



***Society of Cable
Telecommunications
Engineers***

**ENGINEERING COMMITTEE
Hybrid Management Sub-Layer Subcommittee**

AMERICAN NATIONAL STANDARD

ANSI/SCTE 154-2 2008

SCTE-HMS-QAM-MIB

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CONTENTS

SCOPE.....	1
COPYRIGHT.....	1
NORMATIVE REFERENCE	1
INFORMATIVE REFERENCE.....	1
TERMS AND DEFINITIONS	1
REQUIREMENTS	1

SCOPE

This document provides the definition for MIB objects within the SCTE-HMS-QAM-MIB Tree.

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NORMATIVE REFERENCE

IETF RFC 2578 SNMPv2-SMI

IETF RFC 2579 SNMPv2-TC

IETF RFC 2580 SNMPv2-CONF

IETF RFC 2863 IF-MIB

IETF RFC 3411 SNMP-FRAMEWORK-MIB

IETF RFC 3418 SNMPV2-MIB

IETF RFC 4001 INET-ADDRESS-MIB

IETF RFC 4133 ENTITY-MIB

IANAiftype-MIB

SCTE 36 2002R2007 (formerly HMS028) SCTE-ROOT

SCTE 37 2007 (formerly HMS072) SCTE-HMS-ROOTS

HMS154-5R3 SCTE-HMS-HEADENDIDENT-TC-MIB

ITU-T J.83 Annex B

INFORMATIVE REFERENCE

DOC-IF-M-CMTS-MIB

DOCS-IF-MIB

TERMS AND DEFINITIONS

This document defines the following terms:

Management Information Base (MIB) – the specification of information in a manner that allows standard access through a network management protocol.

REQUIREMENTS

This section defines the mandatory syntax of the SCTE-HMS-QAM-MIB. It follows the IETF Simple Network Management Protocol (SNMP) for defining managed objects. This mib falls under the SCTE-HMS-ROOTS mib defined by the SCTE Standards HMS Subcommittee.

To avoid issues related to device security and possible user contention, this MIB is only read-only. Device manufacturers are expected to provide device provisioning and control as a separate “out of band” service via protocols of their choice.

The syntax is given below.

```

SCTE-HMS-QAM-MIB DEFINITIONS ::= BEGIN

IMPORTS
    OBJECT-TYPE, OBJECT-IDENTITY, MODULE-IDENTITY,
    enterprises, Integer32, Unsigned32
        FROM SNMPv2-SMI
    OBJECT-GROUP, MODULE-COMPLIANCE
        FROM SNMPv2-CONF
    entPhysicalIndex
        FROM ENTITY-MIB
    ifIndex
        FROM IF-MIB
    InetAddress, InetAddressType
        FROM INET-ADDRESS-MIB
    QAMChannelModulationFormat, QAMChannelInterleaveMode
        FROM SCTE-HMS-HEADENDIDENT-TC-MIB;

heDigitalQamMIB MODULE-IDENTITY
    LAST-UPDATED "200807160305Z"
    ORGANIZATION
        "SCTE HMS Working Group"
    CONTACT-INFO
        "SCTE HMS Subcommittee, Chairman
        mailto:standards@scte.org "
    DESCRIPTION
        "This MIB module is for representing Edge QAM equipment
present          in the headend (or indoor) and is supported by a
SNMP agent.     It defines QAM channel related configuration MIB
objects         associated with both QAM channel's physical and
logical        characteristics.
supporting     qamChannelTable is optional for devices that are
that choose to equivalent DOCSIS MIB objects.
               qamConfigTable is optional and applies to devices
               provide logical level configuration. "

    REVISION "200807160305Z"
    DESCRIPTION
        "Updated Objects based on Comments at 7/11/08 meeting.
        1. Made QAMChannelInterleave mode an imported enumeration
and used the   values from the docsiFDownChannelInterleave enumeration.
               2. Changed name of QAMModulationFormat to
QAMChannelModulationFormat.
               3. Added unknown and other to qamChannelAnnexMode
               4. For consistency changed values names for
qamChannelCommonOutputBw,

```

gamChannelCommonUtilization to add the word Common to the names.

5. Changed description clause of gamConfigQamChannelIdMin and

gamConfigQamChannelIdMax to reference entPhysicalIndex. "

REVISION "200804181055Z"

DESCRIPTION

"Renumbered objects in gamConfigTable to remove gaps."

REVISION "200802041850Z"

DESCRIPTION

"Changes based on comments,

1. Changed description of gamChannelPower.

2. Added units to gamChannelOutputBw.

3. Changed Units on gamChannelUtilization to 0.1 Percent."

REVISION "200712171150Z"

DESCRIPTION

"Changes based on comments,

1. Removed IpAddress import.

2. Changed UNITS,comment, SYNTAX on gamChannelUtilization."

REVISION "200710031700Z"

DESCRIPTION

"Added SCTE-HMS-HEADENDIDENT-TC name to file. Added

QAMModulationFormat textual convention."

REVISION "200710021200Z"

DESCRIPTION

"Prepare MIB for ballot."

```
::= { enterprises scteRoot(5591) scteHmsTree(1) insidePlantIdent(11)
heDigital(5) heDigitalQAM(3) 1}
```

--

-- Node definitions

--

```
gamMIBObjects OBJECT-IDENTITY
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This branch specifies the QAM MIB objects."
```

```
::= { heDigitalQamMIB 1 }
```

```
gamMIBConformance OBJECT-IDENTITY
```

```
STATUS current
```

```
DESCRIPTION
```

```
"This branch describes the different QAM MIB object
groups and
```

```
the different level of compliance."
```

```
::= { heDigitalQamMIB 2 }
```

```

qamMIBCompliances OBJECT-IDENTITY
    STATUS current
    DESCRIPTION
        "The different levels of compliance to the QAM MIB."
    ::= { qamMIBConformance 1 }

qamMIBGroups OBJECT-IDENTITY
    STATUS current
    DESCRIPTION
        "The QAM MIB object groups."
    ::= { qamMIBConformance 2 }

qamChannelTable OBJECT-TYPE
    SYNTAX SEQUENCE OF QamChannelEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This table describes the configuration and attributes of
each
        QAM channel of the QAM designated by ifIndex."
    ::= { qamMIBObjects 1 }

qamChannelEntry OBJECT-TYPE
    SYNTAX QamChannelEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "There is an entry in the table for each QAM channel. The
index
        to this table is the ifIndex of each QAM channel."
    INDEX { ifIndex }
    ::= { qamChannelTable 1 }

QamChannelEntry ::= SEQUENCE {
    qamChannelFrequency
        Unsigned32,
    qamChannelModulationFormat
        QAMChannelModulationFormat,
    qamChannelInterleaverLevel
        QAMChannelInterleaveMode,
    qamChannelInterleaverMode
        INTEGER,
    qamChannelPower
        Integer32,
    qamChannelSquelch
        INTEGER,
    qamChannelContWaveMode
        INTEGER,
    qamChannelAnnexMode
        INTEGER
}

qamChannelFrequency OBJECT-TYPE

```

```

SYNTAX      Unsigned32
UNITS       "Hertz"
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The center frequency of the QAM channel."
 ::= { qamChannelEntry 1 }

qamChannelModulationFormat OBJECT-TYPE
SYNTAX      QAMChannelModulationFormat
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "RF Modulation for this output QAM channel when
    qamChannelContWaveMode is off."
 ::= { qamChannelEntry 2 }

qamChannelInterleaverLevel OBJECT-TYPE
SYNTAX      INTEGER {
    level1 (1),
    level2 (2)
}
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The interleaver level for FEC coding.

    level1 - implies interleaver level 1
    level2 - implies interleaver level 2

    This object is only valid when AnnexMode has the value
annexB."
 ::= { qamChannelEntry 3 }

qamChannelInterleaverMode OBJECT-TYPE
SYNTAX      QAMChannelInterleaveMode
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The interleaving depth or operation mode of the
interleaver.
'taps8Increment16':  protection 5.9/4.1 usec,
                      latency .22/.15 msec
'taps16Increment8':  protection 12/8.2 usec,
                      latency .48/.33 msec
'taps32Increment4':  protection 24/16 usec,
                      latency .98/.68 msec
'taps64Increment2':  protection 47/33 usec,
                      latency 2/1.4 msec
'taps128Increment1': protection 95/66 usec,
                      latency 4/2.8 msec
'taps12increment17': protection 18/14 usec,
                      latency 0.43/0.32 msec
'taps128increment2': protection 190/132 usec,

```

```

        latency 8/5.6 msec
'taps128increment3': protection 285/198 usec,
        latency 12/8.4 msec
'taps128increment4': protection 380/264 usec,
        latency 16/11 msec
'taps128increment5': protection 475/330 usec,
        latency 20/14 msec
'taps128increment6': protection 570/396 usec,
        latency 24/17 msec
'taps128increment7': protection 664/462 usec,
        latency 28/20 msec
'taps128increment8': protection 759/528 usec,
        latency 32/22 msec

```

The value 'taps12increment17' is supported by EuroDOCSIS cable systems only, and the others by DOCSIS cable systems.

If the QAM channel interface is down, this object either returns the configured value, or the value of 'unknown'. The value of 'other' is returned if the interleave is known but not defined in the above list.

When the qamChannelInterleaverLevel is set to 'level 1', a single interleaving depth is supported, namely 'taps128Increment1'.

When the qamChannelInterleaverLevel is set to 'level2', all the other interleaving depths are also supported."

```

REFERENCE
    "ITU-T J.83 Annex B."
 ::= { qamChannelEntry 4 }

```

```

qamChannelPower OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "0.1 dBmV"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The output power of the QAM channel. If the QAM channel
is muted,
        value is not valid."
 ::= { qamChannelEntry 5 }

```

```

qamChannelSquelch OBJECT-TYPE
    SYNTAX      INTEGER {
        unmuted (1),
        muted (2)
    }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates whether the QAM port is muted or not."

```

```

 ::= { qamChannelEntry 6 }

qamChannelContWaveMode OBJECT-TYPE
    SYNTAX      INTEGER {
        cwmOff (1),
        cwmOn (2)
    }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Indicates whether Continuous Wave mode is enabled or not
for
        output."
 ::= { qamChannelEntry 7 }

qamChannelAnnexMode OBJECT-TYPE
    SYNTAX      INTEGER {
        unknown(1),
        other(2),
        annexA(3),
        annexB(4),
        annexC(5)
    }
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "Specifies the ITU-T standard supported by the QAM
channel

        annexA - standard specified by Annex A of ITU-T J.83
        annexB - standard specified by Annex B of ITU-T J.83
        annexC - standard specified by Annex C of ITU-T J.83
        Other - other standard that may apply."
 ::= { qamChannelEntry 8 }

qamChannelCommonTable OBJECT-TYPE
    SYNTAX SEQUENCE OF QamChannelCommonEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
        "This table describes MPEG and DOCSIS characteristics that
are
        not part of the DOCSIS-IF-MIB."
 ::= { qamMIBObjects 2 }

qamChannelCommonEntry OBJECT-TYPE
    SYNTAX      QamChannelCommonEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry of this table describes attributes of an RF
channel
        for both MPEG and DOCSIS QAMs."
    INDEX { ifIndex }

```

```

 ::= { qamChannelCommonTable 1 }

QamChannelCommonEntry ::= SEQUENCE {
    qamChannelCommonOutputBw
        Integer32,
    qamChannelCommonUtilization
        Integer32
}

qamChannelCommonOutputBw OBJECT-TYPE
    SYNTAX      Integer32
    UNITS       "bps"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The QAM channel output bandwidth or capacity."
 ::= { qamChannelCommonEntry 1 }

qamChannelCommonUtilization OBJECT-TYPE
    SYNTAX      Integer32 (-1|0..1000)
    UNITS       "0.1 Percent"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The utilization of the QAM channel in 0.1 percentage.
        This rate may be calculated as transport stream packets /
        ( transport stream packets + null packets ). If not
        applicable, a value of -1 is returned."
 ::= { qamChannelCommonEntry 2 }

qamConfigTable OBJECT-TYPE
    SYNTAX SEQUENCE OF QamConfigEntry
    MAX-ACCESS not-accessible
    STATUS      current
    DESCRIPTION
        "This table is designed to show the IP addresses
configuration
Number
parameters
A
QAM
QAM
this is
reserved UDP
        for the QAM channels, optionally UDP port range, Program
        range associated with QAM channels. Configuring these
        is necessary when performing session-based provisioning.
        session-based provisioning request must conform to the
        configurations in this table. The QAM channels within an
        device may be partitioned to support multiple UDP, QAM or
        ProgramNo ranges. Though it's helpful to partition the
        channels when the total number of QAM channel increases,
        not a must. This table may also be used to show the

```

ports, or program numbers for special purposes instead of
using default ones allowed by hardware, software, or MPEG
protocol."

```
::= { qamMIBObjects 3 }
```

```
qamConfigEntry OBJECT-TYPE  
SYNTAX QamConfigEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION
```

```
"Each entry corresponds to the configuration of a QAM  
channel  
range."
```

```
INDEX { entPhysicalIndex,  
qamConfigIndex }  
::= { qamConfigTable 1 }
```

```
QamConfigEntry ::= SEQUENCE {  
qamConfigIndex  
Unsigned32,  
qamConfigQamChannelIdMin  
Integer32,  
qamConfigQamChannelIdMax  
Integer32,  
qamConfigIPAddrType  
InetAddressType,  
qamConfigIPAddr  
InetAddress,  
qamConfigUdpPortRangeMin  
Integer32,  
qamConfigUdpPortRangeMax  
Integer32,  
qamConfigOutputProgNoMin  
Integer32,  
qamConfigOutputProgNoMax  
Integer32  
}
```

```
qamConfigIndex OBJECT-TYPE  
SYNTAX Unsigned32  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION  
"The table index."  
::= { qamConfigEntry 1 }
```

```
qamConfigQamChannelIdMin OBJECT-TYPE  
SYNTAX Integer32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION
```

```
"QAMChannelId maybe within a line card or global  
depending on
```

```

        entPhysicalIndex."
    DEFVAL { 1 }
    ::= { qamConfigEntry 2 }

qamConfigQamChannelIdMax OBJECT-TYPE
    SYNTAX      Integer32
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "QAMChannelId maybe within a line card or global
depending on
        entPhysicalIndex."
    ::= { qamConfigEntry 3 }

qamConfigIPAddrType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The type of the program destination address as defined
by
        inetAddressType. The default value is 1 for ipv4(1)"
    DEFVAL { ipv4 }
    ::= { qamConfigEntry 4 }

qamConfigIPAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "IP address of the QAM channel."
    ::= { qamConfigEntry 5 }

qamConfigUdpPortRangeMin OBJECT-TYPE
    SYNTAX      Integer32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The lowest UDP port of the UDP port range that can be
used
        on this QAM channel."
    ::= { qamConfigEntry 6 }

qamConfigUdpPortRangeMax OBJECT-TYPE
    SYNTAX      Integer32 (0..65535)
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "The highest UDP port of the UDP port range that can be
used on
        this QAM channel."
    ::= { qamConfigEntry 7 }

qamConfigOutputProgNoMin OBJECT-TYPE

```

```

SYNTAX      Integer32 (1..65535)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The lowest MPEG output program number that can be used
on the
    QAM channel."
DEFVAL { 1 }
 ::= { qamConfigEntry 8 }

qamConfigOutputProgNoMax OBJECT-TYPE
SYNTAX      Integer32 (1..65535)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The highest MPEG output program number that can be used
on the
    QAM channel."
DEFVAL { 255 }
 ::= { qamConfigEntry 9 }

qamSupport MODULE-COMPLIANCE
STATUS      current
DESCRIPTION
    "These objects describe the support level for QAM."
MODULE
    MANDATORY-GROUPS { qamChannelGroup }
    GROUP qamConfigGroup
    DESCRIPTION
        "The qamConfigGroup is unconditionally optional"
 ::= { qamMIBCompliances 1 }

docsisSupport MODULE-COMPLIANCE
STATUS      current
DESCRIPTION
    "These objects are not covered by any DOCSIS MIB, but
they would need to be supported by a DOCSIS EQAM."
MODULE
    MANDATORY-GROUPS { qamMpegDocsisCommonGroup }
 ::= { qamMIBCompliances 2 }

qamMpegDocsisCommonGroup OBJECT-GROUP
OBJECTS { qamChannelCommonOutputBw,
          qamChannelCommonUtilization }
STATUS      current
DESCRIPTION
    "These objects are not covered by any DOCSIS MIB. It is
legitimate for a DOCSIS QAM to support them."
 ::= { qamMIBGroups 1 }

qamChannelGroup OBJECT-GROUP
OBJECTS { qamChannelFrequency,
          qamChannelModulationFormat,
          qamChannelInterleaverLevel,

```

```

        qamChannelInterleaverMode,
        qamChannelPower,
        qamChannelSquelch,
        qamChannelContWaveMode,
        qamChannelAnnexMode }
STATUS      current
DESCRIPTION
    "The objects characterizing the RF channel and that may
be
    supported by an equivalent DOCSIS MIB object."
 ::= { qamMIBGroups 2 }

qamConfigGroup OBJECT-GROUP
OBJECTS { qamConfigQamChannelIdMin,
        qamConfigQamChannelIdMax,
        qamConfigIPAddrType,
        qamConfigIPAddr,
        qamConfigUdpPortRangeMin,
        qamConfigUdpPortRangeMax,
        qamConfigOutputProgNoMin,
        qamConfigOutputProgNoMax }
STATUS      current
DESCRIPTION
    "QAM configuration objects."
 ::= { qamMIBGroups 3 }
END

```