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                  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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