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ATM-Based xDSL Bonded Interfaces MIB
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Abstract

This document defines Management Information Base (MIB) module for use with network management protocols in TCP/IP based networks. This document proposes an extension to the GBOND-MIB module with a set of objects for managing ATM-based multi-pair bonded xDSL interfaces, defined in ITU-T recommendation G.998.1.

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1. Introduction

The ATM-Based Multi-Pair Bonding, a.k.a. G.Bond/ATM, is specified in ITU-T G.998.1 recommendation [[G.998.1](#)], which defines a method for bonding (or aggregating) of multiple xDSL lines (or individual bearer channels in multiple xDSL lines) into a single bi-directional logical link carrying an ATM stream.

This specification can be viewed as an evolution of the legacy Inverse Multiplexing over ATM (IMA) technology [[af-phy-0086](#)], applied to xDSL with variable rates on each line/bearer channel. As with the other bonding schemes, ATM bonding also allows bonding of up to 32 individual sub-layers with variable rates, providing common functionality for the configuration, initialization, operation and monitoring of the bonded link.

The MIB module, defined in this document, defines a set of managed objects for the management of G.998.1 bonded interfaces, extending the common objects specified in the GBOND-MIB [[I-D.ietf-adslmib-gbond-mib](#)] module.

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](#) [[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](#)].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#) [[RFC2119](#)].

3. The DSL Forum Management Framework for xDSL Bonding

This document makes use of the DSL Forum technical report Management Framework for xDSL Bonding [[TR-159](#)], defining a management model and a hierarchy of management objects for the bonded xDSL interfaces.

4. Relationship to other MIB modules

This section outlines the relationship of the MIB modules defined in this document with other MIB modules described in the relevant RFCs. Specifically, the following MIB modules are discussed: Interfaces Group MIB (IF-MIB) and G.Bond MIB (GBOND-MIB).

4.1. Relationship to Interfaces Group MIB module

A G.Bond/ATM port is a private case of a Bonded multi-pair xDSL interface and as such is managed using generic interface management objects defined in the IF-MIB [[RFC2863](#)]. In particular an interface index (ifIndex) is used to index instances of G.Bond/ATM ports, as well as xDSL lines/channels, in a managed system.

4.2. Relationship to G.Bond MIB module

GBOND-MIB [[I-D.ietf-adslmib-gbond-mib](#)] module defines management objects common for all Bonded multi-pair xDSL interfaces. In particular it describes the bonding management, bonded port and channel configuration, initialization sequence etc.

Both GBOND-MIB and GBOND-ATM-MIB modules are REQUIRED to manage a G.Bond/ATM port.

4.3. Relationship to ATM MIB module

ATM-MIB [[RFC2515](#)] module defines management objects for an ATM interface.

ATM-MIB module can be used to manage the ATM aspects of a G.Bond/ATM port.

5. MIB Structure

5.1. Overview

All management objects defined in the GBOND-ATM-MIB module are contained in a single group gBondAtmPort. This group is further split into 4 sub-groups, structured as recommended by [RFC 4181](#) [[RFC4181](#)]:

- o gBondTdimPortNotifications - containing notifications (Up/Downstream Diff. Delay Tolerance Exceeded).
- o gBondAtmPortConfTable - containing objects for configuration of a G.Bond/ATM port.

- o gBondAtmPortStatusTable - containing objects providing overall status information of a G.Bond/ATM port, complementing the generic status information from the ifTable of IF-MIB and gBondFltStatus of GBOND-MIB.
- o gBondAtmPM - containing objects providing historical performance monitoring (PM) information of a G.Bond/ATM port, complementing the PM information from the gBondPortPM of GBOND-MIB.

Note that the rest of the objects for the Generic Bonded Sub-layer (GBS) port configuration, capabilities, status, notifications and performance monitoring is located in the GBOND-MIB module.

5.2. Performance Monitoring

The OPTIONAL performance monitoring counters, thresholds and history buckets (interval-counters) are implemented using the textual conventions defined in the HC-PerfHist-TC-MIB [[RFC3705](#)]. The HC-PerfHist-TC-MIB defines 64-bit versions of the textual conventions found in PerfHist-TC-MIB [[RFC3593](#)].

The agent SHOULD align the beginning of each interval to a fifteen minute boundary of a wall clock. Likewise, the beginning of each one day intervals SHOULD be aligned with the start of a day.

Counters are not reset when a GBS is reinitialized, but rather only when the agent is reset or reinitialized.

Note that the accumulation of certain performance events for a monitored entity is inhibited (counting stops) during periods of service unavailability on that entity. The DESCRIPTION clause of performance monitoring counters in this MIB module specifies which of the counters are inhibited during periods of service unavailability.

5.3. Mapping of Broadband Forum TR-159 Managed Objects

This section contains the mapping between relevant managed objects (attributes) defined in [[TR-159](#)] and the managed objects defined in this document.

TR-159 Managed Object	Corresponding SNMP Object
oBondATM - Basic Package (Mandatory)	
aIMARxLostCells	gBondAtmPortStatRxLostCells
aIMAPeerRxLostCells	gBondAtmPortStatTxLostCells
aIMAMaxUpDiffDelay	gBondAtmPortStatMaxUpDiffDelay
aIMAMaxDownDiffDelay	gBondAtmPortStatMaxDnDiffDelay
aIMAUpDiffDelayTolerance	gBondAtmPortConfUpDiffDelayTolerance
aIMADownDiffDelayTolerance	gBondAtmPortConfDnDiffDelayTolerance
aIMADiffDelayToleranceExceededEnable	gBondAtmPortConfDiffDelayToleranceExceededEnable
nIMAUpDiffDelayToleranceExceeded	gBondAtmUpDiffDelayToleranceExceeded
nIMADownDiffDelayToleranceExceeded	gBondAtmDnDiffDelayToleranceExceeded

Table 1: Mapping of TR-159 Managed Objects

6. G.Bond/ATM MIB Definitions

GBOND-ATM-MIB DEFINITIONS ::= BEGIN

IMPORTS

```

MODULE-IDENTITY,
OBJECT-TYPE,
NOTIFICATION-TYPE,
mib-2,
Unsigned32,
Counter32
    FROM SNMPv2-SMI          -- [RFC2578]
TEXTUAL-CONVENTION,
TruthValue
    FROM SNMPv2-TC          -- [RFC2579]
MODULE-COMPLIANCE,
OBJECT-GROUP,
NOTIFICATION-GROUP

```



```
FROM SNMPv2-CONF          -- [RFC2580]
ifIndex
FROM IF-MIB                -- [RFC2863]
HCPperfCurrentCount,
HCPperfIntervalCount,
HCPperfValidIntervals,
HCPperfInvalidIntervals,
HCPperfTimeElapsed
FROM HC-PerfHist-TC-MIB   -- [RFC3705]
;
```

gBondAtmMIB MODULE-IDENTITY

LAST-UPDATED "201202020000Z" -- Feb 02, 2012

ORGANIZATION "IETF ADSL MIB Working Group"

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DESCRIPTION

"The objects in this MIB module are used to manage the multi-pair bonded xDSL Interfaces using ATM inverse multiplexing, defined in ITU-T recommendation G.998.1 (G.Bond/ATM).

This MIB module MUST be used in conjunction with GBOND-MIB module, common to all G.Bond technologies.

The following references are used throughout this MIB module:

[G.998.1] refers to:

ITU-T Recommendation G.998.1: 'ATM-based multi-pair bonding',
January 2005.

[TR-159] refers to:

Broadband Forum Technical Report: 'Management Framework for
xDSL Bonding', December 2008.

Naming Conventions:

ATM - Asynchronous Transfer Mode
BCE - Bonding Channel Entity
BTU - Bonding Terminating Unit
CO - Central Office
CPE - Customer Premises Equipment
GBS - Generic Bonding Sublayer
GBS-C - Generic Bonded Sub-layer, CO side
GBS-R - Generic Bonded Sub-layer, RT (or CPE) side
PM - Performance Monitoring
RT - Remote Terminal
SNR - Signal to Noise Ratio
SES - Severely Errored Seconds
US - Unavailable Seconds

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This version of this MIB module is part of RFC YYYY;
see the RFC itself for full legal notices."

REVISION "201202020000Z" -- Feb 02, 2012

DESCRIPTION "Initial version, published as RFC YYYY."

-- EdNote: Replace YYYY with the actual RFC number &
-- remove this note

::= { mib-2 ZZZ }

-- EdNote: Replace ZZZ with a real OID once it is
-- allocated & remove this note.

-- Sections of the module

-- Structured as recommended by [\[RFC4181\]](#), [Appendix D](#)

gBondAtmObjects OBJECT IDENTIFIER ::= { gBondAtmMIB 1 }

gBondAtmConformance OBJECT IDENTIFIER ::= { gBondAtmMIB 2 }

-- Groups in the module


```
gBondAtmPort          OBJECT IDENTIFIER ::= { gBondAtmObjects 1 }

-- Textual Conventions

MilliSeconds ::= TEXTUAL-CONVENTION
    DISPLAY-HINT "d"
    STATUS      current
    DESCRIPTION
        "Represents time unit value in milliseconds."
    SYNTAX      Unsigned32

-- Port Notifications Group

gBondAtmPortNotifications OBJECT IDENTIFIER
    ::= { gBondAtmPort 0 }

gBondAtmUpDiffDelayToleranceExceeded NOTIFICATION-TYPE
    OBJECTS {
        -- ifIndex is not needed here since we are under specific GBS
        gBondAtmPortConfUpDiffDelayTolerance,
        gBondAtmPortStatMaxUpDiffDelay
    }
    STATUS      current
    DESCRIPTION
        "This notification indicates that the maximum upstream
        differential delay has exceeded the max upstream differential
        delay threshold, specified by
        gBondAtmPortConfUpDiffDelayTolerance.

        This notification MAY be sent for the GBS-C ports while the
        port is up, on the crossing event in both directions: from
        normal (diff. delay is above the threshold) to low (diff.
        delay equals the threshold or below it) and from low to
        normal. This notification is not applicable to the GBS-R
        ports.

        Generation of this notification is controlled by the
        gBondAtmPortConfDiffDelayToleranceExceededEnable attribute.

        This object maps to the TR-159 notification
        nIMAUppDiffDelayToleranceExceeded."
    REFERENCE
        "[TR-159] 5.5.2.8"
    ::= { gBondAtmPortNotifications 1 }

gBondAtmDnDiffDelayToleranceExceeded NOTIFICATION-TYPE
    OBJECTS {
        -- ifIndex is not needed here since we are under specific GBS
```



```
    gBondAtmPortConfDnDiffDelayTolerance,  
    gBondAtmPortStatMaxDnDiffDelay  
}
```

STATUS current

DESCRIPTION

"This notification indicates that the maximum downstream differential delay has exceeded the max downstream differential delay threshold, specified by gBondAtmPortConfDnDiffDelayTolerance.

This notification MAY be sent for the GBS-C ports while the port is up, on the crossing event in both directions: from normal (diff. delay is above the threshold) to low (diff. delay equals the threshold or below it) and from low to normal. This notification is not applicable to the GBS-R ports.

Generation of this notification is controlled by the gBondAtmPortConfDiffDelayToleranceExceededEnable attribute.

This object maps to the TR-159 notification nIMADownDiffDelayToleranceExceeded."

REFERENCE

"[[TR-159](#)] 5.5.2.9"

::= { gBondAtmPortNotifications 2 }

-- G.Bond/ATM Port group

gBondAtmPortConfTable OBJECT-TYPE

SYNTAX SEQUENCE OF GBondAtmPortConfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Table for Configuration of G.Bond/ATM ports. Entries in this table MUST be maintained in a persistent manner"

::= { gBondAtmPort 1 }

gBondAtmPortConfEntry OBJECT-TYPE

SYNTAX GBondAtmPortConfEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the G.Bond/ATM Port Configuration table. Each entry represents a G.Bond/ATM port indexed by the ifIndex. Additional configuration parameters are available via the gBondPortConfEntry of GBOND-MIB. Note that a G.Bond/ATM port runs on top of a single or multiple BCE port(s), which are also indexed by ifIndex."


```
INDEX { ifIndex }
 ::= { gBondAtmPortConfTable 1 }
```

```
GBondAtmPortConfEntry ::=
  SEQUENCE {
    gBondAtmPortConfUpDiffDelayTolerance      MilliSeconds,
    gBondAtmPortConfDnDiffDelayTolerance      MilliSeconds,
    gBondAtmPortConfDiffDelayToleranceExceededEnable TruthValue
  }
```

gBondAtmPortConfUpDiffDelayTolerance OBJECT-TYPE

SYNTAX MilliSeconds(0..2047)

UNITS "milliseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"A maximum tolerated upstream differential delay (among the member BCEs) of a G.Bond/ATM port, expressed in ms.

This object is read-write for the GBS-C ports.

It is irrelevant for the GBS-R ports - an attempt to read or change this object MUST be rejected (in case of SNMP with the error inconsistentValue).

This object maps to TR-159 attribute
aIMAUppDiffDelayTolerance"

REFERENCE

"[[TR-159](#)] 5.5.2.5; [[G.998.1](#)] 11.4.1 (6)"

```
 ::= { gBondAtmPortConfEntry 1 }
```

gBondAtmPortConfDnDiffDelayTolerance OBJECT-TYPE

SYNTAX MilliSeconds(0..2047)

UNITS "milliseconds"

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"A maximum tolerated downstream differential delay (among the member BCEs) of a G.Bond/ATM port, expressed in ms.

This object is read-write for the GBS-C ports.

It is irrelevant for the GBS-R ports - an attempt to read or change this object MUST be rejected (in case of SNMP with the error inconsistentValue).

This object maps to TR-159 attribute
aIMADownDiffDelayTolerance"

REFERENCE

"[[TR-159](#)] 5.5.2.6; [[G.998.1](#)] 11.4.1 (6)"

::= { gBondAtmPortConfEntry 2 }

gBondAtmPortConfDiffDelayToleranceExceededEnable OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Indicates whether gBondAtmUpDiffDelayToleranceExceeded and gBondAtmDnDiffDelayToleranceExceeded notifications should be generated for G.Bond/ATM port.

Value of true(1) indicates that the notifications are enabled.

Value of false(2) indicates that the notifications are disabled.

This object is read-write for the GBS-C.

It is irrelevant for the GBS-R ports - an attempt to read or change this object MUST be rejected (in case of SNMP with the error inconsistentValue).

This object maps to the TR-159 attribute aIMADiffDelayToleranceExceededEnable."

REFERENCE

"[[TR-159](#)] 5.5.5.7"

::= { gBondAtmPortConfEntry 3 }

gBondAtmPortStatTable OBJECT-TYPE

SYNTAX SEQUENCE OF GBondAtmPortStatEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides overall status information of G.Bond/ATM ports, complementing the generic status information from the ifTable of IF-MIB and gBondFltStatus of GBOND-MIB. Additional status information about connected BCEs is available from the relevant line MIBs.

This table contains live data from the equipment. As such, it is NOT persistent."

::= { gBondAtmPort 2 }

gBondAtmPortStatEntry OBJECT-TYPE

SYNTAX GBondAtmPortStatEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the G.Bond/ATM port Status table.

Each entry represents a G.Bond/ATM port indexed by the ifIndex.

Note that a GBS port runs on top of a single or multiple BCE port(s), which are also indexed by ifIndex."

```
INDEX { ifIndex }  
 ::= { gBondAtmPortStatTable 1 }
```

GBondAtmPortStatEntry ::=

```
SEQUENCE {  
    gBondAtmPortStatRxLostCells      Counter32,  
    gBondAtmPortStatTxLostCells      Counter32,  
    gBondAtmPortStatMaxUpDiffDelay   Unsigned32,  
    gBondAtmPortStatMaxDnDiffDelay   Unsigned32  
}
```

gBondAtmPortStatRxLostCells OBJECT-TYPE

```
SYNTAX      Counter32  
UNITS       "cells"  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The number of lost ATM cells detected by the G.Bond/ATM port in the receive direction, i.e. upstream direction for a GBS-C port.

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, defined in IF-MIB.

This object maps to TR-159 attribute aIMARxLostCells."

REFERENCE

"[[TR-159](#)] 5.5.2.1; [[G.998.1](#)] 11.4.2 (4)"

```
::= { gBondAtmPortStatEntry 1 }
```

gBondAtmPortStatTxLostCells OBJECT-TYPE

```
SYNTAX      Counter32  
UNITS       "cells"  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The number of lost ATM cells detected by the peer G.Bond/ATM port in the receive direction, e.g. downstream direction for a GBS-C port.

This object is irrelevant for the GBS-R ports - an attempt to read it MUST be rejected (in case of SNMP with the error inconsistentValue).

Discontinuities in the value of this counter can occur at re-initialization of the management system, and at other times as indicated by the value of ifCounterDiscontinuityTime, defined in IF-MIB.

This object maps to TR-159 attribute aIMAPeerRxLostCells."

REFERENCE

"[[TR-159](#)] 5.5.2.1; [[G.998.1](#)] 11.4.2 (4)"
::= { gBondAtmPortStatEntry 2 }

gBondAtmPortStatMaxUpDiffDelay OBJECT-TYPE

SYNTAX Unsigned32

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Current maximum upstream differential delay between all operational BCEs in the G.Bond/ATM bonding group, measured in units of 0.1 ms.

This object is read-only for the GBS-C ports.

It is irrelevant for the GBS-R ports - an attempt to read this object MUST be rejected (in case of SNMP with the error inconsistentValue).

This object maps to TR-159 attribute aIMAMaxUpDiffDelay."

REFERENCE

"[[TR-159](#)] 5.5.2.3"
::= { gBondAtmPortStatEntry 3 }

gBondAtmPortStatMaxDnDiffDelay OBJECT-TYPE

SYNTAX Unsigned32

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Current maximum downstream differential delay between all operational BCEs in the G.Bond/ATM bonding group, measured in units of 0.1 ms.

This object is read-only for the GBS-C ports.

It is irrelevant for the GBS-R ports - an attempt to read this object MUST be rejected (in case of SNMP with the error inconsistentValue).

This object maps to TR-159 attribute aIMAMaxDownDiffDelay."

REFERENCE

"[[TR-159](#)] 5.5.2.4"


```
::= { gBondAtmPortStatEntry 4 }
```

```
-----
-- Performance Monitoring group
-----
```

```
gBondAtmPM OBJECT IDENTIFIER ::= { gBondAtmPort 3 }
```

```
gBondAtmPortPmCurTable OBJECT-TYPE
```

```
SYNTAX SEQUENCE OF GBondAtmPortPmCurEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This table contains current Performance Monitoring information
for a G.Bond/ATM port. This table contains live data from the
equipment and as such is NOT persistent."
```

```
::= { gBondAtmPM 1 }
```

```
gBondAtmPortPmCurEntry OBJECT-TYPE
```

```
SYNTAX GBondAtmPortPmCurEntry
```

```
MAX-ACCESS not-accessible
```

```
STATUS current
```

```
DESCRIPTION
```

```
"An entry in the G.Bond/ATM Port PM table.
Each entry represents a G.Bond/ATM port indexed by the
ifIndex."
```

```
INDEX { ifIndex }
```

```
::= { gBondAtmPortPmCurTable 1 }
```

```
GBondAtmPortPmCurEntry ::=
```

```
SEQUENCE {
```

gBondAtmPortPmCur15MinValidIntervals	HCPperfValidIntervals,
gBondAtmPortPmCur15MinInvalidIntervals	HCPperfInvalidIntervals,
gBondAtmPortPmCur15MinTimeElapsed	HCPperfTimeElapsed,
gBondAtmPortPmCur15MinRxLostCells	HCPperfCurrentCount,
gBondAtmPortPmCur15MinTxLostCells	HCPperfCurrentCount,
gBondAtmPortPmCur15MinUpDiffDelay	HCPperfCurrentCount,
gBondAtmPortPmCur15MinDnDiffDelay	HCPperfCurrentCount,
gBondAtmPortPmCur1DayValidIntervals	Unsigned32,
gBondAtmPortPmCur1DayInvalidIntervals	Unsigned32,
gBondAtmPortPmCur1DayTimeElapsed	HCPperfTimeElapsed,
gBondAtmPortPmCur1DayRxLostCells	HCPperfCurrentCount,
gBondAtmPortPmCur1DayTxLostCells	HCPperfCurrentCount,
gBondAtmPortPmCur1DayUpDiffDelay	HCPperfCurrentCount,
gBondAtmPortPmCur1DayDnDiffDelay	HCPperfCurrentCount

```
}
```

```
gBondAtmPortPmCur15MinValidIntervals OBJECT-TYPE
```


SYNTAX HCPperfValidIntervals

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only number of 15-minute intervals for which the performance data was collected. The value of this object will be 96 or the maximum number of 15-minute history intervals collected by the implementation unless the measurement was (re-)started recently, in which case the value will be the number of complete 15 minutes intervals for which there are at least some data.

In certain cases it is possible that some intervals are unavailable. In this case, this object reports the maximum interval number for which data is available.

This object partially maps to the TR-159 attribute aGroupPerf15MinValidIntervals."

REFERENCE

"[[TR-159](#)] 5.5.1.32"

::= { gBondAtmPortPmCurEntry 1 }

gBondAtmPortPmCur15MinInvalidIntervals OBJECT-TYPE

SYNTAX HCPperfInvalidIntervals

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only number of 15-minute intervals for which the performance data was not always available. The value will typically be zero except in cases where the data for some intervals are not available.

This object partially maps to the TR-159 attribute aGroupPerf15MinInvalidIntervals."

REFERENCE

"[[TR-159](#)] 5.5.1.33"

::= { gBondAtmPortPmCurEntry 2 }

gBondAtmPortPmCur15MinTimeElapsed OBJECT-TYPE

SYNTAX HCPperfTimeElapsed

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of seconds that have elapsed since the beginning of the current 15-minute performance interval.

This object partially maps to the TR-159 attribute aGroupPerfCurr15MinTimeElapsed."

REFERENCE

"[[TR-159](#)] 5.5.1.34"
::= { gBondAtmPortPmCurEntry 3 }

gBondAtmPortPmCur15MinRxLostCells OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "cells"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of lost ATM cells detected by a G.Bond/ATM port (e.g. GBS-C) in the receive direction, during the current 15-minute performance history interval.

Note that the total number of lost ATM cells is indicated by the gBondAtmPortStatRxLostCells object.

This object is inhibited during Severely Errored Seconds (SES) or Unavailable Seconds (UAS)."

REFERENCE

"[[TR-159](#)] 5.5.2.1"
::= { gBondAtmPortPmCurEntry 4 }

gBondAtmPortPmCur15MinTxLostCells OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "cells"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of lost ATM cells detected by the peer G.Bond/ATM port (e.g. by GBS-R for GBS-C), during the current 15-minute performance history interval.

Note that the total number of lost ATM cells is indicated by the gBondAtmPortStatTxLostCells object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[[TR-159](#)] 5.5.2.2"
::= { gBondAtmPortPmCurEntry 5 }

gBondAtmPortPmCur15MinUpDiffDelay OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only value specifying maximum upstream differential

delay between all operational BCEs in the GBS-C, measured in units of 0.1 ms, during the current 15-minute performance interval.

Note that the current max upstream differential delay is indicated by the gBondAtmPortStatMaxUpDiffDelay object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[[TR-159](#)] 5.5.2.3"

::= { gBondAtmPortPmCurEntry 6}

gBondAtmPortPmCur15MinDnDiffDelay OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only value specifying maximum downstream differential delay between all operational BCEs in the GBS-C (as perceived by GBS-R), measured in units of 0.1 ms, during the current 15-minute performance history interval.

Note that the current max downstream differential delay is indicated by the gBondAtmPortStatMaxDnDiffDelay object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[[TR-159](#)] 5.5.2.4"

::= { gBondAtmPortPmCurEntry 7}

gBondAtmPortPmCur1DayValidIntervals OBJECT-TYPE

SYNTAX Unsigned32 (0..7)

UNITS "days"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only number of 1-day intervals for which data was collected. The value of this object will be 7 or the maximum number of 1-day history intervals collected by the implementation unless the measurement was (re-)started recently, in which case the value will be the number of complete 1-day intervals for which there are at least some data. In certain cases it is possible that some intervals are unavailable. In this case, this object reports the maximum interval number for which data is available."

REFERENCE

"[[TR-159](#)] 5.5.1.45"


```
::= { gBondAtmPortPmCurEntry 8 }
```

gBondAtmPortPmCur1DayInvalidIntervals OBJECT-TYPE

SYNTAX Unsigned32 (0..7)

UNITS "days"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only number of 1-day intervals for which data was not always available. The value will typically be zero except in cases where the data for some intervals are not available."

REFERENCE

"[[TR-159](#)] 5.5.1.46"

```
::= { gBondAtmPortPmCurEntry 9 }
```

gBondAtmPortPmCur1DayTimeElapsed OBJECT-TYPE

SYNTAX HCPerfTimeElapsed

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of seconds that have elapsed since the beginning of the current 1-day performance interval."

REFERENCE

"[[TR-159](#)] 5.5.1.47"

```
::= { gBondAtmPortPmCurEntry 10 }
```

gBondAtmPortPmCur1DayRxLostCells OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "cells"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of lost ATM cells detected by the G.Bond/ATM port (e.g. GBS-C), during the current 1-day performance interval."

This object is inhibited during Severely Errored Seconds (SES) and Unavailable Seconds (UAS)."

```
::= { gBondAtmPortPmCurEntry 11 }
```

gBondAtmPortPmCur1DayTxLostCells OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "cells"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of lost ATM cells detected by the peer"

G.Bond/ATM port (e.g. by GBS-R for GBS-C), during the current 1-day performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."
::= { gBondAtmPortPmCurEntry 12 }

gBondAtmPortPmCur1DayUpDiffDelay OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only value specifying maximum upstream differential delay between all operational BCEs in the GBS-C, measured in units of 0.1 ms, during the current 1-day performance interval.

This object is inhibited during Unavailable Seconds (UAS)."
::= { gBondAtmPortPmCurEntry 13 }

gBondAtmPortPmCur1DayDnDiffDelay OBJECT-TYPE

SYNTAX HCPerfCurrentCount

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only value specifying maximum downstream differential delay between all operational BCEs in the GBS-C, measured in units of 0.1 ms, during the current 1-day performance interval.

This object is inhibited during Unavailable Seconds (UAS)."
::= { gBondAtmPortPmCurEntry 14 }

-- Port PM history: 15-min buckets

gBondAtmPortPm15MinTable OBJECT-TYPE

SYNTAX SEQUENCE OF GBondAtmPortPm15MinEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains historical 15-minute buckets of Performance Monitoring information for a G.Bond/ATM port (a row for each 15-minute interval, up to 96 intervals).

Entries in this table MUST be maintained in a persistent manner."

::= { gBondAtmPM 2 }

gBondAtmPortPm15MinEntry OBJECT-TYPE

SYNTAX GBondAtmPortPm15MinEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in the G.Bond/ATM Port historical 15-minute PM table. Each entry represents performance monitoring data for a G.Bond/ATM port, indexed by ifIndex, collected during a particular 15-minute interval, indexed by gBondAtmPortPm15MinIntervalIndex."

INDEX { ifIndex, gBondAtmPortPm15MinIntervalIndex }

::= { gBondAtmPortPm15MinTable 1 }

GBondAtmPortPm15MinEntry ::=

SEQUENCE {

 gBondAtmPortPm15MinIntervalIndex Unsigned32,
 gBondAtmPortPm15MinIntervalMoniTime HCPerfTimeElapsed,
 gBondAtmPortPm15MinIntervalRxLostCells HCPerfIntervalCount,
 gBondAtmPortPm15MinIntervalTxLostCells HCPerfIntervalCount,
 gBondAtmPortPm15MinIntervalUpDiffDelay HCPerfIntervalCount,
 gBondAtmPortPm15MinIntervalDnDiffDelay HCPerfIntervalCount,
 gBondAtmPortPm15MinIntervalValid TruthValue

}

gBondAtmPortPm15MinIntervalIndex OBJECT-TYPE

SYNTAX Unsigned32 (1..96)

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Performance Data Interval number. 1 is the most recent previous interval; interval 96 is 24 hours ago. Intervals 2..96 are OPTIONAL."

This object partially maps to the TR-159 attribute aGroupPerf15MinIntervalNumber."

REFERENCE

"[[TR-159](#)] 5.5.1.57"

::= { gBondAtmPortPm15MinEntry 1 }

gBondAtmPortPm15MinIntervalMoniTime OBJECT-TYPE

SYNTAX HCPerfTimeElapsed

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of seconds over which the performance data was actually monitored. This value will be the same as the interval duration (900 seconds), except in a situation where performance data could not be collected for any reason."


```
::= { gBondAtmPortPm15MinEntry 2 }
```

gBondAtmPortPm15MinIntervalRxLostCells OBJECT-TYPE

SYNTAX HCPerfIntervalCount

UNITS "cells"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of lost ATM cells detected by a G.Bond/ATM port (e.g. GBS-C) in the receive direction, during the 15-minute performance history interval.

Note that the total number of lost ATM cells is indicated by the gBondAtmPortStatRxLostCells object.

This object is inhibited during Severely Errored Seconds (SES) or Unavailable Seconds (UAS)."

REFERENCE

"[[TR-159](#)] 5.5.2.1"

```
::= { gBondAtmPortPm15MinEntry 3 }
```

gBondAtmPortPm15MinIntervalTxLostCells OBJECT-TYPE

SYNTAX HCPerfIntervalCount

UNITS "cells"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only count of lost ATM cells detected by the peer G.Bond/ATM port (e.g. by GBS-R for GBS-C), during the 15-minute performance history interval.

Note that the total number of lost ATM cells is indicated by the gBondAtmPortStatTxLostCells object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[[TR-159](#)] 5.5.2.2"

```
::= { gBondAtmPortPm15MinEntry 4 }
```

gBondAtmPortPm15MinIntervalUpDiffDelay OBJECT-TYPE

SYNTAX HCPerfIntervalCount

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only value specifying maximum upstream differential delay between all operational BCEs in the GBS, measured in units of 0.1 ms, during the 15-minute performance history

interval.

Note that the current max upstream differential delay is indicated by the gBondAtmPortStatMaxUpDiffDelay object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[[TR-159](#)] 5.5.2.3"

::= { gBondAtmPortPm15MinEntry 5 }

gBondAtmPortPm15MinIntervalDnDiffDelay OBJECT-TYPE

SYNTAX HCPerfIntervalCount

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only value specifying maximum downstream differential delay between all operational BCEs in the GBS, as perceived by its peer port, measured in units of 0.1 ms, during the 15-minute performance history interval.

Note that the current max upstream differential delay is indicated by the gBondAtmPortStatMaxDnDiffDelay object.

This object is inhibited during Unavailable Seconds (UAS)."

REFERENCE

"[[TR-159](#)] 5.5.2.4"

::= { gBondAtmPortPm15MinEntry 6 }

gBondAtmPortPm15MinIntervalValid OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only object indicating whether or not this history bucket contains valid data. Valid bucket is reported as true(1) and invalid bucket as false(2).

If this history bucket is invalid the BTU MUST NOT produce notifications based upon the value of the counters in this bucket.

Note that an implementation may decide not to store invalid history buckets in its data base. In such case this object is not required as only valid history buckets are available while invalid history buckets are simply not in the data base.

This object partially maps to the TR-159 attribute aGroupPerf15MinIntervalValid."

REFERENCE


```
"[TR-159] 5.5.1.58"
::= { gBondAtmPortPm15MinEntry 7 }

-- Port PM history: 1-day buckets

gBondAtmPortPm1DayTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF GBondAtmPortPm1DayEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains historical 1-day buckets of Performance
        Monitoring information for a G.Bond/ATM port (a row for each
        1-day interval, up to 7 intervals).
        Entries in this table MUST be maintained in a persistent manner."
    ::= { gBondAtmPM 3 }

gBondAtmPortPm1DayEntry OBJECT-TYPE
    SYNTAX      GBondAtmPortPm1DayEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "An entry in the G.Bond/ATM port historical 1-day PM table.
        Each entry represents performance monitoring data for such port,
        indexed by ifIndex, collected during a particular 1-day
        interval, indexed by gBondAtmPortPm1DayIntervalIndex."
    INDEX { ifIndex, gBondAtmPortPm1DayIntervalIndex }
    ::= { gBondAtmPortPm1DayTable 1 }

GBondAtmPortPm1DayEntry ::=
    SEQUENCE {
        gBondAtmPortPm1DayIntervalIndex      Unsigned32,
        gBondAtmPortPm1DayIntervalMoniTime    HCPperfTimeElapsed,
        gBondAtmPortPm1DayIntervalRxLostCells HCPperfIntervalCount,
        gBondAtmPortPm1DayIntervalTxLostCells HCPperfIntervalCount,
        gBondAtmPortPm1DayIntervalUpDiffDelay HCPperfIntervalCount,
        gBondAtmPortPm1DayIntervalDnDiffDelay HCPperfIntervalCount,
        gBondAtmPortPm1DayIntervalValid      TruthValue
    }

gBondAtmPortPm1DayIntervalIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..7)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Performance Data Interval number. 1 is the most recent previous
        interval; interval 7 is 24 hours ago.
        Intervals 2..7 are OPTIONAL."
```


This object partially maps to the TR-159 attribute
aGroupPerf1DayIntervalNumber."

REFERENCE

"[[TR-159](#)] 5.5.1.62"

::= { gBondAtmPortPm1DayEntry 1 }

gBondAtmPortPm1DayIntervalMoniTime OBJECT-TYPE

SYNTAX HCPerfTimeElapsed

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A count of seconds over which the performance data was actually monitored. This value will be the same as the interval duration (86400 seconds), except in a situation where performance data could not be collected for any reason.

This object partially maps to the TR-159 attribute
aGroupPerf1DayIntervalMoniSecs."

REFERENCE

"[[TR-159](#)] 5.5.1.64"

::= { gBondAtmPortPm1DayEntry 2 }

gBondAtmPortPm1DayIntervalRxLostCells OBJECT-TYPE

SYNTAX HCPerfIntervalCount

UNITS "cells"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A count of lost ATM cells detected by the G.Bond/ATM port (e.g. GBS-C), during the 1-day performance history interval.

This object is inhibited during Severely Errored Seconds (SES) and Unavailable Seconds (UAS)."

::= { gBondAtmPortPm1DayEntry 3 }

gBondAtmPortPm1DayIntervalTxLostCells OBJECT-TYPE

SYNTAX HCPerfIntervalCount

UNITS "cells"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A count of lost ATM cells detected by the peer G.Bond/ATM port (e.g. by GBS-R for GBS-C), during the 1-day performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."

::= { gBondAtmPortPm1DayEntry 4 }

gBondAtmPortPm1DayIntervalUpDiffDelay OBJECT-TYPE

SYNTAX HCPerfIntervalCount

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only value specifying maximum upstream differential delay between all operational BCEs in the GBS-C, measured in units of 0.1 ms, during the 1-day performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."

::= { gBondAtmPortPm1DayEntry 5 }

gBondAtmPortPm1DayIntervalDnDiffDelay OBJECT-TYPE

SYNTAX HCPerfIntervalCount

UNITS "0.1 ms"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only value specifying maximum downstream differential delay between all operational BCEs in the GBS-C, measured in units of 0.1 ms, during the 1-day performance history interval.

This object is inhibited during Unavailable Seconds (UAS)."

::= { gBondAtmPortPm1DayEntry 6 }

gBondAtmPortPm1DayIntervalValid OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"A read-only object indicating whether or not this history bucket contains valid data. Valid bucket is reported as true(1) and invalid bucket as false(2).

If this history bucket is invalid the BTU MUST NOT produce notifications based upon the value of the counters in this bucket.

Note that an implementation may decide not to store invalid history buckets in its data base. In such case this object is not required as only valid history buckets are available while invalid history buckets are simply not in the data base.

This object partially maps to the TR-159 attribute aGroupPerf1DayIntervalValid."

REFERENCE

"[[TR-159](#)] 5.5.1.63"

::= { gBondAtmPortPm1DayEntry 7 }


```
--
-- Conformance Statements
--

gBondAtmGroups      OBJECT IDENTIFIER
    ::= { gBondAtmConformance 1 }

gBondAtmCompliances OBJECT IDENTIFIER
    ::= { gBondAtmConformance 2 }

-- Object Groups

gBondAtmBasicGroup OBJECT-GROUP
    OBJECTS {
        gBondAtmPortStatRxLostCells,
        gBondAtmPortStatTxLostCells,
        gBondAtmPortStatMaxUpDiffDelay,
        gBondAtmPortStatMaxDnDiffDelay
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects representing management information
        for a G.Bond/ATM port."
    ::= { gBondAtmGroups 1 }

gBondAtmAlarmConfGroup OBJECT-GROUP
    OBJECTS {
        gBondAtmPortConfUpDiffDelayTolerance,
        gBondAtmPortConfDnDiffDelayTolerance,
        gBondAtmPortConfDiffDelayToleranceExceededEnable
    }
    STATUS      current
    DESCRIPTION
        "A collection of objects required for configuration of alarm
        thresholds and notifications in G.Bond/ATM ports."
    ::= { gBondAtmGroups 2 }

gBondAtmNotificationGroup NOTIFICATION-GROUP
    NOTIFICATIONS {
        gBondAtmUpDiffDelayToleranceExceeded,
        gBondAtmDnDiffDelayToleranceExceeded
    }
    STATUS      current
    DESCRIPTION
        "This group supports notifications of significant conditions
        associated with G.Bond/ATM ports."
    ::= { gBondAtmGroups 3 }
```


gBondAtmPerfCurrGroup OBJECT-GROUP

OBJECTS {

gBondAtmPortPmCur15MinValidIntervals,
gBondAtmPortPmCur15MinInvalidIntervals,
gBondAtmPortPmCur15MinTimeElapsed,
gBondAtmPortPmCur15MinRxLostCells,
gBondAtmPortPmCur15MinTxLostCells,
gBondAtmPortPmCur15MinUpDiffDelay,
gBondAtmPortPmCur15MinDnDiffDelay,
gBondAtmPortPmCur1DayValidIntervals,
gBondAtmPortPmCur1DayInvalidIntervals,
gBondAtmPortPmCur1DayTimeElapsed,
gBondAtmPortPmCur1DayRxLostCells,
gBondAtmPortPmCur1DayTxLostCells,
gBondAtmPortPmCur1DayUpDiffDelay,
gBondAtmPortPmCur1DayDnDiffDelay

}

STATUS current

DESCRIPTION

"A collection of objects supporting OPTIONAL current Performance Monitoring information for G.Bond/ATM ports."

::= { gBondAtmGroups 4 }

gBondAtmPerf15MinGroup OBJECT-GROUP

OBJECTS {

gBondAtmPortPm15MinIntervalMoniTime,
gBondAtmPortPm15MinIntervalRxLostCells,
gBondAtmPortPm15MinIntervalTxLostCells,
gBondAtmPortPm15MinIntervalUpDiffDelay,
gBondAtmPortPm15MinIntervalDnDiffDelay,
gBondAtmPortPm15MinIntervalValid

}

STATUS current

DESCRIPTION

"A collection of objects supporting OPTIONAL historical Performance Monitoring information for G.Bond/ATM ports, during previous 15-minute intervals ."

::= { gBondAtmGroups 5 }

gBondAtmPerf1DayGroup OBJECT-GROUP

OBJECTS {

gBondAtmPortPm1DayIntervalMoniTime,
gBondAtmPortPm1DayIntervalRxLostCells,
gBondAtmPortPm1DayIntervalTxLostCells,
gBondAtmPortPm1DayIntervalUpDiffDelay,
gBondAtmPortPm1DayIntervalDnDiffDelay,
gBondAtmPortPm1DayIntervalValid

}


```
STATUS      current
DESCRIPTION
  "A collection of objects supporting OPTIONAL historical
  Performance Monitoring information for G.Bond/ATM ports, during
  previous 1-day intervals ."
 ::= { gBondAtmGroups 6 }
```

```
-- Compliance Statements
```

```
gBondAtmCompliance MODULE-COMPLIANCE
```

```
STATUS      current
DESCRIPTION
  "The compliance statement for G.Bond/ATM interfaces.
  Compliance with the following external compliance statements
  is REQUIRED:
```

MIB Module	Compliance Statement
-----	-----
IF-MIB	ifCompliance3
GBOND-MIB	gBondCompliance"

```
MODULE -- this module
```

```
MANDATORY-GROUPS {
  gBondAtmBasicGroup,
  gBondAtmAlarmConfGroup,
  gBondAtmNotificationGroup
}
```

```
GROUP      gBondAtmPerfCurrGroup
```

```
DESCRIPTION
  "Support for this group is only required for implementations
  supporting Performance Monitoring."
```

```
GROUP      gBondAtmPerf15MinGroup
```

```
DESCRIPTION
  "Support for this group is only required for implementations
  supporting historical Performance Monitoring."
```

```
GROUP      gBondAtmPerf1DayGroup
```

```
DESCRIPTION
  "Support for this group is only required for implementations
  supporting 1-day historical Performance Monitoring."
```

```
::= { gBondAtmCompliances 1 }
```

```
END
```


7. Security Considerations

There is a number of managed objects defined in this MIB module with a MAX-ACCESS clause of read-write. 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:

- o Changing of gBondAtmPortConfTable configuration parameters MAY lead to a potential Service Level Agreement (SLA) breach, for example if a traffic delay is increased as a result of the higher delay tolerance (increased gBondAtmPortConfUpDiffDelayTolerance and/or gBondAtmPortConfDnDiffDelayTolerance), or the differential delay tolerance notifications are disabled by manipulating the gBondAtmPortConfDiffDelayToleranceExceededEnable parameter.

Some of the readable objects in this MIB module (i.e., those with MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments since, collectively, they provide information about the performance of network interfaces and can reveal some aspects of their configuration.

It is thus important to control even GET and/or NOTIFY access to these objects and possibly even encrypt the values of these objects 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), 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.

Implementations MUST provide the security features described by the SNMPv3 framework (see [[RFC3410](#)]), including full support for authentication and privacy via the User-based Security Model (USM) [[RFC3414](#)] with the AES cipher algorithm [[RFC3826](#)]. Implementations MAY also provide support for the Transport Security Model (TSM) [[RFC5591](#)] in combination with a secure transport such as SSH [[RFC5592](#)] or TLS/DTLS [[RFC6353](#)].

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.

8. IANA Considerations

An object identifier for gBondAtmMIB MODULE-IDENTITY SHALL be allocated by IANA [[1](#)] in the MIB-2 transmission sub-tree, before this document is published as an RFC.

9. Acknowledgments

This document was produced by the [[ADSLMIB](#)] working group.

10. References

10.1. Normative References

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URIs

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