Network-Based Call Signaling (NCS) MIB for PacketCable and IPCablecom Multimedia Terminal Adapters (MTAs)
draft-ietf-ipcdn-pktc-signaling-13

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 provides a common data and format representation for PacketCable and IPCablecom compliant Multimedia Terminal Adapter devices.
1. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIBmodule that is compliant to the SMIV2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

2. Introduction

A multimedia terminal adapter (MTA) is used to deliver broadband Internet, data, and/or voice access jointly with telephony service to a subscriber’s or customer’s premises using a cable network infrastructure. An MTA is normally installed at the customer’s or subscriber’s premises, and it is coupled to a multiple system operator (MSO) using a hybrid fiber coax (HFC) access network.
An MTA is provisioned by the MSO for broadband Internet, data, and/or voice service. For more information on MTA provisioning refer to the PacketCable Provisioning Specification [PKT-SP-PROV] and [RFC4682]. MTA devices include one or more endpoints (e.g., telephone ports) which receive call signaling information to establish ring cadence, and codecs used for providing telephony service. For more information on call signaling refer to the PacketCable Signaling Specification [PKT-SP-MGCP] and [RFC3435]. For more information on codecs refer to the Packetcable Audio/Video Codecs Specification [PKT-SP-CODEC].

Telephone systems are typically very complex and often have a wide distribution. It is therefore important for management systems to support MTAs from multiple vendors at the same time, including those from multiple countries. This MIB module provides objects suitable for managing signaling for MTA devices in the widest possible range of markets.

3. Terminology

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

The terms "MIB module" and "information module" are used interchangeably in this memo. As used here, both terms refer to any of the three types of information modules defined in Section 3 of RFC 2578 [RFC2578].

3.1 MTA

An MTA is a PacketCable or IPCablecom compliant device providing telephony services over a cable or hybrid system used to deliver video signals to a community. It contains an interface to endpoints, a network interface, codecs, and all signaling and encapsulation functions required for Voice over IP transport, call signaling, and Quality of Service signaling. An MTA can be an embedded or a standalone device. An Embedded MTA (E-MTA) is an MTA device containing an embedded Data Over Cable Service Interface Specifications (DOCSIS) Cable Modem. A Standalone MTA (S-MTA) is an MTA device separated from the DOCSIS Cable Modem by non-DOCSIS MAC interface (e.g., Ethernet, USB).

3.2 Endpoint

An endpoint or MTA endpoint is a standard telephony physical port located on the MTA and used for attaching the telephone device to the MTA.
3.3

L Line Package

The L line package refers to the MGCP package for the core signaling functionality as defined by PacketCable and IPCablecom. An MTA provides all L package elements, however the operator determines their application.

3.4

E Line Package

The E line package refers to the MGCP package extensions, over and above the core L package, defined in support of international requirements. E line package elements are optional, vary from country to country, and are set by operator or regulatory requirements.

4.

Overview

This MIB module provides a set of objects required for Multimedia Terminal Adapter (MTA) devices compliant with the PacketCable and IPCablecom signaling specifications published by CableLabs, the European Telecommunications Standards Institute (ETSI), and the International Telecommunication Union Telecommunication Standardization Sector (ITU-T) IPCablecom compliant Multimedia Terminal Adapter (MTA) devices. The IETF NCS MIB module (PKTC-IETF-SIG-MIB) is intended to supersede various Signaling MIB modules from which it is partly derived:

- the PacketCable 1.0 Signaling MIB Specification [PKT-SP-MIB-SIG-1.0],
- the PacketCable 1.5 Signaling MIB Specification [PKT-SP-MIB-SIG-1.5],
- the ITU-T IPCablecom Signaling MIB requirements [ITU-T-J169],
- the ETSI Signaling MIB [ETSI-TS-101-909-9]. The ETSI Signaling MIB requirements also refer to various signal characteristics defined in [ETSI-TS-101-909-4], [ETSI-EN-300-001], [ETSI-EN-300-659-1], [ETSI-EN-300-324-1] and [ETSI-TR-101-183].

Several normative and informative references are used to help define NCS MIB objects. As a convention, wherever PacketCable and IPCablecom requirements are equivalent, the PacketCable reference is used in the object REFERENCE clause. IPCablecom compliant MTA devices MUST use the equivalent IPCablecom references.

This MIB module describes the various Signaling MIB objects that are directly related to the PacketCable MTA and the endpoints supported on the MTA, each of which provides services independently. The recognition and distinction of the endpoints is made by utilizing the ifTable (IF-MIB [RFC2863]), where each index (ifIndex) refers to a unique endpoint. This MIB module also utilizes the syntax definition of the Differentiated Services Code Point (DSCP) from DIFFSERV-DSCP-TC [RFC3289] for defining MIB objects that allow for
differentiation between various types of traffic in the service provider network.

4.1 Structure of the MIB

This MIB is structured in three groups:

- Signaling information that control device and endpoint configuration objects (pktcSigMibObjects)
- Signaling Notification object, that notifies the status (pktcSigNotification)
- Signaling Conformance has mandatory signaling objects (pktcSigConformance)

Each group of objects is explained in detail.

4.2 pktcSigDevObjects

pktcSigDevCodecTable - this object identifies the codec types available on the device.

pktcSigDevEchoCancellation - This object identifies the capability of echo cancellation on the device.

pktcSigDevSilenceSuppression - This object specifies if the device is capable of silence suppression (Voice Activity Detection).

pktcSigDevCidSigProtocol - this international object specifies if the Caller ID protocol uses Frequency Shift Keying (FSK) or Dual tone multi-frequency (DTMF) signaling.

pktcSigDevR0Cadence - this object specifies ring cadence 0.

pktcSigDevR1Cadence - this object specifies ring cadence 1.

pktcSigDevR2Cadence - this object specifies ring cadence 2.

pktcSigDevR3Cadence - this object specifies ring cadence 3.

pktcSigDevR4Cadence - this object specifies ring cadence 4.

pktcSigDevR5Cadence - this object specifies ring cadence 5.

pktcSigDevR6Cadence - this object specifies ring cadence 6.
pktcSigDevR7Cadence - this object specifies ring cadence 7.

pktcSigDevRgCadence - this object specifies ring cadence for ringing (rg).

pktcSigDevRsCadence - this object specifies ring cadence for ring splash (rs).

pktcSigDefCallSigDscp - this object specifies the default value used in the IP header for setting the Differentiated Services Code Point (DSCP) value for call signaling.

pktcSigDefMediaStreamDscp - this object specifies the default value used in the IP header for setting the Differentiated Services Code Point (DSCP) value for media stream packets.

pktcSigCapabilityTable - this table specifies list of supported signaling types, versions and vendor extensions for MTA.

pktcSigDefNcsReceiveUdpPort - this object contains the MTA User Datagram Protocol (UDP) receive port that is being used for NCS call signaling.

pktcSigPowerRingFrequency - this International object selects the various power ring frequencies that may be applied to the twisted pair line.

pktcSigPulseSignalTable - this international object selects the various signals used in the application of the metering pulse signal to the twisted pair line.

pktcSigDevCidMode - this international object selects various modes of caller id in common use.

pktcSigDevCidAfterRing - this international object sets the delay between the end of first ringing and the transmission of caller id information.

pktcSigDevCidAfterDTAS - this international object sets the delay between the dual-tone alert signal and the transmission of caller id information.

pktcSigDevCidAfterRPAS - this international object sets the delay between the ring pulse alert signal and the transmission of caller id information.

pktcSigDevRingAfterCID - this international object sets the delay between the transmission of caller id information and the first ringing pattern.
pktcSigDevCidDTASAfterLR - this international object sets the delay between the end of a line reversal and the dual-tone alert signal.

pktcSigDevVmwiMode - this object selects various modes of visual message waiting indicator service in common use.

pktcSigDevVmwiAfterDTAS - this international object sets the delay between the dual-tone alert signal and the transmission of visual message waiting information.

pktcSigDevVmwiAfterRPAS - this international object sets the delay between the ring pulse alert signal and the transmission of visual message waiting information.

pktcSigDevVmwiDTASAfterLR - this international object sets the delay between the end of a line reversal and the dual-tone alert signal for visual message waiting information.

pktcSigDevRingCadenceTable - this international object provides a flexible structure within which to specify a variety of ring cadences.

pktcSigDevToneTable - this international table specifies a flexible structure within which to specify all of the tones used in the MTA.

pktcSigDevMultiFreqToneTable - this table defines the characteristics of tones with multiple frequencies. Each entry in this table represents the frequency reference of a multi-frequency tone.

pktcSigDevCidDelayAfterLR - this international object sets the delay between the end of a line reversal and the transmission of caller id information.

pktcSigDevCidDtmfStartCode - this international object selects DTMF Start Code Digits for caller id in common use.

pktcSigDevCidDtmfEndCode - this international object selects DTMF End Code Digits for caller id in common use.

pktcSigDevVmwiSigProtocol - This international object specifies if the Visual Message Waiting Indicator (VMWI) protocol uses FSK or DTMF signaling.

pktcSigDevVmwiDelayAfterLR - this international object sets the delay between the end of a line reversal and the transmission of visual message waiting information.
pktcSigDevVmwiDtmfStartCode - this international object selects DTMF Start Code Digits for VMWI in common use.

pktcSigDevVmwiDtmfEndCode - this international object selects DTMF End Code Digits for VMWI in common use.

pktcSigDevrpAsDtsDuration - this international object sets the duration of the ring pulse alerting signal prior to Caller Identification (CID) signaling. Variations in national standards cause CID failure if Ring Pulse Alert Signal (RP-AS) is not defined by local requirements.

pktcNcsEndPntConfigTable - this table describes the PacketCable NCS endPoint configuration. The number of entries in this table represents the number of provisioned endpoints.

pktcSigEndPntConfigTable - this table describes the PacketCable endPoint selected signaling type. The number of entries in this table represents the number of provisioned endpoints.

4.3 pktcSigConformance

pktcSigCompliances - this table has one object that has compliance statements for devices that implement Signaling on the MTA.

pktcSigGroups - this table contains group of objects for the common portion of the PacketCable NCS and Signaling MIB.

pktcInternationalGroup - this table extends this MIB Module by establishing a set of objects designed to support operations over the widest possible range of markets.
5. Definitions

PKTC-IETF-SIG-MIB DEFINITIONS ::= BEGIN

IMPORTS
MODULE-IDENTITY,
OBJECT-TYPE,
Integer32,
Unsigned32,
mib-2
   FROM SNMPv2-SMI -- [RFC2578]
InetAddressType,
InetAddress,
InetPortNumber
   FROM INET-ADDRESS-MIB -- [RFC4001]
TEXTUAL-CONVENTION,
RowStatus,
TruthValue
   FROM SNMPv2-TC -- [RFC2579]
OBJECT-GROUP,
MODULE-COMPLIANCE
   FROM SNMPv2-CONF -- [RFC2580]
SnmpAdminString
   FROM SNMP-FRAMEWORK-MIB -- [RFC3411]
ifIndex
   FROM IF-MIB -- [RFC2863]
Dscp
   FROM DIFFSERV-DSCP-TC; -- [RFC3289]

pktcIetfSigMib MODULE-IDENTITY
LAST-UPDATED "200703030000Z" -- March 03, 2007
ORGANIZATION "IETF IPCDN Working Group"
CONTACT-INFO
"Sumanth Channabasappa
Cable Television Laboratories, Inc.
858 Coal Creek Circle,
Louisville, CO 80027, USA
Phone: +1 303-661-3307
Email: Sumanth@cablelabs.com"
DESCRIPTION

"This MIB module supplies the basic management object for the PacketCable and IPCablecom Signaling protocols. This version of the MIB includes common signaling and Network Call Signaling (NCS) related signaling objects.

Copyright (C) The Internet Society (2007). This version of this MIB module is part of RFC yyyy; see the RFC itself for full legal notices."

-- RFC Ed: replace yyyy with actual RFC number and remove this note

REVISION

"200703030000Z"

DESCRIPTION

"Initial version, published as RFC yyyy."

-- RFC Ed: replace yyyy with actual RFC number and remove this note

::=  { mib-2 XXX }

-- RFC Ed: replace XXX with IANA-assigned number and remove this note

-- note

-- Textual Conventions

TenthdBm ::= TEXTUAL-CONVENTION

DISPLAY-HINT "d-1"
PacketCable/IPCablecom NCS Signaling MIB

STATUS       current
DESCRIPTION
"This textual convention represents power levels that are normally expressed in dBm. Units are in tenths of a dBm; for example, -13.5 dBm will be represented as -135."

SYNTAX       Integer32

PktcCodecType ::= TEXTUAL-CONVENION
STATUS       current
DESCRIPTION
"This textual convention defines various types of codecs that MAY be supported. The description for each enumeration is listed below:

<table>
<thead>
<tr>
<th>Enumeration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>other</td>
<td>a defined codec not in the enumeration</td>
</tr>
<tr>
<td>unknown</td>
<td>a codec not defined by the PacketCable Codec Specification</td>
</tr>
<tr>
<td>g729</td>
<td>ITU-T Recommendation G.729</td>
</tr>
<tr>
<td>reserved</td>
<td>for future use</td>
</tr>
<tr>
<td>g729E</td>
<td>ITU-T Recommendation G.729E</td>
</tr>
<tr>
<td>pcmu</td>
<td>Pulse Code Modulation u-law (PCMU)</td>
</tr>
<tr>
<td>g726at32</td>
<td>ITU-T Recommendation G.726-32 (32 kbit/s)</td>
</tr>
<tr>
<td>g728</td>
<td>ITU-T Recommendation G.728</td>
</tr>
<tr>
<td>pcma</td>
<td>Pulse Code Modulation a-law (PCMA)</td>
</tr>
<tr>
<td>g726at16</td>
<td>ITU-T Recommendation G.726-16 (16 kbit/s)</td>
</tr>
<tr>
<td>g726at24</td>
<td>ITU-T Recommendation G.726-24 (24 kbit/s)</td>
</tr>
<tr>
<td>g726at40</td>
<td>ITU-T Recommendation G.726-40 (40 kbit/s)</td>
</tr>
<tr>
<td>ilbc</td>
<td>IETF internet low bit rate codec</td>
</tr>
<tr>
<td>bv16</td>
<td>Broadcom BroadVoice16</td>
</tr>
</tbody>
</table>

The list of codecs is consistent with the IETF Real Time Transport Protocol (RTP) Profile registry and the RTP Map Parameters Table in Packetcable Audio/Video Codecs Specification [PKT-SP-CODEC]. The literal codec name for each codec is listed below:

<table>
<thead>
<tr>
<th>Codec</th>
<th>Literal Codec Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>g729</td>
<td>G729</td>
</tr>
<tr>
<td>g729E</td>
<td>G729E</td>
</tr>
<tr>
<td>pcmu</td>
<td>PCMU</td>
</tr>
<tr>
<td>g726at32</td>
<td>G726-32</td>
</tr>
<tr>
<td>g728</td>
<td>G728</td>
</tr>
<tr>
<td>pcma</td>
<td>PCMA</td>
</tr>
<tr>
<td>g726at16</td>
<td>G726-16</td>
</tr>
<tr>
<td>g726at24</td>
<td>G726-24</td>
</tr>
<tr>
<td>g726at40</td>
<td>G726-40</td>
</tr>
<tr>
<td>ilbc</td>
<td>iLBC</td>
</tr>
<tr>
<td>bv16</td>
<td>BV16</td>
</tr>
</tbody>
</table>

The literal codec name is the second column of the table.
with codec RTP Map Parameters. Literal Codec Name Column contains the codec name used in the local connection options (LCO) of the NCS messages create connection (CRCX)/modify connection (MDCX) and is also used to identify the codec in the Call Management System (CMS) Provisioning Specification. RTP Map Parameter Column of the Table contains the string used in the media attribute line (a=) of the session description protocol (SDP) parameters in NCS messages.

**SYNTAX**

```plaintext
SYNTAX INTEGER {
  other      (1),
  unknown    (2),
  g729       (3),
  reserved   (4),
  g729E      (5),
  pcmu       (6),
  g726at32   (7),
  g728       (8),
  pcma       (9),
  g726at16   (10),
  g726at24   (11),
  g726at40   (12),
  ilbc       (13),
  bv16       (14)
}
```

**PktcRingCadence** ::= TEXTUAL-CONVENTION

**STATUS** current

**DESCRIPTION**

"This object provides an encoding scheme for ring cadences, including repeatability characteristics. All fields in this object MUST be encoded in network-byte order.

The first three higher order octets are reserved. The octets that follow are used to encode a ‘bit-string’, with each bit corresponding to 50 milliseconds. A bit value of ‘1’ indicates the presence of a ring-tone and a bit value of ‘0’ indicates the absence of a ring-tone, for that duration (50 ms) (Note: A minimum number of octets required to encode the bit-string MUST be used).

The first two of the reserved octets MUST indicate the length of the encoded cadence (in bits) and MUST range between 1 and 264. (Note: The length in bits MUST also be consistent with the number of octets that encode the cadence). The MTA MUST ignore any unused bits in the last octet, but MUST reflect the value as provided on subsequent SNMP GETs."
The third of the reserved octets indicates 'repeatability' and MUST be either 0x80 or 0x00 - the former value indicating 'non-repeatability' and the latter indicating 'repeatability'.

The MTA MUST reject attempts to set a value that violates any of the above requirements.

SYNTAX OCTET STRING (SIZE(4..36))

PktcSigType ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
"This object lists the various types of signaling that may be supported:
   other(1) - set when signaling other than NCS is used
   ncs(2)   - Network call signaling is a derivation of MGCP (Media Gateway Control Protocol) defined for IPCablecom/PacketCable MTAs."
SYNTAX INTEGER {
   other(1),
   ncs(2)
}

DtmfCode ::= TEXTUAL-CONVENTION
STATUS current
DESCRIPTION
"This textual convention represents the DTMF Character used to indicate the start or end of the digit transition sequence used for Caller ID or VMWI.
Note: The DTMF code ‘*’ is indicated using ‘dtmfcodeStar’ and the DTMF code ‘#’ is indicated using ‘dtmfcodeHash’."
SYNTAX INTEGER {
   dtmfcode0(0),
   dtmfcode1(1),
   dtmfcode2(2),
   dtmfcode3(3),
   dtmfcode4(4),
   dtmfcode5(5),
   dtmfcode6(6),
   dtmfcode7(7),
   dtmfcode8(8),
   dtmfcode9(9),
   dtmfcodeStar(10),
   dtmfcodeHash(11),
packetSigMibObjects OBJECT IDENTIFIER ::= { pktcIetfSigMib 1 }
pktcSigDevObjects OBJECT IDENTIFIER ::= { pktcSigMibObjects 1 }
pktcNcsEndPntConfigObjects OBJECT IDENTIFIER ::= { pktcSigMibObjects 2 }

-- The codec table (pktcSigDevCodecTable) defines all combinations of codecs supported by the Multimedia Terminal Adapter (MTA).

--
pktcSigDevCodecTable OBJECT-TYPE
SYNTAX SEQUENCE OF PktcSigDevCodecEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION " This table describes the MTA supported codec types. An MTA MUST populate this table with all possible combinations of codecs it supports for simultaneous operation. For example, an MTA with two endpoints may be designed with a particular DSP and memory architecture that allows it to support the following fixed combinations of codecs for simultaneous operation:

<table>
<thead>
<tr>
<th>Codec Type</th>
<th>Maximum Number of Simultaneous Codecs</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCMA</td>
<td>3</td>
</tr>
<tr>
<td>PCMA</td>
<td>2</td>
</tr>
<tr>
<td>PCMU</td>
<td>1</td>
</tr>
<tr>
<td>PCMA</td>
<td>1</td>
</tr>
<tr>
<td>PCMU</td>
<td>2</td>
</tr>
<tr>
<td>PCMU</td>
<td>3</td>
</tr>
<tr>
<td>PCMA</td>
<td>1</td>
</tr>
<tr>
<td>G729</td>
<td>1</td>
</tr>
<tr>
<td>G729</td>
<td>2</td>
</tr>
<tr>
<td>PCMU</td>
<td>1</td>
</tr>
<tr>
<td>G729</td>
<td>1</td>
</tr>
</tbody>
</table>

Based on this example, the entries in the codec table
would be:

<table>
<thead>
<tr>
<th>CodecComboIndex</th>
<th>CodecType</th>
<th>CodecMax</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pcma</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>pcmu</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>pcma</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>pcmu</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>pcma</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>pcmu</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>pcmu</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>pcma</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>g729</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>g729</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>pcmu</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>g729</td>
<td>1</td>
</tr>
</tbody>
</table>

An operator querying this table is able to determine all possible codec combinations the MTA is capable of simultaneously supporting. This table MUST NOT include non-voice codecs."

 ::= { pktcSigDevObjects 1 }

pktcSigDevCodecEntry OBJECT-TYPE
SYNTAX       PktcSigDevCodecEntry
MAX-ACCESS   not-accessible
STATUS       current
DESCRIPTION
"Each entry represents the maximum number of active connections with a particular codec the MTA is capable of supporting. Each row is indexed by a composite key consisting of a number enumerating the particular codec combination and the codec type."
INDEX { pktcSigDevCodecComboIndex, pktcSigDevCodecType }
 ::= { pktcSigDevCodecTable 1 }

PktcSigDevCodecEntry ::= SEQUENCE {
    pktcSigDevCodecComboIndex       Unsigned32,
    pktcSigDevCodecType             PktcCodecType,
    pktcSigDevCodecMax              Unsigned32
}

pktcSigDevCodecComboIndex OBJECT-TYPE
SYNTAX       Unsigned32 (1..255)
MAX-ACCESS   not-accessible
STATUS       current
DESCRIPTION
"The index value which enumerates a particular codec combination in the pktcSigDevCodecTable."
 ::= { pktcSigDevCodecEntry 1 }
pktcSigDevCodecType  OBJECT-TYPE
SYNTAX       PktcCodecType
MAX-ACCESS   not-accessible
STATUS       current
DESCRIPTION
   " A codec type supported by this MTA."
 ::= { pktcSigDevCodecEntry 2 }

pktcSigDevCodecMax  OBJECT-TYPE
SYNTAX      Unsigned32(1..255)
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
   " The maximum number of simultaneous sessions of a particular codec that the MTA can support."
 ::= { pktcSigDevCodecEntry 3 }

--
-- These are the common signaling related definitions that affect the entire MTA device.
--

pktcSigDevEchoCancellation  OBJECT-TYPE
SYNTAX       TruthValue
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
   " This object specifies if the device is capable of echo cancellation."
 ::= { pktcSigDevObjects 2 }

pktcSigDevSilenceSuppression  OBJECT-TYPE
SYNTAX       TruthValue
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
   " This object specifies if the device is capable of silence suppression (as a result of Voice Activity Detection)."
 ::= { pktcSigDevObjects 3 }

pktcSigDevCidSigProtocol  OBJECT-TYPE
SYNTAX       INTEGER {
         fsk   (1),
         dtmf  (2)
    }
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION

This object is used to configure the subscriber line protocol used for signaling on-hook caller id information. Different countries define different caller id signaling protocols to support caller identification.

Setting this object at a value fsk(1) sets the subscriber line protocol to be Frequency Shift Keying (FSK).

Setting this object at a value dtmf(2) sets the subscriber line protocol to be Dual tone multi-frequency (DTMF).

REFERENCE

"ETSI-EN-300-659-1 Specification"

DEFVAL { fsk }

::= { pktcSigDevObjects 4 }

pktcSigDevR0Cadence  OBJECT-TYPE
SYNTAX       PktcRingCadence
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
  " This object specifies ring cadence 0 (a user defined field). This object is required for the L line package."
 ::= { pktcSigDevObjects 5 }

pktcSigDevR1Cadence  OBJECT-TYPE
SYNTAX       PktcRingCadence
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
  " This object specifies ring cadence 1 (a user defined field). This object is required for the L line package."
 ::= { pktcSigDevObjects 6 }

pktcSigDevR2Cadence  OBJECT-TYPE
SYNTAX       PktcRingCadence
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
  " This object specifies ring cadence 2 (a user defined field). This object is required for the L line package."
 ::= { pktcSigDevObjects 7 }

pktcSigDevR3Cadence  OBJECT-TYPE
SYNTAX       PktcRingCadence
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION
  " This object specifies ring cadence 3 (a user defined
field). This object is required for the L line package.

::= { pktcSigDevObjects 8 }

pktcSigDevR4Cadence OBJECT-TYPE
SYNTAX PktcRingCadence
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This object specifies ring cadence 4 (a user defined field). This object is required for the L line package."
::= { pktcSigDevObjects 9 }

pktcSigDevR5Cadence OBJECT-TYPE
SYNTAX PktcRingCadence
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This object specifies ring cadence 5 (a user defined field). This object is required for the L line package."
::= { pktcSigDevObjects 10 }

pktcSigDevR6Cadence OBJECT-TYPE
SYNTAX PktcRingCadence
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This object specifies ring cadence 6 (a user defined field). This object is required for the L line package."
::= { pktcSigDevObjects 11 }

pktcSigDevR7Cadence OBJECT-TYPE
SYNTAX PktcRingCadence
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This object specifies ring cadence 7 (a user defined field). This object is required for the L line package."
::= { pktcSigDevObjects 12 }

pktcSigDevRgCadence OBJECT-TYPE
SYNTAX PktcRingCadence
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This object specifies ring cadence rg (a user defined field). This object is required for the L line package."
::= { pktcSigDevObjects 13 }

pktcSigDevRsCadence OBJECT-TYPE
SYNTAX       PktcRingCadence
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION  "This object specifies ring cadence rs (a user defined field) The MTA MUST reject any attempt to make this object repeatable. This object is required for the L line package."
::= { pktcSigDevObjects 14 }

pktcSigDefCallSigDscp  OBJECT-TYPE
SYNTAX      Dscp  --  RFC 3289: DIFFSERV-DSCP-TC
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION  "The default value used in the IP header for setting the Differentiated Services Code Point (DSCP) value for call signaling."
DEFVAL { 0 }
::= { pktcSigDevObjects 15 }

pktcSigDefMediaStreamDscp  OBJECT-TYPE
SYNTAX      Dscp  --  RFC 3289: DIFFSERV-DSCP-TC
MAX-ACCESS  read-write
STATUS      current
DESCRIPTION  "This object contains the default value used in the IP header for setting the Differentiated Services Code Point (DSCP) value for media stream packets. The MTA MUST NOT update this object with the value supplied by the CMS in the NCS messages (if present). Any currently active connections are not affected by updates to this object. When the value of this object is updated by SNMP, the MTA MUST use the new value as a default starting only from new connections."
DEFVAL { 0 }
::= { pktcSigDevObjects 16 }

--
-- pktcSigCapabilityTable - This table defines the valid signaling types supported by this MTA.
--

pktcSigCapabilityTable  OBJECT-TYPE
SYNTAX      SEQUENCE OF PktcSigCapabilityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION  "This table describes the signaling types supported by this
::= { pktcSigDevObjects 17 }

pktcSigCapabilityEntry OBJECT-TYPE
SYNTAX      PktcSigCapabilityEntry
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
" Entries in pktcMtaDevSigCapabilityTable - List of supported signaling types, versions and vendor extensions for this MTA. Each entry in the list provides for one signaling type and version combination. If the device supports multiple versions of the same signaling type it will require multiple entries."
INDEX { pktcSigCapabilityIndex }
::= { pktcSigCapabilityTable 1 }

PktcSigCapabilityEntry ::= SEQUENCE {
pktcSigCapabilityIndex             Unsigned32,
pktcSigCapabilityType              PktcSigType,
pktcSigCapabilityVersion           SnmpAdminString,
pktcSigCapabilityVendorExt         SnmpAdminString
}

pktcSigCapabilityIndex OBJECT-TYPE
SYNTAX      Unsigned32 (1..255)
MAX-ACCESS  not-accessible
STATUS      current
DESCRIPTION
" The index value which uniquely identifies an entry in the pktcSigCapabilityTable."
::= { pktcSigCapabilityEntry 1 }

pktcSigCapabilityType OBJECT-TYPE
SYNTAX      PktcSigType
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
" This object identifies the type of signaling used. This value has to be associated with a single signaling version."
::= { pktcSigCapabilityEntry 2 }

pktcSigCapabilityVersion OBJECT-TYPE
SYNTAX      SnmpAdminString
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
" Provides the version of the signaling type - reference
pktcSigCapabilityType. Examples would be 1.0 or 2.33 etc."
 ::= { pktcSigCapabilityEntry 3 }

pktcSigCapabilityVendorExt OBJECT-TYPE
SYNTAX SnmpAdminString
MAX-ACCESS read-only
STATUS current
DESCRIPTION
" The vendor extension allows vendors to provide a list of
additional capabilities.

The syntax for this MIB Object in ABNF ([RFC4234]) is
specified to be zero or more occurrences of vendor
extensions, as follows:

pktcSigCapabilityVendorExt =
    *[X ('-'/'+') 1*6(ALPHA / DIGIT ) '];']

 ::= { pktcSigCapabilityEntry 4 }

pktcSigDefNcsReceiveUdpPort OBJECT-TYPE
SYNTAX InetPortNumber (1025..65535)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
" This object contains the MTA User Datagram Protocol (UDP)
receive port that is being used for NCS call signaling.
This object should only be changed by the configuration
file.
Unless changed via configuration this MIB Object MUST
reflect a value of '2427'.

REFERENCE
"PacketCable NCS Specification"
 ::= { pktcSigDevObjects 18 }

pktcSigPowerRingFrequency OBJECT-TYPE
SYNTAX INTEGER {
    f20Hz(1),
    f25Hz(2),
    f33Point33Hz(3),
    f50Hz(4),
    f15Hz(5),
    f16Hz(6),
    f22Hz(7),
    f23Hz(8),
    f45Hz(9)
}
UNITS "Hertz"
MAX-ACCESS read-only
This object must only be provided via the configuration file during the provisioning process. The power ring frequency is the frequency at which the sinusoidal voltage must travel down the twisted pair to make terminal equipment ring. Different countries define different electrical characteristics to make terminal equipment ring.

The f20Hz setting corresponds to a power ring frequency of 20 Hertz. The f25Hz setting corresponds to a power ring frequency of 25 Hertz. The f33Point33Hz setting corresponds to a power ring frequency of 33.33 Hertz. The f50Hz setting corresponds to a power ring frequency of 50 Hertz. The f15Hz setting corresponds to a power ring frequency of 15 Hertz. The f16Hz setting corresponds to a power ring frequency of 16 Hertz. The f22Hz setting corresponds to a power ring frequency of 22 Hertz. The f23Hz setting corresponds to a power ring frequency of 23 Hertz. The f45Hz setting corresponds to a power ring frequency of 45 Hertz.

ETSİ-EN-300-001 contains a list of frequency ranges that are defined for each country.

Reference:

ETSİ-EN-300-001

p stkC i gSignal Table OBJECT-TYPE
SYNTAX SEQUENCE OF PktcSigPulseSignalEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The Pulse signal table defines the pulse signal operation. There are nine types of international pulse signals, with each signal having a set of provisionable parameters. The values of the MIB objects in this table take effect only if these parameters are not defined via signaling, in which case the latter determines the values of the parameters. This object is required for the E line package. Signals defined in this table are triggered using the E line package. Objects in this table do not persist across MTA reboots."

REFERENCE

ETSİ-1S1-101-909-4 Specification

p stkC i gSignal Entry OBJECT-TYPE
SYNTAX PktcSigPulseSignalEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION

"This object defines the set of parameters associated with each particular value of pktcSigPulseSignalType. Each entry in the pktcSigPulseSignalTable is indexed by the pktcSigPulseSignalType object."

INDEX { pktcSigPulseSignalType }
::= { pktcSigPulseSignalTable 1 }

PktcSigPulseSignalEntry ::= SEQUENCE {
    pktcSigPulseSignalType              INTEGER,
    pktcSigPulseSignalFrequency         INTEGER,
    pktcSigPulseSignalDbLevel           TenthdBm,
    pktcSigPulseSignalDuration          Unsigned32,
    pktcSigPulseSignalPulseInterval     Unsigned32,
    pktcSigPulseSignalRepeatCount       Unsigned32
}

pktcSigPulseSignalType    OBJECT-TYPE
SYNTAX       INTEGER

{ initialRing(1),
  pulseLoopClose(2),
  pulseLoopOpen(3),
  enableMeterPulse(4),
  meterPulseBurst(5),
  pulseNoBattery(6),
  pulseNormalPolarity(7),
  pulseReducedBattery(8),
  pulseReversePolarity(9)
}

MAX-ACCESS   not-accessible
STATUS       current
DESCRIPTION

"There are nine types of international pulse signals. These signals are defined as follows:
initial ring
pulse loop close
pulse loop open
enable meter pulse
meter pulse burst
pulse no battery
pulse normal polarity
pulse reduced battery
pulse reverse polarity"

REFERENCE

"ETSI-EN-300-324-1 Specification"

::= { pktcSigPulseSignalEntry 1 }
pktcSigPulseSignalFrequency OBJECT-TYPE
SYNTAX INTEGER {
twentyfive (1),
twelvethousand (2),
sixteenthousand (3)
}
UNITS "Hertz"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object is only applicable to the initialRing, enableMeterPulse, and meterPulseBurst signal type. This object identifies the frequency of the generated signal. The following table defines the default values for this object depending on signal type:
pktcSigPulseSignalType Default
initialRing 25
enableMeterPulse 16000
meterPulseBurst 16000
The value of twentyfive MUST only be used for the initialRing signal type. The values of twelvethousand and sixteenthousand MUST only be used for enableMeterPulse and meterPulseBurst signal types. An attempt to set this object while the value of pktcSigPulseSignalType is not initialRing, enableMeterPulse, or meterPulseBurst will result in an 'inconsistentValue' error."
REFERENCE
"ETSI-EN-300-001 Specification"
::= { pktcSigPulseSignalEntry 2 }

pktcSigPulseSignalDbLevel OBJECT-TYPE
SYNTAX TenhdBm (-350..0)
UNITS "dBm"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object is only applicable to the enableMeterPulse and meterPulseBurst signal types. This is the decibel level for each frequency at which tones could be generated at the a and b terminals (TE connection point). An attempt to set this object while the value of pktcSigPulseSignalType is not enableMeterPulse, or meterPulseBurst will result in an 'inconsistentValue' error."
REFERENCE
"ETSI-EN-300-001 Specification"
DEFVAL {-135 }
::= { pktcSigPulseSignalEntry 3 }

pktcSigPulseSignalDuration OBJECT-TYPE
SYNTAX     Unsigned32 (0..5000)
UNITS     "Milliseconds"
MAX-ACCESS read-write
STATUS     current
DESCRIPTION  "This object specifies the pulse duration for each
signal type. In addition, the MTA must accept the values
in the incremental steps specific for each signal type.
The following table defines the default values and the
incremental steps for this object depending on the signal
type.
pktcSigPulseSignaltype  Default (ms)   Increment (ms)
initialRing                 200             50
pulseLoopClose              200             10
pulseLoopOpen               200             10
enableMeterPulse            150             10
meterPulseBurst             150             10
pulseNoBattery              200             10
pulseNormalPolarity         200             10
pulseReducedBattery         200             10
pulseReversePolarity        200             10
An attempt to set this object to a value that does not
fall on one of the increment boundaries, or on the wrong
increment boundary for the specific signal type will
result in an 'inconsistentValue' error."
REFERENCE
"ETSI-EN-300-324-1 Specification"
::= {pktcSigPulseSignalEntry 4 }

pktcSigPulseSignalPulseInterval  OBJECT-TYPE
SYNTAX     Unsigned32 (0..5000)
UNITS     "Milliseconds"
MAX-ACCESS read-write
STATUS     current
DESCRIPTION  "This object specifies the repeat interval, or the period
for each signal type. In addition, the MTA must accept
the values in the incremental steps specific for each
signal type. The following table defines the default
values and the incremental steps for this object depending
on the signal type.
pktcSigPulseSignaltype  Default (ms)   Increment (ms)
initialRing                 200             50
pulseLoopClose              1000             10
pulseLoopOpen               1000             10
enableMeterPulse            1000             10
meterPulseBurst             1000             10
pulseNoBattery              1000             10
pulseNormalPolarity         1000             10
pulseReducedBattery         1000             10
pulseReversePolarity        1000             10
pulseReducedBattery 1000 10
pulseReversePolarity 1000 10

An attempt to set this object to a value that does not fall on one of the increment boundaries, or on the wrong increment boundary for the specific signal type will result in an 'inconsistentValue' error.

REFERENCE
"ETSI-EN-300-324-1 Specification"
::= { pktcSigPulseSignalEntry 5}

pktcSigPulseSignalRepeatCount OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object specifies how many times to repeat a pulse. This object is not used by the enableMeterPulse signal type and as such must have a value of zero. The following table defines the default values and the valid ranges for this object depending on the signal type.

<table>
<thead>
<tr>
<th>Signal Type</th>
<th>Default</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>initialRing</td>
<td>1</td>
<td>1-5</td>
</tr>
<tr>
<td>pulseLoopClose</td>
<td>1</td>
<td>1-50</td>
</tr>
<tr>
<td>pulseLoopOpen</td>
<td>1</td>
<td>1-50</td>
</tr>
<tr>
<td>enableMeterPulse</td>
<td>(any value)</td>
<td>(not used)</td>
</tr>
<tr>
<td>meterPulseBurst</td>
<td>1</td>
<td>1-50</td>
</tr>
<tr>
<td>pulseNoBattery</td>
<td>1</td>
<td>1-50</td>
</tr>
<tr>
<td>pulseNormalPolarity</td>
<td>1</td>
<td>1-50</td>
</tr>
<tr>
<td>pulseReducedBattery</td>
<td>1</td>
<td>1-50</td>
</tr>
<tr>
<td>pulseReversePolarity</td>
<td>1</td>
<td>1-50</td>
</tr>
</tbody>
</table>

An attempt to set this object to a value that does not fall within the range for the specific signal type will result in an 'inconsistentValue' error."
::={ pktcSigPulseSignalEntry 6 }

pktcSigDevCidMode OBJECT-TYPE
SYNTAX INTEGER {
  duringRingingETS(1),
dtAsETS(2),
rpAsETS(3),
lrAsETS(4),
lrETS(5) }
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"For on-hook Caller ID, pktcSigDevCidMode selects the method for representing and signaling Caller Identification. For the duringRingingETS method, the Frequency Shift Keying (FSK) or the Dual Tone Multi Frequency (DTMF) containing the Caller Identification information is sent between the first and second ring pattern.

For the dtAsETS, rpAsETS, lrAsETS and lrETS methods, the FSK or DTMF containing the Caller ID information is sent before the first ring pattern.

For the dtAsETS method, the FSK or DTMF is sent after the Dual Tone Alert Signal. For the rpAsETS method, the FSK or DTMF is sent after a Ring Pulse.

For the lrAsETS method, the Line Reversal occurs first, then the Dual Tone Alert Signal, and finally the FSK or DTMF is sent.

For the lrETS method, the Line Reversal occurs first then the FSK or DTMF is sent."

DEFVAL { rpAsETS}
::= {pktcSigDevObjects 21 }

pktcSigDevCidAfterRing OBJECT-TYPE
SYNTAX       Unsigned32 (0|50..2000)
UNITS        "Milliseconds"
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION
"This object specifies the delay between the end of first ringing pattern and the start of the transmission of the FSK or DTMF containing the Caller ID information. It is only used when pktcSigDevCidMode is set to a value of 'duringRingingETS'.

The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevCidMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevCidMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>duringRingingETS</td>
<td>550 ms</td>
</tr>
<tr>
<td>dtAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrETS</td>
<td>any value (not used)</td>
</tr>
</tbody>
</table>
An attempt to set this object while the value of pktcSigDevCidMode is not duringringingETS will result in an ‘inconsistentValue’ error.

REFERENCE
"ETSI-EN-300-659-1 Specification"
DEFVAL { 550 }
::= {pktcSigDevObjects 22 }

pktcSigDevCidAfterDTAS OBJECT-TYPE
SYNTAX       Unsigned32 (0|45..500)
UNITS        "Milliseconds"
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION
"This object specifies the delay between the end of the Dual Tone Alert Signal (DT-AS) and the start of the transmission of the FSK or DTMF containing the Caller ID information. This object is only used when pktcSigDevCidMode is set to a value of ’dtAsETS’ or ’lrAsETS’.

The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevCidMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevCidMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>duringringingETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>dtAsETS</td>
<td>50 ms</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>50 ms</td>
</tr>
<tr>
<td>lrETS</td>
<td>any value (not used)</td>
</tr>
</tbody>
</table>

An attempt to set this object while the value of pktcSigDevCidMode is not ’dtAsETS’ or ’lrAsETS’ will result in an ‘inconsistentValue’ error."

REFERENCE
"ETSI-EN-300-659-1 Specification"
DEFVAL { 50 }
::= {pktcSigDevObjects 23 }

pktcSigDevCidAfterRPAS OBJECT-TYPE
SYNTAX       Unsigned32 (0|500..800)
UNITS        "Milliseconds"
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION
This object specifies the delay between the end of the Ring Pulse Alert Signal (RP-AS) and the start of the transmission of the FSK or DTMF containing the Caller ID information. This MIB object is only used when pktcSigDevCidMode is set to a value of ‘rpAsETS’. The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevCidMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevCidMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>duringringingETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>dtAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>650 ms</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrETS</td>
<td>any value (not used)</td>
</tr>
</tbody>
</table>

An attempt to set this object while the value of pktcSigDevCidMode is not ‘rpAsETS’ will result in an ‘inconsistentValue’ error.

REFERENCE
"ETSI-EN-300-659-1 Specification"
DEFVAL { 650 }
::= { pktcSigDevObjects 24 }

pktcSigDevRingAfterCID OBJECT-TYPE
SYNTAX     Unsigned32 (0..50..500)
UNITS      "Milliseconds"
MAX-ACCESS read-write
STATUS     current
DESCRIPTION
" This object specifies the delay between the end of the complete transmission of the FSK or DTMF containing the Caller ID information and the start of the first ring pattern. It is only used when pktcSigDevCidMode is set to a value of ‘dtAsETS’, ‘rpAsETS’, ‘lrAsETS’ or ‘lrETS’.
The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevCidMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevCidMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>duringringingETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>dtAsETS</td>
<td>250 ms</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>250 ms</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>250 ms</td>
</tr>
<tr>
<td>lrETS</td>
<td>250 ms</td>
</tr>
</tbody>
</table>
An attempt to set this object while the value of pktcSigDevCidMode is not 'dtAsETS', 'rpAsETS', 'lrAsETS' or 'lrETS' will result in an 'inconsistent value' error.

REFERENCE
"ETSI-EN-300-659-1 Specification"
DEFVAL { 250 }
::= {pktcSigDevObjects 25 }

pktcSigDevCidDTASAfterLR OBJECT-TYPE
SYNTAX Unsigned32 (50..655)
UNIT "Milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION "This object specifies the delay between the end of the Line Reversal and the start of the Dual Tone Alert Signal (DT-AS). This object is only used when pktcSigDevCidMode is set to a value of 'lrAsETS'.

The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevCidMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevCidMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>duringringingETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>dtAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>250 ms</td>
</tr>
<tr>
<td>lrETS</td>
<td>any value (not used)</td>
</tr>
</tbody>
</table>

An attempt to set this object while the value of pktcSigDevCidMode is not lrAsETS will result in an 'inconsistentValue' error.

REFERENCE
"ETSI-EN-300-659-1 Specification"
DEFVAL { 250 }
::= {pktcSigDevObjects 26 }

pktcSigDevVmwiMode OBJECT-TYPE
SYNTAX INTEGER {
  dtAsETS(1),
  rpAsETS(2),
  lrAsETS(3),
  osi(4),
  lrETS(5)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"For visual message waiting indicator (VMWI),
pktcSigDevVmwiMode selects the alerting signal method. For the dtAsETS, rpAsETS, lrAsETS, osi and lrETS methods, the FSK containing the VMWI information is sent after an alerting signal.

For the dtAsETS method, the FSK or DTMF is sent after the Dual Tone Alert Signal. For the rpAsETS method, the FSK or DTMF is sent after a Ring Pulse.

For the lrAsETS method, the Line Reversal occurs first, then the Dual Tone Alert Signal, and finally the FSK or DTMF is sent.

For the OSI method, the FSK or DTMF is sent after the Open Switching Interval.

For the lrETS method, the Line Reversal occurs first then the FSK or DTMF is sent."
DEFVAL { rpAsETS }
::= {pktcSigDevObjects 27 }
An attempt to set this object while the value of pktcSigDevVmwiMode is not 'dtAsETS' or 'lrAsETS' will result in an 'inconsistentValue' error.

REFERENCE
"ETSI-EN-300-659-1 Specification"
DEFVAL { 50 }
::= {pktcSigDevObjects 28 }

pktcSigDevVmwiAfterRPAS OBJECT-TYPE
SYNTAX Unsigned32 (0..500..800)
UNITS "Milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
" This object specifies the delay between the end of the Ring Pulse Alert Signal (RP-AS) and the start of the transmission of the FSK or DTMF containing the VMWI information. This object is only used when pktcSigDevVmwiMode is set to a value of 'rpAsETS'. The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevVmwiMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevVmwiMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dtAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>650 ms</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrETS</td>
<td>any value (not used)</td>
</tr>
</tbody>
</table>

An attempt to set this object while the value of pktcSigDevVmwiMode is not 'rpAsETS' will result in an 'inconsistentValue' error.

REFERENCE
"ETSI-EN-300-659-1 Specification"
DEFVAL { 650 }
::= {pktcSigDevObjects 29 }

pktcSigDevVmwiDTASAfterLR OBJECT-TYPE
SYNTAX Unsigned32 (0..50..655)
UNITS "Milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
" This object specifies the delay between the end of the
Line Reversal and the start of the Dual Tone Alert Signal (DT-AS) for VMWI information. This object is only used when pktcSigDevVmwiMode is set to a value of ‘lrAsETS’.

The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevVmwiMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevVmwiMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dtAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>250 ms</td>
</tr>
<tr>
<td>lrETS</td>
<td>any value (not used)</td>
</tr>
</tbody>
</table>

An attempt to set this object while the value of pktcSigDevVmwiMode is not ‘lrAsETS’ will result in an ‘inconsistentValue’ error.

REFERENCE
"ETSI-EN-300-659-1 Specification"

pktcSigDevRingCadenceTable OBJECT-TYPE
SYNTAX SEQUENCE OF PktcSigDevRingCadenceEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Cadence rings are defined by the telco governing body for each country. The MTA must be able to support various ranges of cadence patterns and cadence periods. The MTA will be able to support country specific provisioning of the cadence and idle period. Each cadence pattern will be assigned a unique value ranging from 0-127 (inclusive) corresponding to the value of x, where x is the value sent in the cadence ringing (cr) signal cr(x), requested per the appropriate NCS message, and defined in the E package. The MTA will derive the cadence periods from the ring cadence table entry as provisioned by the customer. The MTA is allowed to provide appropriate default values for each of the ring cadences. This table only needs to be supported when the MTA implements the E package. Objects in this table do not persist across MTA reboots."

REFERENCE
"ETSI-TS-101-909-4 Specification"

::= { pktcSigDevObjects 31 }
pktcSigDevRingCadenceEntry OBJECT-TYPE
SYNTAX PktcSigDevRingCadenceEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Unique value ranging from 0 to 127 that will correspond to the
different ring cadences that are being supported by the device."
INDEX { pktcSigDevRingCadenceIndex }
 ::= { pktcSigDevRingCadenceTable 1 }

PktcSigDevRingCadenceEntry ::= SEQUENCE {
   pktcSigDevRingCadenceIndex       Unsigned32,
pktcSigDevRingCadence            PktcRingCadence
}

pktcSigDevRingCadenceIndex OBJECT-TYPE
SYNTAX Unsigned32 (0..127)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"Unique value ranging from 0 to 127 that corresponds to the value
sent by the LE based on country specific cadences, one row per
cadence cycle. In any given system implementation for a particular
country, it is anticipated that a small number of ring cadences
will be in use. Thus, this table most likely will not be populated
to its full size."
 ::= { pktcSigDevRingCadenceEntry 1 }

pktcSigDevRingCadence OBJECT-TYPE
SYNTAX PktcRingCadence
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This is the Ring Cadence. This object is required for the
E line package."
 ::= { pktcSigDevRingCadenceEntry 2 }

pktcSigDevToneTable OBJECT-TYPE
SYNTAX SEQUENCE OF PktcSigDevToneEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The Tone Table defines the composition of tones and various tone
operations.

The definition of the tones callWaiting1 through
callWaiting4 in this table MUST only contain the audible tone itself; the delay between tones or the value of the tone repeat count are not applicable for the call waiting tones.

The delay between tones or the repeat count is controlled by the objects pktcNcsEndPntConfigCallWaitingDelay, and pktcNcsEndPntConfigCallWaitingMaxRep. If the pktcSigDevToneType is set to either of the values callWaiting1, callWaiting2, callWaiting3 or callWaiting4, then the value of the pktcSigDevToneWholeToneRepeatCount object indicates that the particular frequency group is applicable, as a repeatable part of the tone, based on the value of the MIB Object pktcSigDevToneWholeToneRepeatCount.

The MTA MUST make sure that, after the provisioning cycle, the table is fully populated (i.e., for each possible index, an entry MUST be defined) using reasonable defaults for each row that was not defined by the provisioning information delivered via MTA Configuration.

The frequency composition of each tone is defined by the pktcSigDevMultiFreqToneTable. For each ToneType defined in pktcSigDevToneTable, the MTA MUST populate at least one entry in the pktcSigDevMultiFreqToneTable.

For each particular value of pktcSigDevToneType, the pktcSigDevToneTable table can define non-repeating and repeating groups of the frequencies defined by the pktcSigDevMultiFreqToneTable, such that each group is represented by the set of the consecutive rows (frequency group) in the pktcSigDevMultiFreqToneTable.

Objects in this table do not persist across MTA reboots. For tones with multiple frequencies refer to the MIB table pktcSigDevMultiFreqToneTable.

REFERENCE
::= { pktcSigDevObjects 32 }

pktcSigDevToneEntry OBJECT-TYPE
SYNTAX PktcSigDevToneEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "The different tone types that can be provisioned based on
Each entry contains the tone generation parameters for a specific frequency group of the specific Tone Type. The different parameters can be provisioned via MTA configuration based on country specific needs. An MTA MUST populate all entries of this table for each tone type.

INDEX { pktcSigDevToneType, pktcSigDevToneFreqGroup } ::= { pktcSigDevToneTable 1 }

PktcSigDevToneEntry ::= SEQUENCE {
  pktcSigDevToneType                      INTEGER,
  pktcSigDevToneFreqGroup                 Unsigned32,
  pktcSigDevToneFreqCounter               Unsigned32,
  pktcSigDevToneWholeToneRepeatCount      Unsigned32,
  pktcSigDevToneSteady                    TruthValue
}

pktcSigDevToneType OBJECT-TYPE
SYNTAX INTEGER {
  busy(1),
  confirmation(2),
  dial(3),
  messageWaiting(4),
  offHookWarning(5),
  ringBack(6),
  reOrder(7),
  stutterdial(8),
  callWaiting1(9),
  callWaiting2(10),
  callWaiting3(11),
  callWaiting4(12),
  alertingSignal(13),
  specialDial(14),
  specialInfo(15),
  release(16),
  congestion(17),
  userDefined1(18),
  userDefined2(19),
  userDefined3(20),
  userDefined4(21)
}
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION "Unique value that will correspond to the different tone types. These tones can be provisioned based on country specific needs. This object defines the type
of tone being accessed.
The alertingSignal, specialDial, specialInfo, release,
congestion, userDefined1, userDefined2, userDefined3
and userDefined4 tone types are used in
the E line package."
::= { pktcSigDevToneEntry 1 }

pktcSigDevToneFreqGroup OBJECT-TYPE
SYNTAX             Unsigned32(1..4)
MAX-ACCESS         not-accessible
STATUS             current
DESCRIPTION
 "This MIB Object represents the Tone Sequence reference
 of a multi-sequence tone."
::={ pktcSigDevToneEntry 2 }

pktcSigDevToneFreqCounter OBJECT-TYPE
SYNTAX             Unsigned32(1..8)
MAX-ACCESS         read-only
STATUS             current
DESCRIPTION
 "This MIB Object represents the number of consecutive
 multi-frequency tones for the particular tone type in
 the multi-frequency table (pktcSigDevMultiFreqToneTable).

 Such a sequence of the consecutive multi-frequency tones
 forms the tone group for the particular tone type in the
 pktcSigDevToneTable."
::={ pktcSigDevToneEntry 3 }

pktcSigDevToneWholeToneRepeatCount OBJECT-TYPE
SYNTAX             Unsigned32 (0..5000)
MAX-ACCESS         read-only
STATUS             current
DESCRIPTION
 "This is the repeat count, which signifies how many times
 to repeat the entire on-off cadence sequence. Setting this
 object may result in a cadence duration longer or shorter
 than the overall signal duration specified by the time out
 (TO) object for a particular signal. If the repeat count
 results in a longer tone duration than the signal duration
 specified by the TO, the tone duration defined by the
 TO object for a particular signal always represents
 the overall signal duration for a tone. In this case, the
 tone duration repeat count will not be fully exercised and
 the desired tone duration will be truncated per the TO
 setting. If the repeat count results in a shorter tone
duration than the signal duration specified by the TO, the
tone duration defined by the repeat count takes precedence
over the TO and will end the signal event. In this case,
the TO represents a time not to be exceeded for the signal.
It is recommended to ensure proper telephony signaling that
The TO duration setting should always be longer than the
desired repeat count time duration."
::={ pktcSigDevToneEntry 4 }

pktcSigDevToneSteady OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current

DESCRIPTION
"This is the steady tone. Devices must play out the on-off
cadence sequence for pktcSigDevToneWholeToneRepeatCount
times and then apply the last tone forever. Setting this
object may result in a tone duration longer or shorter than
the overall signal duration specified by the time out (TO)
object for a particular signal. If the repeat count results
in a longer tone duration than the signal duration
specified by the TO, the tone duration defined
by the TO object for a particular signal always represents
the overall signal duration for a tone. In this case, the
tone duration repeat count will not be fully exercised and
the desired tone duration will be truncated per the TO
setting. If the repeat count results in a shorter tone
duration than the signal duration specified by the TO, the
tone duration defined by the repeat count takes precedence
over the TO and will end the signal event. In this case,
the TO represents a time not to be exceeded for the signal.
It is recommended to ensure proper telephony signaling that
The TO duration setting should always be longer than the
desired repeat count time duration plus the desired maximum
steady tone period.
If pktcSigDevToneTable contains multiple rows with this
Object set to ‘true’, the steady tone is applied to the
last repeating frequency group of the tone."
::={ pktcSigDevToneEntry 5 }

pktcSigDevMultiFreqToneTable OBJECT-TYPE
SYNTAX SEQUENCE OF PktcSigDevMultiFreqToneEntry
MAX-ACCESS not-accessible
STATUS current

DESCRIPTION
" This MIB table defines the characteristics of tones
with multiple frequencies. The constraints imposed
on the tones by the MIB table pktcSigDevToneTable
need to be considered for MIB objects in this table as well.
The MTA MUST populate the corresponding row(s) of the 
pktcSigDevMultiFreqToneTable for each tone defined in the pktcSigDevToneTable.
The contents of the table may be provisioned via 
MTA configuration.

REFERENCE
"PacketCable NCS Specification, ETSI-TS-101-909-4 
Specification." 
::= { pktcSigDevObjects 33 }
pktcSigDevMultiFreqToneEntry OBJECT-TYPE
SYNTAX PktcSigDevMultiFreqToneEntry
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"The different tone types with multiple frequencies 
that can be provisioned based on country specific 
needs."
INDEX {pktcSigDevToneType, pktcSigDevToneNumber}
::= { pktcSigDevMultiFreqToneTable 1 }
PktcSigDevMultiFreqToneEntry ::= SEQUENCE {
pktcSigDevToneNumber                    Unsigned32,
pktcSigDevToneFirstFreqValue            Unsigned32,
pktcSigDevToneSecondFreqValue           Unsigned32,
pktcSigDevToneThirdFreqValue            Unsigned32,
pktcSigDevToneFourthFreqValue           Unsigned32,
pktcSigDevToneFreqMode                  INTEGER,
pktcSigDevToneFreqAmpModePrtg           Unsigned32,
pktcSigDevToneDbLevel                   TenthdBm,
pktcSigDevToneFreqOnDuration            Unsigned32,
pktcSigDevToneFreqOffDuration           Unsigned32,
pktcSigDevToneFreqRepeatCount           Unsigned32
}
pktcSigDevToneNumber OBJECT-TYPE
SYNTAX Unsigned32(1..8)
MAX-ACCESS not-accessible
STATUS current
DESCRIPTION
"This MIB Object represents the frequency reference 
of a multi-frequency tone."
::=( pktcSigDevMultiFreqToneEntry 1)
pktcSigDevToneFirstFreqValue OBJECT-TYPE
SYNTAX Unsigned32(0..4000)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB Object represents the value of the first frequency of a tone type. A value of Zero implies absence of the referenced frequency."
::=( pktcSigDevMultiFreqToneEntry 2)

pktcSigDevToneSecondFreqValue OBJECT-TYPE
SYNTAX Unsigned32(0..4000)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB Object represents the value of the second frequency of a tone type. A value of Zero implies absence of the referenced frequency."
::=( pktcSigDevMultiFreqToneEntry 3)

pktcSigDevToneThirdFreqValue OBJECT-TYPE
SYNTAX Unsigned32(0..4000)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB Object represents the value of the third frequency of a tone type. A value of Zero implies absence of the referenced frequency."
::=( pktcSigDevMultiFreqToneEntry 4)

pktcSigDevToneFourthFreqValue OBJECT-TYPE
SYNTAX Unsigned32(0..4000)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB Object represents the value of the fourth frequency of a tone type. A value of Zero implies absence of the referenced frequency."
::=( pktcSigDevMultiFreqToneEntry 5)

pktcSigDevToneFreqMode OBJECT-TYPE
SYNTAX INTEGER {
  firstModulatedBySecond(1),
  summation(2)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB Object provides directive on the modulation or summation of the frequencies involved in the tone."
It is to be noted that while summation can be done without any constraint on the number of frequencies, the modulation (amplitude) holds good only when there are two frequencies (first and second).

Thus:
- If the mode is set to a value of 'firstModulatedBySecond(1)', the first frequency MUST be modulated by the second and the remaining frequencies (third and fourth) ignored. The percentage of amplitude modulation to be applied is defined by the MIB Object pktcSigDevToneFreqAmpModePrtg.
- If the mode is set to a value of 'summation(2)', all the frequencies MUST be summed, without any modulation.

::={ pktcSigDevMultiFreqToneEntry 6}

pktcSigDevToneFreqAmpModePrtg OBJECT-TYPE
SYNTAX Unsigned32(0..100)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB Object represents the percentage of amplitude modulation applied to the second frequency when the MIB Object pktcSigDevToneFreqMode is set to a value of 'firstModulatedBySecond (1)'.

If the MIB Object pktcSigDevToneFreqMode is set to value of ‘summation (2)’ then this MIB Object MUST be ignored."
::={ pktcSigDevMultiFreqToneEntry 7}

pktcSigDevToneDbLevel OBJECT-TYPE
SYNTAX TenthdBm (-250..-110)
UNITS "dBm"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This MIB Object contains the decibel level for each analog signal (tone) that is locally generated (versus in band supervisory tones) and sourced to the a-b terminals (TE connection point). Each tone in itself may consist of multiple frequencies as defined by the MIB table pktcSigDevMultiFreqToneTable."
This MIB Object reflects the desired level at the Telco (POTS) a-b (T/R) terminals including the affect of any MTA receiver gain (loss). This is required so that locally generated tones are consistent with remotely generated in band tones at the a-b terminals, consistent with user expectations.

This MIB Object must be set for each tone. When tones are formed by combining multi-frequencies, the level of each frequency shall be set so as to result in the tone level specified in this object at the a-b (T/R) terminals.

The wide range of levels for this Object is required to provide signal generator levels across the wide range of gains (loss) - but does not imply the entire range is to be achievable given the range of gains (loss) in the MTA."

DEFVAL { -120 }
::={ pktcSigDevMultiFreqToneEntry 8}

pktcSigDevToneFreqOnDuration OBJECT-TYPE
SYNTAX       Unsigned32(0..5000)
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "This MIB Object represents the duration for which the frequency reference corresponding to the tone type is turned on."
::={ pktcSigDevMultiFreqToneEntry 9}

pktcSigDevToneFreqOffDuration OBJECT-TYPE
SYNTAX       Unsigned32(0..5000)
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "This MIB Object represents the duration for which the frequency reference corresponding to the tone type is turned off."
::={ pktcSigDevMultiFreqToneEntry 10}

pktcSigDevToneFreqRepeatCount OBJECT-TYPE
SYNTAX       Unsigned32(0..5000)
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION   "This MIB Object indicates the number of times to repeat the cadence cycle represented by the on/off durations (refer to the MIB Objects..."
pktcSigDevToneFreqOnDuration and pktcSigDevToneFreqOffDuration).

Setting this object may result in a tone duration longer or shorter than the overall signal duration specified by the time out (TO) object for the corresponding tone type. If the value of this MIB Object indicates a longer duration than the specified by the TO, the latter overrules the former and the desired tone duration will be truncated according to the TO.

However, if the repeat count results in a shorter tone duration than the signal duration specified by the TO, the tone duration defined by the repeat count takes precedence over the TO and will end the signal event. In this case, the TO represents a time not to be exceeded for the signal. It is recommended to ensure proper telephony signaling that the TO duration setting should always be longer than the desired repeat count time duration. A value of zero means the tone sequence is to be played once but not repeated."

::={ pktcSigDevMultiFreqToneEntry 11}

pktcSigDevCidDelayAfterLR  OBJECT-TYPE
SYNTAX       Unsigned32 (300..800)
UNITS        "Milliseconds"
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION
"This object specifies the delay between the end of the Line Reversal and the start of the FSK or DTMF signal. This MIB object is used only when pktcSigDevCidMode is set to a value of 'lrETS'. This timing has a range of 300 to 800 ms.
The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevCidMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevCidMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>duringringingETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>dAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrETS</td>
<td>400</td>
</tr>
</tbody>
</table>

An attempt to set this object while the value of
pktcSigDevCidMode is not set to a value of 'lrETS' will result in an 'inconsistentValue' error.

DEFVAL { 400 }
::= {pktcSigDevObjects 34 }

pktcSigDevCidDtmfStartCode OBJECT-TYPE
SYNTAX       DtmfCode
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION  
"This object identifies optional start codes used when the MIB object pktcSigDevCidSigProtocol is set to a value of 'dtmf(2)'.
Different countries define different caller id signaling codes to support caller identification. When Dual tone multi-frequency (DTMF) is used the Caller ID digits are preceded by a 'start code' digit, followed by the digit transmission sequence <S1>...<Sn> (where Sx represents the digits 0-9) and terminated by the 'end code' digit. For e.g. 
<A><S1>...<Sn> <D><S1>...<Sn> <B><S1>...<Sn> <C>

The start code for calling number delivery may be DTMF 'A' or 'D'. The start code for redirecting number may be DTMF 'D'. The DTMF code 'B' may be sent by the network as start code for the transfer of information values, through which special events can be indicated to the user. In some countries the '*' or '#' may be used instead of 'A', 'B', 'C' or 'D'."

REFERENCE  
"ETSI-EN-300-659-1 specification"
DEFVAL {dtmfcodeA}
::= { pktcSigDevObjects 35 }

pktcSigDevCidDtmfEndCode OBJECT-TYPE
SYNTAX       DtmfCode
MAX-ACCESS   read-write
STATUS       current
DESCRIPTION  
"This object identifies optional end codes used when the pktcSigDevCidSigProtocol is set to a value of 'dtmf(2)'.
Different countries define different caller id signaling protocols to support caller identification. When Dual tone multi-frequency (DTMF) is used the Caller ID digits are preceded by a 'start code' digit, followed by the digit transmission sequence <S1>...<Sn> (where Sx represents the digits 0-9) and terminated by the 'end code' digit."
For e.g.,

\[ <A><S1>...<Sn> <D><S1>...<Sn> <B><S1>...<Sn> <C> \].

The DTMF code ‘C’ may be sent by the network as an end code for the transfer of information values, through which special events can be indicated to the user. In some countries, the ‘*’ or ‘#’ may be used instead of ‘A’, ‘B’, ‘C’ or ‘D’.

REFERENCE

"ETSI-EN-300-659-1 specification"

DEFVAL { dtmfcodeC }

::= { pktcSigDevObjects 36 }

pktcSigDevVmwiSigProtocol OBJECT-TYPE
SYNTAX INTEGER {
  fsk(1),
  dtmf(2)
}
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object identifies the subscriber line protocol used for signaling the Information on Visual Message Waiting Indicator (VMWI). Different countries define different VMWI signaling protocols to support VMWI service. Frequency shift keying (FSK) is most commonly used. Dual tone multi-frequency (DTMF) is an alternative."
DEFVAL { fsk }
::= { pktcSigDevObjects 37 }

pktcSigDevVmwiDelayAfterLR OBJECT-TYPE
SYNTAX Unsigned32 (0|300..800)
UNITS "Milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object specifies the delay between the end of the Line Reversal and the start of the FSK or DTMF signal. This object is only used when pktcSigDevVmwiMode is set to a value of ‘lrETS’. This timing has a range of 300 to 800 ms.

The following table defines the default values for this MIB object, depending on the signal type (pktcSigDevVmwiMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevVmwiMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>duringringingETS</td>
<td>any value     (not used)</td>
</tr>
</tbody>
</table>
dtAsETS any value (not used)
rpAsETS any value (not used)
lrAsETS any value (not used)
lrETS 400

An attempt to set this object while the value of pktcSigDevVmwiMode is not ‘lrETS’ will result in an ‘inconsistentValue’ error.

DEFVAL {400}
::= {pktcSigDevObjects 38 }

pktcSigDevVmwiDtmfStartCode OBJECT-TYPE
SYNTAX DtmfCode
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object identifies optional start codes used when the pktcSigDevVmwiSigProtocol is set to a value of ‘dtmf(2)’. Different countries define different On Hook Data Transmission Protocol signaling codes to support VMWI.

When Dual tone multi-frequency (DTMF) is used the VMWI digits are preceded by a ‘start code’ digit, followed by the digit transmission sequence <S1>...<Sn> (where Sx represents the digits 0-9) and terminated by the ‘end code’ digit.

For e.g.
<A><S1>...<Sn> <D><S1>...<Sn> <B><S1>...<Sn> <C>.

The start code for redirecting VMWI may be DTMF ‘D’

The DTMF code ‘B’ may be sent by the network as start code for the transfer of information values, through which special events can be indicated to the user. In some countries the ‘*’ or ‘#’ may be used instead of ‘A’, ‘B’, ‘C’ or ‘D’.

REFERENCE
"ETSI-EN-300-659-1 specification"
DEFVAL {dtmfcodeA}
::= { pktcSigDevObjects 39 }

pktcSigDevVmwiDtmfEndCode OBJECT-TYPE
SYNTAX DtmfCode
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This object identifies optional end code used when the
pktcSigDevVmwiSigProtocol is set to a value of ‘dtmf(2)’. Different countries define different On Hook Data Transmission Protocol signaling codes to support VMWI.

When Dual tone multi-frequency (DTMF) is used the VMWI digits are preceded by a ’start code’ digit, followed by the digit transmission sequence <S1>...<Sn> (where Sx represents the digits 0-9) and terminated by the ’end code’ digit.

For e.g.

<A><S1>...<Sn> <D><S1>...<Sn> <B><S1>...<Sn> <C>.

The DTMF code ‘C’ may be sent by the network as end code for the transfer of information values, through which special events can be indicated to the user. In some countries the ‘*’ or ‘#’ may be used instead of ‘A’, ‘B’, ‘C’ or ‘D’.

REFERENCE

“ETSI-EN-300-659-1 specification”

DEFVAL {dtmfcodeC} ::= { pktcSigDevObjects 40 }

pktcSigDevrpAsDtsDuration OBJECT-TYPE
SYNTAX Unsigned32 (0|200..500)
UNITS "Milliseconds"
MAX-ACCESS read-write
STATUS current
DESCRIPTION

" This object specifies the duration of the rpAsDTS ring pulse prior to the start of the transmission of the FSK or DTMF containing the Caller ID information. It is only used when pktcSigDevCidMode is set to a value of ‘rpAsETS’.

The following table defines the default values for this MIB Object, depending on the signal type (pktcSigDevCidMode) and MUST be followed:

<table>
<thead>
<tr>
<th>Value of pktcSigDevCidMode</th>
<th>Default value</th>
</tr>
</thead>
<tbody>
<tr>
<td>duringringingETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>dtAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>rpAsETS</td>
<td>250</td>
</tr>
<tr>
<td>lrAsETS</td>
<td>any value (not used)</td>
</tr>
<tr>
<td>lrETS</td>
<td>any value (not used)</td>
</tr>
</tbody>
</table>

An attempt to set this object while the value of
pktcSigDevCidMode is not ‘rpAsETS’ will result in an ‘inconsistentValue’ error.

REFERENCE
"ETSI-EN-300-659-1 Specification and Belgacom BGC_D_48_9811_30_09_EDOC version 3.3"

DEFVAL { 250 }
 ::= {pktcSigDevObjects 41 }

-- The NCS Endpoint Config Table is used to define attributes that are specific to connection EndPoints.

pktcNsEndPntConfigTable  OBJECT-TYPE
SYNTAX        SEQUENCE OF PktcNsEndPntConfigEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
"This table describes the information pertaining to each endpoint of the MTA. All entries in this table represent the provisioned endpoints provisioned with the information required by the MTA to maintain the NCS protocol communication with the CMS. Each endpoint can be assigned to its own CMS. If the specific endpoint does not have the corresponding CMS information in this table, the endpoint is considered as not provisioned with voice services. Objects in this table do not persist across MTA reboots."
 ::= { pktcNsEndPntConfigObjects 1 }

PktcNsEndPntConfigEntry  OBJECT-TYPE
SYNTAX        PktcNsEndPntConfigEntry
MAX-ACCESS    not-accessible
STATUS        current
DESCRIPTION
"Each entry in the pktcNsEndPntConfigTable represents required signaling parameters for the specific endpoint provisioned with voice services."
INDEX { ifIndex }
 ::= { pktcNsEndPntConfigTable 1 }

PktcNsEndPntConfigEntry ::= SEQUENCE {
 pktcNsEndPntConfigCallAgentId             SnmpAdminString,
 pktcNsEndPntConfigCallAgentUdpPort        InetPortNumber,
 pktcNsEndPntConfigPartialDialTO           Unsigned32,
 pktcNsEndPntConfigCriticalDialTO          Unsigned32,
 pktcNsEndPntConfigBusyToneTO              Unsigned32,
 pktcNsEndPntConfigDialToneTO              Unsigned32,
 pktcNsEndPntConfigMessageWaitingTO        Unsigned32,
pktcNcsEndPntConfigOffHookWarnToneTO Unsigned32,
pktcNcsEndPntConfigRingingTO Unsigned32,
pktcNcsEndPntConfigRingBackTO Unsigned32,
pktcNcsEndPntConfigReorderToneTO Unsigned32,
pktcNcsEndPntConfigStutterDialToneTO Unsigned32,
pktcNcsEndPntConfigTSMax Unsigned32,
pktcNcsEndPntConfigMax1 Unsigned32,
pktcNcsEndPntConfigMax2 Unsigned32,
pktcNcsEndPntConfigMax1QEnable TruthValue,
pktcNcsEndPntConfigMax2QEnable TruthValue,
pktcNcsEndPntConfigMWD Unsigned32,
pktcNcsEndPntConfigTdinit Unsigned32,
pktcNcsEndPntConfigTdmn Unsigned32,
pktcNcsEndPntConfigTdmax Unsigned32,
pktcNcsEndPntConfigRtoMax Unsigned32,
pktcNcsEndPntConfigRtoInit Unsigned32,
pktcNcsEndPntConfigLongDurationKeepAlive Unsigned32,
pktcNcsEndPntConfigThist Unsigned32,
pktcNcsEndPntConfigStatus RowStatus,
pktcNcsEndPntConfigCallWaitingMaxRep Unsigned32,
pktcNcsEndPntConfigCallWaitingDelay Unsigned32,
pktcNcsEndPntStatusCallIpAddressType InetAddressType,
pktcNcsEndPntStatusCallIpAddress InetAddress,
pktcNcsEndPntStatusError INTEGER,
pktcNcsEndPntConfigMinHookFlash Unsigned32,
pktcNcsEndPntConfigMaxHookFlash Unsigned32,
pktcNcsEndPntConfigPulseDialInterdigitTime Unsigned32,
pktcNcsEndPntConfigPulseDialMinMakeTime Unsigned32,
pktcNcsEndPntConfigPulseDialMaxMakeTime Unsigned32,
pktcNcsEndPntConfigPulseDialMinBreakTime Unsigned32,
pktcNcsEndPntConfigPulseDialMaxBreakTime Unsigned32
}
pktcNcsEndPntConfigCallAgentId OBJECT-TYPE
SYNTAX SnmpAdminString(SIZE (3..255))
MAX-ACCESS read-create
STATUS current
DESCRIPTION "This object contains a string indicating the call agent name (e.g.: ca@example.com). The call agent name, after the character '@', MUST be a fully qualified domain name (FQDN) and MUST have a corresponding pktcMtaDevCmsFqdn entry in the pktcMtaDevCmsTable. The object pktcMtaDevCmsFqdn is defined in the PacketCable MIBMTA Specification. For each particular endpoint, the MTA MUST use the current value of this object to communicate with the corresponding CMS. The MTA MUST update this object with the value of the 'Notified Entity' parameter of the NCS message. Because of the high importance of this object
to the ability of the MTA to maintain reliable NCS communication with the CMS, it is highly recommended not to change this object’s value using SNMP during normal operation."

::= { pktcNcsEndPntConfigEntry 1 }

pktcNcsEndPntConfigCallAgentUdpPort OBJECT-TYPE
SYNTAX InetPortNumber (1025..65535)
MAX-ACCESS read-create
STATUS current
DESCRIPTION "This object contains the current value of the User Datagram Protocol (UDP) receive port on which the call agent will receive NCS from the endpoint. For each particular endpoint, the MTA MUST use the current value of this object to communicate with the corresponding CMS. The MTA MUST update this object with the value of the ‘Notified Entity’ parameter of the NCS message. If the Notified Entity parameter does not contain a CallAgent port, the MTA MUST update this object with the default value of 2727. Because of the high importance of this object to the ability of the MTA to maintain reliable NCS communication with the CMS, it is highly recommended not to change this object’s value using SNMP during normal operation."

REFERENCE "PacketCable NCS Specification"
DEFVAL { 2727 }
 ::= { pktcNcsEndPntConfigEntry 2 }

pktcNcsEndPntConfigPartialDialTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION "This object contains the value of the partial dial time out."

REFERENCE "PacketCable NCS Specification"
DEFVAL { 16 }
 ::= { pktcNcsEndPntConfigEntry 3 }

pktcNcsEndPntConfigCriticalDialTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object contains the value of the critical
dial time out."
REFERENCE
"PacketCable NCS Specification"
DEFVAL { 4 }
::= { pktcNcsEndPntConfigEntry 4 }

pktcNcsEndPntConfigBusyToneTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object contains the default timeout value for busy
tone. The MTA MUST NOT update this object with the
value provided in the NCS message (if present). If
the value of the object is modified by the SNMP Management
Station, the MTA MUST use the new value as a default only
for a new signal requested by the NCS message."
REFERENCE
"PacketCable NCS Specification"
DEFVAL { 30 }
::= { pktcNcsEndPntConfigEntry 5 }

pktcNcsEndPntConfigDialToneTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object contains the default timeout value for dial
tone. The MTA MUST NOT update this object with the
value provided in the NCS message (if present). If
the value of the object is modified by the SNMP Management
Station, the MTA MUST use the new value as a default only
for a new signal requested by the NCS message."
REFERENCE
"PacketCable NCS Specification"
DEFVAL { 16 }
::= { pktcNcsEndPntConfigEntry 6 }

pktcNcsEndPntConfigMessageWaitingTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object contains the default timeout value for message
waiting indicator. The MTA MUST NOT update this object
with the value provided in the NCS message (if present). If the value of the object is modified by the SNMP Manager application, the MTA MUST use the new value as a default only for a new signal requested by the NCS message.

REFERENCE
"PacketCable NCS Specification"

DEFVAL { 16 }
::= { pktcNcsEndPntConfigEntry 7 }

pktcNcsEndPntConfigOffHookWarnToneTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object contains the default timeout value for the off hook Warning tone. The MTA MUST NOT update this object with the value provided in the NCS message (if present). If the value of the object is modified by the SNMP Manager application, the MTA MUST use the new value as a default only for a new signal requested by the NCS message."

REFERENCE
"PacketCable NCS Specification"

DEFVAL { 0 }
::= { pktcNcsEndPntConfigEntry 8 }

pktcNcsEndPntConfigRingingTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object contains the default timeout value for ringing. The MTA MUST NOT update this object with the value provided in the NCS message (if present). If the value of the object is modified by the SNMP Management Station, the MTA MUST use the new value as a default only for a new signal requested by the NCS message."

REFERENCE
"PacketCable NCS Specification"

DEFVAL { 180 }
::= { pktcNcsEndPntConfigEntry 9 }

pktcNcsEndPntConfigRingBackTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current

DESCRIPTION
"This object contains the default timeout value for ring back. The MTA MUST NOT update this object with the value provided in the NCS message (if present). If the value of the object is modified by the SNMP Management Station, the MTA MUST use the new value as a default only for a new signal requested by the NCS message."

REFERENCE
"PacketCable NCS Specification"

DEFVAL { 180 }
::= { pktcNcsEndPntConfigEntry 10 }

pktcNcsEndPntConfigReorderToneTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current

DESCRIPTION
"This object contains the default timeout value for reorder tone. The MTA MUST NOT update this object with the value provided in the NCS message (if present). If the value of the object is modified by the SNMP Management Station, the MTA MUST use the new value as a default only for a new signal requested by the NCS message."

REFERENCE
"PacketCable NCS Specification"

DEFVAL { 30 }
::= { pktcNcsEndPntConfigEntry 11 }

pktcNcsEndPntConfigStutterDialToneTO OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current

DESCRIPTION
"This object contains the default timeout value for stutter dial tone. The MTA MUST NOT update this object with the value provided in the NCS message (if present). If the value of the object is modified by the SNMP Management Station, the MTA MUST use the new value as a default only for a new signal requested by the NCS message."

REFERENCE
"PacketCable NCS Specification"

DEFVAL { 16 }
::= { pktcNcsEndPntConfigEntry 12 }

pktcNcsEndPntConfigTSMax OBJECT-TYPE
SYNTAX Unsigned32
MAX-ACCESS  read-create
STATUS       current
DESCRIPTION  "This MIB object is used as part of an NCS retransmission algorithm. Prior to any retransmission, the MTA must check to make sure that the time elapsed since the sending of the initial datagram does not exceed the value specified by this MIB Object. If more than $T_{\text{max}}$ time has elapsed, then the retransmissions MUST cease.

Refer to the MIB Object pktcNcsEndPntConfigThist for information on when the endpoint becomes disconnected."

REFERENCE  
"PacketCable NCS Specification"
DEFVAL { 20 }
::= { pktcNcsEndPntConfigEntry 13 }

pktcNcsEndPntConfigMax1 OBJECT-TYPE
SYNTAX       Unsigned32
MAX-ACCESS   read-create
STATUS       current
DESCRIPTION  "This object contains the suspicious error threshold for signaling messages. The pktcNcsEndPntConfigMax1 object indicates the retransmission threshold at which the MTA MAY actively query the domain name server (DNS) in order to detect the possible change of call agent interfaces."

REFERENCE  
"PacketCable NCS Specification"
DEFVAL { 5 }
::= { pktcNcsEndPntConfigEntry 14 }

pktcNcsEndPntConfigMax2 OBJECT-TYPE
SYNTAX       Unsigned32
MAX-ACCESS   read-create
STATUS       current
DESCRIPTION  "This object contains the disconnect error threshold for signaling messages. The pktcNcsEndPntConfigMax2 object indicates the retransmission threshold at which the MTA SHOULD contact the DNS one more time to see if any other interfaces to the call agent have become available."

REFERENCE  
"PacketCable NCS Specification"
DEFVAL { 7 }
::= { pktcNcsEndPntConfigEntry 15 }

pktcNcsEndPntConfigMax1QEnable OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION  "This object enables/disables the Max1 domain name server
              (DNS) query operation when the pktcNcsEndPntConfigMax1
              threshold has been reached."
DEFVAL { true }
::= { pktcNcsEndPntConfigEntry 16 }

pktcNcsEndPntConfigMax2QEnable OBJECT-TYPE
SYNTAX      TruthValue
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION  "This object enables/disables the Max2 domain name server
              (DNS) query operation when the pktcNcsEndPntConfigMax2
              threshold has been reached."
DEFVAL { true }
::= { pktcNcsEndPntConfigEntry 17 }

pktcNcsEndPntConfigMWD OBJECT-TYPE
SYNTAX      Unsigned32
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION  "Maximum Waiting Delay (MWD) contains the maximum number of
              seconds an MTA waits after powering on, before initiating
              the restart procedure with the call agent."
REFERENCE    "PacketCable NCS Specification"
DEFVAL { 600 }
::= { pktcNcsEndPntConfigEntry 18 }

pktcNcsEndPntConfigTdinit OBJECT-TYPE
SYNTAX      Unsigned32
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION  "This MIB object represents the ‘disconnected’ initial
              waiting delay within the context of an MTA’s ‘disconnected
              procedure’. The ‘disconnected procedure’ is initiated when
              an endpoint becomes ‘disconnected’ while attempting to
              communicate with a Call Agent.

              The ‘disconnected timer’ associated with the ‘disconnected
              Procedure’ is initialized to a random value, uniformly
distributed between zero and the value contained in this MIB Object.

For more information on the usage of this timer, please refer to the PacketCable NCS Specification.

REFERENCE
"PacketCable NCS Specification"
DEFVAL { 15 }
::= { pktcNcsEndPntConfigEntry 19 }

pktcNcsEndPntConfigTdmin OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This MIB object represents the ‘disconnected’ minimum waiting delay within the context of an MTA’s ‘disconnected procedure’, specifically when local user activity is detected. The ‘disconnected procedure’ is initiated when an endpoint becomes ‘disconnected’ while attempting to communicate with a Call Agent. For more information on the usage of this timer, please refer to the PacketCable NCS Specification."

REFERENCE
"PacketCable NCS Specification"
DEFVAL { 15 }
::= { pktcNcsEndPntConfigEntry 20 }

pktcNcsEndPntConfigTdmax OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-create
STATUS current
DESCRIPTION
"This object contains the maximum number of seconds the MTA waits after a disconnect, before initiating the disconnected procedure with the call agent."

REFERENCE
"PacketCable NCS Specification"
DEFVAL { 600 }
::= { pktcNcsEndPntConfigEntry 21 }

pktcNcsEndPntConfigRtoMax OBJECT-TYPE
SYNTAX     Unsigned32
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
"This object specifies the maximum number of seconds the MTA
waits for a response to an NCS message before initiating
a retransmission."
REFERENCE
"PacketCable NCS Specification"
DEFVAL { 4 }
::= { pktcNcsEndPntConfigEntry 22 }

pktcNcsEndPntConfigRtoInit OBJECT-TYPE
SYNTAX     Unsigned32
UNITS       "milliseconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
"This object contains the initial number of seconds for the
retransmission timer."
REFERENCE
"PacketCable NCS Specification"
DEFVAL { 200 }
::= { pktcNcsEndPntConfigEntry 23 }

pktcNcsEndPntConfigLongDurationKeepAlive OBJECT-TYPE
SYNTAX     Unsigned32
UNITS       "minutes"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
"Specifies a timeout value in minutes for sending long
duration call notification message."
REFERENCE
"PacketCable NCS Specification"
DEFVAL { 60 }
::= { pktcNcsEndPntConfigEntry 24 }

pktcNcsEndPntConfigThist OBJECT-TYPE
SYNTAX     Unsigned32
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
"Timeout period in seconds before no response is declared."
REFERENCE
"PacketCable NCS Specification"
DEFVAL { 30 }
::= { pktcNcsEndPntConfigEntry 25 }

pktcNcsEndPntConfigStatus OBJECT-TYPE
SYNTAX   RowStatus
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
" This object contains the Row Status associated with the
pktcNcsEndPntConfigTable. There are no restrictions or
dependencies amidst the columnar objects before this
row can be activated or for modifications of the
columnar objects when this object is set to a
value of 'active(1)."
 ::= { pktcNcsEndPntConfigEntry 26 }

pktcNcsEndPntConfigCallWaitingMaxRep OBJECT-TYPE
SYNTAX         Unsigned32 (0..10)
MAX-ACCESS     read-create
STATUS         current
DESCRIPTION
" This object contains the default value of the maximum
number of repetitions of the call waiting tone that the
MTA will play from a single CMS request. The MTA MUST NOT
update this object with the information provided in the
NCS message (if present). If the value of the object is
modified by the SNMP Manager application, the MTA MUST use
the new value as a default only for a new signal
requested by the NCS message."
DEFVAL    { 1 }
 ::= { pktcNcsEndPntConfigEntry 27 }

pktcNcsEndPntConfigCallWaitingDelay OBJECT-TYPE
SYNTAX   Unsigned32 (1..100)
UNITS    "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
" This object contains the delay between repetitions of the
call waiting tone that the MTA will play from a single CMS
request."
DEFVAL    { 10 }
 ::= { pktcNcsEndPntConfigEntry 28 }

pktcNcsEndPntStatusCallIpAddressType OBJECT-TYPE
SYNTAX     InetAddressType
MAX-ACCESS read-only
STATUS     current
DESCRIPTION
"This object contains the type of Internet address of the CMS currently being used for this endpoint."
::= {pktcNcsEndPntConfigEntry 29}

pktcNcsEndPntStatusCallIpAddress OBJECT-TYPE
SYNTAX InetAddress
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This object contains the Internet address of the CMS currently being used for this endpoint. This Internet address is used to create the appropriate security association. The type of this IP address is determined by the value of the pktcNcsEndPntStatusCallIpAddressType object."
::= { pktcNcsEndPntConfigEntry 30 }

pktcNcsEndPntStatusError OBJECT-TYPE
SYNTAX INTEGER {
    operational (1),
    noSecurityAssociation (2),
    disconnected (3)
}
MAX-ACCESS read-only
STATUS current
DESCRIPTION
"This object contains the error status for this interface. The operational status indicates that all operations necessary to put the line in service have occurred, and the CMS has acknowledged the Restart In Progress (RSIP) message successfully. If pktcMtaDevCmsIpsecCtrl is enabled for the associated Call Agent, the noSecurityAssociation status indicates that no Security Association (SA) yet exists for this endpoint. If pktcMtaDevCmsIpsecCtrl is disabled for the associated Call Agent, the noSecurityAssociation status is not applicable and should not be used by the MTA. The disconnected status indicates one of the following two:
If pktcMtaDevCmsIpsecCtrl is disabled, then no security association is involved with this endpoint. The NCS signaling software is in process of establishing the NCS signaling link via an RSIP exchange.
Otherwise, when pktcMtaDevCmsIpsecCtrl is enabled, security Association has been established, and the NCS signaling software is in process of establishing the NCS signaling link via an RSIP exchange."
::= { pktcNcsEndPntConfigEntry 31 }

pktcNcsEndPntConfigMinHookFlash OBJECT-TYPE
SYNTAX       Unsigned32 (20..1550)
UNITS        "Milliseconds"
MAX-ACCESS   read-only
STATUS       current

DESCRIPTION
"This is the minimum time a line needs to be on hook for a
valid hook flash. The value of this object MUST be
greater than the value of
pktcNcsEndPntConfigPulseDialMaxBreakTime. The value of
pktcNcsEndPntConfigMinHookFlash MUST be less than
pktcNcsEndPntConfigMaxHookFlash. This object MUST only be
set via the MTA configuration during the provisioning
process.
Furthermore, given the possibility for the ‘pulse dial’
and 'hook flash’ to overlap, the value of this object
MUST be greater than the value contained by the MIB Object ‘pktcNcsEndPntConfigPulseDialMaxMakeTime’.
"
DEFVAL { 300 }
::= { pktcNcsEndPntConfigEntry 32 }

pktcNcsEndPntConfigMaxHookFlash OBJECT-TYPE
SYNTAX       Unsigned32 (20..1550)
UNITS        "Milliseconds"
MAX-ACCESS   read-only
STATUS       current

DESCRIPTION
"This is the maximum time a line needs to be on hook for a
valid hook flash. The value of
pktcNcsEndPntConfigMaxHookFlash MUST be greater than
pktcNcsEndPntConfigMinHookFlash. This object MUST only be
set via the MTA configuration during the provisioning
process."
DEFVAL { 800 }
::= { pktcNcsEndPntConfigEntry 33 }

pktcNcsEndPntConfigPulseDialInterdigitTime OBJECT-TYPE
SYNTAX       Unsigned32 (100..1500)
UNITS        "Milliseconds"
MAX-ACCESS   read-only
STATUS       current

DESCRIPTION
"This is the pulse dial inter-digit timeout. This object
MUST only be set via the MTA configuration during the
provisioning process."
DEFVAL { 100 }
::= { pktcNcsEndPntConfigEntry 34 }

pktcNcsEndPntConfigPulseDialMinMakeTime OBJECT-TYPE
SYNTAX       Unsigned32 (20..200)

[Page 60]
DESCRIPTION
"This is the minimum make pulse width for the dial pulse. The value of pktcNcsEndPntConfigPulseDialMinMakeTime MUST be less than pktcNcsEndPntConfigPulseDialMaxMakeTime. This object MUST only be set via the MTA configuration during the provisioning process."

DEFVAL { 25 }
::= { pktcNcsEndPntConfigEntry 35 }

pktcNcsEndPntConfigPulseDialMaxMakeTime  OBJECT-TYPE
SYNTAX        Unsigned32 (20..200)
UNITS        "Milliseconds"
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"This is the maximum make pulse width for the dial pulse. The value of pktcNcsEndPntConfigPulseDialMaxMakeTime MUST be greater than pktcNcsEndPntConfigPulseDialMinMakeTime. This object MUST only be provided via the configuration file during the provisioning process. Furthermore, given the possibility for the 'pulse dial' and 'hook flash' to overlap, the value of this object MUST be less than the value contained by the MIB Object pktcNcsEndPntConfigMinHookFlash."

DEFVAL { 55 }
::= { pktcNcsEndPntConfigEntry 36 }

pktcNcsEndPntConfigPulseDialMinBreakTime  OBJECT-TYPE
SYNTAX        Unsigned32 (20..200)
UNITS        "Milliseconds"
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION
"This is the minimum break pulse width for the dial pulse. The value of pktcNcsEndPntConfigPulseDialMinBreakTime MUST be less than pktcNcsEndPntConfigPulseDialMaxBreakTime. This object must only be provided via the configuration file during the provisioning process."

DEFVAL { 45 }
::= { pktcNcsEndPntConfigEntry 37 }

pktcNcsEndPntConfigPulseDialMaxBreakTime  OBJECT-TYPE
SYNTAX        Unsigned32 (20..200)
UNITS        "Milliseconds"
MAX-ACCESS   read-only
STATUS       current
DESCRIPTION

"This is the maximum break pulse width for the dial pulse. The value of pktcNcsEndPntConfigPulseDialMaxBreakTime MUST be greater than pktcNcsEndPntConfigPulseDialMinBreakTime. This object MUST only be provided via the configuration file during the provisioning process."

DEFVAL { 75 }
::= { pktcNcsEndPntConfigEntry 38 }

-- notification group is for future extension.
--
pktcSigNotification OBJECT IDENTIFIER ::= { pktcIetfSigMib 0 }
pktcSigConformance OBJECT IDENTIFIER ::= { pktcIetfSigMib 2 }
pktcSigCompliances OBJECT IDENTIFIER ::= { pktcSigConformance 1 }
pktcSigGroups OBJECT IDENTIFIER ::= { pktcSigConformance 2 }

-- compliance statements
--
pktcSigBasicCompliance MODULE-COMPLIANCE
  STATUS current
  DESCRIPTION
  "The compliance statement for devices that implement Signaling on the MTA."

MODULE -- pktcIetfSigMib

-- unconditionally mandatory groups
--
MANDATORY-GROUPS {
  pktcSigGroup
}

GROUP pktcNcsGroup
DESCRIPTION
  "This group is mandatory for any MTA implementing NCS signaling"

GROUP pktcInternationalGroup
DESCRIPTION
  "This group is mandatory for any MTA implementing international telephony features. In such cases, it is left to manufacturers to determine whether to support both"
PacketCable and IPCablecom objects in the same MTA."
::={ pktcSigCompliances 1 }

--
-- units of conformance
--

pktcSigGroup  OBJECT-GROUP
OBJECTS {
pktcSigDevCodecMax,
pktcSigDevEchoCancellation,
pktcSigDevSilenceSuppression,
pktcSigDevR0Cadence,
pktcSigDevR1Cadence,
pktcSigDevR2Cadence,
pktcSigDevR3Cadence,
pktcSigDevR4Cadence,
pktcSigDevR5Cadence,
pktcSigDevR6Cadence,
pktcSigDevR7Cadence,
pktcSigDevRgCadence,
pktcSigDevRsCadence,
pktcSigDefCallSigDscp,
pktcSigDefMediaStreamDscp,
pktcSigDevVmwiMode,
pktcSigCapabilityType,
pktcSigCapabilityVersion,
pktcSigCapabilityVendorExt,
pktcSigDefNcsReceiveUdpPort
}
STATUS current
DESCRIPTION
"Group of objects for the common portion of the PacketCable Signaling MIB."
::={ pktcSigGroups 1 }

pktcNcsGroup  OBJECT-GROUP
OBJECTS {
pktcNcsEndPntConfigCallAgentId,
pktcNcsEndPntConfigCallAgentUdpPort,
pktcNcsEndPntConfigPartialDialTO,
pktcNcsEndPntConfigCriticalDialTO,
pktcNcsEndPntConfigBusyToneTO,
pktcNcsEndPntConfigDialToneTO,
pktcNcsEndPntConfigMessageWaitingTO,
pktcNcsEndPntConfigOffHookWarnToneTO,
pktcNcsEndPntConfigRingingTO,
pktcNcsEndPntConfigRingBackTO,
pktcNcsEndPntConfigReorderToneTO,
pktcNcsEndPntConfigStutterDialToneTO,
pktcNcsEndPntConfigTSMax,
pktcNcsEndPntConfigMax1,
pktcNcsEndPntConfigMax2,
pktcNcsEndPntConfigMax1QEnable,
pktcNcsEndPntConfigMax2QEnable,
pktcNcsEndPntConfigMWD,
pktcNcsEndPntConfigTdinit,
pktcNcsEndPntConfigTdmin,
pktcNcsEndPntConfigTdmax,
pktcNcsEndPntConfigRtoMax,
pktcNcsEndPntConfigRtoInit,
pktcNcsEndPntConfigLongDurationKeepAlive,
pktcNcsEndPntConfigThist,
pktcNcsEndPntConfigStatus,
pktcNcsEndPntConfigCallWaitingMaxRep,
pktcNcsEndPntConfigCallWaitingDelay,
pktcNcsEndPntStatusCallIpAddressType,
pktcNcsEndPntStatusCallIpAddress,
pktcNcsEndPntStatusError
}

STATUS current

DESCRIPTION
"Group of objects for the NCS portion of the PacketCable Signaling MIB. This is mandatory for NCS."
::= { pktcSigGroups 2 }

pktcInternationalGroup  OBJECT-GROUP

OBJECTS {
    pktcNcsEndPntConfigMinHookFlash,
pktcNcsEndPntConfigMaxHookFlash,
pktcNcsEndPntConfigPulseDialInterdigitTime,
pktcNcsEndPntConfigPulseDialMinMakeTime,
pktcNcsEndPntConfigPulseDialMaxMakeTime,
pktcNcsEndPntConfigPulseDialMinBreakTime,
pktcNcsEndPntConfigPulseDialMaxBreakTime,
pktcSigDevRingCadence,
pktcSigDevCidSigProtocol,
pktcSigDevCidDelayAfterLR,
pktcSigDevCidDtmfStartCode,
pktcSigDevCidDtmfEndCode,
pktcSigDevVmwiSigProtocol,
pktcSigDevVmwiDelayAfterLR,
pktcSigDevVmwiDtmfStartCode,
pktcSigDevVmwiDtmfEndCode,
pktcSigDevrpAsDtsDuration,
pktcSigDevCidMode,
pktcSigDevCidAfterRing,
pktcSigDevCidAfterDTAS,


pktcSigDevCidAfterRPAS,
pktcSigDevRingAfterCID,
pktcSigDevCidDTASAfterLR,
pktcSigDevVmwiMode,
pktcSigDevVmwiAfterDTAS,
pktcSigDevVmwiAfterRPAS,
pktcSigDevVmwiDTASAfterLR,
pktcSigPowerRingFrequency,
pktcSigPulseSignalFrequency,
pktcSigPulseSignalDbLevel,
pktcSigPulseSignalDuration,
pktcSigPulseSignalPulseInterval,
pktcSigDevToneDbLevel,
pktcSigDevToneFreqCounter,
pktcSigDevToneWholeToneRepeatCount,
pktcSigDevToneSteady,
pktcSigDevToneFirstFreqValue,
pktcSigDevToneSecondFreqValue,
pktcSigDevToneThirdFreqValue,
pktcSigDevToneFourthFreqValue,
pktcSigDevToneFreqMode,
pktcSigDevToneFreqAmpModePrtg,
pktcSigDevToneFreqOnDuration,
pktcSigDevToneFreqOffDuration,
pktcSigDevToneFreqRepeatCount

} 

STATUS current
DESCRIPTION
" Group of objects that extend the behavior of existing objects to support operations in the widest possible set of international marketplaces. Note that many of these objects represent a superset of behaviors described in other objects within this MIB Module."
::= { pktcSigGroups 3 }

END

6.
Examples
This section provides a couple of examples, specifically related to the MIB tables pktcSigDevToneTable and pktcSigDevMultiFreqToneTable.

Example A: Call waiting tone defined per ITU-T E.180:

1) 400 Hz AM modulated by 16 Hz, on for 500ms at -4 dBm
2) 400 Hz AM modulated by 16 Hz, off for 400ms
3) 400 Hz not AM modulated, on for 50 ms at -4 dBm
4) 400 Hz not AM modulated, off for 450 ms
5) 400 Hz not AM modulated, on for 50 ms at -4 dBm
6) 400 Hz not AM modulated, off for 3450 ms
7) 400 Hz not AM modulated, on for 50 ms at -4 dBm
8) 400 Hz not AM modulated, off for 450 ms
9) 400 Hz not AM modulated, on for 50 ms at -4 dBm
10) 400 Hz not AM modulated, off for 3450 ms
11) not repeated, not continuous

Assume userDefined1(18) is assigned to this tone:

\[
\begin{array}{cccccccccccc}
\text{ToneType} & \text{F-1} & \text{F-2} & \text{F-3} & \text{F-4} & \text{F-Mode} & \text{ModePrtg} & \text{DbL} & \text{OnDur} & \text{OffDur} & \text{Rep-Count} \\
18 & 400 & 16 & 0 & 0 & 1 & 90 & -40 & 500 & 400 & 0 \\
18 & 400 & 0 & 0 & 0 & 2 & 0 & -40 & 50 & 450 & 0 \\
18 & 400 & 0 & 0 & 0 & 2 & 0 & -40 & 50 & 3450 & 0 \\
18 & 400 & 0 & 0 & 0 & 2 & 0 & -40 & 50 & 450 & 0 \\
18 & 400 & 0 & 0 & 0 & 2 & 0 & -40 & 50 & 3450 & 0 \\
\end{array}
\]

pktcSigDevToneTable:

\[
\begin{array}{cccccccc}
\text{ToneType} & \text{ToneFreqGroup} & \text{ToneFreqCounter} & \text{ToneRep-Count} & \text{Steady} \\
18 & 1 & 5 & 0 & false(2) \\
\end{array}
\]

The single row of the pktcSigDevToneTable defines one multi-frequency group of five rows (ToneFreqCounter) defined in the pktcSigDevMultiFreqToneTable and instructs the MTA to play this group only once (non-repeatable as ToneRep-Count equals 0).

Example B - Congestion Tone - congestion(17):

Note: This example of an embedded cadence is based on an operator variation.

1) 400Hz on for 400ms -10 dBm
2) 400Hz off for 350ms
3) 400Hz on for 225ms -4 dBm
4) 400Hz off for 525ms
5) repeat (1) through (4) 5000 times or T0 timeout (which ever is shortest period)

\[
\begin{array}{cccccccccccc}
\text{ToneType} & \text{F-1} & \text{F-2} & \text{F-3} & \text{F-4} & \text{F-Mode} & \text{ModePrtg} & \text{DbL} & \text{OnDur} & \text{OffDur} & \text{Rep-Count} \\
17 & 400 & 0 & 0 & 0 & 2 & 0 & -100 & 400 & 350 & 0 \\
17 & 400 & 0 & 0 & 0 & 2 & 0 & -40 & 225 & 525 & 0 \\
\end{array}
\]
pktcSigDevToneTable:
ToneType|ToneFreqGroup|ToneFreqCounter|ToneRep-Count|Steady
=============================================================
17          1             2              5000        false(2)

Example C - Call Waiting Tone - callWaiting1(9):
1) 16 Hz is modulated to carry the 400 Hz signal, ModulationRate within 85%, on for 500msec, at -25 dBm or more but less than -14 dBm
2) 16 Hz is modulated to carry the 400 Hz signal, off for 0 ~ 4 secs
3) 400 Hz not modulated, on for 50 ms at -25 dBm or more but less than -14 dBm
4) 400 Hz not modulated, off for 450ms
5) 400 Hz not modulated, on for 50 ms at -25 dBm or more but less than -14 dBm
6) 400 Hz not modulated, off for 3450ms ([4000 - (50+450+50)])
7) Steps 3 thru 6 are repeated.

pktcSigDevMultiFreqToneTable:
ToneType|F-1|F-2|F-3|F-4|F-Mode|ModePrtg|DbL|OnDur|OffDur|Rep-Count
===================================================================
9        1   400 16  0   0     1     85     -25  500  1000      0
9        2   400  0  0   0     2      0     -25   50   450      0
9        3   400  0  0   0     2      0     -25   50  3450      0

pktcSigDevToneTable:
ToneType|ToneFreqGroup|ToneFreqCounter|ToneRep-Count|Steady
=============================================================
9           1             1              0       false(2)
9           2             2              1       false(2)

The first row of the pktcSigDevToneTable table instructs the MTA to play one row (ToneFreqCounter) of the pktcSigDevMultiFreqToneTable table only once (non-repeatable as ToneRep-Count equals 0). The second row of the pktcSigDevToneTable table instructs the MTA to play next two rows (ToneFreqCounter) of the pktcSigDevMultiFreqToneTable table and make this frequency group repeatable (ToneRep-Count is not 0).

7. Acknowledgments
The current editors would like to thank the members of the IETF IPCDN working group and the CableLabs PacketCable Provisioning focus team for their contributions, comments and suggestions.

Specifically, the following individuals are recognized:

Angela Lyda            Arris Interactive  
Romascanu, Dan         Avaya         
Chad Griffiths         Broadcom Corp.  
Eugene Nechamkin       Broadcom Corp.  
Jean-Francois Mule     CableLabs(R)   
Matt A. Osman          CableLabs(R)   
Klaus Hermanns         Cisco Systems, Inc. 
Rich Woundy            Comcast Corp.   
Bert Wijnen            Lucent Technologies  
Randy Presuhn          Mindspring    
Phillip Freyman        Motorola, Inc.  
Rick Vetter            Motorola, Inc.  
Sasha Medvinsky        Motorola, Inc.  
Wim De Ketelaere        tComLabs      
David De Reu           tComLabs      
Kristof Sercu          tComLabs      
Roy Spitzer            Telyogy Networks, Inc. 
Itay Sherman           Texas Instruments, Inc. 
Mauricio Sanchez       Texas Instruments, Inc. 
Shivakumar Thangapandi Texas Instruments, Inc. 
Mike Heard             Consultant

For the international objects, the authors are especially thankful to Phillip Freyman and Eugene Nechamkin for their recommendations and contributions. Special appreciation is also expressed to the IPCDN co-chairs (Jean-Francois, Rich woundy) and Dan Romascanu for the numerous reviews and valuable comments.

8. Security Considerations

There are a number of management objects defined in this MIB that have a MAX-ACCESS clause of read-write and/or read-create. Such objects may be considered sensitive or vulnerable in some network environments. The support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

The following Differentiated Services Code Point (DSCP) and mask objects are used to differentiate between various types of traffic in the service provider network:

\[-\]

\[-\]
These objects may contain information that may be sensitive from a business perspective. For example, they may represent a customer’s service contract that a service provider chooses to apply to a customer’s ingress or egress traffic. If these objects are SET maliciously, it may permit unmarked or inappropriately marked signaling and media traffic to enter the service provider network, resulting in unauthorized levels of service for customers.

The following objects determine ring cadence, repeatable characteristics, signal duration, and caller id subscriber line protocol for telephony operation:

- pktcSigDevR0Cadence
- pktcSigDevR1Cadence
- pktcSigDevR2Cadence
- pktcSigDevR3Cadence
- pktcSigDevR4Cadence
- pktcSigDevR5Cadence
- pktcSigDevR6Cadence
- pktcSigDevR7Cadence
- pktcSigDevRgCadence
- pktcSigDevRsCadence
- pktcSigDevCidSigProtocol
- pktcSigDevVmwiSigProtocol
- pktcSigPulseSignalDuration
- pktcSigPulseSignalPauseDuration

If these objects are SET maliciously, it may result in unwanted operation, or a failure to obtain telephony service from client (MTA) devices.

The objects in the pktcNcsEndPntConfigTable are used for endpoint signaling. The pktcNcsEndPntConfigCallAgentId object contains the name of the call agent, which includes the call agent Fully Qualified Domain Name (FQDN). If this object is SET maliciously, the MTA will not be able to communicate with the call agent, resulting in a disruption of telephony service. The pktcNcsEndPntConfigCallAgentUdpPort object identifies the UDP port for NCS traffic. If this object is SET maliciously, the call agent will not receive NCS traffic from the MTA, also resulting in a disruption of telephony service.

Some of the readable objects in this MIB module (i.e., objects with a MAX-ACCESS other than not-accessible) may be considered sensitive or vulnerable in some network environments. It is thus important to control even GET and/or NOTIFY access to these objects and possibly to even encrypt the values of these objects when sending them over the network via SNMP. The most sensitive is
pktcNcsEndPntStatusCallIpAddress within pktcNcsEndPntConfigTable. This information itself may be valuable to would-be attackers.

SNMP versions prior to SNMPv3 did not include adequate security. Even if the network itself is secure (for example by using IPSec), even then, there is no control as to who on the secure network is allowed to access and GET/SET (read/change/create/delete) the objects in this MIB module.

It is RECOMMENDED that implementers consider the security features as provided by the SNMPv3 framework (see [RFC3410], section 8), including full support for the SNMPv3 cryptographic mechanisms (for authentication and privacy).

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

9. IANA Considerations

The MIB module in this document uses the following IANA-assigned OBJECT IDENTIFIER values recorded in the SMI Numbers registry:

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>OBJECT IDENTIFIER Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pktcIetfSigMib</td>
<td>{ mib-2 XXX }</td>
</tr>
</tbody>
</table>

Editor’s Note (to be removed prior to publication): the IANA is requested to assign a value for XXX under the mib-2 subtree and to record the assignment in the SMI Numbers registry. When the assignment has been made, the RFC Editor is asked to replace XXX (here and in the MIB module) with the assigned value and to remove this note.

10. Normative References

http://www.packetcable.com/specifications/
http://www.cablelabs.com/specifications/archives/

http://www.packetcable.com/specifications/
http://www.cablelabs.com/specifications/archives/


11.
Informative References


[ETSI-EN-300-001] ETSI EN 300-001 V1.5.1 (1998-10): "European Standard (Telecommunications series) Attachments to Public Switched Telephone Network (PSTN); General technical requirements for equipment connected to an analogue subscriber interface in the PSTN; Chapter 3: Ringing signal characteristics (national deviations are in Table 3.1.1)".

[ETSI-EN-300-324-1] ETSI EN 300 324-1 V2.1.1 (2000-04): "V Interfaces at the digital Loop Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 1: V5.1 interface specification".

[ETSI-EN-300-659-1] ETSI EN 300 659-1: "Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services; Part 1: On hook data transmission".


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