                Definitions of Managed Object Extensions
        for Very High Speed Digital Subscriber Lines (VDSL) Using
              Single Carrier Modulation (SCM) Line Coding

Status of This Memo

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

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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 the Line Code Specific parameters of Very High Speed Digital
   Subscriber Line (VDSL) interfaces using Single Carrier Modulation
   (SCM) Line Coding. It is an optional extension to the VDSL-LINE-MIB,
   RFC 3728, which handles line code independent objects.

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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 the Line Code
   Dependent, Physical Medium Dependent (PMD) Layer of SCM VDSL Lines.
   These definitions are based upon the specifications for VDSL as
   defined in T1E1, European Telecommunications Standards Institute
   (ETSI), and International Telecommunication Union (ITU) documentation
   [T1E1311, T1E1011, T1E1013, ETSI2701, ETSI2702, ITU9931, ITU9971].
   Additionally the protocol-dependent (and line-code dependent)
   management framework for VDSL lines specified by the Digital
   Subscriber Line Forum (DSLF) has been taken into consideration
   [DSLFTR57] and [DSLFWT96].

The MIB module is located in the MIB tree under MIB-2 transmission.

The key words "MUST", "MUST NOT", "RECOMMENDED", and "SHOULD" in this
document are to be interpreted as described in [RFC2119].

2.1. Relationship of this MIB Module to Other MIB Modules

The relationship of the VDSL Line MIB module to other MIB modules, in
particular to the IF-MIB presented in RFC 2863 [RFC2863], is
discussed in the VDSL-LINE-MIB, RFC 3728 [RFC3728]. This section
outlines the relationship of this VDSL Line Extension MIB to the
VDSL-LINE-MIB, RFC 3728 [RFC3728].

2.2. Conventions Used in the MIB Module

2.2.1. Naming Conventions

    A. Vtuc -- VDSL transceiver unit at near (Central) end of line
    B. Vtur -- VDSL transceiver unit at Remote end of line
    C. Vtu -- One of either Vtuc or Vtur
    D. Curr -- Current
    F. Atn -- Attenuation
    J. LCS -- Line Code Specific
    K. Max -- Maximum
    Q. Mgn -- Margin
    S. PSD -- Power Spectral Density
    T. Rx   -- Receive
    T. Snr -- Signal to Noise Ratio
    U. Tx   -- Transmit

2.3. Structure

The SCM VDSL Line Extension MIB contains the following MIB group:

o   vdslSCMGroup :

This group supports MIB objects for defining configuration profiles
and for monitoring individual bands of Single Carrier Modulation
(SCM) VDSL modems. It contains the following tables:

    - vdslLineSCMConfProfileTxBandTable
    - vdslSCMPhysBandTable

If the SCM VDSL Line Extension MIB is implemented then all objects in
this group MUST be implemented.

Figure 1 below displays the relationship of the tables in the
vdslSCMGroup to the vdslGroup and to the ifEntry:

```
      ifEntry(ifType=97)  ----> vdslLineTableEntry 1:(0..1)

       vdslLineTableEntry (vdslLineCoding=SCM)
              ----> vdslPhysTableEntry 1:(0..2)
                 ----> vdslSCMPhysBandTable 1:(0..5)

       vdslLineConfProfileEntry(vdslLineConfProfileName)
                     ----> vdslLineSCMConfProfileBandTable 1:(0..5)
```

                    Figure 1: Table Relationships

   When the object vdslLineCoding is set to SCM, vdslLineConfProfileName
   is used as the index to vdslLineSCMConfProfileBandTable. The
   existence of an entry in any of the tables of the vdslSCMGroup is
   optional.

2.4. Persistence

   All read-create objects defined in this MIB module SHOULD be stored
   persistently. Following is an exhaustive list of these persistent
   objects:

       vdslLineSCMConfProfileBandId
       vdslLineSCMConfProfileBandUsage
       vdslLineSCMConfProfileBandCenterFrequency
       vdslLineSCMConfProfileBandSymbolRate
       vdslLineSCMConfProfileBandConstellationSize
       vdslLineSCMConfProfileBandTransmitPSDLevel
       vdslLineSCMConfProfileBandRowStatus
       vdslLineSCMPhysBandId
       vdslLineSCMPhysBandUsage
       vdslLineSCMPhysBandCurrPSDLevel
       vdslLineSCMPhysBandCurrSymbolRate
       vdslLineSCMPhysBandCurrConstellationSize
       vdslLineSCMPhysBandCurrCenterFrequency
       vdslLineSCMPhysBandPerformanceBandId
       vdslLineSCMPhysBandPerformanceBandUsage
       vdslLineSCMPhysBandPerformanceBandSnrMgn
       vdslLineSCMPhysBandPerformanceBandAtn

   Note also that the interface indices in this MIB are maintained
   persistently. View-based Access Control Model (VACM) data relating
   to these SHOULD be stored persistently as well [RFC3415].

3. Conformance and Compliance

   An SCM based VDSL agent does not have to implement this MIB to be
   compliant with RFC 3728 [RFC3728]. If the SCM VDSL Line Extension
   MIB is implemented then the following group is mandatory:

      - vdslSCMGroup

4. Definitions

   VDSL-LINE-EXT-SCM-MIB DEFINITIONS ::= BEGIN

   IMPORTS

   MODULE-IDENTITY,
   OBJECT-TYPE,
   Integer32,
   transmission,
   Unsigned32   FROM SNMPv2-SMI   -- [RFC2578]
   TEXTUAL-CONVENTION,
   TruthValue,
   RowStatus   FROM SNMPv2-TC   -- [RFC2579]
   MODULE-COMPLIANCE,
   OBJECT-GROUP   FROM SNMPv2-CONF   -- [RFC2580]
   ifIndex   FROM IF-MIB   -- [RFC2863]
   vdslLineConfProfileName   FROM VDSL-LINE-MIB;   -- [RFC3728]

   vdslExtSCMMIB MODULE-IDENTITY
      LAST-UPDATED "200504280000Z" --   April 28, 2005
      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 VDSL-LINE-MIB found in RFC 3728 defines objects for the
      management of a pair of VDSL transceivers at each end of the VDSL
      line. The VDSL-LINE-MIB configures and monitors the line code
      independent parameters (TC layer) of the VDSL line. This MIB
      module is an optional extension of the VDSL-LINE-MIB and defines
      objects for configuration and monitoring of the line code specific
      (LCS) elements (PMD layer) for VDSL lines using SCM coding. The
      objects in this extension MIB MUST NOT be used for VDSL lines
      using Multiple Carrier Modulation (MCM) line coding. If an object
      in this extension MIB is referenced by a line which does not use
      SCM, it has no effect on the operation of that line.

      Naming Conventions:

         Vtuc -- VDSL transceiver at near (Central) end of line
         Vtur -- VDSL transceiver at Remote end of line
         Vtu -- One of either Vtuc or Vtur
         Curr -- Current
         Atn -- Attenuation
         LCS -- Line Code Specific
         Max -- Maximum
         Mgn -- Margin
         PSD -- Power Spectral Density
         Rx   -- Receive
         Snr -- Signal to Noise Ratio
         Tx   -- Transmit

      Copyright (C) The Internet Society (2005). This version
      of this MIB module is part of RFC 4069: see the RFC
      itself for full legal notices."
            REVISION "200504280000Z" --   April 28, 2005
            DESCRIPTION "Initial version, published as RFC 4069."
         ::= { transmission 228 }

      vdslLineExtSCMMib   OBJECT IDENTIFIER ::= { vdslExtSCMMIB 1 }
      vdslLineExtSCMMibObjects OBJECT IDENTIFIER ::=
                                            { vdslLineExtSCMMib 1 }
   --

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


VdslSCMBandId ::= TEXTUAL-CONVENTION
    STATUS        current
    DESCRIPTION
       "This data type is used as the syntax for the VDSL SCM Band
        Identity.  Attributes with this syntax identify the SCM Band
        referred to.  Specified as an INTEGER, the possible values
        are:

        optionalBand (1)  -- the optional Band range [25kHz - 138kHz]
        firstDownstreamBand (2)  -- first Downstream Band
        firstUpstreamBand (3)    -- first Upstream Band
        secondDownstreamBand (4) -- second Downstream Band
        secondUpstreamBand (5)   -- second Upstream Band
        thirdDownstreamBand (6)  -- third Downstream Band
        thirdUpstreamBand (7)    -- third Upstream Band"


    SYNTAX        INTEGER      {  optionalBand (1),
                                  firstDownstreamBand (2),
                                  firstUpstreamBand (3),
                                  secondDownstreamBand (4),
                                  secondUpstreamBand (5),
                                  thirdDownstreamBand (6),
                                  thirdUpstreamBand(7) }

--
-- Single carrier modulation (SCM) configuration profile tables
--

vdslLineSCMConfProfileBandTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF VdslLineSCMConfProfileBandEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
       "This table contains transmit band descriptor configuration
        information for a VDSL line.  Each entry in this table
        reflects the configuration for one of possibly many bands
        of a single carrier modulation (SCM) VDSL line.  For each
        profile which is associated with a VDSL line using SCM
        line coding, five entries in this table will exist, one for
        each of the five bands.  Bands which are not in use will be
        marked as unused.  These entries are defined by a manager
        and can be used to configure the VDSL line.  If an entry in
```

```
        this table is referenced by a line which does not use SCM,
        it has no effect on the operation of that line."
     ::= { vdslLineExtSCMMibObjects 1 }

  vdslLineSCMConfProfileBandEntry OBJECT-TYPE
     SYNTAX          VdslLineSCMConfProfileBandEntry
     MAX-ACCESS   not-accessible
     STATUS          current
     DESCRIPTION
        "Each entry consists of a list of parameters that
        represents the configuration of a single carrier
        modulation VDSL modem transmit band.

        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.

        All read-create objects defined in this MIB module SHOULD be
        stored persistently."

     INDEX { vdslLineConfProfileName,
      vdslLineSCMConfProfileBandId }
     ::= { vdslLineSCMConfProfileBandTable 1 }

  VdslLineSCMConfProfileBandEntry ::=
     SEQUENCE
        {
        vdslLineSCMConfProfileBandId               VdslSCMBandId,
        vdslLineSCMConfProfileBandInUse            TruthValue,
        vdslLineSCMConfProfileBandCenterFrequency  Unsigned32,
        vdslLineSCMConfProfileBandSymbolRate       Unsigned32,
        vdslLineSCMConfProfileBandConstellationSize Unsigned32,
        vdslLineSCMConfProfileBandTransmitPSDLevel Unsigned32,
        vdslLineSCMConfProfileBandRowStatus        RowStatus
        }

  vdslLineSCMConfProfileBandId OBJECT-TYPE
     SYNTAX      VdslSCMBandId
     MAX-ACCESS  not-accessible
     STATUS  current
     DESCRIPTION
        "The BandId for this entry, which specifies which band
         is being referred to."
     ::= { vdslLineSCMConfProfileBandEntry 1 }
```

```
   vdslLineSCMConfProfileBandInUse OBJECT-TYPE
       SYNTAX        TruthValue
       MAX-ACCESS    read-create
       STATUS  current
       DESCRIPTION
          "Indicates whether this band is in use.
           If set to True this band is in use."
       ::= { vdslLineSCMConfProfileBandEntry 2 }

   vdslLineSCMConfProfileBandCenterFrequency OBJECT-TYPE
       SYNTAX        Unsigned32
       UNITS         "Hz"
       MAX-ACCESS    read-create
       STATUS        current
       DESCRIPTION
          "Specifies the center frequency in Hz"
       REFERENCE     "T1E1.4/2000-011R3"    -- Part 2, SCM
       ::= { vdslLineSCMConfProfileBandEntry 3 }

   vdslLineSCMConfProfileBandSymbolRate OBJECT-TYPE
       SYNTAX        Unsigned32
       UNITS         "baud"
       MAX-ACCESS    read-create
       STATUS        current
       DESCRIPTION
          "The requested symbol rate in baud."
       REFERENCE     "T1E1.4/2000-011R3"    -- Part 2, SCM
       ::= { vdslLineSCMConfProfileBandEntry 4 }

   vdslLineSCMConfProfileBandConstellationSize OBJECT-TYPE
       SYNTAX        Unsigned32 (0..16)
       UNITS         "log2"
       MAX-ACCESS    read-create
       STATUS        current
       DESCRIPTION
          "Specifies the constellation size."
       REFERENCE     "T1E1.4/2000-011R3"    -- Part 2, SCM
       ::= { vdslLineSCMConfProfileBandEntry 5 }
```

```
    vdslLineSCMConfProfileBandTransmitPSDLevel OBJECT-TYPE
        SYNTAX        Unsigned32
        UNITS         "-0.25 dBm/Hz"
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
           "The requested transmit power spectral density for the VDSL
            modem.  The Actual value in -0.25 dBm/Hz."
        REFERENCE     "T1E1.4/2000-011R3"    -- Part 2, SCM
        ::= { vdslLineSCMConfProfileBandEntry 6  }


    vdslLineSCMConfProfileBandRowStatus 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.

            None of the columns in this row may be modified while the
            row is in the 'active' state.

            Before a profile can be deleted or taken out of
            service, (by setting this object to 'destroy' or
            'notInService') it must be first unreferenced
            from all associated lines."

        ::= { vdslLineSCMConfProfileBandEntry 7 }

    --
    -- SCM physical band
    --

    vdslLineSCMPhysBandTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF VdslLineSCMPhysBandEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
           "This table provides one row for each SCM Vtu band.  This
            table is read only as it reflects the current physical
            parameters of each band.  For each ifIndex which is
            associated with a VDSL line using SCM line coding, five
            entries in this table will exist, one for each of the
            five bands.  Bands which are not in use will be marked
            as unused."
```

```
       ::= { vdslLineExtSCMMibObjects 2 }

   vdslLineSCMPhysBandEntry OBJECT-TYPE
       SYNTAX         VdslLineSCMPhysBandEntry
       MAX-ACCESS     not-accessible
       STATUS         current
       DESCRIPTION
          "An entry in the vdslLineSCMPhysBandTable."
       INDEX { ifIndex,
             vdslLineSCMPhysBandId  }
       ::= { vdslLineSCMPhysBandTable 1 }

   VdslLineSCMPhysBandEntry ::=
       SEQUENCE
           {
           vdslLineSCMPhysBandId                     VdslSCMBandId,
           vdslLineSCMPhysBandInUse                  TruthValue,
           vdslLineSCMPhysBandCurrCenterFrequency    Unsigned32,
           vdslLineSCMPhysBandCurrSymbolRate         Unsigned32,
           vdslLineSCMPhysBandCurrConstellationSize  Unsigned32,
           vdslLineSCMPhysBandCurrPSDLevel           Unsigned32,
           vdslLineSCMPhysBandCurrSnrMgn             Integer32,
           vdslLineSCMPhysBandCurrAtn                Unsigned32
           }

   vdslLineSCMPhysBandId OBJECT-TYPE
       SYNTAX         VdslSCMBandId
       MAX-ACCESS  not-accessible
       STATUS  current
       DESCRIPTION
          "The BandId for this entry, which specifies which band
           is being referred to."
       ::= { vdslLineSCMPhysBandEntry 1 }

   vdslLineSCMPhysBandInUse OBJECT-TYPE
       SYNTAX         TruthValue
       MAX-ACCESS  read-only
       STATUS  current
       DESCRIPTION
          "Indicates whether this band is in use.
           If set to True this band is in use."
       ::= { vdslLineSCMPhysBandEntry 2 }
```

```
    vdslLineSCMPhysBandCurrCenterFrequency OBJECT-TYPE
        SYNTAX        Unsigned32
        UNITS         "Hz"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
           "The current center frequency in Hz for this band."
        REFERENCE     "T1E1.4/2000-011R3"    -- Part 2, SCM
        ::= { vdslLineSCMPhysBandEntry 3 }

    vdslLineSCMPhysBandCurrSymbolRate    OBJECT-TYPE
        SYNTAX        Unsigned32
        UNITS         "baud"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
           "The current value of the symbol rate in baud for this
            band."
       REFERENCE     "T1E1.4/2000-011R3"    -- Part 2, SCM
       ::= { vdslLineSCMPhysBandEntry 4 }

    vdslLineSCMPhysBandCurrConstellationSize OBJECT-TYPE
        SYNTAX        Unsigned32 (0..16)
        UNITS         "log2"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
           "The current constellation size on this band."
        REFERENCE     "T1E1.4/2000-011R3"    -- Part 2, SCM
        ::= { vdslLineSCMPhysBandEntry 5 }

    vdslLineSCMPhysBandCurrPSDLevel    OBJECT-TYPE
        SYNTAX        Unsigned32
        UNITS         "- 0.25 dBm/Hz"
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
           "The transmit power spectral density for the
            VDSL modem."
        REFERENCE     "T1E1.4/2000-011R3"    -- Part 2, SCM
        ::= { vdslLineSCMPhysBandEntry 6 }
```

```
   vdslLineSCMPhysBandCurrSnrMgn OBJECT-TYPE
       SYNTAX         Integer32
       UNITS          "0.25 dB"
       MAX-ACCESS     read-only
       STATUS         current
       DESCRIPTION
          "Noise margin as seen by this Vtu and band with respect
           to its received signal in 0.25 dB."
       ::= { vdslLineSCMPhysBandEntry 7 }

   vdslLineSCMPhysBandCurrAtn OBJECT-TYPE
       SYNTAX         Unsigned32 (0..255)
       UNITS          "0.25 dB"
       MAX-ACCESS     read-only
       STATUS         current
       DESCRIPTION
          "Measured difference in the total power transmitted by
           the peer Vtu on this band and the total power received
           by this Vtu on this band in 0.25 dB."
       ::= { vdslLineSCMPhysBandEntry 8 }

   -- conformance information

   vdslLineExtSCMConformance OBJECT IDENTIFIER ::=
                                       { vdslLineExtSCMMib 2 }
   vdslLineExtSCMGroups OBJECT IDENTIFIER ::=
                                     { vdslLineExtSCMConformance 1 }
   vdslLineExtSCMCompliances OBJECT IDENTIFIER ::=
                                     { vdslLineExtSCMConformance 2 }

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

       MODULE  -- this module

       MANDATORY-GROUPS
       {
         vdslLineExtSCMGroup
       }

       ::= { vdslLineExtSCMCompliances 1 }
```

```
   -- units of conformance

   vdslLineExtSCMGroup      OBJECT-GROUP
       OBJECTS
           {
           vdslLineSCMConfProfileBandInUse,
           vdslLineSCMConfProfileBandTransmitPSDLevel,
           vdslLineSCMConfProfileBandSymbolRate,
           vdslLineSCMConfProfileBandConstellationSize,
           vdslLineSCMConfProfileBandCenterFrequency,
           vdslLineSCMConfProfileBandRowStatus,
           vdslLineSCMPhysBandInUse,
           vdslLineSCMPhysBandCurrPSDLevel,
           vdslLineSCMPhysBandCurrSymbolRate,
           vdslLineSCMPhysBandCurrConstellationSize,
           vdslLineSCMPhysBandCurrCenterFrequency,
           vdslLineSCMPhysBandCurrSnrMgn,
           vdslLineSCMPhysBandCurrAtn

           }
       STATUS        current
       DESCRIPTION
           "A collection of objects providing configuration
           information for a VDSL line based upon single carrier
           modulation modem."
       ::= { vdslLineExtSCMGroups 1 }

   END
```

5. Acknowledgments

    This document contains many definitions taken from an early version
    of the VDSL MIB [RFC3728]. As such, any credit for the text found
    within should be fully attributed to the authors of that document.

6. Security Considerations

    There are a number of management objects defined in this MIB module
    with a MAX-ACCESS clause of 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. These
    are the tables and objects and their sensitivity/vulnerability:

        vdslLineSCMConfProfileBandTable
        vdslLineSCMConfProfileBandInUse,
        vdslLineSCMConfProfileBandTransmitPSDLevel,
        vdslLineSCMConfProfileBandSymbolRate,

```
   vdslLineSCMConfProfileBandConstellationSize,
   vdslLineSCMConfProfileBandCenterFrequency,
   vdslLineSCMConfProfileBandRowStatus
```

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

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

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

```
   vdslLineSCMPhysBandInUse,
   vdslLineSCMPhysBandCurrPSDLevel,
   vdslLineSCMPhysBandCurrSymbolRate,
   vdslLineSCMPhysBandCurrConstellationSize,
   vdslLineSCMPhysBandCurrCenterFrequency,
   vdslLineSCMPhysBandCurrSnrMgn,
   vdslLineSCMPhysBandCurrAtn
```

Read access of the physical band parameters may provide knowledge to
an end-user that would allow malicious behavior, for example the
application of an intentional interference on one or all of the
physical bands in use.

SNMP versions prior to SNMPv3 did not include adequate security.
Even if the network itself is secure (for example by using IPSec),
even then, there is no control as to who on the secure network is
allowed to access and GET/SET (read/change/create/delete) the objects
in this MIB module.

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

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

7. IANA Considerations

   The IANA has assigned the transmission value 228 to VDSL-LINE-EXT-
   SCM-MIB.

8. References

8.1. Normative References

   [DSLFTR57] DSL Forum TR-057, "VDSL Network Element Management",
             February 2003.

   [DSLFWT96] DSL Forum WT-096, "SCM Specific Managed Objects In VDSL
             Network Elements".

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             (TM); Access transmission systems on metallic access
             cables; Very high speed Digital Subscriber Line (VDSL);
             Part 1: Functional requirements", October 1999.

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             (TM); Access transmission systems on metallic access
             cables; Very high speed Digital Subscriber Line (VDSL);
             Part 1: Transceiver specification", February 2001.

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

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

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             Requirement Levels", BCP 14, RFC 2119, March 1997.

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             "Structure of Management Information Version 2 (SMIv2)",
             STD 58, RFC 2578, April 1999.

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

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              "Conformance Statements for SMIv2", STD 58, RFC 2580,
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