              Definitions of Managed Object Extensions
      for Very High Speed Digital Subscriber Lines (VDSL) Using
             Multiple Carrier Modulation (MCM) 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 Multiple Carrier Modulation
   (MCM) 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 MCM 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].

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 and
in particular to the IF-MIB, as 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 -- (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.  LCS  -- Line Code Specific
    F.  Max  -- Maximum
    G.  PSD  -- Power Spectral Density
    H.  Rx   -- Receive
    I.  Tx   -- Transmit

2.3.  Structure

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

    o   vdslMCMGroup :

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

        - vdslLineMCMConfProfileTable
        - vdslLineMCMConfProfileTxBandTable
        - vdslLineMCMConfProfileRxBandTable
        - vdslLineMCMConfProfileTxPSDTable
        - vdslLineMCMConfProfileMaxTxPSDTable
        - vdslLineMCMConfProfileMaxRxPSDTable

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

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

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

    vdslLineTableEntry (vdslLineCoding=MCM)

    vdslLineConfProfileEntry(vdslLineConfProfileName)
              ----> vdslLineMCMConfProfileTable 1:(0..1)
              ----> vdslLineMCMConfProfileTxBandTable 1:(0..n)
              ----> vdslLineMCMConfProfileRxBandTable 1:(0..n)
              ----> vdslLineMCMConfProfileTxPSDTable 1:(0..n)
              ----> vdslLineMCMConfProfileMaxTxPSDTable 1:(0..n)
              ----> vdslLineMCMConfProfileMaxRxPSDTable 1:(0..n)
```

                  Figure 1: Table Relationships

When the object vdslLineCoding is set to MCM, vdslLineConfProfileName
is used as the index to each of the six vdslLineMCMConfProfile
Tables.  The existence of an entry in any of the tables of the
vdslMCMGroup 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:

```
    vdslMCMConfProfileTxWindowLength
    vdslMCMConfProfileRowStatus
    vdslMCMConfProfileTxBandNumber
    vdslMCMConfProfileTxBandStart
    vdslMCMConfProfileTxBandStop
    vdslMCMConfProfileTxBandRowStatus
    vdslMCMConfProfileRxBandStart
    vdslMCMConfProfileRxBandStop
    vdslMCMConfProfileRxBandRowStatus
    vdslMCMConfProfileTxPSDTone
    vdslMCMConfProfileTxPSDPSD
    vdslMCMConfProfileTxPSDRowStatus
    vdslMCMConfProfileMaxTxPSDTone
    vdslMCMConfProfileMaxTxPSDPSD
    vdslMCMConfProfileMaxTxPSDRowStatus
    vdslMCMConfProfileMaxRxPSDTone
    vdslMCMConfProfileMaxRxPSDPSD
    vdslMCMConfProfileMaxRxPSDRowStatus
```

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

      -  vdslMCMGroup

4.  Definitions

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

   IMPORTS
   MODULE-IDENTITY,
   OBJECT-TYPE,
   transmission,
   Unsigned32                    FROM SNMPv2-SMI        -- [RFC2578]
   RowStatus                     FROM SNMPv2-TC         -- [RFC2579]
   MODULE-COMPLIANCE,
   OBJECT-GROUP                  FROM SNMPv2-CONF       -- [RFC2580]
   vdslLineConfProfileName       FROM VDSL-LINE-MIB;    -- [RFC3728]

   vdslExtMCMMIB 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 MCM coding.  The objects in this extension MIB MUST NOT
          be used for VDSL lines using Single Carrier Modulation (SCM)
          line coding.  If an object in this extension MIB is referenced
          by a line which does not use MCM, it has no effect on the
          operation of that line.

          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
              LCS  -- Line Code Specific
              Max  -- Maximum
              PSD  -- Power Spectral Density
              Rx   -- Receive
              Tx   -- Transmit

          Copyright (C) The Internet Society (2005).  This version
          of this MIB module is part of RFC 4070: see the RFC
          itself for full legal notices."
              REVISION "200504280000Z" --    April 28, 2005
              DESCRIPTION "Initial version, published as RFC 4070."
          ::= { transmission 229 }

      vdslLineExtMCMMib OBJECT IDENTIFIER ::= { vdslExtMCMMIB 1 }
      vdslLineExtMCMMibObjects OBJECT IDENTIFIER ::= {vdslLineExtMCMMib 1}


      --
      -- Multiple carrier modulation (MCM) configuration profile tables
      --

```
vdslLineMCMConfProfileTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF VdslLineMCMConfProfileEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "This table contains additional information on multiple
        carrier VDSL lines.  One entry in this table reflects a
        profile defined by a manager which can be used to
        configure the VDSL line.

        If an entry in this table is referenced by a line which
        does not use MCM, it has no effect on the operation of that
        line.

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

    ::= { vdslLineExtMCMMibObjects  1 }

vdslLineMCMConfProfileEntry OBJECT-TYPE
    SYNTAX        VdslLineMCMConfProfileEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "Each entry consists of a list of parameters that
        represents the configuration of a multiple carrier
        modulation VDSL modem."
    INDEX { vdslLineConfProfileName }
    ::= { vdslLineMCMConfProfileTable 1 }

VdslLineMCMConfProfileEntry ::=
    SEQUENCE
        {
        vdslLineMCMConfProfileTxWindowLength      Unsigned32,
        vdslLineMCMConfProfileRowStatus           RowStatus
        }

vdslLineMCMConfProfileTxWindowLength OBJECT-TYPE
    SYNTAX        Unsigned32 (1..255)
    UNITS         "samples"
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION
        "Specifies the length of the transmit window, counted
        in samples at the sampling rate corresponding to the
        negotiated value of N."
    REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
    ::= { vdslLineMCMConfProfileEntry 1 }
```

```
    vdslLineMCMConfProfileRowStatus 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 is 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 first be unreferenced
            from all associated lines."
        ::= { vdslLineMCMConfProfileEntry 2 }

    vdslLineMCMConfProfileTxBandTable OBJECT-TYPE
        SYNTAX          SEQUENCE OF VdslLineMCMConfProfileTxBandEntry
        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
            with a multiple carrier modulation (MCM) VDSL line.
            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 MCM, it has no effect on the operation of that
            line.

            All read-create-objects defined in this table SHOULD be
            stored persistently."
        ::= { vdslLineExtMCMMibObjects  2 }

    vdslLineMCMConfProfileTxBandEntry OBJECT-TYPE
        SYNTAX          VdslLineMCMConfProfileTxBandEntry
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
            "Each entry consists of a transmit band descriptor, which
            is defined by a start and a stop tone index."
        INDEX { vdslLineConfProfileName,
```

```
                vdslLineMCMConfProfileTxBandNumber }
        ::= { vdslLineMCMConfProfileTxBandTable 1 }

   VdslLineMCMConfProfileTxBandEntry ::=
        SEQUENCE
            {
            vdslLineMCMConfProfileTxBandNumber          Unsigned32,
            vdslLineMCMConfProfileTxBandStart           Unsigned32,
            vdslLineMCMConfProfileTxBandStop            Unsigned32,
            vdslLineMCMConfProfileTxBandRowStatus       RowStatus
            }

   vdslLineMCMConfProfileTxBandNumber OBJECT-TYPE
        SYNTAX        Unsigned32 (1..4096)
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
            "The index for this band descriptor entry."
        ::= { vdslLineMCMConfProfileTxBandEntry 1 }

   vdslLineMCMConfProfileTxBandStart OBJECT-TYPE
        SYNTAX        Unsigned32 (1..4096)
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "Start tone index for this band."
        REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
        ::= { vdslLineMCMConfProfileTxBandEntry 2 }

   vdslLineMCMConfProfileTxBandStop OBJECT-TYPE
        SYNTAX        Unsigned32 (1..4096)
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
            "Stop tone index for this band."
        REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
        ::= { vdslLineMCMConfProfileTxBandEntry 3 }

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

          Each entry must be internally consistent, the Stop Tone must
          be greater than the Start Tone.  Each entry must also be
          externally consistent, all entries indexed by a specific
          profile must not overlap.  Validation of the profile will
          check both internal and external consistency.

          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."
      ::= { vdslLineMCMConfProfileTxBandEntry 4 }

   vdslLineMCMConfProfileRxBandTable OBJECT-TYPE
       SYNTAX        SEQUENCE OF VdslLineMCMConfProfileRxBandEntry
       MAX-ACCESS    not-accessible
       STATUS        current
       DESCRIPTION
           "This table contains receive band descriptor configuration
           information for a VDSL line.  Each entry in this table
           reflects the configuration for one of possibly many bands
           with a multiple carrier modulation (MCM) VDSL line.
           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 MCM, it has no effect on the operation of that
           line.

           All read-create-objects defined in this table SHOULD be
           stored persistently."
       ::= { vdslLineExtMCMMibObjects 3 }

   vdslLineMCMConfProfileRxBandEntry OBJECT-TYPE
       SYNTAX        VdslLineMCMConfProfileRxBandEntry
       MAX-ACCESS    not-accessible
       STATUS        current
       DESCRIPTION
           "Each entry consists of a transmit band descriptor, which
           is defined by a start and a stop tone index."

       INDEX { vdslLineConfProfileName,
             vdslLineMCMConfProfileRxBandNumber }
       ::= { vdslLineMCMConfProfileRxBandTable 1 }

   VdslLineMCMConfProfileRxBandEntry ::=

```
       SEQUENCE
           {
           vdslLineMCMConfProfileRxBandNumber          Unsigned32,
           vdslLineMCMConfProfileRxBandStart           Unsigned32,
           vdslLineMCMConfProfileRxBandStop            Unsigned32,
           vdslLineMCMConfProfileRxBandRowStatus       RowStatus
           }

   vdslLineMCMConfProfileRxBandNumber OBJECT-TYPE
       SYNTAX        Unsigned32 (1..4096)
       MAX-ACCESS    not-accessible
       STATUS        current
       DESCRIPTION
           "The index for this band descriptor entry."
       ::= { vdslLineMCMConfProfileRxBandEntry 1 }

   vdslLineMCMConfProfileRxBandStart OBJECT-TYPE
       SYNTAX        Unsigned32 (1..4096)
       MAX-ACCESS    read-create
       STATUS        current
       DESCRIPTION
           "Start tone index for this band."
       REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
       ::= { vdslLineMCMConfProfileRxBandEntry 2 }


   vdslLineMCMConfProfileRxBandStop OBJECT-TYPE
       SYNTAX        Unsigned32 (1..4096)
       MAX-ACCESS    read-create
       STATUS        current
       DESCRIPTION
           "Stop tone index for this band."
       REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
       ::= { vdslLineMCMConfProfileRxBandEntry 3 }

   vdslLineMCMConfProfileRxBandRowStatus 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 is activated by setting this object to 'active'.
           When 'active' is set, the system will validate the profile.
           Each entry must be internally consistent, the Stop Tone must
           be greater than the Start Tone.  Each entry must also be
           externally consistent, all entries indexed by a specific
```

profile must not overlap.  Validation of the profile will
check both internal and external consistency.

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."
    ::= { vdslLineMCMConfProfileRxBandEntry 4 }

vdslLineMCMConfProfileTxPSDTable OBJECT-TYPE
    SYNTAX        SEQUENCE OF VdslLineMCMConfProfileTxPSDEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "This table contains transmit PSD mask descriptor
        configuration information for a VDSL line.  Each entry in
        this table reflects the configuration for one tone within
        a multiple carrier modulation (MCM) VDSL line.  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 MCM, it has no effect on the operation of that
        line.

        All read-create-objects defined in this table SHOULD be
        stored persistently."
    ::= { vdslLineExtMCMMibObjects 4 }

vdslLineMCMConfProfileTxPSDEntry OBJECT-TYPE
    SYNTAX        VdslLineMCMConfProfileTxPSDEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "Each entry consists of a transmit PSD mask descriptor,
        which defines the power spectral density (PSD) for a tone."

    INDEX { vdslLineConfProfileName,
            vdslLineMCMConfProfileTxPSDNumber }
    ::= { vdslLineMCMConfProfileTxPSDTable 1 }

VdslLineMCMConfProfileTxPSDEntry ::=
    SEQUENCE
        {
        vdslLineMCMConfProfileTxPSDNumber           Unsigned32,

```
        vdslLineMCMConfProfileTxPSDTone                 Unsigned32,
        vdslLineMCMConfProfileTxPSDPSD                  Unsigned32,
        vdslLineMCMConfProfileTxPSDRowStatus            RowStatus
        }

vdslLineMCMConfProfileTxPSDNumber OBJECT-TYPE
    SYNTAX        Unsigned32 (1..4096)
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "The index for this mask descriptor entry."
    ::= { vdslLineMCMConfProfileTxPSDEntry 1 }

vdslLineMCMConfProfileTxPSDTone OBJECT-TYPE
    SYNTAX        Unsigned32 (1..4096)
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION
        "The tone index for which the PSD is being specified."
    REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
    ::= { vdslLineMCMConfProfileTxPSDEntry 2 }

vdslLineMCMConfProfileTxPSDPSD OBJECT-TYPE
    SYNTAX        Unsigned32
    UNITS         "0.5dBm/Hz"
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION
        "Power Spectral Density level in steps of 0.5dBm/Hz with
        an offset of -140dBm/Hz."
    REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
    ::= { vdslLineMCMConfProfileTxPSDEntry 3 }

    vdslLineMCMConfProfileTxPSDRowStatus 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 is 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."
    ::= { vdslLineMCMConfProfileTxPSDEntry 4 }

vdslLineMCMConfProfileMaxTxPSDTable OBJECT-TYPE
    SYNTAX         SEQUENCE OF VdslLineMCMConfProfileMaxTxPSDEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "This table contains transmit maximum PSD mask descriptor
        configuration information for a VDSL line.  Each entry in
        this table reflects the configuration for one tone within
        a multiple carrier modulation (MCM) VDSL modem.  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 MCM, it has no effect on the operation of that
        line.

        All read-create-objects defined in this table SHOULD be
        stored persistently."
    ::= { vdslLineExtMCMMibObjects 5 }

vdslLineMCMConfProfileMaxTxPSDEntry OBJECT-TYPE
    SYNTAX         VdslLineMCMConfProfileMaxTxPSDEntry
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "Each entry consists of a transmit PSD mask descriptor,
        which defines the maximum power spectral density (PSD)
        for a tone."
    INDEX { vdslLineConfProfileName,
          vdslLineMCMConfProfileMaxTxPSDNumber }
    ::= { vdslLineMCMConfProfileMaxTxPSDTable 1 }

VdslLineMCMConfProfileMaxTxPSDEntry ::=
    SEQUENCE
        {
        vdslLineMCMConfProfileMaxTxPSDNumber           Unsigned32,
        vdslLineMCMConfProfileMaxTxPSDTone             Unsigned32,
        vdslLineMCMConfProfileMaxTxPSDPSD              Unsigned32,
        vdslLineMCMConfProfileMaxTxPSDRowStatus        RowStatus
        }

vdslLineMCMConfProfileMaxTxPSDNumber OBJECT-TYPE
    SYNTAX         Unsigned32 (1..4096)
```

```
    MAX-ACCESS    not-accessible
    STATUS        current
    DESCRIPTION
        "The index for this band descriptor entry."
    ::= { vdslLineMCMConfProfileMaxTxPSDEntry 1 }

vdslLineMCMConfProfileMaxTxPSDTone OBJECT-TYPE
    SYNTAX        Unsigned32 (1..4096)
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION
        "The tone index for which the PSD is being specified.
         There must not be multiple rows defined, for a particular
         profile, with the same value for this field."
    REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
    ::= { vdslLineMCMConfProfileMaxTxPSDEntry 2 }

vdslLineMCMConfProfileMaxTxPSDPSD OBJECT-TYPE
    SYNTAX        Unsigned32
    UNITS         "0.5dBm/Hz"
    MAX-ACCESS    read-create
    STATUS        current
    DESCRIPTION
        "Power Spectral Density level in steps of 0.5dBm/Hz with
        an offset of -140dBm/Hz."
    REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
    ::= { vdslLineMCMConfProfileMaxTxPSDEntry 3 }

vdslLineMCMConfProfileMaxTxPSDRowStatus 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 is activated by setting this object to 'active'.
        When 'active' is set, the system will validate the profile.
        There must be only one entry in this table for each tone
        associated with a specific profile.  This will be checked
        during the validation process.

        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."
```

```
        ::= { vdslLineMCMConfProfileMaxTxPSDEntry 4 }

   vdslLineMCMConfProfileMaxRxPSDTable OBJECT-TYPE
       SYNTAX          SEQUENCE OF VdslLineMCMConfProfileMaxRxPSDEntry
       MAX-ACCESS      not-accessible
       STATUS          current
       DESCRIPTION
           "This table contains maximum receive PSD mask descriptor
           configuration information for a VDSL line.  Each entry in
           this table reflects the configuration for one tone within
           a multiple carrier modulation (MCM) VDSL modem.  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 MCM, it has no effect on the operation of that
           line.

           All read-create-objects defined in this table SHOULD be
           stored persistently."
       ::= { vdslLineExtMCMMibObjects 6 }

   vdslLineMCMConfProfileMaxRxPSDEntry OBJECT-TYPE
       SYNTAX          VdslLineMCMConfProfileMaxRxPSDEntry
       MAX-ACCESS      not-accessible
       STATUS          current
       DESCRIPTION
           "Each entry consists of a transmit PSD mask descriptor,
           which defines the power spectral density (PSD) for a
           tone."

       INDEX { vdslLineConfProfileName,
               vdslLineMCMConfProfileMaxRxPSDNumber }
       ::= { vdslLineMCMConfProfileMaxRxPSDTable 1 }

   VdslLineMCMConfProfileMaxRxPSDEntry ::=
       SEQUENCE
           {
           vdslLineMCMConfProfileMaxRxPSDNumber           Unsigned32,
           vdslLineMCMConfProfileMaxRxPSDTone             Unsigned32,
           vdslLineMCMConfProfileMaxRxPSDPSD              Unsigned32,
           vdslLineMCMConfProfileMaxRxPSDRowStatus        RowStatus
           }

   vdslLineMCMConfProfileMaxRxPSDNumber OBJECT-TYPE
       SYNTAX          Unsigned32 (1..4096)
       MAX-ACCESS      not-accessible
       STATUS          current
```

         DESCRIPTION
             "The index for this band descriptor entry."
         ::= { vdslLineMCMConfProfileMaxRxPSDEntry 1 }

    vdslLineMCMConfProfileMaxRxPSDTone OBJECT-TYPE
         SYNTAX        Unsigned32 (1..4096)
         MAX-ACCESS    read-create
         STATUS        current
         DESCRIPTION
             "The tone index for which the PSD is being specified.
              There must not be multiple rows defined, for a particular
              profile, with the same value for this field."
         REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
         ::= { vdslLineMCMConfProfileMaxRxPSDEntry 2 }

    vdslLineMCMConfProfileMaxRxPSDPSD OBJECT-TYPE
         SYNTAX        Unsigned32
         UNITS         "0.5dBm/Hz"
         MAX-ACCESS    read-create
         STATUS        current
         DESCRIPTION
             "Power Spectral Density level in steps of 0.5dBm/Hz with
             an offset of -140dBm/Hz."
         REFERENCE     "T1E1.4/2000-013R4"    -- Part 3, MCM
         ::= { vdslLineMCMConfProfileMaxRxPSDEntry 3 }

    vdslLineMCMConfProfileMaxRxPSDRowStatus 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 is activated by setting this object to 'active'.
             When 'active' is set, the system will validate the profile.
             There must be only one entry in this table for each tone
             associated with a specific profile.  This will be checked
             during the validation process.

             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."
         ::= { vdslLineMCMConfProfileMaxRxPSDEntry 4 }

```
    -- conformance information

    vdslLineExtMCMConformance OBJECT IDENTIFIER ::=
                  { vdslLineExtMCMMib 2 }
    vdslLineExtMCMGroups OBJECT IDENTIFIER ::=
                  { vdslLineExtMCMConformance 1 }
    vdslLineExtMCMCompliances OBJECT IDENTIFIER ::=
                  { vdslLineExtMCMConformance 2 }


    vdslLineExtMCMMibCompliance MODULE-COMPLIANCE
        STATUS   current
        DESCRIPTION
            "The compliance statement for SNMP entities which
            manage VDSL interfaces."
        MODULE  -- this module
        MANDATORY-GROUPS
        {
            vdslLineExtMCMGroup
        }

        ::= { vdslLineExtMCMCompliances 1 }

    -- units of conformance

        vdslLineExtMCMGroup OBJECT-GROUP
            OBJECTS
                {
                vdslLineMCMConfProfileTxWindowLength,
                vdslLineMCMConfProfileRowStatus,
                vdslLineMCMConfProfileTxBandStart,
                vdslLineMCMConfProfileTxBandStop,
                vdslLineMCMConfProfileTxBandRowStatus,
                vdslLineMCMConfProfileRxBandStart,
                vdslLineMCMConfProfileRxBandStop,
                vdslLineMCMConfProfileRxBandRowStatus,
                vdslLineMCMConfProfileTxPSDTone,
                vdslLineMCMConfProfileTxPSDPSD,
                vdslLineMCMConfProfileTxPSDRowStatus,
                vdslLineMCMConfProfileMaxTxPSDTone,
                vdslLineMCMConfProfileMaxTxPSDPSD,
                vdslLineMCMConfProfileMaxTxPSDRowStatus,
                vdslLineMCMConfProfileMaxRxPSDTone,
                vdslLineMCMConfProfileMaxRxPSDPSD,
                vdslLineMCMConfProfileMaxRxPSDRowStatus
                }
            STATUS      current
            DESCRIPTION
                "A collection of objects providing configuration
```

```
            information for a VDSL line based upon multiple
            carrier modulation modem."
    ::= { vdslLineExtMCMGroups 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:

```
   vdslLineMCMConfProfileTable,
   vdslLineMCMConfProfileTxWindowLength,
   vdslLineMCMConfProfileRowStatus,
   vdslLineMCMConfProfileTxBandTable,
   vdslLineMCMConfProfileTxBandStart,
   vdslLineMCMConfProfileTxBandStop,
   vdslLineMCMConfProfileTxBandRowStatus,
   vdslLineMCMConfProfileRxBandTable,
   vdslLineMCMConfProfileRxBandStart,
   vdslLineMCMConfProfileRxBandStop,
   vdslLineMCMConfProfileRxBandRowStatus,
   vdslLineMCMConfProfileTxPSDTable,
   vdslLineMCMConfProfileTxPSDTone,
   vdslLineMCMConfProfileTxPSDPSD,
   vdslLineMCMConfProfileTxPSDRowStatus,
   vdslLineMCMConfProfileMaxTxPSDTable
   vdslLineMCMConfProfileMaxTxPSDTone,
   vdslLineMCMConfProfileMaxTxPSDPSD,
   vdslLineMCMConfProfileMaxTxPSDRowStatus,
   vdslLineMCMConfProfileMaxRxPSDTable
   vdslLineMCMConfProfileMaxRxPSDTone,
   vdslLineMCMConfProfileMaxRxPSDPSD,
   vdslLineMCMConfProfileMaxRxPSDRowStatus
```

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:

    vdslLineMCMConfProfileTable,
    vdslLineMCMConfProfileTxWindowLength,
    vdslLineMCMConfProfileRowStatus,
    vdslLineMCMConfProfileTxBandTable,
    vdslLineMCMConfProfileTxBandStart,
    vdslLineMCMConfProfileTxBandStop,
    vdslLineMCMConfProfileTxBandRowStatus,
    vdslLineMCMConfProfileRxBandTable,
    vdslLineMCMConfProfileRxBandStart,
    vdslLineMCMConfProfileRxBandStop,
    vdslLineMCMConfProfileRxBandRowStatus,
    vdslLineMCMConfProfileTxPSDTable,
    vdslLineMCMConfProfileTxPSDTone,
    vdslLineMCMConfProfileTxPSDPSD,
    vdslLineMCMConfProfileTxPSDRowStatus,
    vdslLineMCMConfProfileMaxTxPSDTable
    vdslLineMCMConfProfileMaxTxPSDTone,
    vdslLineMCMConfProfileMaxTxPSDPSD,
    vdslLineMCMConfProfileMaxTxPSDRowStatus,
    vdslLineMCMConfProfileMaxRxPSDTable
    vdslLineMCMConfProfileMaxRxPSDTone,
    vdslLineMCMConfProfileMaxRxPSDPSD,
    vdslLineMCMConfProfileMaxRxPSDRowStatus

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 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.

7.  IANA Considerations

The IANA has assigned the transmission value 229 to VDSL-LINE-EXT-
MCM-MIB.

8.  References

8.1.  Normative References

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## 8.2.  Informative References

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