdslChan1DayIntervalBadBlks,
                vdslLineConfDownRateMode,
```

```
                vdslLineConfUpRateMode,
                vdslLineConfDownMaxPwr,
                vdslLineConfUpMaxPwr,
                vdslLineConfDownMaxSnrMgn,
                vdslLineConfDownMinSnrMgn,
                vdslLineConfDownTargetSnrMgn,
                vdslLineConfUpMaxSnrMgn,
                vdslLineConfUpMinSnrMgn,
                vdslLineConfUpTargetSnrMgn,
                vdslLineConfDownFastMaxDataRate,
                vdslLineConfDownFastMinDataRate,
                vdslLineConfDownSlowMaxDataRate,
                vdslLineConfDownSlowMinDataRate,
                vdslLineConfUpFastMaxDataRate,
                vdslLineConfUpFastMinDataRate,
                vdslLineConfUpSlowMaxDataRate,
                vdslLineConfUpSlowMinDataRate,
                vdslLineConfDownRateRatio,
                vdslLineConfUpRateRatio,
                vdslLineConfDownMaxInterDelay,
                vdslLineConfUpMaxInterDelay,
                vdslLineConfDownPboControl,
                vdslLineConfUpPboControl,
                vdslLineConfDownPboLevel,
                vdslLineConfUpPboLevel,
                vdslLineConfDeploymentScenario,
                vdslLineConfAdslPresence,
                vdslLineConfApplicableStandard,
                vdslLineConfBandPlan,
                vdslLineConfBandPlanFx,
                vdslLineConfBandOptUsage,
                vdslLineConfUpPsdTemplate,
                vdslLineConfDownPsdTemplate,
                vdslLineConfHamBandMask,
                vdslLineConfCustomNotch1Start,
                vdslLineConfCustomNotch1Stop,
                vdslLineConfCustomNotch2Start,
                vdslLineConfCustomNotch2Stop,
                vdslLineConfDownTargetSlowBurst,
                vdslLineConfUpTargetSlowBurst,
                vdslLineConfDownMaxFastFec,
                vdslLineConfUpMaxFastFec,
                vdslLineConfLineType,
                vdslLineConfProfRowStatus,
                vdslLineAlarmConfThresh15MinLofs,
                vdslLineAlarmConfThresh15MinLoss,
                vdslLineAlarmConfThresh15MinLprs,
                vdslLineAlarmConfThresh15MinLols,
```

```
            vdslLineAlarmConfThresh15MinESs,
            vdslLineAlarmConfThresh15MinSESs,
            vdslLineAlarmConfThresh15MinUASs,
            vdslLineAlarmConfInitFailure,
            vdslLineAlarmConfProfRowStatus
            }
        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,
            vdslDownMaxSnrMgnNotification,
            vdslDownMinSnrMgnNotification,
            vdslUpMaxSnrMgnNotification,
            vdslUpMinSnrMgnNotification,
            vdslInitFailureNotification
            }
        STATUS      current
        DESCRIPTION
             "This group supports notifications of significant
             conditions associated with VDSL Lines."
    ::= { vdslGroups 2 }

END
```

5. Security Considerations

There are a number of management objects defined in this MIB module with 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.

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP.

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.

Additionally, allowing write access to configuration data may allow an end-user to increase their service levels or affect other end-users in either a positive or negative manner. For this reason, the following tables should be considered to contain sensitive information:

- vdslLineTable
- vdslLineConfProfileTable
- vdslLineAlarmConfProfileTable

Individual line utilization information, available via the performance tables, may be considered sensitive. For example, if an end-user has a far lower line utilization during certain periods of the day, it may indicate an empty office or residence. For these reasons, the following tables should be considered to contain sensitive information:

- vdslPerfDataTable
- vdslPerfIntervalTable
- vdslPerf1DayIntervalTable

Further, notifications generated by agents implementing this MIB will contain threshold and performance information.

It is thus important to control even GET access to the objects within these tables 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.

SNMP versions prior to SNMPv3 did not include adequate security. 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 module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module 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.

6. References

6.1. Normative References

[DSLFTR057] DSL Forum TR-057, "VDSL Network Element Management", February 2003.

[ETSI2701] ETSI TS 101 270-1 V1.2.1 "Transmission and Multiplexing (TM); Access transmission systems on metallic access cables; Very high speed Digital Subscriber Line (VDSL); Part 1: Functional requirements", October 1999.

[ETSI2702] ETSI TS 101 270-2 V1.1.1 "Transmission and Multiplexing (TM); Access transmission systems on metallic access cables; Very high speed Digital Subscriber Line (VDSL); Part 1: Transceiver specification", February 2001.

[ITU9931] ITU-T G.993.1 "Very-high-speed digital subscriber line foundation", November 2001.

[ITU9971] ITU-T G.997.1 "Physical layer management for Digital Subscriber Line (DSL) Transceivers", July 1999.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2578] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Structure of Management Information Version 2 (SMIv2)", STD 58, RFC 2578, April 1999.

[RFC2579] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Textual Conventions for SMIv2", STD 58, RFC 2579, April 1999.

[RFC2580] McCloghrie, K., Perkins, D., Schoenwaelder, J., Case, J., Rose, M. and S. Waldbusser, "Conformance Statements for SMIv2", STD 58, RFC 2580, April 1999.

[RFC2856] Bierman, A., McCloghrie, K. and R. Presuhn, "Textual Conventions for Additional High Capacity Data Types", RFC 2856, June 2000.

[RFC2863] McCloghrie, K. and F. Kastenholz, "The Interfaces Group MIB", RFC 2863, June 2000.

[RFC3411] Harrington, D., Presuhn, R. and B. Wijnen, "An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks", RFC 3411, December 2002.

[RFC3418] Presuhn, R., "Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)", STD 62, RFC 3418, December 2002.

[RFC3593] Tesink, K., "Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals", RFC 3593, September 2003.

[RFC3705] Ray, B. and R. Abbi, "High Capacity Textual Conventions for MIB Modules Using Performance History Based on 15 Minute Intervals", RFC 3705, February 2004.

[T1E1311] ANSI T1E1.4/2001-311, "Very-high-bit-rate Digital Subscriber Line (VDSL) Metallic Interface, Part 1: Functional Requirements and Common Specification", February 2001.

[T1E1011] ANSI T1E1.4/2001-011R3, "VDSL Metallic Interface, Part 2: Technical Specification for a Single-Carrier Modulation (SCM) Transceiver", November 2001.

[T1E1013] ANSI T1E1.4/2001-013R4, "VDSL Metallic Interface, Part 3: Technical Specification for a Multi-Carrier Modulation (MCM) Transceiver", November 2000.

6.2. Informative References

[RFC3410] Case, J., Mundy, R., Partain, D. and B. Stewart, "Introduction and Applicability Statements for Internet-Standard Management Framework", RFC 3410, December 2002.

[RFC3415] Wijnen, B., Presuhn, R. and K. McCloghrie, "View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP)", STD 62, RFC 3415, December 2002.

7. Acknowledgements

Greg Bathrick (Texas Instruments)

Umberto Bonollo (NEC)

Andrew Cheers (NEC)

Felix Flemisch (Siemens)

David Horton (CiTR)

Travis Levin (Paradyne)

Moti Morgenstern (Inovia)

Randy Presuhn (BMC)

Say Sabit (NLC)

Bert Wijnen (Lucent)

8. Authors' Addresses

Bob Ray
PESA Switching Systems, Inc.
330-A Wynn Drive
Huntsville, AL 35805
USA

Phone: +1 256 726 9200 ext. 142
Fax: +1 256 726 9271
EMail: rray@pesa.com

Rajesh Abbi
Alcatel USA
2301 Sugar Bush Road
Raleigh, NC 27612-3339
USA

Phone: +1 919 850 6194
EMail: Rajesh.Abbi@alcatel.com

9. Full Copyright Statement

Copyright (C) The Internet Society (2004). This document is subject to the rights, licenses and restrictions contained in BCP 78 and except as set forth therein, the authors retain all their rights.

This document and the information contained herein are provided on an "AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Intellectual Property

The IETF takes no position regarding the validity or scope of any Intellectual Property Rights or other rights that might be claimed to pertain to the implementation or use of the technology described in this document or the extent to which any license under such rights might or might not be available; nor does it represent that it has made any independent effort to identify any such rights. Information on the procedures with respect to rights in RFC documents can be found in BCP 78 and BCP 79.

Copies of IPR disclosures made to the IETF Secretariat and any assurances of licenses to be made available, or the result of an attempt made to obtain a general license or permission for the use of such proprietary rights by implementers or users of this specification can be obtained from the IETF on-line IPR repository at http://www.ietf.org/ipr.

The IETF invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement this standard. Please address the information to the IETF at ietf-ipr@ietf.org.

Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.