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**Access, Terminals, Transmission and Multiplexing (ATTM);
Integrated Broadband Cable and Television Networks;
IPCablecom 1.5;
Part 21: Signalling Extension MIB Specification**

Reference

DTS/ATTM-003011-21

Keywords

access, broadband, cable, IP, multimedia, PSTN

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Access, Terminals, Transmission and Multiplexing (ATTM).

The present document is part 21 of a multi-part IPCablecom 1.5 deliverable covering the Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services, as identified below:

- Part 1: "Overview";
- Part 2: "Architectural framework for the delivery of time critical services over Cable Television Networks using Cable Modems";
- Part 3: "Audio Codec Requirements for the Provision of Bi-Directional Audio Service over Cable Television Networks using Cable Modems";
- Part 4: "Network Call Signalling Protocol";
- Part 5: "Dynamic Quality of Service for the Provision of Real Time Services over Cable Television Networks using Cable Modems";
- Part 6: "Event Message Specification";
- Part 7: "Media Terminal Adapter (MTA) Management Information Base (MIB)";
- Part 8: "Network Call Signalling (NCS) MIB Requirements";
- Part 9: "Security";
- Part 10: "Management Information Base (MIB) Framework";
- Part 11: "Media terminal adapter (MTA) device provisioning";
- Part 12: "Management Event Mechanism";
- Part 13: "Trunking Gateway Control Protocol - MGCP option";
- Part 14: "Embedded MTA Analog Interface and Powering Specification"
- Part 15: "Analog Trunking for PBX Specification";
- Part 16: "Signalling for Call Management Server";
- Part 17: "CMS Subscriber Provisioning Specification";
- Part 18: "Media Terminal Adapter Extension MIB";
- Part 19: "IPCablecom Audio Server Protocol Specification - MGCP option";
- Part 20: "Management Event MIB Specification";

Part 21: "Signalling Extension MIB Specification".

NOTE 1: Additional parts may be proposed and will be added to the list in future versions.

NOTE 2: The choice of a multi-part format for this deliverable is to facilitate maintenance and future enhancements.

1 Scope

1.1 Purpose of the document

New objects that are being introduced beyond IPCablecom 1.0 for Signalling MIBS are being grouped in the present document so that the additional changes made can be tracked easily.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] ETSI TS 103 161-11: "Access, Terminals, Transmission and Multiplexing (ATTM) Integrated Broadband Cable and Television Networks; IPCablecom 1.5 Part 11: Media Terminal Adapter (MTA) device provisioning".
- [2] IETF RFC 2833 (May 2000): "RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals".
- [3] ETSI TS 103 161-3: "Access, Terminals, Transmission and Multiplexing (ATTM); Integrated Broadband Cable and Television Networks; IPCablecom 1.5; Part 3: Audio Codec Requirements for the Provision of Bi-Directional Audio Service over Cable Television Networks using Cable Modems".
- [4] ETSI TS 103 161-4: "Access, Terminals, Transmission and Multiplexing (ATTM) Integrated Broadband Cable and Television Networks; IPCablecom 1.5 Part 4: Network Call Signalling Protocol".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions, symbols and abbreviations

Void.

4 Void

5 Requirements

The IPCablecom Extension Signalling MIB shall be implemented as defined below, using these references [1], [2], [3] and [4].

```
PKTC-EN-SIG-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32, BITS FROM SNMPv2-SMI
    ifIndex FROM IF-MIB
    SnmpAdminString
        FROM SNMP-FRAMEWORK-MIB
    TruthValue
        FROM SNMPv2-TC
    OBJECT-GROUP,
    MODULE-COMPLIANCE
        FROM SNMPv2-CONF
    pktcEnhancements
        FROM CLAB-DEF-MIB
    pktcNcsEndPntConfigEntry
        FROM PKTC-SIG-MIB;

pktcEnSigMib MODULE-IDENTITY
    LAST-UPDATED "200906150000Z" -- June 15, 2009
    ORGANIZATION "Cable Television Laboratories, Inc "
    CONTACT-INFO
        "Sumanth Channabasappa
    Postal: Cable Television Laboratories, Inc.
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    Louisville, Colorado 80027-9750
    U.S.A.
    Phone: +1 303-661-9100
    Fax: +1 303-661-9199
    E-mail: mibs@cablelabs.com"

    DESCRIPTION
        "This MIB module enhances the basic management
        objects defined for PacketCable Signalling
        protocols by the MIB group pktcSigMib.

        Acknowledgements:
        Rodney Osborne - Arris Interactive
        Eugene Nechamkin - Broadcom Corporation
        Satish Kumar - Texas Instruments
        Jean-Francois Mule - CableLabs

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    REVISION "200906150000Z" -- June 15, 2009

    DESCRIPTION
        "Revised Version includes ECNs
        MIB-EXSIG1.5-N-09.0569-2
        and published as part of PKT-SP-MIB-EXSIG1.5-I04-090624"

    REVISION "200704120000Z"

    DESCRIPTION
        "This revision is being published as part of the PacketCable
        Signalling MIBs I03 enhancements for PacketCable 1.5."

    REVISION "200508120000Z"
```

DESCRIPTION

"This revision is being published as part of the PacketCable
Signalling MIBs enhancements for PacketCable 1.5."

::= { pktcEnhancements 2 }

```
--
-- Enhanced MIB Objects and Divisions.
--
pktcEnSigMibObjects          OBJECT IDENTIFIER
                             ::= { pktcEnSigMib 1 }
pktcEnSigDevConfigObjects    OBJECT IDENTIFIER
                             ::= { pktcEnSigMibObjects 1 }
pktcEnNcsEndPntConfigObjects OBJECT IDENTIFIER
                             ::= { pktcEnSigMibObjects 2 }
pktcEnSigEndPntConfigObjects OBJECT IDENTIFIER
                             ::= { pktcEnSigMibObjects 3 }
pktcEnDcsEndPntConfigObjects OBJECT IDENTIFIER
                             ::= { pktcEnSigMibObjects 4 }

--
-- Enhanced Notification groups.
--
pktcEnSigNotificationPrefix OBJECT IDENTIFIER
                             ::= { pktcEnSigMib 2 }
pktcEnSigNotification       OBJECT IDENTIFIER
                             ::= { pktcEnSigNotificationPrefix 0 }
pktcEnSigConformance        OBJECT IDENTIFIER
                             ::= { pktcEnSigMib 3 }
pktcEnSigCompliances        OBJECT IDENTIFIER
                             ::= { pktcEnSigConformance 1 }
pktcEnSigGroups             OBJECT IDENTIFIER
                             ::= { pktcEnSigConformance 2 }

pktcEnNcsMinimumDtmfPlayout OBJECT-TYPE
    SYNTAX Unsigned32 (0 | 40..100)
    UNITS "milliseconds"
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
        "This object defines the minimum playout time for
        the DTMF digit when IETF RFC 2833 DTMF Relay is used
        for the egress gateway.
        If the value set via this pktcEnNcsMinimumDtmfPlayout
        object is different from that specified in RFC2833 packet,
        then the MTA must use the maximum of the two values.
        For example:
        If the RFC 2833 packet specifies 23ms and if the object
        pktcEnNcsMinimumDtmfPlayout is set to 40ms then
        the egress gateway must use a value of 40ms.
        Similarly if the RFC 2833 packet specifies
        60 ms and if the object pktcEnNcsMinimumDtmfPlayout
        is set to 40ms then the egress gateway must use a
        value of 60 ms."
    REFERENCE
        "PacketCable(tm) Codec Specification"
    DEFVAL {0}
    ::= { pktcEnSigDevConfigObjects 1 }

--
-- The following table enhances the NCS End Point Config Table
-- (pktcNcsEndPntConfigTable) defined in pktSigMib.
--
pktcEnNcsEndPntConfigTable OBJECT-TYPE
    SYNTAX SEQUENCE OF PkctEnNcsEndPntConfigEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This table augments pktcNcsEndPntConfigTable."
    ::= { pktcEnNcsEndPntConfigObjects 1 }
```



```

pktcEnNcsEndPntConfigEntry  OBJECT-TYPE
    SYNTAX      PktcEnNcsEndPntConfigEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "An enhancement to pktcNcEndPntConfigTable - where each
        entry describes endpoint characteristics."
    AUGMENTS { pktcNcsEndPntConfigEntry }
    ::= { pktcEnNcsEndPntConfigTable 1 }

PktcEnNcsEndPntConfigEntry ::=
    SEQUENCE {
        pktcEnNcsEndPntQuarantineState  INTEGER,
        pktcEnNcsEndPntHookState  INTEGER,
        pktcEnNcsEndPntFaxDetection  TruthValue,
        pktcEnNcsEndPntStatusReportCtrl  INTEGER
    }

pktcEnNcsEndPntQuarantineState  OBJECT-TYPE
    SYNTAX  INTEGER {
        normal          (1),
        notification    (2),
        lockstep        (3),
        extendedlockstep (4)
    }
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the state of the Endpoint.
        When the endpoint is in notification, lockstep or
        'extended lockstep' states, the E-MTA must report the
        values of notification(2), lockstep(3) or extendedlockstep
        (4), respectively. Else, the endpoint must report a value of
        normal(1).
        'Extended Lockstep' is defined as the state when the
        E-MTA is in the lockstep state for longer than 2 minutes.
        For more description about the states refer
        to the PacketCable Network Based Call signaling
        specification."
    REFERENCE
        "PacketCable Network-Based Call Signalling Protocol
        Specification,"
    ::= { pktcEnNcsEndPntConfigEntry 1 }

pktcEnNcsEndPntHookState  OBJECT-TYPE
    SYNTAX  INTEGER {
        onHook          (1),
        onHookPlusNCSActivity (2),
        offHook         (3)
    }
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "This object reflects the 'hook state' and 'NCS Activity'
        of an endpoint.
        'NCS Activity', by definition includes: an active
        timeout signal, active brief signal or existence of
        an NCS connection.
        The onHook(1) state indicates that the endpoint is
        'on hook' and the absence of 'NCS Activity' on that
        endpoint.
        The onHookPlusNCSActivity(2) indicates that the endpoint
        is 'on hook' and the presence of 'NCS Activity' on that
        endpoint.
        The offHook(3) state indicates that the endpoint is
        'off hook'."
    REFERENCE
        "PacketCable Network-Based Call Signalling Protocol Specification"
    ::= { pktcEnNcsEndPntConfigEntry 2 }

```

```

pktcEnNcsEndPntFaxDetection      OBJECT-TYPE
    SYNTAX TruthValue
    MAX-ACCESS read-create
    STATUS      current
    DESCRIPTION
        "This MIB object is used to configure
        the distinctive fax calling tone (CNG) detection feature
        on an MTA endpoint with reference to the analog interface.
        When set to true, the MTA must enable the detection
        of CNG tones on the specific endpoint.
        When set to false, the MTA must disable the detection
        of CNG tones on the specific endpoint.
        If a connection already exists on the endpoint when this
        MIB Object is modified, then the setting needs to take
        effect on the next connection."

    DEFVAL {false}
    ::= { pktcEnNcsEndPntConfigEntry 3}

pktcEnNcsEndPntStatusReportCtrl  OBJECT-TYPE
    SYNTAX INTEGER {
        unsupported          (1),
        reportActualStatus   (2),
        reportEndPointAsActive (3)
    }
    MAX-ACCESS read-create
    STATUS      deprecated
    DESCRIPTION
        "This MIB object is be used to control
        the Endpoint Status Reporting, if the feature is
        supported by the MTA and is configurable.
        The term 'Endpoint Status Reporting' refers to any
        information that the MTA may provide to External
        Systems for use in a particular reporting mechanism
        (Ex: Home Alarm Systems). The definition of the External
        Systems and reporting mechanism are beyond the scope
        of this definition (In the example of Home Alarm Systems,
        this MIB Object will allow Management Stations to
        temporarily disable outage reporting on an EndPoint
        during planned downtime).
        If supported, the MTA must:
        - reflect the actual Endpoint status when the value
          is set to 'reportActualStatus(2)'
        - reflect the EndPoint status as being active when the
          value is set to 'reportEndPointAsActive(3)',
          irrespective of the actual status.
        If unsupported, the MTA must set this value to
        'unsupported(1)' and reject any attempt to set
        this MIB object using SNMP SET to any other value."
    ::= { pktcEnNcsEndPntConfigEntry 4}

pktcEnEndPntInfoTable  OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEnEndPntInfoTableEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "This table includes any additional information
        associated with PacketCable EndPoints.
        The number of entries in this table represents the
        number of available PacketCable EndPoints."
    ::= { pktcEnNcsEndPntConfigObjects 2 }

pktcEnEndPntInfoTableEntry  OBJECT-TYPE
    SYNTAX      PktcEnEndPntInfoTableEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "An entry in this table must be created for each
        PacketCable EndPoint.
        The index needs to be the corresponding index in the ifTable
        for the associated PacketCable EndPoint."
    INDEX { ifIndex }
    ::= { pktcEnEndPntInfoTable 1 }

```

```

PktcEnEndPntInfoTableEntry ::=
    SEQUENCE {
        pktcEnEndPntFgnPotSupport    BITS,
        pktcEnEndPntFgnPotDescr      SnmpAdminString,
        pktcEnEndPntClrFgnPotTsts    BITS,
        pktcEnEndPntRunFgnPotTsts    BITS,
        pktcEnEndPntFgnTestValidity  BITS,
        pktcEnEndPntFgnTestResults   BITS
    }

pktcEnEndPntFgnPotSupport OBJECT-TYPE
    SYNTAX BITS {
        fgnPotDetection (0),
        hazardousFgnPotDetection (1)
    }
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "This MIB object indicates the capabilities of the MTA to
        detect various conditions related to the presence of
        foreign potential on an endpoint.
        The MTA must set a value of '1' for each bit corresponding
        to a supported functionality and a value of '0' for each
        bit corresponding to an unsupported functionality."
    ::= { pktcEnEndPntInfoTableEntry 1 }

pktcEnEndPntFgnPotDescr OBJECT-TYPE
    SYNTAX SnmpAdminString
    MAX-ACCESS read-only
    STATUS current
    DESCRIPTION
        "This MIB object provides information related to the
        various tests for each detection mechanism supported by
        the MTA. While the actual contents are vendor-specific,
        the recommended format is:
        [<Capability>:<Test References>:<Other Info>]...
        Example:
        <fgnPotDetection>:<test XYZ, Reference 'Document'>:<NA>;
        <hazardousFngPotDetection>:<Test ABC, References>:<NA>
        "
    ::= { pktcEnEndPntInfoTableEntry 2 }

pktcEnEndPntClrFgnPotTsts OBJECT-TYPE
    SYNTAX BITS {
        clrFgnPotentialResults (0),
        clrHazardousPotResults (1)
    }
    MAX-ACCESS read-write
    STATUS current
    DESCRIPTION
        "This MIB object is used to clear the current test
        results of supported conditions indicated by
        'pktcEnEndPntFgnPotSupport'.
        Setting a bit to a value of '1' clears the corresponding
        results in the MIB Object 'pktcEnEndPntFgnTestResults' and
        the validity as indicated by the MIB object
        'pktcEnEndPntFgnTestValidity' for the supported
        conditions only (i.e. the MTA must set the corresponding
        bits to a value of '0' in the indicated tables).
        If an SNMP SET attempts to set a bit corresponding to an
        unsupported condition to a value of '1', then the MTA must
        reject the entire SNMP SET and report an 'inconsistent
        value' error.
        For all unsupported scenarios, the corresponding bits must
        be set to a value of '0'.
        Whenever one or more tests are enabled by the MIB Object
        'pktcEnEndPntRunFgnPotTests', the MTA must also reset the
        corresponding bits in this MIB Object to a value of '0'."
    ::= { pktcEnEndPntInfoTableEntry 3}

```

pktcEnEndPntRunFgnPotTsts OBJECT-TYPE

```
SYNTAX BITS {
    runFgnPotentialTsts (0),
    runHazardousPotTsts (1)
}
MAX-ACCESS      read-write
STATUS          current
DESCRIPTION
```

"This MIB object is used to initiate one or more test cases associated with a supported foreign potential detection. Thus, whenever one or more BITS corresponding to supported foreign scenario potential detection mechanisms are set to a value of '1', the MTA must enable those tests.

Once the tests are executed, the MTA must:

- set the corresponding bit to a value of '0'
- update the corresponding BITS in the MIB Objects 'pktcEnEndPntFgnTestValidity' and 'pktcEnEndPntFgnTestResults'.

If an SNMP SET attempts to set a bit corresponding to an unsupported condition to a value of '1', then the MTA must reject the entire SNMP SET and report an 'inconsistent value' error.

Whenever a test is being run on an EndPoint the MTA must set the corresponding 'ifOperStatus' MIB Object to a value of 'testing(3)' for the whole duration of the test. When the test is completed, the MTA must set the ifOperStatus to the value corresponding to the current state of the line.

Note: Whenever multiple tests are run, the ordering of the tests or the results is vendor dependent and need not necessarily follow the ordering of BITS in this MIB Object."

::= { pktcEnEndPntInfoTableEntry 4}

pktcEnEndPntFgnTestValidity OBJECT-TYPE

```
SYNTAX BITS {
    fgnPotTstValidity (0),
    hazardousPotTstValidity (1)
}
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
```

"This MIB object is used to indicate the validity of the corresponding test cases that were initiated using the MIB Object 'pktcEnEndPntRunFgnPotTests'.

An MTA must:

- return a value of '1' if the tests were run successfully and the results are valid.
- return a value of '0' if a particular test was not initiated or if the tests could not be run successfully and hence the results are invalid.

Note: The MTA must set all the BITS to '0' as soon as one or more test cases are initiated."

::= { pktcEnEndPntInfoTableEntry 5}

pktcEnEndPntFgnTestResults OBJECT-TYPE

```
SYNTAX BITS {
    fgnPotentialResults (0),
    hazardousPotResults (1)
}
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
```

"This MIB object is used to indicate the results of the corresponding test cases that were initiated using the MIB Object 'pktcEnEndPntRunFgnPotTests'.

An MTA must:

- set the corresponding bit to a value of '1' if the tests indicated the presence of a foreign potential as per the associated test case.
- set the corresponding bit to a value of '0' if the tests indicated the absence of a foreign potential as per the associated test case.

Note: The MTA must set all the BITS to '0' as soon as one or more test cases are initiated."

```
::= { pktcEnEndPntInfoTableEntry 6 }
```

```
pktcEnNcsEndPntLVMgmtTable    OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEnNcsEndPntLVMgmtTableEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "This MIB table contains the MIB Objects used for
        managing loop voltage on an MTA. An MTA must
        implement the defined MIB Objects and the associated
        functionality."
    ::= { pktcEnNcsEndPntConfigObjects 3 }
```

```
pktcEnNcsEndPntLVMgmtTableEntry OBJECT-TYPE
    SYNTAX      PktcEnNcsEndPntLVMgmtTableEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry in this MIB table consists of the
        loop voltage management policy for the specified
        index. The MTA must use the ifIndex with a value of '1'
        to represent the E-MTA and the remaining indices
        (if used) to represent the endpoints (as specified
        in [1]).

        When the ifIndex is set to a value of '1', it represents
        a policy that must be applied to all the lines on an MTA.

        A MTA must support access to this MIB Object via the
        ifIndex set to a value of '1' (i.e., per-device policy). "
    REFERENCE "PacketCable Device Provisioning specification [1]"
    INDEX { ifIndex }
    ::= { pktcEnNcsEndPntLVMgmtTable 1 }
```

```
PktcEnNcsEndPntLVMgmtTableEntry ::=
    SEQUENCE {
        pktcEnNcsEndPntLVMgmtPolicy      INTEGER,
        pktcEnNcsEndPntLVMgmtResetTimer  Unsigned32,
        pktcEnNcsEndPntLVMgmtMaintTimer  Unsigned32
    }
```

```
pktcEnNcsEndPntLVMgmtPolicy    OBJECT-TYPE
    SYNTAX      INTEGER {
        voltageAtAllTimes(1),
        voltageUnlessRFQAMAbsent(2),
        voltageBasedOnServiceOrTimers(3),
        voltageBasedOnService(4)
    }
    MAX-ACCESS   read-write
    STATUS      current
    DESCRIPTION
```

"This MIB Object allows the Service Provider to choose a suitable policy for Loop Voltage behaviour on MTAs.

Unless overridden by the operator, the MTA must use the default value specified in the definition of this MIB Object.

The MTA must adhere to PacketCable signaling requirements, such as the NCS open loop voltage requirement, irrespective of any chosen policy.

For MTAs that need to remove loop voltage during the MTA initialization phase, in contradiction to a chosen policy, such a loop voltage removal period must NOT exceed 1000ms.

The MTA must retain the value of this MIB Object across hard reboots or soft resets (for a definition of the terms, please refer to [1]).

This MIB object specifies four policies. An informative illustration of the E-MTA behaviour with different policies is presented in Annex A.

Provisioned line is an MTA Endpoint that has been provided with valid per-line configuration data either via the configuration file (during provisioning) or the SNMP management interface.

When the MIB Object is set to a value of 'voltageAtAllTimes', - indicating Policy 1 - the MTA must maintain the loop idle voltage on all lines, irrespective of the line status.

When this MIB Object is set to a value of 'voltageUnlessRFQAMAbsent' - indicating Policy 2 - the MTA must apply loop idle voltage at all times except when it confirms the absence of any RF QAM carrier, following a complete scan of the spectrum (i.e., loop voltage is maintained during the scan). When the MTA detects the presence of any RF QAM carrier, it must apply the loop idle voltage. Additionally, the following conditions apply:

- during a hard reboot, this policy applies at all lines until the MTA is successfully provisioned (i.e., pktcMtaDevProvisioningState has a value other than 'InProgress')
- once the MTA is successfully provisioned (i.e., pktcMtaDevProvisioningState has a value of 'pass(1)', 'passWithWarnings(4)' or 'passWithIncompleteParsing(5)') then the policy applies to all provisioned lines
- upon the onset of a re-initialization due to a soft reset (via SNMP or Rf conditions) the MTA must continue to maintain the existing policy and state on previously provisioned lines, unless overridden by a policy or the provisioning process specifies otherwise

This policy is similar to Policy 1, except for the ability to recognize events like cable cuts (due to malicious activities, or otherwise).

The following requirements apply to policies 3 and 4:

- upon the onset of a re-initialization due to a soft reset the MTA must continue to maintain the existing policy and state on provisioned lines, unless overridden by a policy or the provisioning process specifies otherwise
- once the provisioning process is completed with the value of the MIB Object pktcMtaDevProvisioningState set to a value of 'pass(1)', 'passWithWarnings(4)' or 'passWithIncompleteParsing(5)', the MTA must apply the chosen policy to all the provisioned lines

When this MIB Object is set to a value of 'voltageBasedOnServiceOrTimers' - indicating Policy 3 - the MTA must adhere to the requirements that follow at any given point in time:

- when the timer defined by pktcEnNcsEndPntLVMgmtResetTimer has a non-zero value, the MTA must apply loop idle voltage under all circumstances (similar to policy 1). Refer to the definition of the MIB Object for the persistence and timer requirements.
- when the timer defined by pktcEnNcsEndPntLVMgmtMaintTimer has a non-zero value, the MTA must maintain a line's loop idle voltage state that was in effect prior to the timer being set to a non-zero value. Refer to the definition of the MIB Object defining the timer for the persistence and timer requirements.
- When the timers defined by pktcEnNcsEndPntLVMgmtMaintTimer and pktcEnNcsEndPntLVMgmtResetTimer have expired (both have a value of zero), then:
 - = the MTA must apply loop voltage if the provisioning process is completed with the value of

- pktcMtaDevProvisioningState set to a value of
 than 'pass(1)', 'passWithWarnings(4)' or
 'passWithIncompleteParsing(5)'
 = During a T4 timeout (note: the timers have expired),
 the E-MTA must remove loop idle voltage on all lines
- When both the timers are active (i.e., they both have non-zero values), then the timer defined by the MIB Object pktcEnNcsEndPntLVMgmtMaintTimer takes precedence
 - if none of the above cases apply, the MTA must remove loop idle voltage on all lines

When the MIB Object is set to a value of
 'voltageBasedOnService' - indicating Policy 4 - the
 following conditions apply at any given point in time:

- the MTA must apply loop idle voltage to all the provisioned lines if the value of the MIB Object 'pktcMtaDevProvisioningState' is set to a value of 'pass(1)', 'passWithWarnings(4)' or 'passWithIncompleteParsing(5)'
 - in all other cases, the MTA must remove loop idle voltage on all lines."
- REFERENCE "PacketCable Device Provisioning specification [1]"
 DEFVAL { voltageBasedOnService }
 ::= { pktcEnNcsEndPntLVMgmtTableEntry 1}

pktcEnNcsEndPntLVMgmtResetTimer OBJECT-TYPE
 SYNTAX Unsigned32 (0..1440)
 UNITS "minutes"
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "This MIB Object specifies the time duration allowed for an MTA to successfully provision and is only applicable when the MIB Object pktcEnNcsEndPntLVMgmtPolicy is set to a value of 'voltageBasedOnServiceOrTimers'. In all other cases, the MTA must:
 - return a value of '0' upon any retrieval requests
 - return an error of 'inconsistentValue' upon any modification requests

The value contained by this MIB Object is a countdown timer and the MTA must start counting down the configured value only upon a hard reboot, a soft reset or a T4 timeout. Once this timer has reached a value of zero, the MTA must retain the value (of zero) until successfully configured otherwise. The MTA must use a change in the value of this MIB Object only on the next hard reboot, soft reset or T4 timeout.

The MTA must persist the last configured value (i.e., not the countdown value) of this MIB Object across hard reboots and soft resets.

Refer to the MIB Object pktcEnNcsEndPntLVMgmtPolicy for usage within 'voltageBasedOnServiceOrTimers '."

DEFVAL { 5 }
 ::= { pktcEnNcsEndPntLVMgmtTableEntry 2}

pktcEnNcsEndPntLVMgmtMaintTimer OBJECT-TYPE
 SYNTAX Unsigned32 (0..1440)
 UNITS "minutes"
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "This MIB Object allows the operator to specify the time that loop voltage condition will be maintained, irrespective of the changes to the MTA. It is only applicable when the MIB Object pktcEnNcsEndPntLVMgmtPolicy is set to a value of 'voltageBasedOnServiceOrTimers'. In all other cases, the MTA must:
 - return a value of '0' upon any retrieval requests
 - return an error of 'inconsistentValue' upon any

modification requests

The value contained in this MIB Object is a countdown timer and the MTA must start counting down the value immediately after a successful configuration to a non-zero value. Once this timer has reached a value of zero, the MTA must retain the value (of zero) until successfully configured otherwise.

The MTA must retain the value of this MIB Object (i.e., the countdown value) across soft resets. The MTA must reset the value of this MIB Object (to its default value) during a hard reboot of the MTA.

Refer to the MIB Object pktcEnNcsEndPntLVMgmtPolicy for information about applicability and usage."

```
DEFVAL { 0 }
::= { pktcEnNcsEndPntLVMgmtTableEntry 3 }
```

```
--
```

```
-- Compliance statements
```

```
--
```

```
pktcEnSigBasicCompliance MODULE-COMPLIANCE
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "The compliance statement for devices that implement
        PacketCable defined Signalling on an MTA."
```

```
    MODULE PKTC-EN-SIG-MIB
```

```
--
```

```
-- Mandatory groups
```

```
--
```

```
MANDATORY-GROUPS {
```

```
    pktcEnSigGroup
```

```
}
```

```
GROUP pktcEnNcsGroup
```

```
DESCRIPTION
```

```
    "This group is mandatory for any MTA implementing
    PacketCable signaling."
```

```
GROUP pktcEnNcsLVMgmtGroup
```

```
DESCRIPTION
```

```
    "This group is mandatory for any MTA implementing
    PacketCable signaling."
```

```
::={ pktcEnSigCompliances 1 }
```

```
--
```

```
-- Conformance group for common Signalling.
```

```
--
```

```
pktcEnSigGroup OBJECT-GROUP
```

```
    OBJECTS {
```

```
        pktcEnNcsMinimumDtmfPayout
```

```
    }
```

```
    STATUS current
```

```
    DESCRIPTION
```

```
        "Enhanced group of objects for the common portion of the
        PacketCable Signalling MIB."
```

```
::= { pktcEnSigGroups 1 }
```

```
--
```

```
-- Conformance group for NCS Signalling.
```

```
--
```

```
pktcEnNcsGroup OBJECT-GROUP
```

```
    OBJECTS {
```

```
        pktcEnNcsEndPntQuarantineState,
        pktcEnNcsEndPntHookState,
        pktcEnNcsEndPntFaxDetection,
        pktcEnEndPntFgnPotSupport,
        pktcEnEndPntFgnPotDescr,
        pktcEnEndPntClrFgnPotTsts,
        pktcEnEndPntRunFgnPotTsts,
        pktcEnEndPntFgnTestValidity,
        pktcEnEndPntFgnTestResults
```

```
    }
```



```

STATUS current
DESCRIPTION
    "Enhanced group of objects for the NCS portion of the
    PacketCable Signalling MIB. This is mandatory for
    NCS signaling support."
::= { pktcEnSigGroups 2 }

--
-- Conformance group for Loop Voltage Management
--
pktcEnNcsLVMgmtGroup OBJECT-GROUP
    OBJECTS {
        pktcEnNcsEndPntLVMgmtPolicy,
        pktcEnNcsEndPntLVMgmtResetTimer,
        pktcEnNcsEndPntLVMgmtMaintTimer
    }
    STATUS current
    DESCRIPTION
        "Enhanced group of objects for the loop voltage
        Management of PacketCable MTAs based on Signalling
        and configured policies."
    ::= { pktcEnSigGroups 3 }

pktcEnNcsDeprecatedGroup OBJECT-GROUP
    OBJECTS {
        pktcEnNcsEndPntStatusReportCtrl
    }
    STATUS deprecated
    DESCRIPTION
        "This contains a list of deprecated Extension
        Signalling MIB Objects."
    ::= { pktcEnSigGroups 4 }

END

```

Annex A (informative): Loop Voltage Management Policies

This annex provides an illustration of the loop voltage management policies defined by the MIB Object `pktnEnNcsEndPntLVMgmtPolicy`. Please note that this is an informative illustration and the MIB Object definition is normative under all circumstances.

Stage	Policy 1	Policy 2	Policy 3	Policy 4 (default)
Boot loader initialization following a hard reboot	unspecified	unspecified	unspecified	unspecified
Boot loader initialization following a soft reset	Same status as prior to reset	Same status as prior to reset	Same status as prior to reset	Same status as prior to reset
DOCSIS RF Scan	APPLY voltage on all lines	APPLY for first full pass through spectrum, REMOVE if no QAM lock occurred; REAPPLY if QAM returns	APPLY until Maintenance Timer and Voltage Reset Timeout expire; REMOVE thereafter	REMOVE voltage
eCM Ranging/Registering	APPLY	APPLY	Same status as final state from scanning; REMOVE if timers expire;	REMOVE
eCM provisioning process	APPLY	Same status as final state from scanning	Same status as final state from scanning; REMOVE if timers expire	REMOVE
Loss of Rf signal prior to T4	APPLY	APPLY	APPLY	APPLY
DOCSIS Rf scanning after T4	APPLY	APPLY for first full pass through spectrum, REMOVE if no QAM lock occurred; REAPPLY if QAM returns	APPLY until timers expire, REMOVE thereafter	REMOVE
eMTA provisioning (MTA1 onwards, while <code>pktnMtaDevProvisioningState</code> is set to a value of 'InProgress')	APPLY	Same status as final state from Rf scanning	APPLY until timers expire, REMOVE thereafter	REMOVE
E-MTA is operational and the eMTA MIB Object <code>pktnMtaDevProvisioningState</code> is set to a value of 'pass', 'passWithWarnings' or 'passWithIncompleteParsing'	APPLY	APPLY	APPLY	APPLY
E-MTA is operational, the eMTA provisioning is completed, but the MTA's MIB Object <code>pktnMtaDevProvisioningState</code> is set to a value *other than * 'pass', 'passWithWarnings' or 'passWithIncompleteParsing'	APPLY	APPLY	APPLY until timers expire, REMOVE thereafter	REMOVE

History

Document history		
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