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Definitions of Managed Objects for Very High Speed Digital Subscriber Lines (VDSL) draft-ietf-adslmib-vdsl-10.txt

Status of this Memo

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Abstract

This document defines a portion of the 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

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].

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 such tables extend the ifEntry table, and are indexed by ifIndex. For interfaces in systems implementing this MIB, those table entries indexed by ifIndex MUST be persistent.

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

ifIndex	Interface index.
ifDescr	See interfaces MIB [RFC2863].
ifType	vdsl(97), interleaved(124), or fast(125)

ifSpeed	Set as appropriate.

ifPhysAddress	This object MUST have an octet string with zero length.
ifAdminStatus	See interfaces MIB [RFC2863].
ifOperStatus	See interfaces MIB [RFC2863].
ifLastChange	See interfaces MIB [RFC2863].
ifName	See interfaces MIB [RFC2863].
ifHighSpeed	Set as appropriate.
ifConnectorPresent	Set as appropriate.
ifLinkUpDownTrapEnable	Default to enabled(1).

Figure 1: Use of ifTable Objects

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

2.2 Conventions used in the MIB 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 occurs (e.g., xxx=Lof, Los, Lpr, Lol)
P. Max -- Maximum
Q. Mgn -- Margin
R. Min -- Minimum
S. Psd -- Power Spectral Density
T. Snr -- Signal to Noise Ratio
U. Tx -- Transmit

V. Blks -- Blocks

2.2.2 Textual Conventions

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

o VdslLineCodingType :

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

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

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 interleaved(124) and (fast):

- vdslChanTable
- vdslChanPerfDataTable
- vdslChanPerfIntervalTable
- vdslChanPerf1DayIntervalTable

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

```
ifEntry(ifType=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 tranceiver unit) and a Vtur (the remote transceiver unit).

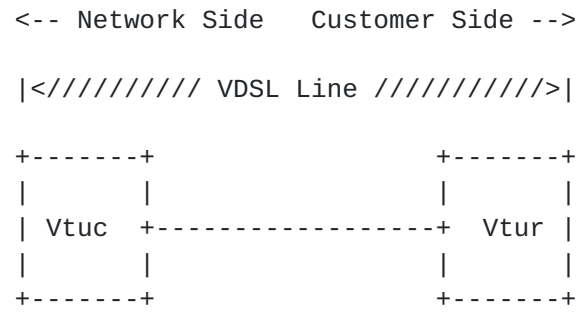

Figure 3: General topology for a VDSL Line

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 [RFCXXXX]. The HC-PerfHist-TC-MIB defines 64-
--- RFC Ed: please replace XXXX with the RFC number assigned to the
--- accompanying HC-TC MIB
bit versions of the textual conventions found in RFC 2493 [RFC2493].

There is no requirement for an agent to ensure a fixed relationship between the start of a fifteen minute 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 its vdslLineConfProfile objects to the value of this profile. If a change is made to the profile, all lines that refer to it will be reconfigured to the changed parameters. Before a profile can be deleted or taken out of service it must be first unreferenced from all associated lines.

Implementations MUST provide a default profile with an index value of 'DEFVAL' for each profile type. The values of the associated parameters will be vendor specific unless otherwise indicated in

this document. Before a line's profiles have been set, these
profiles will be automatically used by setting vdslLineConfProfile

and vdslLineAlarmConfProfile to 'DEFVAL' where appropriate. This default profile name, 'DEFVAL', is considered reserved in the context of profiles defined in this MIB 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 vdslCurrStatus 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 EOC during a line error condition. Therefore, not all conditions may always be included in its current status. Notifications corresponding to the bit fields in this object are defined.

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

Note that the Network Management System, or NMS, may receive a linkDown notification, as well, if enabled (via

ifLinkUpDownTrapEnable [RFC2863]). At the beginning of the next 15 minute interval, the counter is reset. When the first second goes by and the event occurs, the current interval bucket will be 1, which equals the threshold and the notification will be sent again.

2.7 Persistence

All 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
vdslThresh15MinLofs
vdslThresh15MinLoss
vdslThresh15MinLprs
vdslThresh15MinLols
vdslThresh15MinESs
vdslThresh15MinSESs
vdslThresh15MinUASs
vdslInitFailureNotifyEnable
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 [RFC2575].

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
ZeroBasedCounter64              FROM HCNUM-TC
TEXTUAL-CONVENTION,
RowStatus,
TruthValue                      FROM SNMPv2-TC
HCPerfValidIntervals,
HCPerfInvalidIntervals,
HCPerfTimeElapsed,
```

```
    HCPerfIntervalThreshold,
    HCPerfCurrentCount,
    HCPerfIntervalCount             FROM HC-PerfHist-TC-MIB
```

```
    MODULE-COMPLIANCE,
    OBJECT-GROUP,
    NOTIFICATION-GROUP              FROM SNMPv2-CONF
    ifIndex                         FROM IF-MIB
    SnmpAdminString                 FROM SNMP-FRAMEWORK-MIB;

    vdslMIB MODULE-IDENTITY
       LAST-UPDATED "200306060000Z" -- June 6, 2003
       ORGANIZATION "ADSLMIB Working Group"
       CONTACT-INFO "WG-email:  adslmib@ietf.org
              Info:      https://www1.ietf.org/mailman/listinfo/adslmib

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            "
    DESCRIPTION
        "The MIB module defining objects for the management of a pair
        of VDSL 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 -- Interval of Seconds in which xxx occurs
                    (e.g., xxx=Lof, Los, Lpr)
            Max  -- Maximum
            Mgn  -- Margin
            Min  -- Minimum
            Psd  -- Power Spectral Density
            Snr  -- Signal to Noise Ratio
            Tx   -- Transmit
            Blks -- Blocks

        Copyright (C) The Internet Society (2003).  This version
        of this MIB module is part of RFC XXXX: see the RFC
        itself for full legal notices."
-- RFC Ed.: replace XXXX with assigned number & remove this note
        REVISION "200306060000Z" -- June 6, 2003
        DESCRIPTION "Initial version, published as RFC XXXX."
-- RFC Ed.: replace XXXX with assigned number & remove this note
    ::= { transmission YYYY }
-- RFC Ed.: replace YYYY with IANA-assigned number & remove this note

    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 transcievers, 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

            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."
        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."
        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,
            vdslInvSerialNumber           SnmpAdminString,
            vdslInvVendorID               SnmpAdminString,
            vdslInvVersionNumber          SnmpAdminString,
            vdslCurrSnrMgn                Integer32,
```

```
            vdslCurrAtn                 Gauge32,
            vdslCurrStatus              BITS,
            vdslCurrOutputPwr           Integer32,
```

```
            vdslCurrAttainableRate         Gauge32,
            vdslCurrLineRate               Gauge32
            }

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

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

    vdslInvVendorID OBJECT-TYPE
        SYNTAX       SnmpAdminString (SIZE (0..16))
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "The vendor ID code is a copy of the binary vendor
            identification field expressed as readable characters
            in hexadecimal notation."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPhysEntry 3 }

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

    vdslCurrSnrMgn OBJECT-TYPE
        SYNTAX       Integer32 (-127..127)
        UNITS        "0.25dBm"
        MAX-ACCESS   read-only
```

```
        STATUS       current
        DESCRIPTION
            "Noise Margin as seen by this Vtu with respect to its
```

```
            received signal in 0.25dB.  The effective range is
            -31.75 to +31.75 dB."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
         ::= { vdslPhysEntry 5 }

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

    vdslCurrStatus OBJECT-TYPE
        SYNTAX       BITS
            {
            noDefect(0),
            lossOfFraming(1),
            lossOfSignal(2),
            lossOfPower(3),
            lossOfSignalQuality(4),
            lossOfLink(5),
            dataInitFailure(6),
            configInitFailure(7),
            protocolInitFailure(8),
            noPeerVtuPresent(9)
            }
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
            "Indicates current state of the Vtu line.  This is a
            bit-map of possible conditions.  The various bit
            positions are:

            0   noDefect             There 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 }

    vdslCurrOutputPwr OBJECT-TYPE
        SYNTAX       Integer32 (0..160)
        UNITS        "0.1dBm"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Measured total output power transmitted by this VTU.
            This is the measurement that was reported during
            the last activation sequence."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPhysEntry 8 }

    vdslCurrAttainableRate OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "kbps"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Indicates the maximum currently attainable data rate
            in steps of 1000 bits/second by the Vtu.  This value
            will be equal to or greater than vdslCurrLineRate.
            Note that for SCM, the minimum and maximum data rates
            are equal.  Note: 1 kbps = 1000 bps."
```

```
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPhysEntry 9 }
```

```
    vdslCurrLineRate OBJECT-TYPE
        SYNTAX       Gauge32
        UNITS        "kbps"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Indicates the current data rate in steps of 1000
            bits/second by the Vtu.  This value will be less than
            or equal to vdslCurrAttainableRate.  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
            {
            vdslPerfValidIntervals         HCPerfValidIntervals,
            vdslPerfInvalidIntervals       HCPerfInvalidIntervals,
            vdslPerfLofs                   Unsigned32,
            vdslPerfLoss                   Unsigned32,
            vdslPerfLprs                   Unsigned32,
            vdslPerfLols                   Unsigned32,
            vdslPerfESs                    Unsigned32,
            vdslPerfSESs                   Unsigned32,
            vdslPerfUASs                   Unsigned32,
            vdslPerfInits                  Unsigned32,
            vdslPerfCurr15MinTimeElapsed   HCPerfTimeElapsed,
            vdslPerfCurr15MinLofs          HCPerfCurrentCount,
            vdslPerfCurr15MinLoss          HCPerfCurrentCount,
            vdslPerfCurr15MinLprs          HCPerfCurrentCount,
            vdslPerfCurr15MinLols          HCPerfCurrentCount,
            vdslPerfCurr15MinESs           HCPerfCurrentCount,
            vdslPerfCurr15MinSESs          HCPerfCurrentCount,
```

```
            vdslPerfCurr15MinUASs          HCPerfCurrentCount,
            vdslPerfCurr15MinInits         HCPerfCurrentCount,
            vdslPerf1DayValidIntervals     HCPerfValidIntervals,
```

```
            vdslPerf1DayInvalidIntervals   HCPerfInvalidIntervals,
            vdslPerfCurr1DayTimeElapsed    HCPerfTimeElapsed,
            vdslPerfCurr1DayLofs           Unsigned32,
            vdslPerfCurr1DayLoss           Unsigned32,
            vdslPerfCurr1DayLprs           Unsigned32,
            vdslPerfCurr1DayLols           Unsigned32,
            vdslPerfCurr1DayESs            Unsigned32,
            vdslPerfCurr1DaySESs           Unsigned32,
            vdslPerfCurr1DayUASs           Unsigned32,
            vdslPerfCurr1DayInits          Unsigned32
            }

    vdslPerfValidIntervals 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 }

    vdslPerfInvalidIntervals 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 }

    vdslPerfLofs 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 }

    vdslPerfLoss 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 }

    vdslPerfLprs 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 }

    vdslPerfLols 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 }

    vdslPerfESs 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 }

    vdslPerfSESs 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 }

    vdslPerfUASs 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 }

    vdslPerfInits OBJECT-TYPE
        SYNTAX       Unsigned32
        UNITS        "occurences"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of the line initialization attempts since the unit
            was last reset.  This count includes both successful and
            failed attempts."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerfDataEntry 10 }

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

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

    vdslPerfCurr15MinLoss OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
        MAX-ACCESS   read-only
        STATUS       current
        DESCRIPTION
            "Count of seconds during this interval that there
            was Loss of Signal."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerfDataEntry 13 }

    vdslPerfCurr15MinLprs OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "seconds"
```

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

```
            "Count of seconds during this interval that there
            was Loss of Power."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerfDataEntry 14 }

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

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

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

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

    vdslPerfCurr15MinInits OBJECT-TYPE
        SYNTAX       HCPerfCurrentCount
        UNITS        "occurences"
        MAX-ACCESS   read-only
```

```
        STATUS       current
        DESCRIPTION
            "Count of the line initialization attempts during this
```

```
            interval.  This count includes both successful and
            failed attempts."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerfDataEntry 19 }

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

    vdslPerf1DayInvalidIntervals 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 }

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

    vdslPerfCurr1DayLofs OBJECT-TYPE
        SYNTAX       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 }

    vdslPerfCurr1DayLoss 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 }

    vdslPerfCurr1DayLprs 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 }

    vdslPerfCurr1DayLols 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 }

    vdslPerfCurr1DayESs 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 }

    vdslPerfCurr1DaySESs 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 }

    vdslPerfCurr1DayUASs 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 }
```

```
    vdslPerfCurr1DayInits 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,
                vdslIntervalNumber }
        ::= { vdslPerfIntervalTable 1 }

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

    vdslIntervalNumber OBJECT-TYPE
        SYNTAX       Unsigned32 (1..96)
```

```
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
```

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

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

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

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

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

    vdslIntervalESs OBJECT-TYPE
```

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

```
        STATUS       current
        DESCRIPTION
            "Count of Errored Seconds (ES) in the interval.  An Errored
            Second is a one-second interval containing one or more CRC
            anomalies, one or more LOS or LOF defects."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdslPerfIntervalEntry 6 }

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

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

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

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

    vdsl1DayIntervalEntry OBJECT-TYPE
        SYNTAX       Vdsl1DayIntervalEntry
```

```
        MAX-ACCESS   not-accessible
        STATUS       current
        DESCRIPTION
```

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

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

    vdsl1DayIntervalNumber 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."
        ::= { vdsl1DayIntervalEntry 1 }

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

    vdsl1DayIntervalLofs OBJECT-TYPE
        SYNTAX       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 vdsl1DayIntervalMoniSecs."
```

```
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdsl1DayIntervalEntry 3 }

    vdsl1DayIntervalLoss 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 vdsl1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdsl1DayIntervalEntry 4 }

    vdsl1DayIntervalLprs 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 vdsl1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdsl1DayIntervalEntry 5 }

    vdsl1DayIntervalLols 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 vdsl1DayIntervalMoniSecs."
        ::= { vdsl1DayIntervalEntry 6 }

    vdsl1DayIntervalESs 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 vdsl1DayIntervalMoniSecs."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdsl1DayIntervalEntry 7 }

    vdsl1DayIntervalSESs 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 vdsl1DayIntervalMoniSecs."
        ::= { vdsl1DayIntervalEntry 8 }

    vdsl1DayIntervalUASs 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 vdsl1DayIntervalMoniSecs."
        ::= { vdsl1DayIntervalEntry 9 }

    vdsl1DayIntervalInits 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 vdsl1DayIntervalMoniSecs.
            This count includes both successful and failed attempts."
        REFERENCE    "T1E1.4/2000-009R3, Part 1, common spec"
        ::= { vdsl1DayIntervalEntry 10 }

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

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

    VdslChanPerfDataEntry ::=
        SEQUENCE
            {
```

```
            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."
        ::= { 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 vdslLineConfCustomNotch2Stop."
        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 vlaue,
            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 the fast channel exists
            interleavedOnly(3)    -- only the interleaved channel exists
            fastOrInterleaved(4)  -- either the fast or the 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."
        ::= { 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."
        ::= { vdslMibObjects 20 }

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

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

    VdslLineAlarmConfProfileEntry ::=
        SEQUENCE
            {
            vdslLineAlarmConfProfileName       SnmpAdminString,
            vdslThresh15MinLofs                HCPerfIntervalThreshold,
            vdslThresh15MinLoss                HCPerfIntervalThreshold,
            vdslThresh15MinLprs                HCPerfIntervalThreshold,
            vdslThresh15MinLols                HCPerfIntervalThreshold,
            vdslThresh15MinESs                 HCPerfIntervalThreshold,
            vdslThresh15MinSESs                HCPerfIntervalThreshold,
            vdslThresh15MinUASs                HCPerfIntervalThreshold,
            vdslInitFailureNotifyEnable        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
            adminstrator."
        ::= { vdslLineAlarmConfProfileEntry 1 }

    vdslThresh15MinLofs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
```

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

```
        DESCRIPTION
            "This object configures the threshold for the number of
             loss of frame seconds (lofs) within any given 15-minute
             performance data collection interval.  If the value of
             loss of frame seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfLofsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 2 }

    vdslThresh15MinLoss OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
             loss of signal seconds (loss) within any given 15-minute
             performance data collection interval.  If the value of
             loss of signal seconds in a particular 15-minute
             collection interval reaches/exceeds this value, a
             vdslPerfLossThreshNotification notification will be
             generated.  One notification will be sent per interval
             per endpoint."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 3 }

    vdslThresh15MinLprs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
             loss of power seconds (lprs) within any given 15-minute
             performance data collection interval.  If the value of
             loss of power seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfLprsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 4 }

    vdslThresh15MinLols OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
```

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

```
            "This object configures the threshold for the number of
             loss of link seconds (lols) within any given 15-minute
             performance data collection interval.  If the value of
             loss of power seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfLolsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 5 }

    vdslThresh15MinESs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
             errored seconds (ESs) within any given 15-minute
             performance data collection interval.  If the value of
             errored seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfESsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 6 }

    vdslThresh15MinSESs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
             severely errored seconds (SESs) within any given 15-minute
             performance data collection interval.  If the value of
             severely errored seconds in a particular 15-minute
             collection interval reaches/exceeds this value, a
             vdslPerfSESsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
        DEFVAL       { 0 }
        ::= { vdslLineAlarmConfProfileEntry 7 }

    vdslThresh15MinUASs OBJECT-TYPE
        SYNTAX       HCPerfIntervalThreshold
        UNITS        "seconds"
        MAX-ACCESS   read-create
```

```
        STATUS       current
        DESCRIPTION
            "This object configures the threshold for the number of
```

```
             unavailable seconds (UASs) within any given 15-minute
             performance data collection interval.  If the value of
             unavailable seconds in a particular 15-minute collection
             interval reaches/exceeds this value, a
             vdslPerfUASsThreshNotification notification will be
             generated.  No more than one notification will be sent
             per interval."
         DEFVAL       { 0 }
         ::= { vdslLineAlarmConfProfileEntry 8 }

    vdslInitFailureNotifyEnable 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."
         ::= { vdslLineAlarmConfProfileEntry 10 }

    -- Notification definitions

    vdslNotifications OBJECT IDENTIFIER ::= { vdslLineMib 0 }

    vdslPerfLofsThreshNotification NOTIFICATION-TYPE
         OBJECTS      {
                      vdslPerfCurr15MinLofs
                      }
         STATUS       current
         DESCRIPTION
             "Loss of Framing 15-minute interval threshold
              (vdslThresh15MinLofs) reached."
```

```
        ::= { vdslNotifications 1 }

    vdslPerfLossThreshNotification NOTIFICATION-TYPE
```

```
        OBJECTS       {
                      vdslPerfCurr15MinLoss
                      }
        STATUS        current
        DESCRIPTION
            "Loss of Signal 15-minute interval threshold
            (vdslThresh15MinLoss) reached."
        ::= { vdslNotifications 2 }

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

    vdslPerfLolsThreshNotification NOTIFICATION-TYPE
        OBJECTS       {
                      vdslPerfCurr15MinLols
                      }
        STATUS        current
        DESCRIPTION
            "Loss of Link 15-minute interval threshold
            (vdslThresh15MinLols) reached."
        ::= { vdslNotifications 4 }

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

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

```
    vdslPerfUASsThreshNotification NOTIFICATION-TYPE
        OBJECTS       {
                      vdslPerfCurr15MinUASs
```

```
                    }
        STATUS      current
        DESCRIPTION
            "Unavailable Seconds 15-minute interval threshold
            (vdslThresh15MinUASs) reached."
        ::= { vdslNotifications 7 }

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

    vdslDownMinSnrMgnNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslCurrSnrMgn
                    }
        STATUS      current
        DESCRIPTION
            "The downstream Signal to Noise Margin fell below
            vdslLineConfDownMinSnrMgn.    The object
            vdslCurrSnrMgn will contain the Signal to Noise
            margin as measured by the VTU-R."
        ::= { vdslNotifications 9 }

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

    vdslUpMinSnrMgnNotification NOTIFICATION-TYPE
        OBJECTS     {
                    vdslCurrSnrMgn
                    }
        STATUS      current
        DESCRIPTION
```

"The upstream Signal to Noise Margin fell below
vdslLineConfUpMinSnrMgn. The object
vdslCurrSnrMgn will contain the Signal to Noise

```
            margin as measured by the VTU-C."
        ::= { vdslNotifications 11 }

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

    -- conformance information

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

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

        MODULE  -- this module
        MANDATORY-GROUPS
            {
            vdslGroup,
            vdslNotificationGroup
            }
        ::= { vdslCompliances 1 }

    -- units of conformance

        vdslGroup OBJECT-GROUP
            OBJECTS
                {
                vdslLineCoding,
                vdslLineType,
                vdslLineConfProfile,
                vdslLineAlarmConfProfile,
                vdslInvSerialNumber,
                vdslInvVendorID,
                vdslInvVersionNumber,
                vdslCurrSnrMgn,
                vdslCurrAtn,
                vdslCurrStatus,
                vdslCurrOutputPwr,
```

```
                vdslCurrAttainableRate,
                vdslCurrLineRate,
                vdslChanInterleaveDelay,
```

```
                vdslChanCrcBlockLength,
                vdslChanCurrTxRate,
                vdslChanCurrTxSlowBurstProtect,
                vdslChanCurrTxFastFec,
                vdslPerfValidIntervals,
                vdslPerfInvalidIntervals,
                vdslPerfLofs,
                vdslPerfLoss,
                vdslPerfLprs,
                vdslPerfLols,
                vdslPerfESs,
                vdslPerfSESs,
                vdslPerfUASs,
                vdslPerfInits,
                vdslPerfCurr15MinTimeElapsed,
                vdslPerfCurr15MinLofs,
                vdslPerfCurr15MinLoss,
                vdslPerfCurr15MinLprs,
                vdslPerfCurr15MinLols,
                vdslPerfCurr15MinESs,
                vdslPerfCurr15MinSESs,
                vdslPerfCurr15MinUASs,
                vdslPerfCurr15MinInits,
                vdslPerf1DayValidIntervals,
                vdslPerf1DayInvalidIntervals,
                vdslPerfCurr1DayTimeElapsed,
                vdslPerfCurr1DayLofs,
                vdslPerfCurr1DayLoss,
                vdslPerfCurr1DayLprs,
                vdslPerfCurr1DayLols,
                vdslPerfCurr1DayESs,
                vdslPerfCurr1DaySESs,
                vdslPerfCurr1DayUASs,
                vdslPerfCurr1DayInits,
                vdslIntervalLofs,
                vdslIntervalLoss,
                vdslIntervalLprs,
                vdslIntervalLols,
                vdslIntervalESs,
                vdslIntervalSESs,
                vdslIntervalUASs,
                vdslIntervalInits,
                vdsl1DayIntervalMoniSecs,
                vdsl1DayIntervalLofs,
                vdsl1DayIntervalLoss,
                vdsl1DayIntervalLprs,
                vdsl1DayIntervalLols,
                vdsl1DayIntervalESs,
                vdsl1DayIntervalSESs,
```

```
                vdsl1DayIntervalUASs,
                vdsl1DayIntervalInits,
                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,
                vdslThresh15MinLofs,
                vdslThresh15MinLoss,
                vdslThresh15MinLprs,
                vdslThresh15MinLols,
                vdslThresh15MinESs,
                vdslThresh15MinSESs,
                vdslThresh15MinUASs,
                vdslInitFailureNotifyEnable,
                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. Intellectual Property Notice

The IETF takes no position regarding the validity or scope of any

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6. Normative References

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8. Security Considerations

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

VDSL layer connectivity from the Vtur will permit the subscriber to manipulate both the VDSL link directly and the VDSL embedded

operations channel (EOC) for their own loop. For example, unchecked or unfiltered fluctuations initiated by the subscriber could generate sufficient notifications to potentially overwhelm either the management interface to the network or the element manager.

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

```
vdslThresh15MinLofs
vdslThresh15MinLoss
vdslThresh15MinLprs
vdslThresh15MinLols
vdslThresh15MinESs
vdslThresh15MinSESs
vdslThresh15MinUASs
```

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

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

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) objects which utilize the textual conventions defined 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 a MIB module which utilizes the textual conventions defined in 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.

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