

Network Working Group  
Internet-Draft  
Expires: April 19, 2004

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October 20, 2003

Ethernet in the First Mile Copper (EFMCu) Interfaces MIB  
draft-beili-hubmib-efm-cu-mib-00.txt

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Abstract

This document defines a portion of the Management Information Base (MIB) for use with network management protocols in TCP/IP based Internets. This document proposes an extension to the Ethernet-like Interfaces MIB and MAU MIB with a set of objects for managing an Ethernet in the First Mile Copper (EFMCu) interfaces 10PassTS and 2BaseTL defined in IEEE 802.3ah.

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## 1. Introduction

New Ethernet like interfaces have been defined in the IEEE 802.3ah project Ethernet in the First Mile (EFM). In particular 2BaseTL and 10PassTS interfaces defined over voice-grade copper pairs have been specified. These interfaces, collectively called EFMCu, support variable rates and optional PMI aggregation (multi-pair bonding).

This memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community to manage EFMCu interfaces.

## 2. 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](#) .

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](#)].

## 3. Relation to Interfaces MIB

This section specifies how the ifStackTable, as defined in [[RFC2863](#)] and ifInvStackTable, as defined in [[RFC2864](#)] are used for the EFMCu application.

### 3.1 Layering Model

An EFMcu interface can aggregate up to 32 PMDs (modems) using so called PMI Aggregation Function (PAF).

An generic EFMcu device can have a number of MII/PCS ports cross-connected to a number of PMDs, with a single PCS per PMD relationship.

Each PMD comprising an aggregated EFMcu port is represented in the Interface table as a separate port with ifType of shdsl (169) for 2BaseTL or vdsl(97) for 10PassTS. The ifType values are defined in IANAifType-MIB. ifSpeed for each PMD shall return an actual bitrate of the active PMD or a configured bitrate for pre-activated modems (note that unassigned PMD has its default bitrate).

The ifStackTable is indexed by the ifIndex values of the aggregated EFMcu port (PCS) and the PMDs connected to it. ifStackTable allows a Network Management application to determine which PMDs are connected to a particular PCS and change connections. The ifInvStackTable, being an inverted version of the ifStackTable, provides an efficient means for a Network Management application to read a subset of the ifStackTable and thereby determine which PCS runs on top of a particular PMD.

A new table efmCuAvailableStackTable defined in this MIB, specifies for each PCS a list of PMDs, which can possibly be cross-connected to that PCS, determined by the cross-connect capability of the device. This table, modeled after ifStackTable, is read only.

Editor's Note: An alternative would be to use ifStackTable to describe cross-connect capability and efmCuAvailableStackTable to describe actual connections, so that the cross-connect action would be done in the EFM-CU-MIB by modifying the efmCuAvailableStackTable (and not in IF-MIB).

### [3.2](#) PMI Aggregation Function (PAF)

aPAFSupported is mandatory for all EFMcu ports (2BASE-TL and 10PASS-TS).

### [3.3](#) Discovery Operation

This MIB allows a Network Management application to control EFM

Discovery mechanism and query its results. Note that the Discovery mechanism can work only if PAF is supported and enabled.

Two tables are used by Discovery mechanism: ifStackTable and efmCuAvailableStackTable defined. The following pseudo-code defines an example of Discovery for a generic PAF enabled multi-PCS EFMcu device, located at Central Office (CO):

```
foreach PCS[i] in Device
{ if ( PCS[i].PAFSupported ) // Discover only on ports supporting PAF
  { dc = PCS[i].DiscoveryCode = MAC[i]; // unique 6 byte code per PCS
    // go over all currently disconnected PMDs, which can
  // potentially be connected to PCS[i]
    foreach PMD[j] in efmCuAvailableStackTable[PCS[i]] and
      not in ifStackTable[PCS[i]]
      { PMD[j].RemoteDiscoveryCode = dc; // Set if Clear
        r = PMD[j].RemoteDiscoveryCode; // Get
        if ( r == dc )
          { // Remote CPE connected via PMD[j] is/was a peer for
            // PCS[i]. Connect this PMD to the PCS
            Add PMD[j] to ifStackTable[PCS[i]];
            // Discover all other currently disconnected PMDs,
            // attached to the same CPE and connect them to the PCS
            foreach PMD[k] in efmCuAvailableStackTable[PCS[i]] and
              not in ifStackTable[PCS[i]]
              { r = PMD[k].RemoteDiscoveryCode; // Get
                if ( r == dc )
                  Add PMD[k] to ifStackTable[PCS[i]];
              }
          }
      }
  }
}
```

```

        }
        // Discovered all PMDs which lead to the same CPE and
        // connected them to PCS[i]. Go to the next PCS.
        break;
    }
}
}

```

The SNMP Agent builds efmCuStackTable according to the information contained in the Clause 45 PMI\_Available\_register (see [[802.3ah](#)] 61.1.5.3 and 45.2.3.20).

Adding a PMD to the ifStackTable row for a specific PCS involve actual connection of the PCS and PMD, which can be done by modifying Clause 45 PMI\_Aggregate\_register (see [[802.3ah](#)] 61.1.5.3 and 45.2.3.21).

### [3.4](#) Relation to SHDSL MIB

PMD(s) comprising a 2BaseTL port are described in HDLSL2-SHDSL-LINE-MIB . Note that HDLSL2-SHDSL-LINE-MIB describes standard G.SHDSL modems according to ITU-T G.991.2, while IEEE 802.3ah uses so called G.SHDSL.bis spec, extended to support higher constellations and rates. In cases where G.SHDSL and 802.3ah differ, the definitions in 802.3ah take precedence.

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### [3.5](#) Relation to VDSL MIB

PMD(s) comprising a 10PasSTS port are described in VDSL-LINE-MIB [[draft-ietf-adslmib-vdsl](#)]. In cases where VDSL-LINE-MIB and 802.3ah differ, the definitions in 802.3ah take precedence

### [3.6](#) Relation to Ethernet-Like and MAU MIBs

EFMCu interfaces require implementation of ETHERIF-MIB [[draft-ietf-hubmib-etherif-mib](#)] and MAU-MIB [[RFC3636](#)]. As such EFMCu interfaces 2BaseTL/10PasSTS shall return an ifType of ethernetCsmacd(6). Information on the particular flavor of EFMCu that an interface is running is available from ifSpeed in the Interfaces Group MIB [[RFC2863](#)], and ifMauType in the MAU MIB [[RFC3636](#)].

### [3.7](#) Mapping of IEEE 802.3ah Managed Objects

This section contains the mapping between oMAU managed objects defined in [[802.3ah](#)] and managed objects defined in this document and in associated MIB modules, i.e., the IF-MIB [[RFC2863](#)], the HDSL2-SHDSL-LINE-MIB, and the MAU-MIB [[RFC3636](#)].

IEEE 802.3 Managed Object                      Corresponding SNMP Object

## [4.](#) Definitions

```
EFM-CU-MIB DEFINITIONS ::= BEGIN
```

```
IMPORTS
```

```
    MODULE-IDENTITY, OBJECT-TYPE,  
    Gauge32, Integer32, transmission  
        FROM SNMPv2-SMI  
    TruthValue, RowStatus, PhysAddress  
        FROM SNMPv2-TC  
    ifIndex, InterfaceIndexOrZero  
        FROM IF-MIB  
    MODULE-COMPLIANCE, OBJECT-GROUP  
        FROM SNMPv2-CONF  
    ;
```

```
efmCuMIB MODULE-IDENTITY
```

```
    LAST-UPDATED "200310200000Z" -- October 20, 2003  
    ORGANIZATION "IETF Ethernet Interfaces and Hub MIB  
        Working Group"
```

```
    CONTACT-INFO
```

```
        "WG charter:
```

```
            http://www.ietf.org/html.charters/hubmib-charter.html
```

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#### DESCRIPTION

"The objects in this MIB module are used to manage the Ethernet in the First Mile (EFM) Copper (EFMCu) Interfaces 2BASE-TL and 10PASS-TS, defined in IEEE Draft P802.3ah/D2.1.

The following reference is used throughout this MIB module:

[802.3ah] refers to:

IEEE Draft P802.3ah/D2.1: 'Draft amendment to - Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications - Media Access Control Parameters, Physical Layers and Management Parameters for subscriber access networks', 07 October 2003.

Of particular interest are Clause 61, 'Physical Coding Sublayer (PCS) and common specifications, type 10PASS-TS and type 2BASE-TL', Clause 30, 'Management', and Clause 45, 'Management Data Input/Output (MDIO) Interface'.

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```

-- Editor's Note: Replace XXXX with the actual RFC number
-- assigned by RFC Editor and remove this note

REVISION    "200310200000Z" -- October 20, 2003
DESCRIPTION "Initial version, published as RFC XXXX."

 ::= { transmission 135 }

-- Editor's Note: Replace 135 with a real OID once it is
-- assigned by IANA and remove this note.
-- This OID is temporary so that compilation does not fail.

-- Sections of the module

efmCuObjects      OBJECT IDENTIFIER ::= { efmCuMIB 1 }

efmCuConformance OBJECT IDENTIFIER ::= { efmCuMIB 2 }

-- Groups in the module

efmCuPort         OBJECT IDENTIFIER ::= { efmCuObjects 1 }

efmCuPmd          OBJECT IDENTIFIER ::= { efmCuObjects 2 }

-- The PCS Port group

efmCuPortTable OBJECT-TYPE
    SYNTAX SEQUENCE OF EfmCuPortEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "Table for EFMcu 2BaseTL/10PassTS (PCS) Ports."
    ::= { efmCuPort 1 }

efmCuPortEntry OBJECT-TYPE
    SYNTAX EfmCuPortEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "An entry in the EFMcu Port table."
    INDEX { ifIndex }
    ::= { efmCuPortTable 1 }

EfmCuPortEntry ::=
    SEQUENCE {
        efmCuPortSidesSupported      INTEGER,
        efmCuPortSide                INTEGER,
        efmCuPAFSupported            TruthValue,

```

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```
        efmCuPAFAdminState          INTEGER,
        efmCuPAFDiscoveryCode       PhysAddress
    }
```

efmCuPortSidesSupported OBJECT-TYPE

```
SYNTAX  INTEGER {
        subscriber(1),
        office(2),
        both(3)
    }
```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"EFM port supported mode of operation (subtype).  
The value of 'subscriber' indicates that the port supports  
'CPE' or '-R' subtype.  
The value of 'office' indicates that the port supports  
'CO' or '-O' subtype.  
The value of 'both' indicates that the port supports both  
'CO' and 'CPE' subtypes.  
An actual mode of operation is determined by ifPhySide.

If a Clause 45 MDIO Interface to the PCS is present, then this  
attribute will map to the CO supported and CPE supported  
bits in the 10P/2B capability register"

REFERENCE

"[[802.3ah](#)] 61.1, 45.2.3.18.2, 45.2.3.18.3"  
 ::= { efmCuPortEntry 1 }

efmCuPortSide OBJECT-TYPE

```
SYNTAX  INTEGER {
        subscriber(1),
        office(2)
    }
```

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"EFM port mode of operation (subtype).  
The value of 'subscriber' indicates the port is designated as  
the 'CPE' or '-R' subtype.  
The value of the 'office' indicates that the port is  
designated as the 'CO' or '-O' subtype.  
Attempts to change this object to an unsupported subtype shall

be ignored.

If a Clause 45 MDIO Interface to the PCS is present, then this attribute will map to the Port sub-type select bit in the 10P/2B capability register"

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REFERENCE

"[[802.3ah](#)] 61.1, 45.2.3.18.1"  
 ::= { efmCuPortEntry 2 }

efmCuPAFSupported OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"PMI Aggregation Function (PAF) Capability of the EFMCu port (PCS).

This object has a value of true(1) when the PCS can perform PMI aggregation on the available PMDs.

Ports incapable of PAF shall return a value of false(2).

If a Clause 45 MDIO Interface to the PCS is present, then this attribute will map to the PAF supported bit in the 10P/2B capability register."

REFERENCE

"[[802.3ah](#)] 61.2.2, 45.2.3.18.4"  
 ::= { efmCuPortEntry 3 }

efmCuPAFAdminState OBJECT-TYPE

SYNTAX INTEGER {  
 enabled(1),  
 disabled(2)  
 }

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Administrative (desired) state of the PAF of the EFMCu port (PCS).

When 'disabled', PMI Aggregation will not be performed by the PCS.

When 'enabled', PAF will be performed by the PCS when the link is Up, even on a single PMD, if PAF is supported.

PCS ports incapable of supporting PAF shall return a value of 'disabled'. Attempts to 'enable' such port shall be ignored.

Changing PAFAdminState is a traffic disruptive operation and as such shall be done when the link is Down. Attempts to change this object shall be ignored if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PCS is present, then this attribute will map to the PAF enable bit in the 10P/2B capability register"  
REFERENCE

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"[[802.3ah](#)] 61.2.2, 45.2.3.18.4"  
::= { efmCuPortEntry 4 }

efmCuPAFDiscoveryCode OBJECT-TYPE

SYNTAX PhysAddress

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"PAF Discovery Code of the EFMCu port (PCS).

A unique 6 Byte long code used by the Discovery function.

This object must be instantiated for the C0 subtype PCS before writing operations on the PAFRemoteDiscoveryCode

(Set\_if\_Clear and Clear\_if\_Same) are performed by PMDs associated with the PCS.

The value of this object is read-only for CPE port subtypes. (The initial value of this object for CPE ports after reset is 0).

Discovery must be performed when the link is Down.

Attempts to change this object MUST be rejected with the error inconsistentValue if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PCS is present, then this attribute will map to the Aggregaion Discovery Code registers"

REFERENCE

"[[802.3ah](#)] 61.2.2.8.3, 45.2.1.12, 45.2.1.13"  
::= { efmCuPortEntry 5 }

-- The PMD group

efmCuPmdTable OBJECT-TYPE

SYNTAX SEQUENCE OF EfmCuPmdEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Table for EFMcu 2BaseTL/10PassTS PMDs (modems). Common part"

::= { efmCuPmd 1 }

efmCuPmdEntry OBJECT-TYPE

SYNTAX EfmCuPmdEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the EFMcu PMD Common table."

INDEX { ifIndex }

::= { efmCuPmdTable 1 }

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EfmCuPmdEntry ::=

SEQUENCE {

efmCuPAFRemoteDiscoveryCode PhysAddress,

efmCuPmdRxSnrMgn Integer32,

efmCuPmdRemoteRxSnrMgn Integer32

}

efmCuPAFRemoteDiscoveryCode OBJECT-TYPE

SYNTAX PhysAddress

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"PAF Remote Discovery Code of the PMD port at CO.

A 6 Byte long Discovery Code of the peer PCS connected via the PMD.

Reading this object results in a Discovery Get operation.

Writing a zero to this object results in a Discovery Clear\_if\_Same operation (the value of the ifPAFDiscoveryCode at the peer PCS shall be the same as ifPAFDiscoveryCode of the local PCS associated with the PMD for the operation to succeed).

Writing a non-zero value to this object results in a

Discovery Set\_if\_Clear operation.  
This object does not exist in CPE port subtypes. A zero length octet string shall be returned for CPE port subtypes and also when PAF aggregation is not enabled.

Discovery must be performed when the link is Down.  
Attempts to change this object MUST be rejected with the error inconsistentValue, if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PCS is present, then this attribute is a function of Aggregation Discovery Operation, Code and Operation result registers"

REFERENCE

"[[802.3ah](#)] 61.2.2.8.3, 45.2.1.12.1"  
 ::= { efmCuPmdEntry 1 }

efmCuPmdRxSnrMgn OBJECT-TYPE

SYNTAX Integer32(-127..128)

UNITS "dB"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The current Signal-to-Noise Ratio (SNR) margin with respect to the received signal, for the PMD.

If a Clause 45 MDIO Interface is present, then this

attribute will map to the Rx SNR Margin register"

REFERENCE

"[[802.3ah](#)] 45.2.1.17"  
 ::= { efmCuPmdEntry 2 }

efmCuPmdRemoteRxSnrMgn OBJECT-TYPE

SYNTAX Integer32(-127..128)

UNITS "dB"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The current SNR margin with respect to the received signal, for the CO PMD's link partner (CPE PMD).

This object is not supported by CPE port subtypes.

If a Clause 45 MDIO Interface is present, then this attribute will map to the Remote Rx SNR Margin register"

REFERENCE

"[[802.3ah](#)] 45.2.1.17"

::= { efmCuPmdEntry 3 }

-- 2BaseTL specific PMD group

efmCuPmd2BTable OBJECT-TYPE

SYNTAX SEQUENCE OF EfmCuPmd2BEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Table for EFMcu 2BaseTL PMDs (modems)."

::= { efmCuPmd 2 }

efmCuPmd2BEntry OBJECT-TYPE

SYNTAX EfmCuPmd2BEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the EFMcu 2BaseTL PMD table."

AUGMENTS { efmCuPmdEntry }

::= { efmCuPmd2BTable 1 }

EfmCuPmd2BEntry ::=

SEQUENCE {

efmCuPmd2BRegion	INTEGER,
efmCuPmd2BPower	Integer32,
efmCuPmd2BDataRate	Integer32,
efmCuPmd2BConstellation	INTEGER,

efmCuPmd2BLoopAtnThreshold	Integer32,
efmCuPmd2BSnrMgnThreshold	Integer32
}	

efmCuPmd2BRegion OBJECT-TYPE

SYNTAX INTEGER {

annexA(1), -- region 1

annexB(2), -- region 2

```
        annexC(3)  -- region 3
    }
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
    "Desired Power Spectral Density (PSD) Regional setting as specified
in Regional Annex of [ITU-T G.991.2] to operate under.
    This object is writable for the CO subtype PMDs (2BaseTL-0).
    It is read-only for the CPE subtype (2BaseTL-R).
```

Changing Regional Annex must be performed when the link is Down. Attempts to change this object MUST be rejected with the error inconsistentValue, if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PMD is present, then this attribute will map to the Region bits in the 2B general parameter register"

```
REFERENCE
    "[802.3ah] 45.2.1.34"
 ::= { efmCuPmd2BEntry 1 }
```

```
efmCuPmd2BPower  OBJECT-TYPE
SYNTAX  Integer32(0..15)
UNITS   "dBm"
MAX-ACCESS  read-write
STATUS    current
DESCRIPTION
    "Desired Signal Transmit Power. Multiple of 0.5dBm.
    This object is writable for the CO subtype PMDs (2BaseTL-0).
    It is read-only for the CPE subtype (2BaseTL-R).
```

Changing of the Signal Transmit Power must be performed when the link is Down. Attempts to change this object MUST be rejected with the error inconsistentValue, if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PMD is present, then this attribute will map to the Power bits in the 2B PMD parameters register"



```
"[802.3ah] 45.2.1.35"  
 ::= { efmCuPmd2BEntry 2 }
```

efmCuPmd2BDataRate OBJECT-TYPE

SYNTAX Integer32(0..5696)

UNITS "Kbps"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Desired 2BaseTL PMD Data Rate.

The rate is fixed when the value is  $n \times 64\text{Kbps}$ , where  $n=3..60$  for 16-TCPAM and  $n=12..89$  for 32-TCPAM. The value of 0 means that data rate is not fixed but is adaptive and should be set to the maximum attainable rate during line probing.

This object is writable for the CO subtype PMDs (2BaseTL-0).

It is read-only for the CPE subtype (2BaseTL-R).

Changing of the Data Rate must be performed when the link is Down. Attempts to change this object MUST be rejected with the error inconsistentValue, if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PMD is present, then this attribute will map to the Data Rate bits in the 2B PMD parameters register"

REFERENCE

"[802.3ah] 45.2.1.35"

```
 ::= { efmCuPmd2BEntry 3 }
```

efmCuPmd2BConstellation OBJECT-TYPE

SYNTAX INTEGER {

tcpam16(1), -- 16-TCPAM

tcpam32(2) -- 32-TCPAM

}

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Desired TCPAM Constellation of the 2BaseTL PMD.

This object is writable for the CO subtype PMDs (2BaseTL-0).

It is read-only for the CPE subtype (2BaseTL-R).

Changing Constellation must be performed when the link is Down. Attempts to change this object MUST be rejected with the error inconsistentValue, if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PMD is present, then this

---

attribute will map to the Constellation bits in the 2B general parameter register"

REFERENCE

"[[802.3ah](#)] 45.2.1.34"

::= { efmCuPmd2BEntry 4 }

efmCuPmd2BLoopAtnThreshold OBJECT-TYPE

SYNTAX Integer32(-127..128)

UNITS "dB"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Desired Loop Attenuation Threshold for the 2BaseTL PMD.  
This object configures the loop attenuation alarm threshold.  
When the current value of Loop Attenuation reaches  
or exceeds this threshold, a efmCuPmd2BLoopAttnDefect  
notification MAY be generated.

This object is writable for the C0 subtype PMDs (2BaseTL-0).  
It is read-only for the CPE subtype (2BaseTL-R).

Changing of the Loop Attenuation Threshold must be performed when the link is Down. Attempts to change this object MUST be rejected with the error inconsistentValue, if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PMD is present, then this attribute will map to the Loop attenuation threshold bits in the 2B PMD line quality thresholds register"

REFERENCE

"[[802.3ah](#)] 45.2.1.36"

::= { efmCuPmd2BEntry 5 }

efmCuPmd2BSnrMgnThreshold OBJECT-TYPE

SYNTAX Integer32(-127..128)

UNITS "dB"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Desired SNR Margin Threshold for the 2BaseTL PMD.  
This object configures the SNR margin alarm threshold.  
When the current value of SNR Margin reaches  
or exceeds this threshold, a efmCuPmd2BSnrMgnDefect  
notification MAY be generated.

This object is writable for the C0 subtype PMDs (2BaseTL-0).

It is read-only for the CPE subtype (2BaseTL-R).

Changing of the SNR Margin Threshold must be performed when the link is Down. Attempts to change this object MUST be rejected with the error inconsistentValue, if the link is Up or Initializing.

If a Clause 45 MDIO Interface to the PMD is present, then this attribute will map to the SNR margin threshold bits in the 2B PMD line quality thresholds register"

REFERENCE

"[[802.3ah](#)] 45.2.1.36"

::= { efmCuPmd2BEntry 6 }

-- 10PasSTS specific PMD group

efmCuPmd10PTable OBJECT-TYPE

SYNTAX SEQUENCE OF EfmCuPmd10PEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Table for EFMCu 10PasSTS PMDs (modems)."

::= { efmCuPmd 3 }

efmCuPmd10PEntry OBJECT-TYPE

SYNTAX EfmCuPmd10PEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the EFMCu 10PasSTS PMD table."

AUGMENTS { efmCuPmdEntry }

::= { efmCuPmd10PTable 1 }

EfmCuPmd10PEntry ::=

SEQUENCE {

efmCuPmd10PElectricalLength Integer32

-- To be continued

}

```
efmCuPmd10PElectricalLength OBJECT-TYPE
    SYNTAX Integer32(0..1024)
    UNITS      "m"
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "Electrical Length in meters as perceived by the 10PasTS PMD
        after the link is established.
        The value of 0 is returned if the link is Down or Initializing
```

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or the PMD is unable to estimate the Electrical Length.

If a Clause 45 MDIO Interface to the PMD is present, then this attribute will map to the 10P Electrical Length register"

REFERENCE

```
"[802.3ah] 45.2.1.21"
 ::= { efmCuPmd10PEntry 1 }
```

-- efmCuAvailableStackTable for use in Discovery

```
efmCuAvailableStackTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF EfmCuAvailableStackEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table, modeled after ifStackTable from [IF-MIB],
        contains information on the possible 'on-top-of'
        relationships between the multiple sub-layers of network
        interfaces (as opposed to actual relationships in
        ifStackTable).  In particular, it contains information on
        which PCS ports (sub-layers) can possible run 'on top of'
        which PMDs (sublayers), as determined by cross-connect
        capability of the EFCu device, where each sub-layer
        corresponds to a conceptual row in the ifTable.  For example,
        when the PCS port with ifIndex value x can be connected
        to run on top of the PMD with ifIndex value y, then this table
        contains:
```

```
    efmCuAvailableStackStatus.x.y=active
```

For each ifIndex value, I, which identifies a PCS or PMD

interface, there are always at least two instantiated rows in this table associated with I. For one of these rows, I is the value of efmCuAvailableStackHigherLayer; for the other, I is the value of efmCuAvailableStackLowerLayer.

Note that there's always at least one PCS for each PMD and at least one PMD for each PCS in the EFMcu devices.

This table is ready only as it describes device capability"

REFERENCE

"ifStackTable of [RFC 2863](#)"

::= { efmCuObjects 3 }

efmCuAvailableStackEntry OBJECT-TYPE  
SYNTAX EfmCuAvailableStackEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION

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"Information on a particular relationship between two sub-layers, specifying that one sub-layer runs on 'top' of the other sub-layer. Each sub-layer corresponds to a conceptual row in the ifTable."

INDEX {  
efmCuAvailableStackHigherLayer,  
efmCuAvailableStackLowerLayer  
}  
::= { efmCuAvailableStackTable 1 }

EfmCuAvailableStackEntry ::=  
SEQUENCE {  
efmCuAvailableStackHigherLayer InterfaceIndexOrZero,  
efmCuAvailableStackLowerLayer InterfaceIndexOrZero,  
efmCuAvailableStackStatus RowStatus  
}

efmCuAvailableStackHigherLayer OBJECT-TYPE  
SYNTAX InterfaceIndexOrZero  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION

"The value of ifIndex corresponding to the higher sub-layer of the relationship, i.e., the sub-layer which runs on 'top' of the sub-layer identified by the corresponding instance of

ifStackLowerLayer. If there is no higher sub-layer (below the internetwork layer), then this object has the value 0."  
 ::= { efmCuAvailableStackEntry 1 }

efmCuAvailableStackLowerLayer OBJECT-TYPE

SYNTAX InterfaceIndexOrZero

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"The value of ifIndex corresponding to the lower sub-layer of the relationship, i.e., the sub-layer which runs 'below' the sub-layer identified by the corresponding instance of ifStackHigherLayer. If there is no lower sub-layer, then this object has the value 0."

::= { efmCuAvailableStackEntry 2 }

efmCuAvailableStackStatus OBJECT-TYPE

SYNTAX RowStatus

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The status of the relationship between two sub-layers."

This object is read only, unlike ifStackStatus, as it describes the device capability."

::= { efmCuAvailableStackEntry 3 }

--

-- Conformance Statements

--

efmCuGroups OBJECT IDENTIFIER ::= { efmCuConformance 1 }

efmCuCompliances OBJECT IDENTIFIER ::= { efmCuConformance 2 }

-- Object Groups

efmCuPortGroupBasic OBJECT-GROUP

OBJECTS {

efmCuPortSidesSupported,

```

        efmCuPortSide,
        efmCuPAFSupported
    }
STATUS current
DESCRIPTION
    "A collection of objects required for all EFMcu ports."
 ::= { efmCuGroups 1 }

efmCuGroupPAF OBJECT-GROUP
OBJECTS {
    efmCuPAFAdminState,
    efmCuPAFDiscoveryCode,
    efmCuPAFRemoteDiscoveryCode,
    efmCuAvailableStackTable
}
STATUS current
DESCRIPTION
    "A collection of objects that support
    optional Aggregation features on EFMcu ports."
 ::= { efmCuGroups 2 }

efmCuPmdGroupCommon OBJECT-GROUP
OBJECTS {
    efmCuPmdRxSnrMgn,
    efmCuPmdRemoteRxSnrMgn
}
STATUS current
DESCRIPTION
    "A collection of objects that provide
    required information about a 2BaseTL/10PasSTS PMD."

```

```
 ::= { efmCuGroups 3 }
```

```
efmCu2BGroup OBJECT-GROUP
OBJECTS {
    efmCuPmd2BRegion,
    efmCuPmd2BPower,
    efmCuPmd2BDataRate,
    efmCuPmd2BConstellation,
    efmCuPmd2BLoopAtnThreshold,
    efmCuPmd2BSnrMgnThreshold
}

```

```

STATUS current
DESCRIPTION
    "A collection of objects that provide
    required information about a 2BaseTL PMD."
 ::= { efmCuGroups 4 }

```

```

efmCu10PGroup OBJECT-GROUP
OBJECTS {
    efmCuPmd10PElectricalLength
}
STATUS current
DESCRIPTION
    "A collection of objects that provide required
    information about a 10PasSTS PMD."
 ::= { efmCuGroups 5 }

```

-- Compliance Statements

```

efmCuCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
    "The compliance statement for 2BaseTL/10PasSTS interfaces.
    Compliance with the following external compliance statements
    is prerequisite:

```

MIB Module	Compliance Statement
-----	-----
IF-MIB	ifCompliance3
IF-INVERTED-STACK-MIB	ifInvCompliance
EtherLike-MIB	dot3Compliance2
MAU-MIB	mauModIfCompl3"

```

MODULE -- this module
MANDATORY-GROUPS {
    efmCuPortGroupBasic,
    efmCuPmdGroupCommon,
    efmCuPmd2BGroup,

```

```

    efmCuPmd10PGroup
}

```

```

OBJECT    efmCuPortSidesSupported

```



```

SYNTAX INTEGER {
    subscriber(1),
    office(2),
}
DESCRIPTION
    "Support for values other than subscriber(1),
    and office(2) is not required."

OBJECT          efmCuPortSide
MIN-ACCESS      read-only
DESCRIPTION
    "Write access is not required (needed only for ports
    supporting both subscriber and office sides)"

-- Editor's Note: To be Continued

 ::= { efmCuCompliances 1 }

END

```

## 5. Security Considerations

There are number of managed objects defined in this MIB module that have a MAX-ACCESS clause of read-write. Most objects are writeable only when the link is Down. Writing to these objects can have the following potentially disruptive effects on network operation:

- o TBD

The user of this MIB module must therefore be aware that support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

The readable objects in this MIB module (i.e., those with MAX-ACCESS other than not-accessible) may be considered sensitive in some environments since, collectively, they provide information about the performance of network interfaces and can reveal some aspects of their configuration. In such environments it is important to control even GET and NOTIFY access to these objects and possibly even to encrypt their values when sending them over the network via SNMP.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed

to access and GET/SET (read/change/create/delete) the objects in this MIB module.

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

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

## [6](#). Acknowledgments

Not yet.

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#### Acknowledgment

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

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