Network Operations Subcommittee

AMERICAN NATIONAL STANDARD

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SCTE-HMS-QAM-MIB
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SCOPE
This document is identical to SCTE 154-2 2008 except for informative components which may have been updated such as the title page, NOTICE text, headers and footers. No normative changes have been made to this document.

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
SNMP agent. It defines QAM channel related configuration MIB
objects
associated with both QAM channel's physical and
logical
characteristics.

qamChannelTable is optional for devices that are
supporting
equivalent DOCSIS MIB objects.

gamConfigTable is optional and applies to devices
that choose to
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,
qamChannelCommonUtilization to add the word Common to the names.

5. Changed description clause of qamConfigQamChannelIdMin and
   qamConfigQamChannelIdMax to reference entPhysicalIndex. "

REVISION "200804181055Z"
DESCRIPTION
"Renumbered objects in qamConfigTable to remove gaps."

REVISION "200802041850Z"
DESCRIPTION
"Changes based on comments,
  1. Changed description of qamChannelPower.
  2. Added units to qamChannelOutputBw.
  3. Changed Units on qamChannelUtilization to 0.1 Percent."

REVISION "200712171150Z"
DESCRIPTION
"Changes based on comments,
  1. Removed IpAddress import.
  2. Changed UNITS,comment, SYNTAX on qamChannelUtilization."

REVISION "200710031700Z"
DESCRIPTION
"Prepare MIB for ballot."

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

--
-- Node definitions
--
qamMIBObjects OBJECT-IDENTITY
  STATUS current
  DESCRIPTION
  "This branch specifies the QAM MIB objects."
  ::= { heDigitalQamMIB 1 }

qamMIBConformance 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,
  qamChannelInterleaveMode
    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 for the QAM channels, optionally UDP port range, Program Number range associated with QAM channels. Configuring these parameters is necessary when performing session-based provisioning. A session-based provisioning request must conform to the configurations in this table. The QAM channels within an QAM device may be partitioned to support multiple UDP, QAM or ProgramNo ranges. Though it's helpful to partition the QAM channels when the total number of QAM channel increases, this is not a must. This table may also be used to show the reserved UDP"
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
qamConfigQamChannelIdMax  OBJECT-TYPE
SYNTAX     Integer32
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
  "QAMChannelId maybe within a line card or global depending on
  entPhysicalIndex."
 ::= { qamConfigEntry 2 }

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