Radio Frequency (RF) Interface Management Information Base for MCNS/DOCSIS compliant RF interfaces

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 memo defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it defines a basic set of managed objects for SNMP-based management of MCNS/DOCSIS compliant Radio Frequency (RF) interfaces.

This memo specifies a MIB module in a manner that is compliant to the SNMP SMIv2 [5][6][7]. The set of objects are consistent with the SNMP framework and existing SNMP standards.

This memo is a product of the IPCDN working group within the Internet Engineering Task Force. Comments are solicited and should be addressed to the working group’s mailing list at ipcdn@terayon.com and/or the author.

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St. Johns Standard [Page 1]
1. The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- An overall architecture, described in RFC 2571 [1].

- Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIv1 and described in STD 16, RFC 1155 [2], STD 16, RFC 1212 [3] and RFC 1215 [4]. The second version, called SMIv2, is described in STD 58, RFC 2578 [5], STD 58, RFC 2579 [6] and STD 58, RFC 2580 [7].

- Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in RFC 1157 [8]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in RFC 1901 [9] and RFC 1906 [10]. The third version of the message protocol is called SNMPv3 and described in RFC 1906 [10], RFC 2572 [11] and RFC 2574 [12].

- Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, RFC 1157 [8]. A second set of protocol operations and associated PDU formats is described in RFC 1905 [13].

- A set of fundamental applications described in RFC 2573 [14] and the view-based access control mechanism described in RFC 2575 [15].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI.

This memo specifies a MIB module that is compliant to the SMIv2. A MIB conforming to the SMIv1 can be produced through the appropriate translations. The resulting translated MIB MUST be semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.
2. Glossary

The terms in this document are derived either from normal cable system usage, or from the documents associated with the Data Over Cable Service Interface Specification process.

2.1. CATV

Originally "Community Antenna Television", now used to refer to any cable or hybrid fiber and cable system used to deliver video signals to a community.

2.2. Channel

A specific frequency allocation with an RF medium, specified by channel width in Hertz (cycles per second) and by center frequency. Within the US Cable Systems, upstream channels are generally allocated from the 5-42MHz range while downstream channels are generally allocated from the 50-750MHz range depending on the capabilities of the given system. The typical broadcast channel width in the US is 6MHz. Upstream channel widths for DOCSIS vary.

2.3. CM Cable Modem.

A CM acts as a "slave" station in a DOCSIS compliant cable data system.

2.4. CMTS Cable Modem Termination System.

A generic term covering a cable bridge or cable router in a head-end. A CMTS acts as the master station in a DOCSIS compliant cable data system. It is the only station that transmits downstream, and it controls the scheduling of upstream transmissions by its associated CMs.

2.5. Codeword

See [16]. A characteristic of the Forward Error Correction scheme used above the RF media layer.

2.6. Data Packet

The payload portion of the MAC Packet.

2.7. dBmV

Decibel relative to one milli-volt. A measure of RF power.
2.8. DOCSIS

"Data Over Cable Interface Specification". A term referring to the ITU-T J.112 Annex B standard for cable modem systems [20].

2.9. Downstream

The direction from the head-end towards the subscriber.

2.10. Head-end

The origination point in most cable systems of the subscriber video signals.

2.11. MAC Packet

A DOCSIS PDU.

2.12. MCNS

"Multimedia Cable Network System". Generally replaced in usage by DOCSIS.

2.13. Mini-slot

See [16]. In general, an interval of time which is allocated by the CMTS to a given CM for that CM to transmit in an upstream direction.

2.14. QPSK   Quadrature Phase Shift Keying.

A particular modulation scheme on an RF medium. See [19].

2.15. QAM   Quadrature Amplitude Modulation.

A particular modulation scheme on an RF medium. Usually expressed with a number indicating the size of the modulation constellation (e.g. 16 QAM). See [19], or any other book on digital communications over RF for a complete explanation of this.

2.16. RF

Radio Frequency.

2.17. Symbol-times

See [16]. A characteristic of the RF modulation scheme.
2.18. Upstream

The direction from the subscriber towards the head-end.

3. Overview

This MIB provides a set of objects required for the management of MCNS/DOCSIS compliant Cable Modem (CM) and Cable Modem Termination System (CMTS) RF interfaces. The specification is derived in part from the parameters and protocols described in DOCSIS Radio Frequency Interface Specification [16].

3.1. Structure of the MIB

This MIB is structured as three groups:

- Management information pertinent to both Cable Modems (CM) and Cable Modem Termination Systems (CMTS) (docsIfBaseObjects).
- Management information pertinent to Cable Modems only (docsIfCmObjects).
- Management information pertinent to Cable Modem Termination Systems only (docsIfCmtsObjects).

Tables within each of these groups group objects functionally - e.g. Quality of Service, Channel characteristics, MAC layer management, etc. Rows created automatically (e.g. by the device according to the hardware configuration) may and generally will have a mixture of configuration and status objects within them. Rows that are meant to be created by the management station are generally restricted to configuration (read-create) objects.

3.1.1. docsIfBaseObjects

- docsIfDownstreamChannelTable - This table describes the active downstream channels for a CMTS and the received downstream channel for a CM.

- docsIfUpstreamChannelTable - This table describes the active upstream channels for a CMTS and the current upstream transmission channel for a CM.

- docsIfQosProfileTable - This table describes the valid Quality of Service service profiles for the cable data system.

- docsIfSignalQualityTable - This table is used to monitor RF signal quality characteristics of received signals.
3.1.2. docsIfCmObjects

docsIfCmMacTable - This table is used to monitor the DOCSIS MAC interface and can be considered an extension to the ifEntry.

docsIfCmServiceTable - This table describes the upstream service queues available at this CM. There is a comparable table at the CMTS, docsIfCmtsServiceEntry, which describes the service queues from the point of view of the CMTS.

3.1.3. docsIfCmtsObjects

docsIfCmtsStatusTable - This table provides a set of aggregated counters which roll-up values and events that occur on the underlying sub-interfaces.

docsIfCmtsCmStatusTable - This table is used to hold information about known (e.g. registered) cable modems on the system serviced by this CMTS.

docsIfCmtsServiceEntry - This table provides access to the information related to upstream service queues.

docsIfCmtsModulationTable - This table allows control over the modulation profiles for RF channels associated with this CMTS.

docsIfCmtsMacToCmTable - This table allows fast access into the docsIfCmtsCmTable via a MAC address (of the CM) interface.

3.2. Relationship to the Interfaces MIB

This section clarifies the relationship of this MIB to the Interfaces MIB [17]. Several areas of correlation are addressed in the following subsections. The implementor is referred to the Interfaces MIB document in order to understand the general intent of these areas.

3.2.1. Layering Model

An instance of ifEntry exists for each RF Downstream interface, for each RF Upstream interface, and for each RF MAC layer. The ifStackTable [17] MUST be implemented to identify relationships among sub-interfaces.
The following example illustrates a MAC interface with one downstream and two upstream channels.

```
| <== to network layer
+------------------------+
|                       RF MAC |
|                        |           |
+------------------------+------------------------+
|                     +----+---------+-----------+-+
|                   |         |           |
|                  +---------+---+ +---+-------+ +-+---------+
| Downstream1 | | Upstream1 | | Upstream2 |
+-------------+ +-----------+ +-----------+
```

As can be seen from this example, the RF MAC interface is layered on top of the downstream and upstream interfaces.

In this example, the assignment of index values could be as follows:

<table>
<thead>
<tr>
<th>ifIndex</th>
<th>ifType</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>docsCableMaclayer(127)</td>
<td>CATV MAC Layer</td>
</tr>
<tr>
<td>2</td>
<td>docsCableDownstream(128)</td>
<td>CATV Downstream interface</td>
</tr>
<tr>
<td>3</td>
<td>docsCableUpstream(129)</td>
<td>CATV Upstream interface</td>
</tr>
<tr>
<td>4</td>
<td>docsCableUpstream(129)</td>
<td>CATV Upstream interface</td>
</tr>
</tbody>
</table>

The corresponding ifStack entries would then be:

```
<table>
<thead>
<tr>
<th>IfStackHigherLayer</th>
<th>ifStackLowerLayer</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
```

The same interface model can also be used in Telephony or Telco Return systems. A pure Telco Return system (Cable Modem as well as Cable Modem Termination System) would not have upstream, but only downstream cable channels. Systems supporting both Telco Return and cable upstream channels can use the above model without modification.

Telco Return Upstream channel(s) are handled by the appropriate MIBs, such as PPP or Modem MIBs.

3.2.2. Virtual Circuits

This medium does not support virtual circuits and this area is not applicable to this MIB.
3.2.3. ifTestTable

The ifTestTable is not supported by this MIB.

3.2.4. ifRcvAddressTable

The ifRcvAddressTable is not supported by this MIB.

3.2.5. ifEntry

This section documents only the differences from the requirements specified in the Interfaces MIB. See that MIB for columns omitted from the descriptions below.

3.2.5.1. ifEntry for Downstream interfaces

The ifEntry for Downstream interfaces supports the ifGeneralInformationGroup and the ifPacketGroup of the Interfaces MIB. This is an output only interface at the CMTS and all input status counters - ifIn* - will return zero. This is an input only interface at the CM and all output status counters - ifOut* - will return zero.

3.2.5.1.1. ifEntry for Downstream interfaces in Cable Modem Termination Systems

<table>
<thead>
<tr>
<th>ifTable</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifIndex</td>
<td>Each RF Cable Downstream interface is represented by an ifEntry.</td>
</tr>
<tr>
<td>ifType</td>
<td>The IANA value of docsCableDownstream(128).</td>
</tr>
<tr>
<td>ifSpeed</td>
<td>Return the speed of this downstream channel. The returned value the raw</td>
</tr>
<tr>
<td></td>
<td>bandwidth in bits/s of this interface. This is the symbol rate</td>
</tr>
<tr>
<td></td>
<td>multiplied with the number of bits per symbol.</td>
</tr>
<tr>
<td>ifPhysAddress</td>
<td>Return an empty string.</td>
</tr>
<tr>
<td>ifAdminStatus</td>
<td>The administrative status of this interface.</td>
</tr>
<tr>
<td>ifOperStatus</td>
<td>The current operational status of this interface.</td>
</tr>
<tr>
<td>ifMtu</td>
<td>The size of the largest frame which can be sent on this interface,</td>
</tr>
<tr>
<td></td>
<td>specified in octets. The value includes the length of the MAC header.</td>
</tr>
</tbody>
</table>
ifInOctets   Return zero.
ifInUcastPkts Return zero.
ifInMulticastPkts Return zero.
ifInBroadcastPkts Return zero.
ifInDiscards Return zero.
ifInErrors Return zero.
ifInUnknownProtos Return zero.

ifOutOctets   The total number of octets transmitted on this interface. This includes MAC packets as well as data packets, and includes the length of the MAC header.
ifOutUcastPkts The number of Unicast packets transmitted on this interface. This includes MAC packets as well as data packets.

ifOutMulticastPkts Return the number of Multicast packets transmitted on this interface. This includes MAC packets as well as data packets.
ifOutBroadcastPkts Return the number of broadcast packets transmitted on this interface. This includes MAC packets as well as data packets.
ifOutDiscards The total number of outbound packets which were discarded. Possible reasons are: buffer shortage.
ifOutErrors The number of packets which could not be transmitted due to errors.
ifPromiscuousMode Return false.
### ifTable

<table>
<thead>
<tr>
<th>Comments</th>
</tr>
</thead>
</table>

### ifIndex

Each RF Cable Downstream interface is represented by an ifEntry.

### ifType

The IANA value of docsCableDownstream(128).

### ifSpeed

Return the speed of this downstream channel. The returned value the raw bandwidth in bits/s of this interface. This is the symbol rate multiplied with the number of bits per symbol.

### ifPhysAddress

Return an empty string.

### ifAdminStatus

The administrative status of this interface.

### ifOperStatus

The current operational status of this interface.

### ifMtu

The size of the largest frame which can be received from this interface, specified in octets. The value includes the length of the MAC header.

### ifInOctets

The total number of octets received on this interface. This includes data packets as well as MAC layer packets, and includes the length of the MAC header.

### ifInUcastPkts

The number of Unicast packets received on this interface. This includes data packets as well as MAC layer packets.

### ifInMulticastPkts

Return the number of Multicast packets received on this interface. This includes data packets as well as MAC layer packets.

### ifInBroadcastPkts

Return the number of Broadcast packets received on this interface. This includes data packets as well as MAC layer packets.

### ifInDiscards

The total number of received packets which have been discarded. The possible reasons are: buffer shortage.

### ifInErrors

The number of inbound packets that contained errors preventing them from being deliverable to higher layers.
Possible reasons are: MAC FCS error.

ifInUnknownProtos The number of frames with an unknown packet type. These are MAC frames with an unknown packet type.

ifOutOctets Return zero.
ifOutUcastPkts Return zero.
ifOutMulticastPkts Return zero.
ifOutBroadcastPkts Return zero.
ifOutDiscards Return zero.
ifOutErrors Return zero.
ifPromiscuousMode Refer to the Interfaces MIB.

3.2.5.2. ifEntry for Upstream interfaces

The ifEntry for Upstream interfaces supports the ifGeneralInformationGroup and the ifPacketGroup of the Interfaces MIB. This is an input only interface at the CMTS and all output status counters - ifOut* - will return zero. This is an output only interface at the CM and all input status counters - ifIn* - will return zero.

3.2.5.2.1. ifEntry for Upstream interfaces in Cable Modem Termination Systems

<table>
<thead>
<tr>
<th>ifIndex</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each RF Cable Upstream interface is represented by an ifEntry.</td>
<td></td>
</tr>
</tbody>
</table>

ifType The IANA value of docsCableUpstream(129).

ifSpeed Return the speed of this upstream channel. The returned value is the raw bandwidth in bits/s of this interface, regarding the highest speed modulation profile that is defined. This is the symbol rate multiplied with the number of bits per symbol for this modulation profile.
ifPhysAddress    Return an empty string.

ifAdminStatus    The administrative status of this interface.

ifOperStatus     The current operational status of this interface.

ifMtU            The size of the largest frame which can be received on this interface, specified in octets. The value includes the length of the MAC header.

ifInOctets       The total number of octets received on this interface. This includes data packets as well as MAC layer packets, and includes the length of the MAC header.

ifInUcastPkts    The number of Unicast packets received on this interface. This includes data packets as well as MAC layer packets.

ifInMulticastPkts Return the number of Multicast packets received on this interface. This includes data packets as well as MAC layer packets.

ifInBroadcastPkts Return the number of Broadcast packets received on this interface. This includes data packets as well as MAC layer packets.

ifInDiscards     The total number of received packets which have been discarded. The possible reasons are: buffer shortage.

ifInErrors       The number of inbound packets that contained errors preventing them from being deliverable to higher layers. Possible reasons are: MAC FCS error.

ifInUnknownProtos The number of frames with an unknown packet type. This are MAC frames with an unknown packet type.

ifOutOctets      Return zero.

ifOutUcastPkts   Return zero.

ifOutMulticastPkts Return zero.

ifOutBroadcastPkts Return zero.
### 3.2.5.2.2. ifEntry for Upstream interfaces in Cable Modems

<table>
<thead>
<tr>
<th>Name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>ifTable</td>
<td>Each RF Cable Upstream interface is represented by an ifEntry.</td>
</tr>
<tr>
<td>ifIndex</td>
<td>The IANA value of docsCableUpstream(129).</td>
</tr>
<tr>
<td>ifType</td>
<td>Return the speed of this upstream channel. The returned value is the raw</td>
</tr>
<tr>
<td></td>
<td>bandwidth in bits/s of this interface, regarding the highest speed</td>
</tr>
<tr>
<td></td>
<td>modulation profile that is defined. This is the symbol rate multiplied</td>
</tr>
<tr>
<td></td>
<td>with the number of bits per symbol for this modulation profile.</td>
</tr>
<tr>
<td>ifPhysAddress</td>
<td>Return an empty string.</td>
</tr>
<tr>
<td>ifAdminStatus</td>
<td>The administrative status of this interface.</td>
</tr>
<tr>
<td>ifOperStatus</td>
<td>The current operational status of this interface.</td>
</tr>
<tr>
<td>ifMtu</td>
<td>The size of the largest frame which can be transmitted on this interface,</td>
</tr>
<tr>
<td></td>
<td>specified in octets. The value includes the length of the MAC header.</td>
</tr>
<tr>
<td>ifInOctets</td>
<td>Return zero.</td>
</tr>
<tr>
<td>ifInUcastPkts</td>
<td>Return zero.</td>
</tr>
<tr>
<td>ifInMulticastPkts</td>
<td>Return zero.</td>
</tr>
<tr>
<td>ifInBroadcastPkts</td>
<td>Return zero.</td>
</tr>
<tr>
<td>ifInDiscards</td>
<td>Return zero.</td>
</tr>
<tr>
<td>ifInErrors</td>
<td>Return zero.</td>
</tr>
<tr>
<td>ifInUnknownProtos</td>
<td>Return zero.</td>
</tr>
</tbody>
</table>
ifOutOctets  The total number of octets transmitted on this interface. This includes MAC packets as well as data packets, and includes the length of the MAC header.

ifOutUcastPkts  The number of Unicast packets transmitted on this interface. This includes MAC packets as well as data packets.

ifOutMulticastPkts  Return the number of Multicast packets transmitted on this interface. This includes MAC packets as well as data packets.

ifOutBroadcastPkts  Return the number of broadcast packets transmitted on this interface. This includes MAC packets as well as data packets.

ifOutDiscards  The total number of outbound packets which were discarded. Possible reasons are: buffer shortage.

ifOutErrors  The number of packets which could not be transmitted due to errors.

ifPromiscuousMode  Return false.

3.2.5.3. ifEntry for the MAC Layer

The ifEntry for the MAC Layer supports the ifGeneralInformationGroup and the ifPacketGroup of the Interfaces MIB. This interface provides an aggregate view of status for the lower level Downstream and Upstream interfaces.

ifTable Comments
ifIndex Each RF Cable MAC layer entity is represented by an ifEntry.
ifType The IANA value of docsCableMaclayer(127).
ifSpeed Return zero.
ifPhysAddress Return the physical address of this interface.
ifAdminStatus The administrative status of this interface.
ifOperStatus  The current operational status of the MAC layer interface.

ifHighSpeed  Return zero.

ifMtu  Return 1500.

ifInOctets  The total number of data octets received on this interface, targeted for upper protocol layers.

ifInUcastPkts  The number of Unicast packets received on this interface, targeted for upper protocol layers.

ifInMulticastPkts  Return the number of Multicast packets received on this interface, targeted for upper protocol layers.

ifInBroadcastPkts  Return the number of Broadcast packets received on this interface, targeted for upper protocol layers.

ifInDiscards  The total number of received packets which have been discarded. The possible reasons are: buffer shortage.

ifInErrors  The number of inbound packets that contained errors preventing them from being deliverable to higher layers. Possible reasons are: data packet FCS error, invalid MAC header.

ifInUnknownProtos  The number of frames with an unknown packet type. This is the number of data packets targeted for upper protocol layers with an unknown packet type.

ifOutOctets  The total number of octets, received from upper protocol layers and transmitted on this interface.

ifOutUcastPkts  The number of Unicast packets, received from upper protocol layers and transmitted on this interface.

ifOutMulticastPkts  Return the number of Multicast packets received from upper protocol layers and transmitted on this interface.
ifOutBroadcastPkts
Return the number of broadcast packets received from upper protocol layers and transmitted on this interface.

ifOutDiscards
The total number of outbound packets which were discarded. Possible reasons are: buffer shortage.

ifOutErrors
The number of packets which could not be transmitted due to errors.

ifPromiscuousMode
Refer to the Interfaces MIB.
4. Definitions

DOCS-IF-MIB DEFINITIONS ::= BEGIN

IMPORTS
   MODULE-IDENTITY,
   OBJECT-TYPE,
   -- do not import        BITS,
   Unsigned32,  
   Integer32,  
   Counter32,  
   TimeTicks,  
   IpAddress, 
   transmission
      FROM SNMPv2-SMI
   TEXTUAL-CONVENTION,
   MacAddress,
   RowStatus,
   TruthValue,
   TimeInterval,
   TimeStamp
      FROM SNMPv2-TC
   OBJECT-GROUP,

   MODULE-COMPLIANCE
      FROM SNMPv2-CONF
   ifIndex, InterfaceIndexOrZero
      FROM IF-MIB;

docsIfMib MODULE-IDENTITY
   LAST-UPDATED "9908190000Z" -- August 19, 1999
   ORGANIZATION "IETF IPCDN Working Group"
   CONTACT-INFO
      "Michael StJohns
       Postal: @Home Network
               425 Broadway
               Redwood City, CA
               U.S.A.
               Phone: +1 650 569 5368
               E-mail: stjohns@corp.home.net"
   DESCRIPTION
      "This is the MIB Module for MCNS/DOCSIS compliant Radio
       Frequency (RF) interfaces in Cable Modems (CM) and
       Cable Modem Termination Systems (CMTS)."
   REVISION "9908190000Z"
   DESCRIPTION
      "Initial Version, published as RFC 2670.
       Modified by Mike StJohns to fix problems identified by
the first pass of the MIB doctor. Of special note, docsIfRangingResp and docsIfCmtsInsertionInterval were obsoleted and replaced by other objects with the same functionality, but more appropriate SYNTAX.

::= { transmission 127 }

-- Textual Conventions

TenthdBmV ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "d-1"
   STATUS current
   DESCRIPTION
   "This data type represents power levels that are normally expressed in dBmV. Units are in tenths of a dBmV; for example, 5.1 dBmV will be represented as 51."
   SYNTAX Integer32

TenthdB ::= TEXTUAL-CONVENTION
   DISPLAY-HINT "d-1"
   STATUS current
   DESCRIPTION
   "This data type represents power levels that are normally expressed in dB. Units are in tenths of a dB; for example, 5.1 dB will be represented as 51."
   SYNTAX Integer32

-- BASE GROUP

-- The following table is implemented on both the Cable Modem (CM) and the Cable Modem Termination System (CMTS).

docsIfDownstreamChannelTable OBJECT-TYPE
   SYNTAX SEQUENCE OF DocsIfDownstreamChannelEntry
   MAX-ACCESS not-accessible
   STATUS current
   DESCRIPTION
   "This table describes the attributes of downstream channels (frequency bands)."
   REFERENCE

St. Johns Standard [Page 19]
"DOCSIS Radio Frequency Interface Specification, Table 4-12 and Table 4-13."
::= { docsIfBaseObjects 1 }

docsIfDownstreamChannelEntry OBJECT-TYPE
SYNTAX DocsIfDownstreamChannelEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry provides a list of attributes for a single Downstream channel. An entry in this table exists for each ifEntry with an ifType of docsCableDownstream(128)."
INDEX { ifIndex }
::= { docsIfDownstreamChannelTable 1 }

DocsIfDownstreamChannelEntry ::= SEQUENCE {
    docsIfDownChannelId               Integer32,
    docsIfDownChannelFrequency        Integer32,
    docsIfDownChannelWidth            Integer32,
    docsIfDownChannelModulation       INTEGER,
    docsIfDownChannelInterleave       INTEGER,
    docsIfDownChannelPower            TenthdBmV
}

docsIfDownChannelId OBJECT-TYPE
SYNTAX Integer32 (0..255)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The Cable Modem Termination System (CMTS) identification of the downstream channel within this particular MAC interface. If the interface is down, the object returns the most current value. If the downstream channel ID is unknown, this object returns a value of 0."
::= { docsIfDownstreamChannelEntry 1 }

docsIfDownChannelFrequency OBJECT-TYPE
SYNTAX Integer32 (0..1000000000)
UNITS "hertz"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The center of the downstream frequency associated with this channel. This object will return the current tuner frequency. If a CMTS provides IF output, this object will return 0, unless this CMTS is in control of the final downstream RF frequency. See the associated
compliance object for a description of valid frequencies
that may be written to this object.

REFERENCE
  "DOCSIS Radio Frequency Interface Specification,
  Section 4.3.3."
::= { docsIfDownstreamChannelEntry 2 }

docsIfDownChannelWidth OBJECT-TYPE
SYNTAX       Integer32 (0..16000000)
UNITS        "hertz"
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION   "The bandwidth of this downstream channel. Most
implementations are expected to support a channel width
of 6 MHz (North America) and/or 8 MHz (Europe). See the
associated compliance object for a description of the
valid channel widths for this object."
REFERENCE
  "DOCSIS Radio Frequency Interface Specification,
  Table 4-12 and Table 4-13."
::= { docsIfDownstreamChannelEntry 3 }

docsIfDownChannelModulation OBJECT-TYPE
SYNTAX       INTEGER {
            unknown(1),
            other(2),
            qam64(3),
            qam256(4)
        }
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION   "The modulation type associated with this downstream
channel. If the interface is down, this object either
returns the configured value (CMTS), the most current
value (CM), or the value of unknown(1). See the
associated conformance object for write conditions and
limitations. See the reference for specifics on the
modulation profiles implied by qam64 and qam256."
REFERENCE
  "DOCSIS Radio Frequency Interface Specification,
  Section 3.6.2."
::= { docsIfDownstreamChannelEntry 4 }

docsIfDownChannelInterleave OBJECT-TYPE
SYNTAX       INTEGER {
            unknown(1),

St. Johns                                   Standard [Page 21]
other(2),
taps8Increment16(3),
taps16Increment8(4),
taps32Increment4(5),
taps64Increment2(6),
taps128Increment1(7)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The Forward Error Correction (FEC) interleaving used for this downstream channel. Values are defined as follows:
taps8Increment16(3): protection 5.9/4.1 usec,
     latency .22/.15 msec
taps16Increment8(4): protection 12/8.2 usec,
     latency .48/.33 msec
taps32Increment4(5): protection 24/16 usec,
     latency .98/.68 msec
taps64Increment2(6): protection 47/33 usec,
     latency 2/1.4 msec
taps128Increment1(7): protection 95/66 usec,
     latency 4/2.8 msec
If the interface is down, this object either returns the configured value (CMTS), the most current value (CM), or the value of unknown(1). The value of other(2) is returned if the interleave is known but not defined in the above list. See the associated conformance object for write conditions and limitations. See the reference for the FEC configuration described by the setting of this object."
REFERENCE
"DOCSIS Radio Frequency Interface Specification, Section 4.3.2."
::= { docsIfDownstreamChannelEntry 5 }
docsIfDownChannelPower OBJECT-TYPE
SYNTAX TenthdBmV
UNITS "dBmV"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"At the CMTS, the operational transmit power. At the CM, the received power level. May be set to zero at the CM if power level measurement is not supported. If the interface is down, this object either returns the configured value (CMTS), the most current value (CM) or the value of 0. See the associated conformance object
for write conditions and limitations. See the reference for recommended and required power levels."

REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Table 4-12 and Table 4-13."
 ::= { docsIfDownstreamChannelEntry 6 }

--
-- The following table is implemented on both the CM and the CMTS.
-- For the CM, only attached channels appear in the table. For the
-- CM, this table is read only as well.
--

docsIfUpstreamChannelTable OBJECT-TYPE
 SYNTAX      SEQUENCE OF DocsIfUpstreamChannelEntry
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
 "This table describes the attributes of attached upstream
  channels (frequency bands)."
 ::= { docsIfBaseObjects 2 }

docsIfUpstreamChannelEntry OBJECT-TYPE
 SYNTAX      DocsIfUpstreamChannelEntry
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
 "List of attributes for a single upstream channel.
  An entry in this table exists for each ifEntry with an
  ifType of docsCableUpstream(129)."
 INDEX { ifIndex }
 ::= { docsIfUpstreamChannelTable 1 }

DocsIfUpstreamChannelEntry ::= SEQUENCE {
   docsIfUpChannelId                     Integer32,
   docsIfUpChannelFrequency              Integer32,
   docsIfUpChannelWidth                  Integer32,
   docsIfUpChannelModulationProfile      Unsigned32,
   docsIfUpChannelSlotSize               Unsigned32,
   docsIfUpChannelTxTimingOffset         Unsigned32,
   docsIfUpChannelRangingBackoffStart    Integer32,
   docsIfUpChannelRangingBackoffEnd      Integer32,
   docsIfUpChannelTxBackoffStart         Integer32,
   docsIfUpChannelTxBackoffEnd           Integer32
}

docsIfUpChannelId OBJECT-TYPE
 SYNTAX      Integer32 (0..255)
<table>
<thead>
<tr>
<th>Object Type</th>
<th>Syntax</th>
<th>Max-Access</th>
<th>Status</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>docsIfUpChannelFrequency</td>
<td>Integer32 (0..1000000000)</td>
<td>read-write</td>
<td>current</td>
<td>&quot;The center of the frequency band associated with this upstream channel. This object returns 0 if the frequency is undefined or unknown. Minimum permitted upstream frequency is 5,000,000 Hz for current technology. See the associated conformance object for write conditions and limitations.&quot;</td>
<td>&quot;DOCSIS Radio Frequency Interface Specification, Table 2-2.&quot;</td>
</tr>
<tr>
<td>docsIfUpChannelWidth</td>
<td>Integer32 (0..20000000)</td>
<td>read-write</td>
<td>current</td>
<td>&quot;The bandwidth of this upstream channel. This object returns 0 if the channel width is undefined or unknown. Minimum permitted channel width is 200,000 Hz currently. See the associated conformance object for write conditions and limitations.&quot;</td>
<td>&quot;DOCSIS Radio Frequency Interface Specification, Table 4-3.&quot;</td>
</tr>
<tr>
<td>docsIfUpChannelModulationProfile</td>
<td>Unsigned32</td>
<td>read-write</td>
<td>current</td>
<td>&quot;An entry identical to the docsIfModIndex in the docsIfCmtsModulationTable that describes this channel. This channel is further instantiated there by a grouping of interval usage codes which together fully describe the</td>
<td></td>
</tr>
</tbody>
</table>
channel modulation. This object returns 0 if the
docsIfCmtsModulationTable entry does not exist or
docsIfCmtsModulationTable is empty. See
the associated conformance object for write conditions
and limitations."
::= { docsIfUpstreamChannelEntry 4 }

docsIfUpChannelSlotSize OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The number of 6.25 microsecond ticks in each upstream mini-
slot. Returns zero if the value is undefined or unknown.
See the associated conformance object for write
conditions and limitations."
REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Section 6.1.2.4."
::= { docsIfUpstreamChannelEntry 5 }

docsIfUpChannelTxTimingOffset OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"A measure of the current round trip time at the CM, or the
maximum round trip time seen by the CMTS. Used for timing
of CM upstream transmissions to ensure synchronized
arrivals at the CMTS. Units are in terms of
(6.25 microseconds/64)."
REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Section 6.5."
::= { docsIfUpstreamChannelEntry 6 }

docsIfUpChannelRangingBackoffStart OBJECT-TYPE
SYNTAX Integer32 (0..16)
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The initial random backoff window to use when retrying
Ranging Requests. Expressed as a power of 2. A value of 16
at the CMTS indicates that a proprietary adaptive retry
mechanism is to be used. See the associated conformance
object for write conditions and limitations."
REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Section 6.4.4.
 ::= { docsIfUpstreamChannelEntry 7 }

docsIfUpChannelRangingBackoffEnd OBJECT-TYPE
SYNTAX Integer32 (0..16)
MAX-ACCESS read-write
STATUS current
DESCRIPTION
  "The final random backoff window to use when retrying
  Ranging Requests. Expressed as a power of 2. A value of 16
  at the CMTS indicates that a proprietary adaptive retry
  mechanism is to be used. See the associated conformance
  object for write conditions and limitations."
REFERENCE
  "DOCSIS Radio Frequency Interface Specification,
   Section 6.4.4."
 ::= { docsIfUpstreamChannelEntry 8 }

docsIfUpChannelTxBackoffStart OBJECT-TYPE
SYNTAX Integer32 (0..16)
MAX-ACCESS read-write
STATUS current
DESCRIPTION
  "The initial random backoff window to use when retrying
  transmissions. Expressed as a power of 2. A value of 16
  at the CMTS indicates that a proprietary adaptive retry
  mechanism is to be used. See the associated conformance
  object for write conditions and limitations."
REFERENCE
  "DOCSIS Radio Frequency Interface Specification,
   Section 6.4.4."
 ::= { docsIfUpstreamChannelEntry 9 }

docsIfUpChannelTxBackoffEnd OBJECT-TYPE
SYNTAX Integer32 (0..16)
MAX-ACCESS read-write
STATUS current
DESCRIPTION
  "The final random backoff window to use when retrying
  transmissions. Expressed as a power of 2. A value of 16
  at the CMTS indicates that a proprietary adaptive retry
  mechanism is to be used. See the associated conformance
  object for write conditions and limitations."
REFERENCE
  "DOCSIS Radio Frequency Interface Specification,
   Section 6.4.4."
 ::= { docsIfUpstreamChannelEntry 10 }
The following table describes the attributes of each class of service. The entries in this table are referenced from the docsIfServiceEntries. They exist as a separate table in order to reduce redundant information in docsIfServiceTable. 

This table is implemented at both the CM and the CMTS. The CM need only maintain entries for the classes of service referenced by its docsIfServiceTable.

docsIfQosProfileTable OBJECT-TYPE
SYNTAX SEQUENCE OF DocsIfQosProfileEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Describes the attributes for each class of service."
::= { docsIfBaseObjects 3 }

docsIfQosProfileEntry OBJECT-TYPE
SYNTAX DocsIfQosProfileEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Describes the attributes for a single class of service.

If implemented as read-create in the Cable Modem Termination System, creation of entries in this table is controlled by the value of docsIfCmtsQosProfilePermissions.

If implemented as read-only, entries are created based on information in REG-REQ MAC messages received from Cable Modems (Cable Modem Termination System implementation), or based on information extracted from the TFTP option file (Cable Modem implementation). In the Cable Modem Termination system, read-only entries are removed if no longer referenced by docsIfCmtsServiceTable.

An entry in this table must not be removed while it is referenced by an entry in docsIfCmServiceTable (Cable Modem) or docsIfCmtsServiceTable (Cable Modem Termination System).

An entry in this table should not be changeable while it is referenced by an entry in docsIfCmtsServiceTable.

If this table is created automatically, there should only be a single entry for each Class of Service. Multiple entries with the same Class of Service parameters are not
INDEX { docsIfQosProfIndex }
 ::= { docsIfQosProfileTable 1 }

DocsIfQosProfileEntry ::= SEQUENCE {
    docsIfQosProfIndex                Integer32,
    docsIfQosProfPriority             Integer32,
    docsIfQosProfMaxUpBandwidth       Integer32,
    docsIfQosProfGuarUpBandwidth      Integer32,
    docsIfQosProfMaxDownBandwidth     Integer32,
    docsIfQosProfMaxTxBurst           Integer32,
    docsIfQosProfBaselinePrivacy      TruthValue,
    docsIfQosProfStatus               RowStatus
}

docsIfQosProfIndex OBJECT-TYPE
SYNTAX     Integer32 (1..16383)
MAX-ACCESS not-accessible
STATUS     current
DESCRIPTION
    "The index value which uniquely identifies an entry in the docsIfQosProfileTable."
 ::= { docsIfQosProfileEntry 1 }

docsIfQosProfPriority OBJECT-TYPE
SYNTAX     Integer32 (0..7)
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
    "A relative priority assigned to this service when allocating bandwidth. Zero indicates lowest priority; and seven indicates highest priority. Interpretation of priority is device-specific. MUST NOT be changed while this row is active."
DEFVAL { 0 }
 ::= { docsIfQosProfileEntry 2 }

docsIfQosProfMaxUpBandwidth OBJECT-TYPE
SYNTAX     Integer32 (0..100000000)
MAX-ACCESS read-create
STATUS     current
DESCRIPTION
    "The maximum upstream bandwidth, in bits per second, allowed for a service with this service class. Zero if there is no restriction of upstream bandwidth. MUST NOT be changed while this row is active."
DEFVAL { 0 }
 ::= { docsIfQosProfileEntry 3 }
docsIfQosProfGuarUpBandwidth OBJECT-TYPE
SYNTAX       Integer32 (0..100000000)
MAX-ACCESS   read-create
STATUS       current
DESCRIPTION  "Minimum guaranteed upstream bandwidth, in bits per second,
               allowed for a service with this service class.
               MUST NOT be changed while this row is active."
DEFVAL       { 0 }
::= { docsIfQosProfileEntry 4 }

docsIfQosProfMaxDownBandwidth OBJECT-TYPE
SYNTAX       Integer32 (0..100000000)
MAX-ACCESS   read-create
STATUS       current
DESCRIPTION  "The maximum downstream bandwidth, in bits per second,
               allowed for a service with this service class.
               Zero if there is no restriction of downstream bandwidth.
               MUST NOT be changed while this row is active."
DEFVAL       { 0 }
::= { docsIfQosProfileEntry 5 }

docsIfQosProfMaxTxBurst OBJECT-TYPE
SYNTAX       Integer32 (0..255)
MAX-ACCESS   read-create
STATUS       current
DESCRIPTION  "The maximum number of mini-slots that may be requested
               for a single upstream transmission.
               A value of zero means there is no limit.
               MUST NOT be changed while this row is active."
DEFVAL       { 0 }
::= { docsIfQosProfileEntry 6 }

docsIfQosProfBaselinePrivacy OBJECT-TYPE
SYNTAX       TruthValue
MAX-ACCESS   read-create
STATUS       current
DESCRIPTION  "Indicates whether Baseline Privacy is enabled for this
               service class.
               MUST NOT be changed while this row is active."
DEFVAL       { false }
::= { docsIfQosProfileEntry 7 }

docsIfQosProfStatus OBJECT-TYPE
SYNTAX       RowStatus
This object is used to create or delete rows in this table. This object MUST NOT be changed from active while the row is referenced by the any entry in either docsIfCmServiceTable (on the CM), or the docsIfCmtsServiceTable (on the CMTS).

::= { docsIfQosProfileEntry 8 }

docsIfSignalQualityTable OBJECT-TYPE
SYNTAX SEQUENCE OF DocsIfSignalQualityEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "At the CM, describes the PHY signal quality of downstream channels. At the CMTS, describes the PHY signal quality of upstream channels. At the CMTS, this table may exclude contention intervals."

::= { docsIfBaseObjects 4 }

docsIfSignalQualityEntry OBJECT-TYPE
SYNTAX DocsIfSignalQualityEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "At the CM, describes the PHY characteristics of a downstream channel. At the CMTS, describes the PHY signal quality of an upstream channel. An entry in this table exists for each ifEntry with an ifType of docsCableUpstream(129) for Cable Modem Termination Systems and docsCableDownstream(128) for Cable Modems."
INDEX { ifIndex }

::= { docsIfSignalQualityTable 1 }

DocsIfSignalQualityEntry ::= SEQUENCE {
  docsIfSigQIncludesContention TruthValue,
  docsIfSigQUnerroredCounter32,
  docsIfSigQCorrectedCounter32,
  docsIfSigQUncorrectablesCounter32,
  docsIfSigQSignalNoiseTenthdB,
  docsIfSigQMicroreflectionsInteger32,
  docsIfSigQEqualizationDataOCTET STRING
}

docsIfSigQIncludesContention OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION    "true(1) if this CMTS includes contention intervals in
the counters in this table. Always false(2) for CMs."
REFERENCE      "DOCSIS Radio Frequency Interface specification,
            Section 6.4.4"
 ::= { docsIfSignalQualityEntry 1 }

docsIfSigQUnerroreds OBJECT-TYPE
SYNTAX         Counter32
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION    "Codewords received on this channel without error.
This includes all codewords, whether or not they
were part of frames destined for this device."
REFERENCE      "DOCSIS Radio Frequency Interface specification,
            Section 4.2.3 and 4.3.6"
 ::= { docsIfSignalQualityEntry 2 }

docsIfSigQCorrecteds OBJECT-TYPE
SYNTAX         Counter32
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION    "Codewords received on this channel with correctable
errors. This includes all codewords, whether or not they
were part of frames destined for this device."
REFERENCE      "DOCSIS Radio Frequency Interface specification,
            Section 4.2.3 and 4.3.6"
 ::= { docsIfSignalQualityEntry 3 }

docsIfSigUncorrectables OBJECT-TYPE
SYNTAX         Counter32
MAX-ACCESS     read-only
STATUS         current
DESCRIPTION    "Codewords received on this channel with uncorrectable
errors. This includes all codewords, whether or not they
were part of frames destined for this device."
REFERENCE      "DOCSIS Radio Frequency Interface specification,
            Section 4.2.3 and 4.3.6"
 ::= { docsIfSignalQualityEntry 4 }
docsIfSigQSignalNoise OBJECT-TYPE
SYNTAX    TenthdB
UNITS      "dB"
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "Signal/Noise ratio as perceived for this channel.  
  At the CM, describes the Signal/Noise of the downstream 
  channel. At the CMTS, describes the average Signal/Noise 
  of the upstream channel."
REFERENCE
  "DOCSIS Radio Frequency Interface specification, 
  Table 2-1 and 2-2"
::= { docsIfSignalQualityEntry 5 }

docsIfSigQMicroreflections OBJECT-TYPE
SYNTAX    Integer32 (0..255)
UNITS      "dBc"
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "Total microreflections including in-channel response 
  as perceived on this interface, measured in dBc below 
  the signal level.  
  This object is not assumed to return an absolutely 
  accurate value, but should give a rough indication 
  of microreflections received on this interface. 
  It is up to the implementor to provide information 
  as accurate as possible."
REFERENCE
  "DOCSIS Radio Frequency Interface specification, 
  Table 2-1 and 2-2"
::= { docsIfSignalQualityEntry 6 }

docsIfSigQEqualizationData OBJECT-TYPE
SYNTAX    OCTET STRING
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "At the CM, returns the equalization data for the downstream 
  channel. At the CMTS, returns the average equalization 
  data for the upstream channel. Returns an empty string 
  if the value is unknown or if there is no equalization 
  data available or defined."
REFERENCE
  "DOCSIS Radio Frequency Interface Specification, 
  Figure 6-23."
::= { docsIfSignalQualityEntry 7 }
--
-- CABLE MODEM GROUP
--

-- #######
--
-- The CM MAC Table
--

docsIfCmMacTable OBJECT-TYPE
SYNTAX SEQUENCE OF DocsIfCmMacEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Describes the attributes of each CM MAC interface, extending the information available from ifEntry."
::= { docsIfCmObjects 1 }

docsIfCmMacEntry OBJECT-TYPE
SYNTAX DocsIfCmMacEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry containing objects describing attributes of each MAC entry, extending the information in ifEntry. An entry in this table exists for each ifEntry with an ifType of docsCableMaclayer(127)."
INDEX { ifIndex }
::= { docsIfCmMacTable 1 }

DocsIfCmMacEntry ::= SEQUENCE {
docsIfCmCmtsAddress MacAddress,
docsIfCmCapabilities BITS,
docsIfCmRangingRespTimeout TimeTicks,
docsIfCmRangingTimeout TimeInterval
}

docsIfCmCmtsAddress OBJECT-TYPE
SYNTAX MacAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Identifies the CMTS that is believed to control this MAC domain. At the CM, this will be the source address from SYNC, MAP, and other MAC-layer messages. If the CMTS is unknown, returns 00-00-00-00-00-00."
::= { docsIfCmMacEntry 1 }
docsIfCmCapabilities OBJECT-TYPE
SYNTAX      BITS {
    atmCells(0),
    concatenation(1)
}
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
  "Identifies the capabilities of the MAC implementation
  at this interface. Note that packet transmission is
  always supported. Therefore, there is no specific bit
  required to explicitly indicate this capability."
::= { docsIfCmMacEntry 2 }

-- This object has been obsoleted and replaced by
-- docsIfCmRangingTimeout to correct the typing to TimeInterval. New
-- implementations of the MIB should use docsIfCmRangingTimeout instead.

docsIfCmRangingRespTimeout OBJECT-TYPE
SYNTAX      TimeTicks
MAX-ACCESS  read-write
STATUS      obsolete
DESCRIPTION
  "Waiting time for a Ranging Response packet."
REFERENCE
  "DOCSIS Radio Frequency Interface specification,
  Figure 7-6 and 7-7, timer T3."
DEFVAL { 20 }
::= { docsIfCmMacEntry 3 }

docsIfCmRangingTimeout OBJECT-TYPE
SYNTAX      TimeInterval
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
  "Waiting time for a Ranging Response packet."
REFERENCE
  "DOCSIS Radio Frequency Interface specification,
  Figure 7-6 and 7-7, timer T3."
DEFVAL { 20 }
::= { docsIfCmMacEntry 4 }

--
-- CM status table.
-- This table is implemented only at the CM.
--

docsIfCmStatusTable OBJECT-TYPE
SYNTAX         SEQUENCE OF DocsIfCmStatusEntry
MAX-ACCESS     not-accessible
STATUS         current
DESCRIPTION
   "This table maintains a number of status objects
   and counters for Cable Modems."
::= { docsIfCmObjects 2 }

docsIfCmStatusEntry OBJECT-TYPE
SYNTAX         DocsIfCmStatusEntry
MAX-ACCESS     not-accessible
STATUS         current
DESCRIPTION
   "A set of status objects and counters for a single MAC
   layer instance in a Cable Modem.
   An entry in this table exists for each ifEntry with an
   ifType of docsCableMaclayer(127)."
INDEX { ifIndex }
::= { docsIfCmStatusTable 1 }

DocsIfCmStatusEntry ::= SEQUENCE {
    docsIfCmStatusValue                     INTEGER,
    docsIfCmStatusCode                      OCTET STRING,
    docsIfCmStatusTxPower                   TenthdBmV,
    docsIfCmStatusResets                    Counter32,
    docsIfCmStatusLostSyncs                 Counter32,
    docsIfCmStatusInvalidMaps               Counter32,
    docsIfCmStatusInvalidUcds               Counter32,
    docsIfCmStatusInvalidRangingResponses   Counter32,
--       docsIfCmStatusInvalidRangingResp     Counter32,
    docsIfCmStatusInvalidRegistrationResponses Counter32,
--       docsIfCmStatusInvalidRegistrationResp Counter32,
    docsIfCmStatusT1Timeouts                Counter32,
    docsIfCmStatusT2Timeouts                Counter32,
    docsIfCmStatusT3Timeouts                Counter32,
    docsIfCmStatusT4Timeouts                Counter32,
    docsIfCmStatusRangingAborteds           Counter32
}

docsIfCmStatusValue OBJECT-TYPE
SYNTAX         INTEGER {
    other(1),
    notReady(2),
    notSynchronized(3),
    phySynchronized(4),
    usParametersAcquired(5),
    rangingComplete(6),
    ipComplete(7),
todEstablished(8),
securityEstablished(9),
paramTransferComplete(10),
registrationComplete(11),
operational(12),
accessDenied(13)

MAX-ACCESS read-only
STATUS current
DESCRIPTION "Current Cable Modem connectivity state, as specified in the RF Interface Specification."
REFERENCE "DOCSIS Radio Frequency Interface Specification, Chapter 7.2."
::= { docsIfCmStatusEntry 1 }

docsIfCmStatusCode OBJECT-TYPE
SYNTAX OCTET STRING
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Status code for this Cable Modem as defined in the RF Interface Specification. The status code consists of a single character indicating error groups, followed by a two- or three-digit number indicating the status condition."
REFERENCE "DOCSIS Radio Frequency Interface Specification, Cable Modem status codes."
::= { docsIfCmStatusEntry 2 }

docsIfCmStatusTxPower OBJECT-TYPE
SYNTAX TenthdBmV
UNITS "dBmV"
MAX-ACCESS read-only
STATUS current
DESCRIPTION "The operational transmit power for the attached upstream channel."
REFERENCE "DOCSIS Radio Frequency Interface specification, Section 4.2.8."
::= { docsIfCmStatusEntry 3 }

docsIfCmStatusResets OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS    current
DESCRIPTION       "Number of times the CM reset or initialized this interface."
::= { docsIfCmStatusEntry 4 }

docsIfCmStatusLostSyncs OBJECT-TYPE
SYNTAX        Counter32
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION    "Number of times the CM lost synchronization with the downstream channel."
REFERENCE      "DOCSIS Radio Frequency Interface specification, Section 6.5."
::= { docsIfCmStatusEntry 5 }

docsIfCmStatusInvalidMaps OBJECT-TYPE
SYNTAX        Counter32
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION    "Number of times the CM received invalid MAP messages."
REFERENCE      "DOCSIS Radio Frequency Interface specification, Section 6.3.2.3 and 6.4.2."
::= { docsIfCmStatusEntry 6 }

docsIfCmStatusInvalidUcds OBJECT-TYPE
SYNTAX        Counter32
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION    "Number of times the CM received invalid UCD messages."
REFERENCE      "DOCSIS Radio Frequency Interface specification, Section 6.3.2.2."
::= { docsIfCmStatusEntry 7 }

-- docsIfCmStatusInvalidRangingResp replaced for Counter32
-- naming requirements

docsIfCmStatusInvalidRangingResponses OBJECT-TYPE
SYNTAX        Counter32
MAX-ACCESS    read-only
STATUS        current
DESCRIPTION   

St. Johns                       Standard                       [Page 37]
"Number of times the CM received invalid ranging response messages."
::= { docsIfCmStatusEntry 8 }

-- docsIfCmStatusInvalidRegistrationResp replaced for
-- Counter32 naming requirements
docsIfCmStatusInvalidRegistrationResponses OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of times the CM received invalid registration response messages."
::= { docsIfCmStatusEntry 9 }

docsIfCmStatusT1Timeouts OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of times counter T1 expired in the CM."
REFERENCE
"DOCSIS Radio Frequency Interface specification, Figure 7-3."
::= { docsIfCmStatusEntry 10 }

docsIfCmStatusT2Timeouts OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of times counter T2 expired in the CM."
REFERENCE
"DOCSIS Radio Frequency Interface specification, Figure 7-6."
::= { docsIfCmStatusEntry 11 }

docsIfCmStatusT3Timeouts OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Number of times counter T3 expired in the CM."
REFERENCE
"DOCSIS Radio Frequency Interface specification, Figure 7-6 and 7-7."
::= { docsIfCmStatusEntry 12 }
docsIfCmStatusT4Timeouts OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of times counter T4 expired in the CM."
REFERENCE "DOCSIS Radio Frequency Interface specification, Figure 7-7."
::= { docsIfCmStatusEntry 13 }

docsIfCmStatusRangingAborteds OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Number of times the ranging process was aborted by the CMTS."
::= { docsIfCmStatusEntry 14 }

--
-- The Cable Modem Service Table
--

docsIfCmServiceTable OBJECT-TYPE
SYNTAX SEQUENCE OF DocsIfCmServiceEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Describes the attributes of each upstream service queue on a CM."
::= { docsIfCmObjects 3 }

docsIfCmServiceEntry OBJECT-TYPE
SYNTAX DocsIfCmServiceEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Describes the attributes of an upstream bandwidth service queue. An entry in this table exists for each Service ID. The primary index is an ifIndex with an ifType of docsCableMaclayer(127)."
INDEX { ifIndex, docsIfCmServiceId }
::= { docsIfCmServiceTable 1 }

DocsIfCmServiceEntry ::= SEQUENCE {
    docsIfCmServiceId                Integer32,
docsIfCmServiceQosProfile OBJECT-TYPE
SYNTAX  Integer32 (0..16383)
MAX-ACCESS read-only
STATUS   current
DESCRIPTION
"The index in docsIfQosProfileTable describing the quality of service attributes associated with this particular service. If no associated entry in docsIfQosProfileTable exists, this object returns a value of zero."
 ::= { docsIfCmServiceEntry 2 }

docsIfCmServiceTxSlotsImmed OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS   current
DESCRIPTION
"The number of upstream mini-slots which have been used to transmit data PDUs in immediate (contention) mode. This includes only those PDUs which are presumed to have arrived at the headend (i.e., those which were explicitly acknowledged.) It does not include retransmission attempts or mini-slots used by Requests."
REFERENCE
"DOCSIS Radio Frequency Interface specification,
Section 6.4.
::= { docsIfCmServiceEntry 3 }

**docsIfCmServiceTxSlotsDed**

**OBJECT-TYPE**

**SYNTAX** Counter32  
**MAX-ACCESS** read-only  
**STATUS** current  
**DESCRIPTION**
"The number of upstream mini-slots which have been used to transmit data PDUs in dedicated mode (i.e., as a result of a unicast Data Grant)."

**REFERENCE**
"DOCSIS Radio Frequency Interface specification, Section 6.4."
::= { docsIfCmServiceEntry 4 }

**docsIfCmServiceTxRetries**

**OBJECT-TYPE**

**SYNTAX** Counter32  
**MAX-ACCESS** read-only  
**STATUS** current  
**DESCRIPTION**
"The number of attempts to transmit data PDUs containing requests for acknowledgment which did not result in acknowledgment."

**REFERENCE**
"DOCSIS Radio Frequency Interface specification, Section 6.4."
::= { docsIfCmServiceEntry 5 }

-- docsIfCmServiceTxExceeded renamed for Counter32 naming requirements

**docsIfCmServiceTxExceededs**

**OBJECT-TYPE**

**SYNTAX** Counter32  
**MAX-ACCESS** read-only  
**STATUS** current  
**DESCRIPTION**
"The number of data PDUs transmission failures due to excessive retries without acknowledgment."

**REFERENCE**
"DOCSIS Radio Frequency Interface specification, Section 6.4."
::= { docsIfCmServiceEntry 6 }

**docsIfCmServiceRqRetries**

**OBJECT-TYPE**

**SYNTAX** Counter32  
**MAX-ACCESS** read-only  
**STATUS** current  
**DESCRIPTION**
"The number of attempts to transmit bandwidth requests"
which did not result in acknowledgment."

REFERENCE
"DOCSIS Radio Frequency Interface specification, Section 6.4."
::= { docsIfCmServiceEntry 7 }

-- docsIfCmServiceRqExceeded renamed for Counter 32 naming
-- requirements
docsIfCmServiceRqExceededs OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of requests for bandwidth which failed due to excessive retries without acknowledgment."
REFERENCE
"DOCSIS Radio Frequency Interface specification, Section 6.4."
::= { docsIfCmServiceEntry 8 }

--
-- CMTS GROUP
--
--
-- The CMTS MAC Table
--
docsIfCmtsMacTable OBJECT-TYPE
SYNTAX SEQUENCE OF DocsIfCmtsMacEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Describes the attributes of each CMTS MAC interface, extending the information available from ifEntry. Mandatory for all CMTS devices."
::= { docsIfCmtsObjects 1 }
docsIfCmtsMacEntry OBJECT-TYPE
SYNTAX DocsIfCmtsMacEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An entry containing objects describing attributes of each MAC entry, extending the information in ifEntry. An entry in this table exists for each ifEntry with an ifType of docsCableMaclayer(127)."
INDEX { ifIndex }
 ::= { docsIfCmtsMacTable 1 }

DocsIfCmtsMacEntry ::= SEQUENCE {
    docsIfCmtsCapabilities           BITS,
    docsIfCmtsSyncInterval           Integer32,
    docsIfCmtsUcdInterval            Integer32,
    docsIfCmtsMaxServiceIds          Integer32,
    docsIfCmtsInsertionInterval      TimeTicks,   -- Obsolete
    docsIfCmtsInvitedRangingAttempts Integer32,
    docsIfCmtsInsertInterval        TimeInterval
}

docsIfCmtsCapabilities OBJECT-TYPE
    SYNTAX      BITS {
        atmCells(0),
        concatenation(1)
    }
    MAX-ACCESS read-only
    STATUS      current
    DESCRIPTION
"Identifies the capabilities of the CMTS MAC
implementation at this interface. Note that packet
transmission is always supported. Therefore, there
is no specific bit required to explicitly indicate
this capability."
    REFERENCE
"DOCSIS Radio Frequency Interface specification,
Chapter 6."
 ::= { docsIfCmtsMacEntry 1 }

docsIfCmtsSyncInterval OBJECT-TYPE
    SYNTAX      Integer32 (1..200)
    UNITS       "Milliseconds"
    MAX-ACCESS read-write
    STATUS      current
    DESCRIPTION
"The interval between CMTS transmission of successive SYNC
messages at this interface."
    REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Section 6.5 and Appendix B."
 ::= { docsIfCmtsMacEntry 2 }

docsIfCmtsUcdInterval OBJECT-TYPE
    SYNTAX      Integer32 (1..2000)
    UNITS       "Milliseconds"
    MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"The interval between CMTS transmission of successive
Upstream Channel Descriptor messages for each upstream
channel at this interface."
REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Section 6.5 and Appendix B."
 ::= { docsIfCmtsMacEntry 3 }

docsIfCmtsMaxServiceIds OBJECT-TYPE
SYNTAX     Integer32 (1..16383)
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"The maximum number of service IDs that may be
simultaneously active."
 ::= { docsIfCmtsMacEntry 4 }

-- This object has been obsoleted and replaced by
-- docsIfCmtsInsertInterval to fix a SYNTAX typing problem. New
-- implementations of this MIB should use that object instead.
docsIfCmtsInsertionInterval OBJECT-TYPE
SYNTAX     TimeTicks
MAX-ACCESS read-write
STATUS     obsolete
DESCRIPTION
"The amount of time to elapse between each broadcast
station maintenance grant. Broadcast station maintenance
grants are used to allow new cable modems to join the
network. Zero indicates that a vendor-specific algorithm
is used instead of a fixed time. Maximum amount of time
permitted by the specification is 2 seconds."
REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Appendix B, Ranging Interval."
 ::= { docsIfCmtsMacEntry 5 }

docsIfCmtsInvitedRangingAttempts OBJECT-TYPE
SYNTAX     Integer32 (0..1024)
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
"The maximum number of attempts to make on invitations
for ranging requests. A value of zero means the system
should attempt to range forever."
REFERENCE
"DOCSIS Radio Frequency Interface specification, Section 7.2.5 and Appendix B."
::= { docsIfCmtsMacEntry 6 }
docsIfCmtsInsertInterval OBJECT-TYPE
SYNTAX TimeInterval
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"The amount of time to elapse between each broadcast station maintenance grant. Broadcast station maintenance grants are used to allow new cable modems to join the network. Zero indicates that a vendor-specific algorithm is used instead of a fixed time. Maximum amount of time permitted by the specification is 2 seconds."
REFERENCE
"DOCSIS Radio Frequency Interface Specification, Appendix B."
::= { docsIfCmtsMacEntry 7 }

--
-- CMTS status table.
--
docsIfCmtsStatusTable OBJECT-TYPE
SYNTAX SEQUENCE OF DocsIfCmtsStatusEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"For the MAC layer, this group maintains a number of status objects and counters."
::= { docsIfCmtsObjects 2 }
docsIfCmtsStatusEntry OBJECT-TYPE
SYNTAX DocsIfCmtsStatusEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Status entry for a single MAC layer. An entry in this table exists for each ifEntry with an ifType of docsCableMaclayer(127)."
INDEX { ifIndex }
::= { docsIfCmtsStatusTable 1 }

DocsIfCmtsStatusEntry ::= SEQUENCE {
  docsIfCmtsStatusInvalidRangeReqs Counter32,
  docsIfCmtsStatusRangingAborteds Counter32,
}
docsIfCmtsStatusInvalidRegReqs OBJECT-TYPE
   SYNTAX Counter32
   MAX-ACCESS read-only
   STATUS current
   DESCRIPTION
   "This object counts invalid REG-REQ messages received on
   this interface."
   ::= { docsIfCmtsStatusEntry 1 }

docsIfCmtsStatusRangingAborteds OBJECT-TYPE
   SYNTAX Counter32
   MAX-ACCESS read-only
   STATUS current
   DESCRIPTION
   "This object counts ranging attempts that were explicitely
   aborted by the CMTS."
   ::= { docsIfCmtsStatusEntry 2 }

docsIfCmtsStatusInvalidRegReqs OBJECT-TYPE
   SYNTAX Counter32
   MAX-ACCESS read-only
   STATUS current
   DESCRIPTION
   "This object counts invalid REG-REQ messages received on
   this interface."
   ::= { docsIfCmtsStatusEntry 3 }

docsIfCmtsStatusFailedRegReqs OBJECT-TYPE
   SYNTAX Counter32
   MAX-ACCESS read-only
   STATUS current
   DESCRIPTION
   "This object counts failed registration attempts, i.e.,
   authentication failures and class of service failures,
   on this interface."
   ::= { docsIfCmtsStatusEntry 4 }

docsIfCmtsStatusInvalidDataReqs OBJECT-TYPE
   SYNTAX Counter32
   MAX-ACCESS read-only
   STATUS current
   DESCRIPTION
"This object counts invalid data request messages received on this interface."
::= { docsIfCmtsStatusEntry 5 }

docsIfCmtsStatusT5Timeouts OBJECT-TYPE
SYNTAX    Counter32
MAX-ACCESS read-only
STATUS    current
DESCRIPTION
"This object counts the number of times counter T5 expired on this interface."
::= { docsIfCmtsStatusEntry 6 }

--
-- CM status table (within CMTS).
-- This table is implemented only at the CMTS.
-- It contains per CM status information available in the CMTS.
--

docsIfCmtsCmStatusTable OBJECT-TYPE
SYNTAX    SEQUENCE OF DocsIfCmtsCmStatusEntry
MAX-ACCESS not-accessible
STATUS    current
DESCRIPTION
"A set of objects in the CMTS, maintained for each Cable Modem connected to this CMTS."
::= { docsIfCmtsObjects 3 }

docsIfCmtsCmStatusEntry OBJECT-TYPE
SYNTAX    DocsIfCmtsCmStatusEntry
MAX-ACCESS not-accessible
STATUS    current
DESCRIPTION
"Status information for a single Cable Modem. An entry in this table exists for each Cable Modem that is connected to the CMTS implementing this table."
INDEX { docsIfCmtsCmStatusIndex }
::= { docsIfCmtsCmStatusTable 1 }

DocsIfCmtsCmStatusEntry ::= SEQUENCE {
  docsIfCmtsCmStatusIndex               Integer32,
docsIfCmtsCmStatusMacAddress          MacAddress,
docsIfCmtsCmStatusIpAddress           IpAddress,
docsIfCmtsCmStatusDownChannelIfIndex  InterfaceIndexOrZero,
docsIfCmtsCmStatusUpChannelIfIndex    InterfaceIndexOrZero,
docsIfCmtsCmStatusRxPower             TenthdBmV,
docsIfCmtsCmStatusTimingOffset        Unsigned32,
docsIfCmtsCmStatusEqualizationData    OCTET STRING,}
docsIfCmtsCmStatusIndex OBJECT-TYPE  
SYNTAX     Integer32 (1..2147483647)  
MAX-ACCESS not-accessible  
STATUS     current  
DESCRIPTION  
"Index value to uniquely identify an entry in this table.  
For an individual Cable Modem, this index value should 
not change during CMTS uptime."  
::= { docsIfCmtsCmStatusEntry 1 }

docsIfCmtsCmStatusMacAddress OBJECT-TYPE  
SYNTAX     MacAddress  
MAX-ACCESS read-only  
STATUS     current  
DESCRIPTION  
"MAC address of this Cable Modem. If the Cable Modem has 
multiple MAC addresses, this is the MAC address associated 
with the Cable interface."  
::= { docsIfCmtsCmStatusEntry 2 }

docsIfCmtsCmStatusIpAddress OBJECT-TYPE  
SYNTAX     IpAddress  
MAX-ACCESS read-only  
STATUS     current  
DESCRIPTION  
"IP address of this Cable Modem. If the Cable Modem has no 
IP address assigned, or the IP address is unknown, this 
object returns a value of 0.0.0.0. If the Cable Modem has 
multiple IP addresses, this object returns the IP address 
associated with the Cable interface."  
::= { docsIfCmtsCmStatusEntry 3 }

docsIfCmtsCmStatusDownChannelIfIndex OBJECT-TYPE  
SYNTAX     InterfaceIndexOrZero  
MAX-ACCESS read-only  
STATUS     current  
DESCRIPTION  
"IfIndex of the downstream channel this CM is connected 
to. If the downstream channel is unknown, this object 
returns a value of zero."
docsIfCmtsCmStatusUpChannelIfIndex OBJECT-TYPE
SYNTAX InterfaceIndexOrZero
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"IfIndex of the upstream channel this CM is connected to. If the upstream channel is unknown, this object returns a value of zero."

 docsIfCmtsCmStatusRxPower OBJECT-TYPE
SYNTAX TenthdBmV
UNITS "dBmV"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The receive power as percieved for upstream data from this Cable Modem. If the receive power is unknown, this object returns a value of zero."
REFERENCE
"DOCSIS Radio Frequency Interface Specification, Table 4-13."

 docsIfCmtsCmStatusTimingOffset OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"A measure of the current round trip time for this CM. Used for timing of CM upstream transmissions to ensure synchronized arrivals at the CMTS. Units are in terms of (6.25 microseconds/64). Returns zero if the value is unknown."
REFERENCE
"DOCSIS Radio Frequency Interface Specification, Section 6.5."

 docsIfCmtsCmStatusEqualizationData OBJECT-TYPE
SYNTAX OCTET STRING
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"Equalization data for this CM. Returns an empty string
if the value is unknown or if there is no equalization
data available or defined."

REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Figure 6-23."

::= { docsIfCmtsCmStatusEntry 8 }

docsIfCmtsCmStatusValue OBJECT-TYPE
SYNTAX      INTEGER {
    other(1),
    ranging(2),
    rangingAborted(3),
    rangingComplete(4),
    ipComplete(5),
    registrationComplete(6),
    accessDenied(7)
}
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
"Current Cable Modem connectivity state, as specified
in the RF Interface Specification. Returned status
information is the CM status as assumed by the CMTS,
and indicates the following events:
other(1)
    Any state other than below.
ranging(2)
    The CMTS has received an Initial Ranging Request
    message from the CM, and the ranging process is not yet complete.
rangingAborted(3)
    The CMTS has sent a Ranging Abort message to the CM.
rangingComplete(4)
    The CMTS has sent a Ranging Complete message to the CM.
ipComplete(5)
    The CMTS has received a DHCP reply message and forwarded
    it to the CM.
registrationComplete(6)
    The CMTS has sent a Registration Response message to
    the CM.
accessDenied(7)
    The CMTS has sent a Registration Aborted message
    to the CM.

The CMTS only needs to report states it is able to detect."

REFERENCE
"DOCSIS Radio Frequency Interface Specification,
Chapter 7.2."

::= { docsIfCmtsCmStatusEntry 9 }
docsIfCmtsCmStatusUnerroreds OBJECT-TYPE
SYNTAX       Counter32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION  "Codewords received without error from this Cable Modem."
REFERENCE    "DOCSIS Radio Frequency Interface specification, Section 4.2.3"
::= { docsIfCmtsCmStatusEntry 10 }

docsIfCmtsCmStatusCorrecteds OBJECT-TYPE
SYNTAX       Counter32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION  "Codewords received with correctable errors from this Cable Modem."
REFERENCE    "DOCSIS Radio Frequency Interface specification, Section 4.2.3"
::= { docsIfCmtsCmStatusEntry 11 }

docsIfCmtsCmStatusUncorrectables OBJECT-TYPE
SYNTAX       Counter32
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION  "Codewords received with uncorrectable errors from this Cable Modem."
REFERENCE    "DOCSIS Radio Frequency Interface specification, Section 4.2.3"
::= { docsIfCmtsCmStatusEntry 12 }

docsIfCmtsCmStatusSignalNoise OBJECT-TYPE
SYNTAX       TenthdB
UNITS        "dB"
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION  "Signal/Noise ratio as perceived for upstream data from this Cable Modem. If the Signal/Noise is unknown, this object returns a value of zero."
::= { docsIfCmtsCmStatusEntry 13 }

docsIfCmtsCmStatusMicroreflections OBJECT-TYPE
SYNTAX          Integer32 (0..255)
UNITS           "dBc"
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION     "Total microreflections including in-channel response
as perceived on this interface, measured in dBc below
the signal level.
This object is not assumed to return an absolutely
accurate value, but should give a rough indication
of microreflections received on this interface.
It is up to the implementor to provide information
as accurate as possible."
REFERENCE       "DOCSIS Radio Frequency Interface specification,
Table 2-1 and 2-2"
::= { docsIfCmtsCmStatusEntry 14 }

--
-- The CMTS Service Table.
--

docsIfCmtsServiceTable OBJECT-TYPE
SYNTAX          SEQUENCE OF DocsIfCmtsServiceEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION     "Describes the attributes of upstream service queues
in a Cable Modem Termination System."
::= { docsIfCmtsObjects 4 }
docsIfCmtsServiceEntry OBJECT-TYPE
SYNTAX          DocsIfCmtsServiceEntry
MAX-ACCESS      not-accessible
STATUS          current
DESCRIPTION     "Describes the attributes of a single upstream bandwidth
service queue.
Entries in this table exist for each ifEntry with an
ifType of docsCableMaclayer(127), and for each service
queue (Service ID) within this MAC layer.
Entries in this table are created with the creation of
individual Service IDs by the MAC layer and removed
when a Service ID is removed."
INDEX { ifIndex, docsIfCmtsServiceId }
::= { docsIfCmtsServiceTable 1 }

DocsIfCmtsServiceEntry ::= SEQUENCE {
docsIfCmtsServiceId OBJECT-TYPE
SYNTAX Integer32 (1..16383)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Identifies a service queue for upstream bandwidth. The attributes of this service queue are shared between the Cable Modem and the Cable Modem Termination System. The CMTS allocates upstream bandwidth to this service queue based on requests from the CM and on the class of service associated with this queue."
::= { docsIfCmtsServiceEntry 1 }

docsIfCmtsServiceCmStatusIndex OBJECT-TYPE
SYNTAX Integer32 (0..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION "Pointer to an entry in docsIfCmtsCmStatusTable identifying the Cable Modem using this Service Queue. If multiple Cable Modems are using this Service Queue, the value of this object is zero."
::= { docsIfCmtsServiceEntry 2 }

docsIfCmtsServiceAdminStatus OBJECT-TYPE
SYNTAX INTEGER {
   enabled(1),
   disabled(2),
   destroyed(3) }
MAX-ACCESS read-write
STATUS current
DESCRIPTION "Allows a service class for a particular modem to be suppressed, (re-)enabled, or deleted altogether."
::= { docsIfCmtsServiceEntry 3 }

docsIfCmtsServiceQosProfile OBJECT-TYPE
SYNTAX Integer32 (0..16383)
MAX-ACCESS read-only
 STATUS current
DESCRIPTION
"The index in docsIfQosProfileTable describing the quality of service attributes associated with this particular service. If no associated docsIfQosProfileTable entry exists, this object returns a value of zero."
 ::= { docsIfCmtsServiceEntry 4 }

docsIfCmtsServiceCreateTime OBJECT-TYPE
  -- SYNTAX TimeTicks
  SYNTAX TimeStamp
  MAX-ACCESS read-only
  STATUS current
  DESCRIPTION
  "The value of sysUpTime when this entry was created."
  ::= { docsIfCmtsServiceEntry 5 }

docsIfCmtsServiceInOctets OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The cumulative number of Packet Data octets received on this Service ID. The count does not include the size of the Cable MAC header"
 ::= { docsIfCmtsServiceEntry 6 }

docsIfCmtsServiceInPackets OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The cumulative number of Packet Data packets received on this Service ID."
 ::= { docsIfCmtsServiceEntry 7 }

--
-- The following table provides upstream channel modulation profiles.
-- Entries in this table can be re-used by one or more upstream channels. An upstream channel will have a modulation profile for each value of docsIfModIntervalUsageCode.
--

docsIfCmtsModulationTable OBJECT-TYPE
SYNTAX SEQUENCE OF DocsIfCmtsModulationEntry
MAX-ACCESS not-accessible

St. Johns Standard [Page 54]
STATUS      current
DESCRIPTION
  "Describes a modulation profile associated with one or more
  upstream channels."
 ::= { docsIfCmtsObjects 5 }

docsIfCmtsModulationEntry OBJECT-TYPE
SYNTAX      DocsIfCmtsModulationEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "Describes a modulation profile for an Interval Usage Code
  for one or more upstream channels.
  Entries in this table are created by the operator. Initial
default entries may be created at system initialization
time. No individual objects have to be specified in order
to create an entry in this table.
  Note that some objects do not have DEFVALs, but do have
  calculated defaults and need not be specified during row
  creation.
  There is no restriction on the changing of values in this
table while their associated rows are active."
INDEX { docsIfCmtsModIndex, docsIfCmtsModIntervalUsageCode }
 ::= { docsIfCmtsModulationTable 1 }

DocsIfCmtsModulationEntry ::= SEQUENCE {
docsIfCmtsModIndex                    Integer32, 
docsIfCmtsModIntervalUsageCode        INTEGER, 
docsIfCmtsModControl                  RowStatus, 
docsIfCmtsModType                     INTEGER, 
docsIfCmtsModPreambleLen              Integer32, 
docsIfCmtsModDifferentialEncoding     TruthValue, 
docsIfCmtsModFECErrorCorrection       Integer32, 
docsIfCmtsModFECCodewordLength        Integer32, 
docsIfCmtsModScramblerSeed            Integer32, 
docsIfCmtsModMaxBurstSize             Integer32, 
docsIfCmtsModGuardTimeSize            Unsigned32, 
docsIfCmtsModLastCodewordShortened    TruthValue, 
docsIfCmtsModScrambler                TruthValue
}

docsIfCmtsModIndex OBJECT-TYPE
SYNTAX      Integer32 (1..2147483647)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
  "An index into the Channel Modulation table representing
  a group of Interval Usage Codes, all associated with the
same channel."
::= { docsIfCmtsModulationEntry 1 }

docsIfCmtsModIntervalUsageCode OBJECT-TYPE
SYNTAX INTEGER {
     request(1),
     requestData(2),
     initialRanging(3),
     periodicRanging(4),
     shortData(5),
     longData(6)
}
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"An index into the Channel Modulation table which, when
grouped with other Interval Usage Codes, fully
instantiate all modulation sets for a given upstream
channel."
REFERENCE
"DOCSIS Radio Frequency Interface specification,
Table 6-16."
::= { docsIfCmtsModulationEntry 2 }

docsIfCmtsModControl OBJECT-TYPE
SYNTAX RowStatus
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"Controls and reflects the status of rows in this table."
::= { docsIfCmtsModulationEntry 3 }

docsIfCmtsModType OBJECT-TYPE
SYNTAX INTEGER {
     other(1),
     qpsk(2),
     qam16(3)
}
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"The modulation type used on this channel. Returns
other(1) if the modulation type is neither qpsk or
qam16. See the reference for the modulation profiles
implied by qpsk or qam16. See the conformance object for
write conditions and limitations."
REFERENCE
"DOCSIS Radio Frequency Interface specification,
Section 4.2.2.

DEFVAL { qpsk }
::= { docsIfCmtsModulationEntry 4 }

docsIfCmtsModPreambleLen OBJECT-TYPE
SYNTAX Integer32 (0..1024)
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The preamble length for this modulation profile in bits.
Default value is the minimum needed by the implementation
at the CMTS for the given modulation profile."
REFERENCE "DOCSIS Radio Frequency Interface specification,
Section 4.2.5."
::= { docsIfCmtsModulationEntry 5 }

docsIfCmtsModDifferentialEncoding OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-create
STATUS current
DESCRIPTION "Specifies whether or not differential encoding is used
on this channel."
DEFVAL { false }
::= { docsIfCmtsModulationEntry 6 }

docsIfCmtsModFECErrorCorrection OBJECT-TYPE
SYNTAX Integer32 (0..10)
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The number of correctable errored bytes (t) used in
forward error correction code. The value of 0 indicates
no correction is employed. The number of check bytes
appended will be twice this value."
REFERENCE "DOCSIS Radio Frequency Interface specification,
Section 4.2.3."
DEFVAL { 0 }
::= { docsIfCmtsModulationEntry 7 }

docsIfCmtsModFECCodewordLength OBJECT-TYPE
SYNTAX Integer32 (1..255)
MAX-ACCESS read-create
STATUS current
DESCRIPTION "The number of data bytes (k) in the forward error
correction codeword. This object is not used if docsIfCmtsModFECErrorCorrection is zero."

REFERENCE
"DOCSIS Radio Frequency Interface specification, Section 4.2.3."

DEFVAL { 32 }
::= { docsIfCmtsModulationEntry 8 }

docsIfCmtsModScramblerSeed OBJECT-TYPE
SYNTAX Integer32 (0..32767)
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"The 15 bit seed value for the scrambler polynomial."

REFERENCE
"DOCSIS Radio Frequency Interface specification, Section 4.2.4."

DEFVAL { 0 }
::= { docsIfCmtsModulationEntry 9 }

docsIfCmtsModMaxBurstSize OBJECT-TYPE
SYNTAX Integer32 (0..255)
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"The maximum number of mini-slots that can be transmitted during this channel’s burst time. Returns zero if the burst length is bounded by the allocation MAP rather than this profile. Default value is 0 except for shortData, where it is 8."

::= { docsIfCmtsModulationEntry 10 }

docsIfCmtsModGuardTimeSize OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"The number of symbol-times which must follow the end of this channel’s burst. Default value is the minimum time needed by the implementation for this modulation profile."

REFERENCE
"DOCSIS Radio Frequency Interface specification, Section 4.2.7."

::= { docsIfCmtsModulationEntry 11 }

docsIfCmtsModLastCodewordShortened OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS  read-create  
STATUS      current  
DESCRIPTION  "Indicates if the last FEC codeword is truncated."  
REFERENCE  "DOCSIS Radio Frequency Interface specification,  
Section 4.2.10."  
DEFVAL { true }  
::= { docsIfCmtsModulationEntry 12 }  


docsIfCmtsModScrambler OBJECT-TYPE  
SYNTAX      TruthValue  
MAX-ACCESS  read-create  
STATUS      current  
DESCRIPTION  "Indicates if the scrambler is employed."  
REFERENCE  "DOCSIS Radio Frequency Interface specification,  
Section 4.2.4."  
DEFVAL { false }  
::= { docsIfCmtsModulationEntry 13 }  


docsIfCmtsQosProfilePermissions OBJECT-TYPE  
SYNTAX      BITS {  
    createByManagement(0),  
    updateByManagement(1),  
    createByModems(2)  
}  
MAX-ACCESS  read-write  
STATUS      current  
DESCRIPTION  "This object specifies permitted methods of creating  
entries in docsIfQosProfileTable.  
CreateByManagement(0) is set if entries can be created  
using SNMP. UpdateByManagement(1) is set if updating  
entries using SNMP is permitted. CreateByModems(2)  
is set if entries can be created based on information  
in REG-REQ MAC messages received from Cable Modems.  
Information in this object is only applicable if  
docsIfQosProfileTable is implemented as read-create.  
Otherwise, this object is implemented as read-only  
and returns CreateByModems(2).  
Either CreateByManagement(0) or CreateByModems(1)  
must be set when writing to this object."  
::= { docsIfCmtsObjects 6 }  


docsIfCmtsMacToCmTable OBJECT-TYPE  
SYNTAX      SEQUENCE OF DocsIfCmtsMacToCmEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This is a table to provide a quick access index into the
docsIfCmtsCmStatusTable. There is exactly one row in this
table for each row in the docsIfCmtsCmStatusTable. In
general, the management station should use this table only
to get a pointer into the docsIfCmtsCmStatusTable (which
corresponds to the CM’s RF interface MAC address), and
should not iterate (e.g. GetNext through) this table."
::= { docsIfCmtsObjects 7 }

docsIfCmtsMacToCmEntry OBJECT-TYPE
SYNTAX DocsIfCmtsMacToCmEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"A row in the docsIfCmtsMacToCmTable. An entry in this table exists for each Cable Modem that is connected to the CMTS implementing this table."
INDEX { docsIfCmtsCmMac }
::= {docsIfCmtsMacToCmTable 1 }

DocsIfCmtsMacToCmEntry ::= SEQUENCE {
  docsIfCmtsCmMac     MacAddress,
  docsIfCmtsCmPtr     Integer32
}

docsIfCmtsCmMac OBJECT-TYPE
SYNTAX MacAddress
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The RF side MAC address for the referenced CM. (E.g. the interface on the CM that has docsCableMacLayer(127) as its ifType."
::= { docsIfCmtsMacToCmEntry 1 }

docsIfCmtsCmPtr OBJECT-TYPE
SYNTAX Integer32 (1..2147483647)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"An row index into docsIfCmtsCmStatusTable. When queried with the correct instance value (e.g. a CM’s MAC address), returns the index in docsIfCmtsCmStatusTable which represents that CM."
::= { docsIfCmtsMacToCmEntry 2 }
-- notification group is for future extension.

docsIfNotification OBJECT IDENTIFIER ::= { docsIfMib 2 }

docsIfConformance OBJECT IDENTIFIER ::= { docsIfMib 3 }
docsIfCompliances OBJECT IDENTIFIER ::= { docsIfConformance 1 }
docsIfGroups OBJECT IDENTIFIER ::= { docsIfConformance 2 }

-- compliance statements

docsIfBasicCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION "The compliance statement for devices that implement MCNS/DOCSIS compliant Radio Frequency Interfaces."

MODULE -- docsIfMib

-- unconditionally mandatory groups
MANDATORY-GROUPS {
  docsIfBasicGroup
}

-- conditionally mandatory group
GROUP docsIfCmGroup
  DESCRIPTION "This group is implemented only in Cable Modems, not in Cable Modem Termination Systems."

-- conditionally mandatory group
GROUP docsIfCmtsGroup
  DESCRIPTION "This group is implemented only in Cable Modem Termination Systems, not in Cable Modems."

OBJECT docsIfDownChannelFrequency
  WRITE-SYNTAX Integer32 (54000000..860000000)
  MIN-ACCESS read-only
  DESCRIPTION "Read-write in Cable Modem Termination Systems; read-only in Cable Modems. The values above are appropriate for a cable plant using a Sub-Split channel plan. If DOCSIS is extended to cover other types of channel plans (and frequency allocations) this object will be modified accordingly."

OBJECT docsIfDownChannelWidth
WRITE-SYNTAX Integer32 (6000000)
MIN-ACCESS read-only
DESCRIPTION
"It is conformant to implement this object as read-only. In Cable Modems, this object is always implemented as read-only. The above value is appropriate for cable plants running under NTSC (National Television Standards Committee) standards. If DOCSIS is extended to work with other standard (e.g. European standards), this object will be modified accordingly."

OBJECT docsIfDownChannelModulation
WRITE-SYNTAX INTEGER {
  qam64 (3),
  qam256 (4)
}
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems; read-only in Cable Modems."

OBJECT docsIfDownChannelInterleave
WRITE-SYNTAX INTEGER {
  taps8Increment16(3),
  taps16Increment8(4),
  taps32Increment4(5),
  taps64Increment2(6),
  taps128Increment1(7)
}
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems; read-only in Cable Modems."

OBJECT docsIfDownChannelPower
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems; read-only in Cable Modems."

OBJECT docsIfUpChannelFrequency
WRITE-SYNTAX Integer32 (5000000..42000000)
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems; read-only in Cable Modems. The values above are appropriate for a cable plant using a Sub-Split channel plan. If DOCSIS is extended to cover other types of
channel plans (and frequency allocations) this object will be modified accordingly.

OBJECT docsIfUpChannelWidth
WRITE-SYNTAX Integer32 (200000..3200000)
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems;
read-only in Cable Modems. The above value is appropriate
for cable plants running under NTSC (National Television
Standards Committee) standards. If DOCSIS is extended to
work with other standard (e.g. European standards), this
object will be modified accordingly."

OBJECT docsIfUpChannelModulationProfile
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems;
read-only in Cable Modems."

OBJECT docsIfUpChannelSlotSize
MIN-ACCESS read-only
DESCRIPTION
"This object is always read-only in Cable Modems.
It is compliant to implement this object as read-only
in Cable Modem Termination Systems."

OBJECT docsIfUpChannelRangingBackoffStart
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems;
read-only in Cable Modems."

OBJECT docsIfUpChannelRangingBackoffEnd
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems;
read-only in Cable Modems."

OBJECT docsIfUpChannelTxBackoffStart
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems;
read-only in Cable Modems."

OBJECT docsIfUpChannelTxBackoffEnd
MIN-ACCESS read-only
DESCRIPTION
"Read-write in Cable Modem Termination Systems; read-only in Cable Modems."

OBJECT  docsIfQosProfPriority
MIN-ACCESS  read-only
DESCRIPTION
"This object is always read-only in Cable Modems. It is compliant to implement this object as read-only in Cable Modem Termination Systems."

OBJECT  docsIfQosProfMaxUpBandwidth
MIN-ACCESS  read-only
DESCRIPTION
"This object is always read-only in Cable Modems. It is compliant to implement this object as read-only in Cable Modem Termination Systems."

OBJECT  docsIfQosProfGuarUpBandwidth
MIN-ACCESS  read-only
DESCRIPTION
"This object is always read-only in Cable Modems. It is compliant to implement this object as read-only in Cable Modem Termination Systems."

OBJECT  docsIfQosProfMaxDownBandwidth
MIN-ACCESS  read-only
DESCRIPTION
"This object is always read-only in Cable Modems. It is compliant to implement this object as read-only in Cable Modem Termination Systems."

OBJECT  docsIfQosProfMaxTxBurst
MIN-ACCESS  read-only
DESCRIPTION
"This object is always read-only in Cable Modems. It is compliant to implement this object as read-only in Cable Modem Termination Systems."

OBJECT  docsIfQosProfBaselinePrivacy
MIN-ACCESS  read-only
DESCRIPTION
"This object is always read-only in Cable Modems. It is compliant to implement this object as read-only in Cable Modem Termination Systems."

OBJECT  docsIfQosProfStatus
MIN-ACCESS  read-only
DESCRIPTION
"This object is always read-only in Cable Modems. It is compliant to implement this object as read-only in Cable Modem Termination Systems."

OBJECT docsIfCmtsServiceAdminStatus
MIN-ACCESS read-only
DESCRIPTION
"It is compliant to implement this object as read-only."

OBJECT docsIfCmtsSyncInterval
MIN-ACCESS read-only
DESCRIPTION
"It is compliant to implement this object as read-only."

OBJECT docsIfCmtsUcdInterval
MIN-ACCESS read-only
DESCRIPTION
"It is compliant to implement this object as read-only."

OBJECT docsIfCmtsInsertInterval
MIN-ACCESS read-only
DESCRIPTION
"It is compliant to implement this object as read-only."

OBJECT docsIfCmtsInvitedRangingAttempts
MIN-ACCESS read-only
DESCRIPTION
"It is compliant to implement this object as read-only."

OBJECT docsIfCmtsQosProfilePermissions
MIN-ACCESS read-only
DESCRIPTION
"It is compliant to implement this object as read-only."

OBJECT docsIfCmtsModType
WRITE-SYNTAX INTEGER {
  qpsk (2),
  qam16 (3)
}
DESCRIPTION
"Management station may only set 16QAM or QPSK modulation, but others might be possible based on device configuration."

 ::= { docsIfCompliances 1 }

docsIfBasicGroup OBJECT-GROUP
OBJECTS {
  St. Johns                       Standard
  [Page 65]
docsIfDownChannelId,
docsIfDownChannelFrequency,
docsIfDownChannelWidth,
docsIfDownChannelModulation,
docsIfDownChannelInterleave,
docsIfDownChannelPower,
docsIfUpChannelId,
docsIfUpChannelFrequency,
docsIfUpChannelWidth,
docsIfUpChannelModulationProfile,
docsIfUpChannelSlotSize,
docsIfUpChannelTxTimingOffset,
docsIfUpChannelRangingBackoffStart,
docsIfUpChannelRangingBackoffEnd,
docsIfUpChannelTxBackoffStart,
docsIfUpChannelTxBackoffEnd,
docsIfQosProfPriority,
docsIfQosProfMaxUpBandwidth,
docsIfQosProfGuarUpBandwidth,
docsIfQosProfMaxDownBandwidth,
docsIfQosProfMaxTxBurst,
docsIfQosProfBaselinePrivacy,
docsIfQosProfStatus,
docsIfSigQIncludesContention,
docsIfSigQUnerrored,
docsIfSigQCorrected,
docsIfSigQUncorrectable,
docsIfSigQSignalNoise,
docsIfSigQMicreflections,
docsIfSigQEqualizationData

}  

STATUS current

DESCRIPTION
"Group of objects implemented in both Cable Modems and
Cable Modem Termination Systems."

::= { docsIfGroups 1 }

-- The following table was modified to correct naming conventions for
-- Counter32 variables.
docsIfCmGroup OBJECT-GROUP
  OBJECTS {
    docsIfCmCmtsAddress,
    docsIfCmCapabilities,
    --
    docsIfCmRangingRespTimeout,
    docsIfCmRangingTimeout,
    docsIfCmStatusValue,
    docsIfCmStatusCode,
    docsIfCmStatusTxPower,
docsIfCmStatusResets,
docsIfCmStatusLostSyncs,
 docsIfCmStatusInvalidMaps,
 docsIfCmStatusInvalidUcDs,
-- docsIfCmStatusInvalidRangingResp,
 docsIfCmStatusInvalidRangingResponses,
-- docsIfCmStatusInvalidRegistrationResp,
 docsIfCmStatusInvalidRegistrationResponses,
 docsIfCmStatusT1Timeouts,
 docsIfCmStatusT2Timeouts,
 docsIfCmStatusT3Timeouts,
 docsIfCmStatusT4Timeouts,
 docsIfCmStatusRangingAborteds,
 docsIfCmServiceQosProfile,
 docsIfCmServiceTxSlotsImmed,
 docsIfCmServiceTxSlotsDed,
 docsIfCmServiceTxRetries,
-- docsIfCmServiceTxExceeded,
 docsIfCmServiceTxExceededs,
 docsIfCmServiceRqRetries,
-- docsIfCmServiceRqExceeded
 docsIfCmServiceRqExceededs
}

STATUS current
DESCRIPTION
"Group of objects implemented in Cable Modems."
 ::= { docsIfGroups 2 }

docsIfCmGroup OBJECT-GROUP
OBJECTS {
 docsIfCmCapabilities,
 docsIfCmSyncInterval,
 docsIfCmUcdInterval,
 docsIfCmMaxServiceIds,
-- docsIfCmInsertionInterval,
 docsIfCmInvitedRangingAttempts,
 docsIfCmInsertInterval,
 docsIfCmStatusInvalidRangeReqs,
 docsIfCmStatusRangingAborteds,
 docsIfCmStatusInvalidRegReqs,
 docsIfCmStatusFailedRegReqs,
 docsIfCmStatusInvalidDataReqs,
 docsIfCmStatusT5Timeouts,
 docsIfCmStatusMacAddress,
 docsIfCmStatusDownChannelIfIndex,
 docsIfCmStatusUpChannelIfIndex,
 docsIfCmStatusRxPower,
docsIfCmtsCmStatusTimingOffset,
docsIfCmtsCmStatusEqualizationData,
docsIfCmtsCmStatusValue,
docsIfCmtsCmStatusUnerroreds,
docsIfCmtsCmStatusCorrecteds,
docsIfCmtsCmStatusUncorrectables,
docsIfCmtsCmStatusSignalNoise,
docsIfCmtsCmStatusMicroreflections,
docsIfCmtsServiceCmStatusIndex,
docsIfCmtsServiceAdminStatus,
docsIfCmtsServiceQosProfile,
docsIfCmtsServiceCreateTime,
docsIfCmtsServiceInOctets,
docsIfCmtsServiceInPackets,
docsIfCmtsModType,
docsIfCmtsModControl,
docsIfCmtsModPreambleLen,
docsIfCmtsModDifferentialEncoding,
docsIfCmtsModFECCodewordLength,
docsIfCmtsModScramblerSeed,
docsIfCmtsModMaxBurstSize,
docsIfCmtsModGuardTimeSize,
docsIfCmtsModLastCodewordShortened,
docsIfCmtsModScrambler,
docsIfCmtsQosProfilePermissions,
docsIfCmtsCmPtr

}  
STATUS current
DESCRIPTION
"Group of objects implemented in Cable Modem Termination
Systems."
 ::= { docsIfGroups 3 }

docsIfObsoleteGroup OBJECT-GROUP
OBJECTS { 
   docsIfCmRangingRespTimeout,
   docsIfCmtsInsertionInterval
}
STATUS obsolete
DESCRIPTION
"Group of objects obsoleted."
 ::= { docsIfGroups 4 }
END
5. Acknowledgments

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6. References


RFC 2670  DOCSIS RF Interface MIB  August 1999


7. Security Considerations

This MIB relates to a system which will provide metropolitan public internet access. As such, improper manipulation of the objects represented by this MIB may result in denial of service to a large number of end-users. In addition, manipulation of the docsIfCmServiceQosProfile, docsIfCmtsserverQosProfile, and the elements of docsIfQosProfileTable may allow an end-user to improve their service response or decrease other subscriber service response.
This MIB does not affect confidentiality, authentication or authorization of services on a cable modem system. For authentication and authorization, please see the related document "Cable Device Management Information Base for DOCSIS compliant Cable Modems and Cable Modem Termination Systems" [18]. For confidentiality, the working group expects to issue a MIB which describes the management of the DOCSIS Baseline Privacy mechanism.

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