International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

J.370

(06/2008)

SERIES J: CABLE NETWORKS AND TRANSMISSION OF TELEVISION, SOUND PROGRAMME AND OTHER MULTIMEDIA SIGNALS

IPCablecom

IPCablecom2 embedded user equipment provisioning data model specification

Recommendation ITU-T J.370

Recommendation ITU-T J.370

IPCablecom2 embedded user equipment provisioning data model specification

Summary

Recommendation ITU-T J.370 presents the data element definitions and associated requirements for use with the IPCablecom2 embedded user equipment (E-UE) Provisioning Framework. Specifically, it defines data to be used for configuration and management of E-UEs, and associated users.

Source

Recommendation ITU-T J.370 was approved on 13 June 2008 by ITU-T Study Group 9 (2005-2008) under Recommendation ITU-T A.8 procedure.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

CONTENTS

Recommendation ITU-T J.370

IPCablecom2 embedded user equipment provisioning data model specification

1 Scope

This Recommendation presents the data element definitions and associated requirements for use with the IPCablecom2 E-UE Provisioning Framework. Specifically, it defines data to be used for configuration and management of E-UEs, and associated users. For more information on the IPCablecom2 E-UE Provisioning Framework, please refer to [PKT-EUE-PROV].

This Recommendation does not consider IPCablecom2 application specific data within its scope. IPCablecom2 application specifications are expected to specify such data.

It is an important objective of this work that interoperability between IPCablecom 2.0 and 3GPP IMS is provided. IPCablecom 2.0 is based upon 3GPP IMS, but includes additional functionality necessary to meet the requirements of cable operators. Recognizing developing converged solutions for wireless, wireline, and cable, it is expected that further development of IPCablecom 2.0 will continue to monitor and contribute to IMS developments in 3GPP, with the aim of alignment of 3GPP IMS and IPCablecom 2.0.

NOTE – The structure and content of this Recommendation have been organized for ease of use by those familiar with the original source material; as such, the usual style of ITU-T recommendations has not been applied.

2 References

2.1 Normative References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[CL-MIB-BB] Recommendation ITU-T J.199: *Battery backup for cable-based devices*.

[DOCSIS-RFI] Recommendation ITU-T J.112: *Transmission systems for interactive cable television services*.

[eDOCSIS] Recommendation ITU-T J.126: *Embedded Cable Modem device specification*.

[PKT-EUE-PROV] Recommendation ITU-T J.369: *IPCablecom2 E-UE Provisioning Specification*.

[PKT-SP-PROV1.5] Recommendation ITU-T J.167: *Media terminal adapter (MTA) device provisioning requirements for the delivery of real-time services over cable television networks using cable modems*.

[PKT-MEM1.5] Recommendation ITU-T J.172: *IPCablecom management event mechanism*.

[RFC2863] IETF RFC 2863, *The Interfaces Group MIB, June 2000*.

[RFC3410] IETF RFC 3410, *Introduction and Applicability Statements for Internet Standard Management Framework, December 2002*.

[RFC3412] IETF RFC 3412/STD0062, *Message Processing and Dispatching for the Simple Network Management Protocol (SNMP), December 2002*.

[RFC3413] IETF RFC 3413/STD0062, *Simple Network Management Protocol (SNMP) Applications, December 2002*.

[RFC3414] IETF RFC 3414/STD0062, *User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3), December 2002*.

[RFC3415] IETF RFC 3415/STD0062, *View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP), December 2002*.

[RFC3418] IETF RFC 3418, *Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)*.

[RFC3665] IETF RFC 3665, *Definitions of Managed Objects for the Ethernet-like Interface Types, September 2003*.

[RFC4113] IETF RFC 4113, *Management Information Base for the User Datagram Protocol (UDP), June 2005*.

[RFC4293] IETF RFC 4293, *Management Information Base for the Internet Protocol (IP), April 2006*.

[IETF STD58] IETF RFC 2578/STD0058, *Structure of Management Information Version 2 (SMIv2), April 1999*.

[IETF STD62] IETF RFC 3411/STD0062, *An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks, December 2002*.

2.2 Informative References

This Recommendation uses the following informative reference.

[ARCH-FRM TR] Recommendation ITU-T J.160: *Architectural framework for the delivery of time-critical services over cable television networks using cable modems*.

2.3 Reference Acquisition

- Internet Engineering Task Force (IETF) Secretariat, 46000 Center Oak Plaza, Sterling, VA 20166, Phone +1-571-434-3500, Fax +1-571-434-3535, http://www.ietf.org/.

3 Terms and Definitions

This Recommendation uses the following terms:

3.1 eCM: The logical DOCSIS CM component of a E-UE, complies with DOCSIS, eDOCSIS and IPCablecom requirements.

3.2 eUE: The logical IPCablecom UE component of an E-UE, complies with eSAFE and IPCablecom requirements.

3.3 embedded user equipment (E-UE): A single physical device embedded with an eDOCSIS-compliant DOCSIS Cable Modem and an IPCablecom eUE.

3.4 management information base: The description of the data items used by the Network Management for management and configuration of the IPCablecom compliant E-UE. Such description is done based on the formal meta-language SMI defined by the corresponding IETF standards.

3.5 network management: The functions related to the management of data across the network.

4 Abbreviations, acronyms and conventions

4.1 Abbreviations and Acronyms

This Recommendation uses the following abbreviations:

CM	DOCSIS Cable Modem – a DOCSIS-compliant devise which provides data transport connectivity from RFI to IP networks
DOCSIS®	Data-Over-Cable Service Interface Specifications
MIB	Management Information Base
OID	Object Identifier. The sequence of integer positive numbers uniquely identifying the position of each MIB Object in the MIB Hierarchy
RFC	Request for Comments. Technical policy documents approved by the IETF which are available on the World Wide Web at http://www.ietf.cnri.reston.va.us/rfc.html
SNMP	Simple Network Management Protocol
UDP	User Datagram Protocol. A connectionless protocol built upon Internet Protocol (IP)
VACM	View-based Access Control Model

4.2 Conventions

Throughout this Recommendation, the words that are used to define the significance of particular requirements are capitalized. These words are:

"MUST"	This word means that the item is an absolute requirement of this Recommendation.
"MUST NOT"	This phrase means that the item is an absolute prohibition of this Recommendation.
"SHOULD"	This word means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.
"SHOULD NOT"	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
"MAY"	This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

5 Technical Overview

IPCablecom2 is a cable industry specification effort designed to support the convergence of voice, video, data, and mobility technologies. This Recommendation is part of the IPCablecom2 set of specifications and technical reports that define the base architecture and specifies the data elements required to configure and manage E-UEs, associated users and applications, using the IPCablecom2 E-UE Provisioning Framework. For more information about IPCablecom2, please refer to the IPCablecom2 Architecture Framework Technical Report [ARCH-FRM TR]. For more information on the IPCablecom2 E-UE Provisioning Framework, please refer to [PKT-EUE-PROV].

The IPCablecom2 E-UE Provisioning Framework relies on SNMP, as specified in [IETF STD62], for configuration and management. The data is specified using Structure of Management Information, Version 2 (SMIv2) Management Information Bases (MIBs), as specified in [IETF STD58]. Thus, this Recommendation specifies the configuration and management MIBs for use with the IPCablecom2 E-UE Provisioning Framework.

In this Recommendation, the term "DOCSIS" is used to refer to DOCSIS version 1.1 or later, unless explicitly specified otherwise. Additionally, all references to IPCablecom within this Recommendation are assumed to be IPCablecom2, unless stated otherwise.

5.1 Embedded User Equipment (E-UE)

The E-UE is a single physical device embedded with an eDOCSIS-compliant DOCSIS Cable Modem (eCM) and an eUE that complies with eDOCSIS eSAFE and IPCablecom UE requirements. For more information on E-UEs please refer to [PKT-EUE-PROV].

5.2 E-UE Provisioning Framework

The E-UE Provisioning Framework is an IPCablecom2 configuration and management framework based on the IPCablecom 1.5 Device Provisioning specification. For more information on the E-UE Provisioning Framework, please refer to [PKT-EUE-PROV].

This Recommendation is to be used in conjunction with the E-UE Provisioning Framework, and also relies on the IPCablecom 1.5 Device Provisioning specification. For more information on the latter, please refer to [PKT-SP-PROV1.5].

5.3 E-UE Provisioning Data Model

The E-UE Provisioning Data Model serves eCMs, eUEs, users and associated applications. For the eCM component it borrows from the DOCSIS suite of specifications with no additional enhancements. The eUE, user and application data are logically separated, and specified in this Recommendation. Given the use of SNMP for configuration and management, the eUE component is provided with data pertaining to itself, users and applications.

The logical representation of the E-UE Provisioning Data Model is specified in Figure 1.

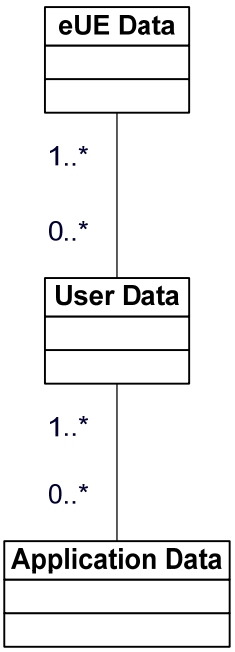

Figure 1 – E-UE Provisioning Data Model

6 E-UE Provisioning MIBs Framework Requirements

The E-UE MIBs framework provides the MIB module implementation requirements for the E-UE. An informative, logical framework depicting MIB modules in the E-UE components is presented in Figure 2. The rest of this clause presents the specific requirements.

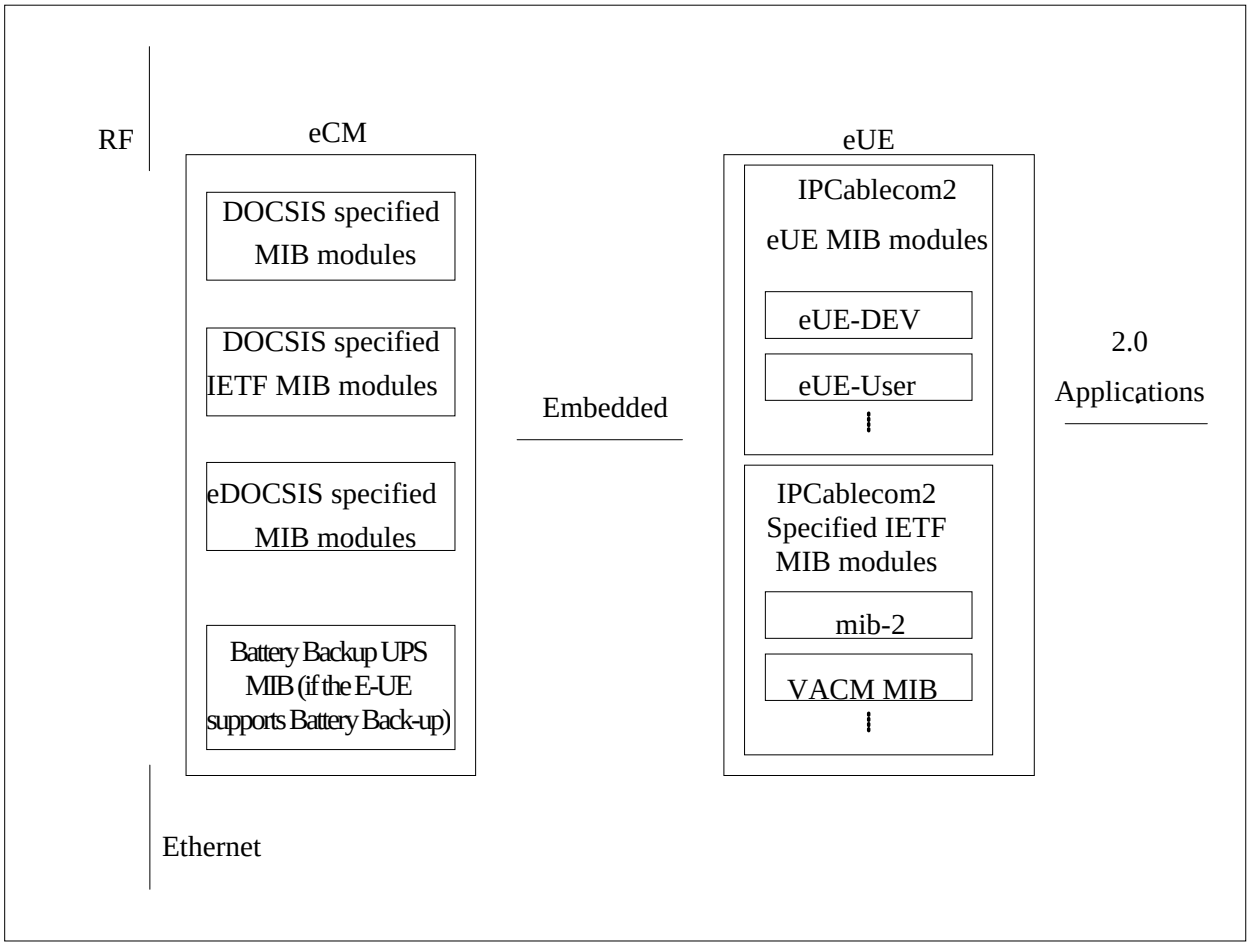

Figure 2 – E-UE Logical MIBs Framework

The eCM component of an E-UE needs to comply with the DOCSIS and eDOCSIS suite of specifications. The eUE component is required to support the data model that was informatively described in clause 5.3. To provide more information:

- The eUE can be associated with one or more Users.
- Each User can be associated with one or more applications.
- Each application has one more features; each feature has a set of configuration data.

Furthermore, each User can be associated with one or more eUEs. However, this is not possible to achieve using an SNMP-based framework that requires the data to be physically stored on a single client. In the E-UE Provisioning framework, this client is the eUE (for IPCablecom data). Support for the other requirements is achieved by using an array of mappings:

- Association of an eUE with multiple Users
- Association of a User with multiple Applications; each Application being associated with one Profile

- Association of a Profile with multiple features; some of which could be shared with other Profiles belonging to the same Application

6.1 eCM MIB Requirements

This clause presents the MIB module requirements for the eCM component of the E-UE.

6.1.1 DOCSIS MIB Modules

The eCM component of an E-UE MUST comply with the DOCSIS MIB module requirements. For more information on the DOCSIS MIB modules, please refer to the DOCSIS Recommendations.

6.1.2 eDOCSIS MIB Modules

The eCM component of an E-UE MUST comply with the eDOCSIS MIB requirements. For more information on the eDOCSIS MIB module requirements, please refer to the eDOCSIS Recommendation [eDOCSIS].

6.1.3 Battery Backup UPS MIB module

If the E-UE supports Battery Backup functionality, as specified in [CL-MIB-BB], the eCM component MUST support the Battery Backup and UPS MIB and associated requirements.

6.2 eUE MIB Requirements

This clause presents the MIB module requirements for the eUE component of the E-UE.

6.2.1 eUE MIB Modules

The eUE component of the E-UE MUST comply with the IPCablecom2 specified eUE MIB configuration and management MIB modules specified in Annexes B and C, respectively.

6.2.2 IETF MIB Modules

The eUE MUST implement the following MIB modules:

- MIB II system group as specified in [RFC3418];
- IF MIB as specified in [RFC2863];
- Ethernet MIB as specified in [RFC3665];
- UDP MIB as specified in [RFC4113]; and
- IP MIB as specified in [RFC4293].

6.2.3 SNMP MIB Requirements

6.2.3.1 eUEsysDescr Requirements

The eUE's MIB II sysDescr MIB object MUST conform to the format specified in the DOCSIS specifications governing the eCM component.

6.2.3.2 eUE ifTable Requirements

The eUE MUST implement the row entry specified in Table 1 for the ifTable as specified in [RFC2863].

Table 1 – eUE ifTable Requirements

ifTable ([RFC2863])	Row Entry
IfIndex	1
ifDescr	"DOCSIS Embedded Interface"
IfType	other(1)
IfMtu	0
IfSpeed	0
ifPhysAddress	eUE MAC address
IfAdminStatus	up(1)
ifOperStatus	up(1)
IfLastChange	per [RFC2863]
ifInOctets (optional)	(n) if implemented, else 0
IfInNUCastPkts	Deprecated
IfInDiscards	0
IfInErrors	0
IfUnknownProtos	0
ifOutOctets (optional)	(n) if implemented, else 0
ifOutUCastPkts (optional)	(n) if implemented, else 0
IfOutNUCastPkts	Deprecated
IfOutDiscards	0
IfOutErrors	0
IfOutQlen	Deprecated
IfSpecific	Deprecated

6.2.3.3 eUE ipNetToPhysicalTable Requirements

The eUE MUST implement the row entry specified in Table 2 for the ipNetToPhysicalTable as specified in [RFC4293].

Table 2 – ipNetToPhysicalTable MIB Object Details

ipNetToPhysicalTable	CM device
ipNetToPhysicalIfIndex	1
ipNetToPhysicalPhysAddress	eCM MAC Address
ipNetToPhysicalNetAddressType	ipv4(1) or ipv6(2)
ipNetToPhysicalNetAddress	eCM IP Address
ipNetToPhysicalLastUpdated	<refer to [RFC4293]>
ipNetToPhysicalType	static(4)
ipNetToPhysicalState	<refer to [RFC4293]>
ipNetToPhysicalRowStatus	'active'

6.2.3.4 eUE USM Requirements

This clause presents the IPCablecom2 eUE USM requirements. Please refer to [RFC3414] for more information on the User-based Security Model (USM) for SNMPv3.

An eUE, provisioned in the Secure Provisioning Flow, MUST configure the usmUserTable immediately after receiving the AP REPLY from the Provisioning Server, with the entry specified in Table 3.

Table 3 – eUE usmUserTable Entry

usmUserTable ([RFC3414][IETF STD62])	Row Entry
usmUserEngineID	The SNMP local engine id
usmUserName	eUE-Prov-xx:xx:xx:xx:xx:xx, where xx:xx:xx:xx:xx:xx represents the eUE's Mac address
usmUserSecurityName	eUE-Prov-xx:xx:xx:xx:xx:xx, where xx:xx:xx:xx:xx:xx represents the eUE's Mac address
usmUserCloneFrom	0.0
usmUserAuthProtocol	usmHMACMD5AuthProtocol or usmHMACSHAAuthProtocol
usmUserAuthKeyChange	""
usmUserOwnAuthKeyChange	""
usmUserPrivProtocol	usmDESPrivProtocol if privacy is indicated in AP REPLY usmNoPrivProtocol if privacy is not indicated in the AP REPLY
usmUserPrivKeyChange	""
usmUserOwnPrivKeyChange	""
usmUserPublic	""
usmUserStorageType	volatile
usmUserStatus	active

Initial authentication and privacy keys for this user are derived from the AP Reply message. The eUE MUST allow for cloning of users as specified in [IETF STD62]. This can be accomplished using the configuration file, or dynamically through SNMP SET operations.

6.2.3.5 eUE VACM Requirements

This clause presents the IPCablecom2 eUE VACM requirements. For more information regarding View-based Access Control Model (VACM) for SNMP, please refer to [RFC3415].

The eUE MUST configure the VacmSecurityToGroupTable with the entry specified in Table 4.

Table 4 – eUE VacmSecurityToGroupTable

VacmSecurityToGroupTable ([RFC3415])	Row Entry
vacmSecurityModel	USM
vacmSecurityName	eUE-Prov-xx:xx:xx:xx:xx:xx
vacmGroupName	IPCablecomFullAccess
vacmSecurityToGroupStorageType	volatile
vacmSecurityToGroupStatus	active

The eUE MUST configure the vacmAccessTable with the entry specified in Table 5 and the associated requirements that follow. This configuration allows for read access of all MIB modules in the eUE, write access to IPCablecom 2.0 eUE MIB modules, and notifications as specified in the IPCablecom2 eUE MIB modules.

Table 5 – eUE vacmAccessTable

vacmAccessTable ([RFC3415])	Row Entry
vacmGroupName	IPCablecomFullAccess
vacmAccessContextPrefix	""
vacmAccessSecurityModel	USM
vacmAccessSecurityLevel	authPriv or authNoPriv (depending on whether privacy has been specified)
vacmAccessContextMatch	exact
vacmAccessReadViewName	ReadOnlyView
vacmAccessWriteViewName	FullAccessView
vacmAccessNotifyViewName	NotifyView
vacmAccessStorageType	volatile
vacmAccessStatus	active

The following requirements are associated with Table 5.

- The eUE's ReadOnlyView MUST consist of the entire MIB tree contained in the eUE.
- The eUE's FullAccessView MUST consist of all the IPCablecom-specified MIB modules, the MIB-II system group, and the IF-MIB tree.
- The eUE's FullAccessView MAY include vendor-specific MIBs, VACM, USM, and Notifications MIB.
- The eUE's NotifyView MUST consist of all the IPCablecom2 specified MIB modules, the MIB-II system group, and the snmpTrapOID MIB tree.
- The eUE's NotifyView MAY include vendor-specific MIB trees.

6.2.3.6 SNMPv2c Management Requirements

The eUE MUST follow the SNMPv2c management requirements as specified in [PKT-SP-PROV1.5], "SNMPV2C MANAGEMENT REQUIREMENTS", with the following clarifications:

- The requirements applicable to the eMTA apply to the eUE.
- The string (or substring) "mta" is replaced with "eue" in snmpCommunityIndex, snmpCommunitySecurityName, snmpCommunityTransportTag, snmpTargetAddrName, snmpTargetAddrTagList, snmpTargetAddrParams, vacmSecurityName, vacmGroupName, VacmAccessReadViewName, VacmAccessWriteViewName, vacmAccessNotifyViewName, vacmViewTreeFamilyViewName, snmpTargetParamsName, snmpTargetParamsSecurityName, snmpNotifyName, snmpNotifyTag, snmpNotifyFilterProfileName and snmpNotifyFilterSubtree.
- Any references to MIB modules, such as pktcMtaNotification within the snmpNotifyFilterTable, applies to the IPCablecom2 E-UE MIB modules.

6.3 Configuration Data Element Requirements

The eCM MUST comply with the DOCSIS and eDOCSIS configuration data element requirements, including mandatory, optional and prohibited MIB Objects. The eUE MUST report any configuration data elements deemed mandatory, and not provided in the respective configuration file.

6.3.1 Configuration File Requirements

This clause provides the configuration data element requirements.

Table 6 – eUE Configuration Data Element Requirements

MIB Module (CL-PKTC-)	Data Element	Requirement	Additional Details
EUE-PROV-MGMT-MIB	pktcMtaDevEnabled	Mandatory	This element is always required.
EUE-PROV-MGMT-MIB	pktcMtaDevRealmOrgName	Conditionally Mandatory	This element is mandatory in the Secure Provisioning Flow.
EUE-DEV-MIB	pktcEUEDevOpTable	Conditionally Mandatory	One table entry is mandatory if the eUE has any active users associated with it.
EUE-DEV-MIB	pktcEUEDevDnsTable	Conditionally Mandatory	One table entry is mandatory if the eUE has any active users associated with it.
EUE-DEV-MIB	pktcEUEDevPCSCFTable	Conditionally Mandatory	One table entry is mandatory if the eUE has any active users associated with it.
EUE-USER-MIB	pktcEUEUsrIMPUTable	Conditionally Mandatory	One table entry is mandatory if the eUE has any active users associated with it.
EUE-USER-MIB	pktcEUEUsrIMPITable	Conditionally Mandatory	One table entry is mandatory if the eUE has any active users which need authentication for registration.
EUE-USER-MIB	pktcEUEUsrAppMapTable	Conditionally Mandatory	One table entry is mandatory if any active user has any applications associated with it.

6.3.2 Certificate Bootstrapping File Requirements

This clause provides the Certificate Bootstrapping configuration data element requirements.

Table 7 – eUE Configuration Bootstrapping Requirements

XML Schema	Data Element	Requirement	Additional Details
CL-PKTC-CB	pktcEUEClearCurrentCredentials	Mandatory	At least one instance is required
CL-PKTC-CB	pktcEUEUsrIMPIType	Conditionally Mandatory	Required for an instance of an IMPI
CL-PKTC-CB	pktcEUEUsrIMPI	Conditionally Mandatory	Required for an instance of an IMPI
CL-PKTC-CB	pktcEUEUsrIMPICredsType	Conditionally Mandatory	Required for an instance of an IMPI
CL-PKTC-CB	pktcEUEUsrIMPICreds	Conditionally Mandatory	Required for an instance of an IMPI

6.4 Management Event Reporting Requirements

The E-UE MUST support all the Management Events specified in [PKT-MEM1.5], Table 4, except for the following:

- PROV-EV-12
- PROV-EV-12.1
- PROV-EV-13
- PROV-EV-13.1
- PROV-EV-14
- PROV-EV-14.1

In addition, the eUE MUST support the management events specified in Table 8.

Table 8 – Additional eUE Management Events

Event Name	Default Severity for Event	Default Display String	IPCablecom Event ID	Comments
EUE-EV-1	error	"Registration did not comply with SigSecurity configuration for user <user IMPU>"	4000960000	The eUE MUST report this event if the directive specified in pktcEUEUsrIMPUSigSecurity is not met during registration of a user IMPU.
EUE-EV-2	critical	"Registration failed for user IMPU=<user IMPU>; IMPI=<user IMPI>; reason <reason>"	4000960001	The eUE MUST report this event if the registration for a specific user failed. The eUE MUST populate <user IMPU> with the user's IMPU and <user IMPI> with the user's IMPI.
EUE-EV-3	informational	"Certificate Bootstrapping Success"	4000960002	The eUE MUST report this event if a Certificate Bootstrapping procedure that was initiated was successfully completed.
EUE-EV-4	critical	"Certificate Bootstrapping Failure"	4000960003	The eUE MUST report this event if a Certificate Bootstrapping procedure was not successfully completed.

Annex A

IPCablecom eUE Common Modules

(This annex forms an integral part of this Recommendation)

A.1 Textual Conventions MIB Module

```
CL-PKTC-EUE-TC-MIB DEFINITIONS ::= BEGIN

IMPORTS
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32
                    FROM SNMPv2-SMI
    MODULE-COMPLIANCE
                    FROM SNMPv2-CONF
    TEXTUAL-CONVENTION, TruthValue
                    FROM SNMPv2-TC
    SnmpAdminString
                    FROM SNMP-FRAMEWORK-MIB
    pktcEUEMibs
                    FROM CLAB-DEF-MIB;

pktcEUETCMIB MODULE-IDENTITY
    LAST-UPDATED "200711060000Z"
    ORGANIZATION "Cable Television Laboratories, Inc."
    CONTACT-INFO
            "Sumanth Channabasappa
             Cable Television Laboratories, Inc.
             858 Coal Creek Circle,
             Louisville, CO 80027, USA
             Phone: +1 303-661-9100
             Email: mibs@cablelabs.com

             Acknowledgements:
             Thomas Clack, Broadcom - Primary author,
             and members of the PacketCable PACM Focus Team."
    DESCRIPTION
            "This MIB module specifies the TEXTUAL CONVENTIONs
             for use in the definition of PacketCable E-UE
             MIB Objects."
    ::= { pktcEUEMibs 2 }

-- Administrative assignments
pktcEUETCNotifications     OBJECT IDENTIFIER ::= { pktcEUETCMIB 0 }
pktcEUETCObjects           OBJECT IDENTIFIER ::= { pktcEUETCMIB 1 }
pktcEUETCConformance       OBJECT IDENTIFIER ::= { pktcEUETCMIB 2 }

pktcEUETCCompliances       OBJECT IDENTIFIER ::= { pktcEUETCConformance 1 }
pktcEUETCGroups            OBJECT IDENTIFIER ::= { pktcEUETCConformance 2 }

-- MIB Objects
pktcEUETCUsageObjs         OBJECT IDENTIFIER ::= { pktcEUETCObjects 1 }


--- ------------------------------------------------------------------
-- TEXTUAL CONVENTION for defining EUE Identifiers
--- ------------------------------------------------------------------
  PktcEUETCID ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION is being defined
            to contain identities that can be used
            within the PacketCable eUE data models.
```

```
            It specifies a hex string that can be
            used to represent the various identities.

            The types of possible identities are
            specified by the TEXTUAL CONVENTION
            'PktcEUETCIDType'.

            The following rules apply:
              - All identities, except macaddress refer
                to either UEs or Users.
                Mac addresses are UE specific
              - When used as a pair, the public and
                private identities MUST be separated
                by a '#', with the private identity
                following the public identity."
      SYNTAX   OCTET STRING(SIZE(0..1023))

--- ------------------------------------------------------------------
-- TEXTUAL CONVENTION for defining EUE Identifier type
--- ------------------------------------------------------------------
  PktcEUETCIDType ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION is being defined
            as a way of indicating an identity
            specified by MIB Objects utilizing the
            TEXTUAL CONVENTION 'PktcEUETCID'.

            The defined types include:
              - other(1)
                  for types not described by the options
                  provided below
              - gruu(2)
                  for Globally Routable Unique URIs
              - publicIdentity(3)
                  for Public Identities as defined by PacketCable
              - privateIdentity(4)
                  for Private Identities as defined by PacketCable
              - publicPrivatePair(5)
                  for Public and Private Identity pairs
                  as defined by PacketCable
              - username(6)
                  for username and password as defined by PacketCable
              - macaddress(7)
                  for mac addresses
              - packetcableIdentity(8)
                  for PacketCable specific types

            UE implementations must ensure that
            PktcEUETCIDType objects and any dependent
            objects (e.g., PktcEUETCID objects) are
            consistent.

            In general, the UE MUST generate an
            'inconsistentValue' error if an attempt
            to change an PktcEUETCIDType object would,
            for example, lead to an undefined PktcEUETCID
            value.
            In particular, PktcEUETCIDType/PktcEUEID pairs
            MUST be changed together."
      SYNTAX   INTEGER {
                        other(1),
                        gruu(2),
                        publicIdentity(3),
                        privateIdentity(4),
                        publicPrivatePair(5),
                        username(6),
                        macaddress(7),
                        packetcableIdentity(8)
                       }
```

```
--- ------------------------------------------------------------------
-- TEXTUAL CONVENTION for defining activation status
--- ------------------------------------------------------------------
  PktcEUETCActStatus ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION is being defined to
            indicate activation status as defined in
            PacketCable.
            A value of true(1) indicates a status
            of 'active'.
            A value of false(2) indicates a status
            of 'inactive'."
      SYNTAX   TruthValue

--- ------------------------------------------------------------------
-- TEXTUAL CONVENTION for defining activation status info
--- ------------------------------------------------------------------
  PktcEUETCActStatusInfo ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION is being defined to provide
            additional activation status information."
      SYNTAX   SnmpAdminString(SIZE(0..31))

--- ------------------------------------------------------------------
-- TEXTUAL CONVENTION for User Element Indices
--- ------------------------------------------------------------------
  PktcEUETCUsrElementIndexType ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION is being defined to
            indicate any indices related to users, such as IMPUs
            and IMPIs as defined in PacketCable.
            Such an instance can be referenced across
            tables to indicate an association.

            The values assigned for objects of this type SHOULD
            be sequential starting with the value of 1 and
            incrementing by 1 for each User. A value of '0',
            if allowed MUST be specified in the DESCRIPTION of
            any MIB Object using this data type."
      SYNTAX   Unsigned32 (0..63)

--- ------------------------------------------------------------------
-- TEXTUAL CONVENTION for defining App Org
--- ------------------------------------------------------------------
  PktcEUETCAppOrgIdentifier ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION is being defined to
            identify the organization specifying the
            a particular application.

            Any MIB Object specified to be of this type
            MUST represent the IANA assigned Enterprise number.

            For CableLabs specified applications, it MUST be
            4491."
      REFERENCE "http://www.iana.org/assignments/enterprise-numbers"
      SYNTAX   Unsigned32

--- ------------------------------------------------------------------
-- TEXTUAL CONVENTION for defining App Identifier
--- ------------------------------------------------------------------
  PktcEUETCAppIdentifier ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION is being defined to
            identify the application id assigned by an
            organization.
```

```
            Each organization planning to specify an application
            MUST publish a registry which identifies each application
            and the corresponding ID that can be referenced."
      SYNTAX   INTEGER(1..127)

--- ---------------------------------------------------------------------
-- TEXTUAL CONVENTION for App Indices
--- ---------------------------------------------------------------------
  PktcEUETCUsrAppIndexType ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION is being defined to
            indicate any indices related to PacketCable Applications.

            The values assigned for objects of this type SHOULD
            be sequential starting with the value of 1 and
            incrementing by 1 for each User. A value of '0',
            if allowed MUST be specified in the DESCRIPTION of
            any MIB Object using this data type."
      SYNTAX   Unsigned32 (0..31)


--- ---------------------------------------------------------------------
-- TEXTUAL CONVENTION for defining Credentials
--- ---------------------------------------------------------------------
  PktcEUETCCredsType ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION represents credential
            types. Each definition of PktcEUETCCredsType MUST
            be accompanied by a definition of the textual
            convention PktcEUETCCreds.

            The specified types include:
              - other(1)
                  An unknown credentials type. It MAY be used to
                  indicate Credentials that are not in one of the
                  formats defined below such as a vendor-specific
                  format.

              - none(2)
                  A non-existent credentials type. This value MUST
                  be used if the value of the corresponding
                  PktcEUETCCreds object is a zero-length string.
                  It MAY be used when the credentials are no longer
                  valid.

              - password(3)
                  A password based credential. When this type is used
                  the credential value contained in PktcEUETCCreds MUST
                  be an ASCII string representing a user-readable
                  password.

              - presharedKey(4)
                  A pre-shared key based credential. When this type is
                  used the credential value contained in PktcEUETCCreds
                  MUST be interpreted as a pre-shared key represented
                  as an octet string.

              - X509certificate(5)
                  A certificate based credential. When this type is
                  used the credential value contained in PktcEUETCCreds
                  MUST be interpreted as a private key and an accompanying
                  X.509 certificate.

            Implementations must ensure that objects with
            SYNTAX of 'PktcEUETCCredsType' and dependent objects
            with SYNTAX of 'PktcEUETCCreds' are consistent.
```

```
            In general, the UE MUST generate an
            'inconsistentValue' error if an attempt
            to change an 'PktcEUETCCredsType' object would,
            for example, lead to an undefined 'PktcEUETCCreds'
            value."
      SYNTAX   INTEGER {
                        other(1),
                        none(2),
                        password(3),
                        preSharedKey(4),
                        certificate(5)
                       }

  PktcEUETCCreds ::= TEXTUAL-CONVENTION
      STATUS  current
      DESCRIPTION
          " This TEXTUAL CONVENTION allows for the definition
            of a credential.

            A PktcEUETCCreds value must always be associated with
            and interpreted within the context of a corresponding
            PktcEUETCCredsType.

            The value of a PktcEUETCCreds object must be consistent
            with the value of its associated PktcEUETCCredsType
            object. Any attempt to SET an object when these values
            are not consistent must fail with an inconsistentValue
            error.

            An object of this type MUST be interpreted as follows
            (in network byte order):

            Bytes 0-1:  Reserved. The application must define the
                        usage of these bytes.
            Bytes 2-3:  Indicate the length of the credential.
            Bytes 4-8191: Contain the credential value."
      SYNTAX   OCTET STRING (SIZE (0..8192))


--- ------------------------------------------------------------------------
-- Sample usage of TEXTUAL CONVENTIONs
--- ------------------------------------------------------------------------

pktcEUETCSampleID OBJECT-TYPE
    SYNTAX      PktcEUETCID
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCID'."
    ::= { pktcEUETCUsageObjs 2 }

pktcEUETCSampleIDType OBJECT-TYPE
    SYNTAX      PktcEUETCIDType
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCIDType'."
    ::= { pktcEUETCUsageObjs 3 }

pktcEUETCSampleActStatus OBJECT-TYPE
    SYNTAX      PktcEUETCActStatus
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCActStatus'."
    ::= { pktcEUETCUsageObjs 4 }

pktcEUETCSampleUsrRef OBJECT-TYPE
    SYNTAX      PktcEUETCUsrElementIndexType
    MAX-ACCESS  not-accessible
    STATUS      obsolete
```

```
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCUsrRef'."
    ::= { pktcEUETCUsageObjs 5 }

pktcEUETCSampleCredsType OBJECT-TYPE
    SYNTAX      PktcEUETCCredsType
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCCredsType'."
    ::= { pktcEUETCUsageObjs 6 }

pktcEUETCSampleCreds OBJECT-TYPE
    SYNTAX      PktcEUETCCreds
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCCreds'."
    ::= { pktcEUETCUsageObjs 7 }

pktcEUETCSampleAppRef OBJECT-TYPE
    SYNTAX      PktcEUETCUsrAppIndexType
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCUsrRef'."
    ::= { pktcEUETCUsageObjs 8 }

pktcEUETCSampleActStatusInfo OBJECT-TYPE
    SYNTAX      PktcEUETCActStatusInfo
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCActStatusInfo'."
    ::= { pktcEUETCUsageObjs 9 }


pktcEUETCAppIdentifier OBJECT-TYPE
    SYNTAX      PktcEUETCAppIdentifier
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCActStatusInfo'."
    ::= { pktcEUETCUsageObjs 10 }

pktcEUETCAppOrgIdentifier OBJECT-TYPE
    SYNTAX      PktcEUETCAppOrgIdentifier
    MAX-ACCESS  not-accessible
    STATUS      obsolete
    DESCRIPTION
           " Sample MIB Object for use of 'PktcEUETCActStatusInfo'."
    ::= { pktcEUETCUsageObjs 11 }

--- ------------------------------------------------------------------------
-- Compliance statements
--- ------------------------------------------------------------------------
pktcEUETCMIBCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        " The compliance statement for implementations of the EUE TC MIB"
    MODULE   -- this module

    ::= { pktcEUETCCompliances 1 }

END
```

Annex B

IPCablecom eUE Device Configuration Modules

(This annex forms an integral part of this Recommendation)

B.1 Device Configuration MIB Module

```
CL-PKTC-EUE-DEV-MIB DEFINITIONS ::= BEGIN

IMPORTS
    PktcEUETCCredsType,
    PktcEUETCCreds
                    FROM CL-PKTC-EUE-TC-MIB
    MODULE-IDENTITY,
    OBJECT-TYPE,
    Unsigned32
                    FROM SNMPv2-SMI

    OBJECT-GROUP,
    MODULE-COMPLIANCE
                    FROM SNMPv2-CONF
    RowStatus, TruthValue
                    FROM SNMPv2-TC
    SnmpAdminString
                    FROM SNMP-FRAMEWORK-MIB
    InetAddress,
    InetPortNumber,
    InetAddressDNS,
    InetAddressType
                    FROM INET-ADDRESS-MIB
    pktcEUEMibs
                    FROM CLAB-DEF-MIB;


pktcEUEDevMIB MODULE-IDENTITY
    LAST-UPDATED "200711060000Z"
    ORGANIZATION "Cable Television Laboratories, Inc."
    CONTACT-INFO
            "Sumanth Channabasappa
             Cable Television Laboratories, Inc.
             858 Coal Creek Circle,
             Louisville, CO 80027, USA
             Phone: +1 303-661-9100
             Email: sumanth@cablelabs.com

             Acknowledgements:
             Thomas Clack, Broadcom - Primary author,
             and members of the PacketCable PACM Focus Team."

    DESCRIPTION
            "This MIB module contains Configuration MIB
             objects for the Embedded User Equipment (eUE)  as
             required by the PacketCable E-UE Provisioning
             Framework Specification."

    ::= { pktcEUEMibs 3 }

-- Administrative assignments
pktcEUEDevNotification      OBJECT IDENTIFIER ::= { pktcEUEDevMIB 0 }
pktcEUEDevObjects           OBJECT IDENTIFIER ::= { pktcEUEDevMIB 1 }
pktcEUEDevConformance       OBJECT IDENTIFIER ::= { pktcEUEDevMIB 2 }

pktcEUEDevCompliances       OBJECT IDENTIFIER ::= { pktcEUEDevConformance 1 }
pktcEUEDevGroups            OBJECT IDENTIFIER ::= { pktcEUEDevConformance 2 }
```

```
-- ---------------------------------------------------------------------
--  eUE Profile Information
-- ---------------------------------------------------------------------
pktcEUEDevProfile            OBJECT IDENTIFIER ::= { pktcEUEDevObjects 1 }


pktcEUEDevProfileVersion OBJECT-TYPE
    SYNTAX      SnmpAdminString(SIZE(0..6))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This MIB Object represents the Device Profile Version for this
          MIB module. The eUE MUST set this MIB Object to a value of '1.0'."
    ::= { pktcEUEDevProfile 1 }

-- ---------------------------------------------------------------------
-- Operator Table
-- ---------------------------------------------------------------------
pktcEUEDevOpTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEUEDevOpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This data table contains Operator specific information
          associated with the eUE."
    ::= { pktcEUEDevProfile 2 }

pktcEUEDevOpEntry OBJECT-TYPE
    SYNTAX      PktcEUEDevOpEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " Each entry in this data table describes Operator
          parameters associated with a specific domain name.

          For each Operator that is associated with a user,
          the corresponding parameters SHOULD be configured by
          the Operator.

          A domain name of '.' indicates any domain name.

          The eUE MUST use the values provided only for sessions
          established on behalf of the eUE identifier (e.g. eUE registration,
          eUE configuration, eUE Identifier based sessions)."

    INDEX  { pktcEUEDevOpIndex }
    ::= { pktcEUEDevOpTable 1 }

PktcEUEDevOpEntry ::=
    SEQUENCE {
             pktcEUEDevOpIndex               Unsigned32,
             pktcEUEDevOpDomain              InetAddressDNS,
             pktcEUEDevOpSTUNAddrType        InetAddressType,
             pktcEUEDevOpSTUNAddr            InetAddress,
             pktcEUEDevOpSTUNAddrPort        InetPortNumber,
             pktcEUEDevOpSTUNRelayAddrType   InetAddressType,
             pktcEUEDevOpSTUNRelayAddr       InetAddress,
             pktcEUEDevOpSTUNRelayAddrPort   InetPortNumber,
             pktcEUEDevOpSTUNRelayCredsType  PktcEUETCCredsType,
             pktcEUEDevOpSTUNRelayCreds      PktcEUETCCreds,
             pktcEUEDevOpTimerT1             Unsigned32,
             pktcEUEDevOpTimerT2             Unsigned32,
             pktcEUEDevOpTimerT4             Unsigned32,
             pktcEUEDevOpRowStatus           RowStatus
             }


pktcEUEDevOpIndex OBJECT-TYPE
    SYNTAX      Unsigned32(1..16)
    MAX-ACCESS  not-accessible
    STATUS      current
```

```
    DESCRIPTION
        " A unique value used to identify an instance of a set of
          values pertaining to a Operator domain identified
          by 'pktcEUEDevOpDomain'. The indices SHOULD be contiguous.
          When multiple entries are specified, the eUE MUST give
          precedence to the values indexed by lower indices."

    ::= { pktcEUEDevOpEntry 1 }

pktcEUEDevOpDomain  OBJECT-TYPE
    SYNTAX      InetAddressDNS
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element contains the Operator's Domain or sub-domain
          name. A value of '.' indicates any domainName."
    ::= { pktcEUEDevOpEntry 2 }

pktcEUEDevOpSTUNAddrType  OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element identifies the data type of the
          value contained in 'pktcEUEDevOpSTUNAddr'."

    DEFVAL   { unknown }
    ::= { pktcEUEDevOpEntry 3 }

pktcEUEDevOpSTUNAddr  OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element contains the STUN server address
          associated with the domain name identified in
          'pktcEUEDevOpDomain'."

    DEFVAL   { "" }
    ::= { pktcEUEDevOpEntry 4 }

pktcEUEDevOpSTUNAddrPort  OBJECT-TYPE
    SYNTAX      InetPortNumber
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element contains the STUN server port
          associated with the server address identified in
          'pktcEUEDevOpSTUNAddr'."

    DEFVAL   { 0 }
    ::= { pktcEUEDevOpEntry 5 }

pktcEUEDevOpSTUNRelayAddrType  OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element identifies the data type of the
          value contained in 'pktcEUEDevOpSTUNRelayAddr'."

    DEFVAL   { unknown }
    ::= { pktcEUEDevOpEntry 6 }

pktcEUEDevOpSTUNRelayAddr  OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
```

```
    DESCRIPTION
        " This data element contains the STUNRelay server address
          associated with the domain name identified in
          'pktcEUEDevOpDomain'."

    DEFVAL   { "" }
    ::= { pktcEUEDevOpEntry 7 }

pktcEUEDevOpSTUNRelayAddrPort  OBJECT-TYPE
    SYNTAX      InetPortNumber
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element contains the STUNRelay server port
          associated with the server address identified in
          'pktcEUEDevOpSTUNRelayAddr'."

    DEFVAL   { 0 }
    ::= { pktcEUEDevOpEntry 8 }

pktcEUEDevOpSTUNRelayCredsType  OBJECT-TYPE
    SYNTAX      PktcEUETCCredsType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element contains the creds type
          associated with the STUN Relay creds identified in
          'pktcEUEDevOpSTUNRelayCreds'.
          Valid types include other(1), publicIdentity(2) and
          username(6)."
    DEFVAL   { none }
    ::= { pktcEUEDevOpEntry 9 }

pktcEUEDevOpSTUNRelayCreds  OBJECT-TYPE
    SYNTAX      PktcEUETCCreds
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This optional data element MAY contain suitable credentials
          related to STUN Relay access.

          If read this data element MUST always return an empty
          string value."
    DEFVAL   { "" }
    ::= { pktcEUEDevOpEntry 10 }

pktcEUEDevOpTimerT1  OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "milliseconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This is the SIP Timer T1, an estimate for the round
          trip time in the system (UE to P-CSCF). Please
          refer to the PacketCable IMS Delta Session Initiation
          Protocol (SIP) and Session Description Protocol (SDP),
          Stage 3 Specification 3GPP TS 24.229 for more
          information."

    REFERENCE
       "PacketCable IMS Delta Session Initiation Protocol (SIP)
        and Session Description Protocol (SDP), Stage 3
        Specification 3GPP TS 24.229"
    DEFVAL {2000}
    ::= { pktcEUEDevOpEntry 11 }

pktcEUEDevOpTimerT2  OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "milliseconds"
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
        " This is the SIP Timer T2, an estimate for the maximum
          retransmit interval for non-INVITE requests and INVITE
          responses. Please refer to the PacketCable IMS Delta
          Session Initiation Protocol (SIP) and Session Description
          Protocol (SDP), Stage 3 Specification 3GPP TS 24.229
          for more information."

    REFERENCE
       "PacketCable IMS Delta Session Initiation Protocol (SIP)
        and Session Description Protocol (SDP), Stage 3
        Specification 3GPP TS 24.229"
    DEFVAL {1600}
    ::= { pktcEUEDevOpEntry 12 }

pktcEUEDevOpTimerT4  OBJECT-TYPE
    SYNTAX      Unsigned32
    UNITS       "milliseconds"
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This is the SIP Timer T4, an estimate for the maximum
          duration a message will remain in the network.
          Please refer to the PacketCable IMS Delta Session
          Initiation Protocol (SIP) and Session Description
          Protocol (SDP), Stage 3 Specification 3GPP TS 24.229
          for more information."

    REFERENCE
       "PacketCable IMS Delta Session Initiation Protocol (SIP)
        and Session Description Protocol (SDP), Stage 3
        Specification 3GPP TS 24.229"
    DEFVAL {1700}
    ::= { pktcEUEDevOpEntry 13 }

pktcEUEDevOpRowStatus  OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This object defines the row status associated with the
          particular Operator in the pktcEUEDevOpTable.

          The value of this object has no effect on
          whether columnar objects in this row can be modified."
     ::= { pktcEUEDevOpEntry 14 }

-- ----------------------------------------------------------------------
-- Operator domain names associated with a eUE
-- ----------------------------------------------------------------------
pktcEUEDevDnsTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEUEDevDnsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This data table represents the eUE's knowledge
          of suitable DNS Server information on a per Operator
          basis.

          The eUE MUST use the values provided only for sessions
          established on behalf of the eUE identifier (e.g. eUE P-CSCF Discovery,
          eUE registration, eUE configuration, eUE Identifier based sessions)."

    ::= { pktcEUEDevProfile 3 }

pktcEUEDevDnsEntry OBJECT-TYPE
    SYNTAX      PktcEUEDevDnsEntry
    MAX-ACCESS  not-accessible
    STATUS      current
```

```
    DESCRIPTION
        " Each entry in this data table contains an instance
          of a DNS Server entry for a given domain name as
          indicated by 'pktcEUEDevOpDomain'.

          The information in this table MAY be configured
          by the Operator."


    INDEX  { pktcEUEDevOpIndex, pktcEUEDevDnsIndex }
    ::= { pktcEUEDevDnsTable 1 }

PktcEUEDevDnsEntry ::=
    SEQUENCE {
             pktcEUEDevDnsIndex          Unsigned32,
             pktcEUEDevDnsAddrType       InetAddressType,
             pktcEUEDevDnsAddr           InetAddress,
             pktcEUEDevDnsRowStatus      RowStatus
             }

pktcEUEDevDnsIndex OBJECT-TYPE
    SYNTAX      Unsigned32(1..16)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " A unique value used to identify an instance in this
          data table. The indices SHOULD be contiguous.
          When multiple entries are specified, the eUE MUST give
          precedence to the values indexed by lower indices."

    ::= { pktcEUEDevDnsEntry 1 }

pktcEUEDevDnsAddrType  OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element contains the type of the data
          element contained in 'pktcEUEDevDnsAddr'."

    DEFVAL   { unknown }
    ::= { pktcEUEDevDnsEntry 2 }

pktcEUEDevDnsAddr  OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " The IP address of a DNS server associated with
          the domain name indicated by the primary index
          'pktcEUEDevOpIndex', for the instance indicated
          by the secondary index 'pktcEUEDevDnsIndex'."

    DEFVAL   { "" }
    ::= { pktcEUEDevDnsEntry 3 }

pktcEUEDevDnsRowStatus  OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This object defines the row status associated with the
          particular Operator domain name in the pktcEUEDevDnsTable.

          The value of the 'pktcEUEDevDnsAddrType' object MUST not be
          modified while this object is 'active'. The value of
          'pktcEUEDevDnsAddr' MAY be modified while this object is active
          if the value is consistent with the type specified by the
          'pktcEUEDevDnsAddrType' object."
     ::= { pktcEUEDevDnsEntry 4 }
```

```
-- ---------------------------------------------------------------------
-- P-CSCFs associated with the eUE
-- ---------------------------------------------------------------------
pktcEUEDevPCSCFTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEUEDevPCSCFEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This data table represents the eUE's knowledge
          of suitable P-CSCFs information on a per Operator
          basis."

    ::= { pktcEUEDevProfile 4 }

pktcEUEDevPCSCFEntry OBJECT-TYPE
    SYNTAX      PktcEUEDevPCSCFEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " Each entry in this data table contains an instance
          of a P-CSCF Server entry for a given domain name.
          The information in this table MAY be configured
          by the Operator.

          The eUE MUST use the values provided only for sessions
          established on behalf of the eUE identifier (e.g. eUE registration,
          eUE configuration, eUE Identifier based sessions)."

    INDEX  { pktcEUEDevOpIndex, pktcEUEDevPCSCFIndex }
    ::= { pktcEUEDevPCSCFTable 1 }

PktcEUEDevPCSCFEntry ::=
    SEQUENCE {
             pktcEUEDevPCSCFIndex          Unsigned32,
             pktcEUEDevPCSCFAddrType       InetAddressType,
             pktcEUEDevPCSCFAddr           InetAddress,
             pktcEUEDevPCSCFRowStatus      RowStatus
             }

pktcEUEDevPCSCFIndex OBJECT-TYPE
    SYNTAX      Unsigned32(1..16)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " A unique value used to identify an instance in this
          data table. The indices SHOULD be contiguous."

    ::= { pktcEUEDevPCSCFEntry 1 }

pktcEUEDevPCSCFAddrType  OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This data element contains the type of the data
          element contained in 'pktcEUEDevPCSCFAddr'."

    DEFVAL   { unknown }
    ::= { pktcEUEDevPCSCFEntry 2 }

pktcEUEDevPCSCFAddr  OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " The IP address of a DNS server associated with
          the domain name indicated by the primary index
          'pktcEUEDevOpIndex', for the instance indicated
          by the secondary index 'pktcEUEDevPCSCFIndex'."
```

```
    DEFVAL   { "" }
    ::= { pktcEUEDevPCSCFEntry 3 }

pktcEUEDevPCSCFRowStatus  OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This object defines the row status associated with the
          particular P-CSCF Server entry for the particular domain name.

          The value of the 'pktcEUEDevPCSCFAddrType' object MUST not be
          modified while this object is 'active'. The value of
          'pktcEUEDevPCSCFAddr' MAY be modified while this object is active
          if the value is consistent with the type specified by the
          'pktcEUEDevPCSCFAddrType' object."
     ::= { pktcEUEDevPCSCFEntry 4 }

-- ---------------------------------------------------------------------
-- BSFs associated with a eUE
-- ---------------------------------------------------------------------
pktcEUEDevBSFTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEUEDevBSFEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This data table represents the eUE's knowledge
          of suitable BSFs to contact."

    ::= { pktcEUEDevProfile 5 }

pktcEUEDevBSFEntry OBJECT-TYPE
    SYNTAX      PktcEUEDevBSFEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " Each entry in this data table contains an instance
          of a BSF, specific to a AS type, for a given Operator's
          Domain Name.
          The entries represent the eUE's knowledge
          of suitable BSFs to contact, as per the IMS GBA
          architecture to obtain credentials and enabling secure
          sessions to Application Servers. A list of
          BSFs for each Operator and application
          types MAY be configured by the Operator."

    INDEX  { pktcEUEDevOpIndex, pktcEUEDevBSFASType, pktcEUEDevBSFIndex }
    ::= { pktcEUEDevBSFTable 1 }

PktcEUEDevBSFEntry ::=
    SEQUENCE {
             pktcEUEDevBSFASType     SnmpAdminString,
             pktcEUEDevBSFIndex      Unsigned32,
             pktcEUEDevBSFAddrType   InetAddressType,
             pktcEUEDevBSFAddr       InetAddress,
             pktcEUEDevBSFRowStatus  RowStatus
             }

pktcEUEDevBSFASType OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " A unique value used to indicate the AS type to
          which the BSFs correspond.
          For example: To contact PACM application types,
          this would be labeled as 'GBA-PACM'.
          Applications using GBA are required to specify
          such identifiers explicitly."
```

```
    ::= { pktcEUEDevBSFEntry 1 }

pktcEUEDevBSFIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..16)
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " A unique value used to identify an instance in this
          data table. The indices SHOULD be contiguous.
          When multiple entries are specified, the eUE MUST give
          precedence to the values indexed by lower indices."

    ::= { pktcEUEDevBSFEntry 2 }

pktcEUEDevBSFAddrType  OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This data element contains the type of the data
          element contained in 'pktcEUEDevBSFAddr'."

    DEFVAL   { unknown }
    ::= { pktcEUEDevBSFEntry 3 }

pktcEUEDevBSFAddr  OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " The address of a BSF server associated with
          the domain name indicated by the indices
          'pktcEUEDevOpIndex' (Operator Domain),
          'pktcEUEDevBSFASType' and 'pktcEUEDevBSFIndex'."

    DEFVAL   { "" }
    ::= { pktcEUEDevBSFEntry 4 }

pktcEUEDevBSFRowStatus  OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This object defines the row status associated with this
          instance of a BSF.

          The value of the 'pktcEUEDevBSFAddrType' object MUST not be
          modified while this object is 'active'. The value of
          'pktcEUEDevBSFAddr' MAY be modified while this object is active
          if the value is consistent with the type specified by the
          'pktcEUEDevBSFAddrType' object."
     ::= { pktcEUEDevBSFEntry 5 }

-- ---------------------------------------------------------------------
-- Certificate Bootstrapping Data
-- ---------------------------------------------------------------------
pktcEUECBSupport OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        "This MIB Object is used by the eUE to report
         support for Certificate Bootstrapping.
         If the MIB Object is set to a value of true(1)
         it indicates that the device supports Certificate
         Bootstrapping.
         If the MIB Object is set to a value of false(1)
         it indicates that the device does not support
         Certificate Bootstrapping."
    ::= { pktcEUEDevProfile 6 }
```

```
pktcEUECBEnable OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This MIB Object is used to initiate the Certificate
         Bootstrapping procedure in an eUE.

         If this value is set to a value of true(1) and the
         MIB Object pktcEUECBData contains a non-zero HTTP/HTTPS
         URI, then the eUE MUST initiate the Certificate
         Bootstrapping procedure, if supported.

         If the eUE does not support the Certificate
         Bootstrapping procedure, it rejects any attempt
         to set this MIB Object to a value of true(1).
         The eUE MUST return a value of false(2) when this
         MIB Object is read.

         If the Certificate Bootstrapping procedure was
         successful, the eUE MUST act on the Certificate
         Bootstrapping configuration file provided.

         If the procedure was unsuccessful (e.g.,
         authentication error or inresponsive server),
         the eUE MUST report the corresponding management
         event."
    DEFVAL {false}
    ::= { pktcEUEDevProfile 7 }

pktcEUECBData OBJECT-TYPE
    SYNTAX      OCTET STRING(SIZE(0..1023))
    MAX-ACCESS  read-write
    STATUS      current
    DESCRIPTION
        "This MIB Object contains a HTTP/HTTPS URI to be used for
         Certificate Bootstrapping. Any attempt to set it to
         anything other than a HTTP/HTTPS URI MUST be rejected
         by the eUE."
    ::= { pktcEUEDevProfile 8 }


-- ---------------------------------------------------------------------
-- Conformance Information
-- ---------------------------------------------------------------------

pktcEUEDevMIBCompliances  OBJECT IDENTIFIER ::= { pktcEUEDevConformance 1 }
pktcEUEDevMIBGroups       OBJECT IDENTIFIER ::= { pktcEUEDevConformance 2 }

-- ----------------------
-- Compliance Statements
-- ----------------------
pktcPACM2UEMIBCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        " The compliance statement for implementations of the eUE MIB "
    MODULE
        MANDATORY-GROUPS {
                pktcEUEDevProfileGroup,
             pktcEUEDevOpGroup,
             pktcEUEDevDnsGroup,
             pktcEUEDevPCSCFGroup,
             pktcEUEDevBSFGroup
                }
    ::= { pktcEUEDevMIBCompliances 1 }

pktcEUEDevProfileGroup OBJECT-GROUP
      OBJECTS {
         pktcEUEDevProfileVersion
      }
      STATUS  current
```

```
      DESCRIPTION
            "The eUE Device Profile Group."
      ::= { pktcEUEDevMIBGroups 1}

pktcEUEDevOpGroup OBJECT-GROUP
      OBJECTS {
         pktcEUEDevOpDomain,
         pktcEUEDevOpSTUNAddrType,
         pktcEUEDevOpSTUNAddr,
         pktcEUEDevOpSTUNAddrPort,
         pktcEUEDevOpSTUNRelayAddrType,
         pktcEUEDevOpSTUNRelayAddr,
         pktcEUEDevOpSTUNRelayAddrPort,
         pktcEUEDevOpSTUNRelayCredsType,
         pktcEUEDevOpSTUNRelayCreds,
         pktcEUEDevOpTimerT1,
         pktcEUEDevOpTimerT2,
         pktcEUEDevOpTimerT4,
         pktcEUEDevOpRowStatus
      }
      STATUS  current
      DESCRIPTION
            "The eUE Operator Group."
      ::= { pktcEUEDevMIBGroups 2}

pktcEUEDevDnsGroup OBJECT-GROUP
      OBJECTS {
         pktcEUEDevDnsAddrType,
         pktcEUEDevDnsAddr,
         pktcEUEDevDnsRowStatus
      }
      STATUS  current
      DESCRIPTION
            "The eUE DNS Group."
      ::= { pktcEUEDevMIBGroups 3}

pktcEUEDevPCSCFGroup OBJECT-GROUP
      OBJECTS {
         pktcEUEDevPCSCFAddrType,
         pktcEUEDevPCSCFAddr,
         pktcEUEDevPCSCFRowStatus
      }
      STATUS  current
      DESCRIPTION
            "The eUE P-CSCF Group."
      ::= { pktcEUEDevMIBGroups 4}

pktcEUEDevBSFGroup OBJECT-GROUP
      OBJECTS {
         pktcEUEDevBSFAddrType,
         pktcEUEDevBSFAddr,
         pktcEUEDevBSFRowStatus
      }
      STATUS  current
      DESCRIPTION
            "The eUE BSF Group."
      ::= { pktcEUEDevMIBGroups 5}


pktcEUEDevCBGroup OBJECT-GROUP
      OBJECTS {
         pktcEUECBSupport,
         pktcEUECBEnable,
         pktcEUECBData
      }
      STATUS  current
      DESCRIPTION
            "The eUE Certificate Bootstrapping Group."
      ::= { pktcEUEDevMIBGroups 6}

END
```

B.2 User Configuration MIB Module

```
CL-PKTC-EUE-USER-MIB DEFINITIONS ::= BEGIN

IMPORTS
    PktcEUETCIDType,
    PktcEUETCID,
    PktcEUETCCredsType,
    PktcEUETCCreds,
    PktcEUETCUsrElementIndexType,
    PktcEUETCUsrAppIndexType,
    PktcEUETCAppOrgIdentifier,
    PktcEUETCAppIdentifier,
    PktcEUETCActStatus,
    PktcEUETCActStatusInfo
                    FROM CL-PKTC-EUE-TC-MIB
    MODULE-IDENTITY,
    OBJECT-TYPE
                    FROM SNMPv2-SMI
    OBJECT-GROUP,
    MODULE-COMPLIANCE
                    FROM SNMPv2-CONF
    SnmpAdminString
                    FROM SNMP-FRAMEWORK-MIB
    TruthValue,
    RowStatus
                    FROM SNMPv2-TC
    pktcEUEMibs
                    FROM CLAB-DEF-MIB;



pktcEUEUserMIB MODULE-IDENTITY
    LAST-UPDATED "200711060000Z"
    ORGANIZATION "Cable Television Laboratories, Inc."
    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

             Acknowledgements:
             Thomas Clack, Broadcom - Primary author,
             and members of the PacketCable PACM Focus Team."

    DESCRIPTION
            "This MIB module contains configuration MIB
             objects for the PacketCable Users as
             required by the PacketCable
             E-UE Provisioning Framework."
    ::= { pktcEUEMibs 4 }


-- Administrative assignments
pktcEUEUsrNotification      OBJECT IDENTIFIER ::= { pktcEUEUserMIB 0 }
pktcEUEUsrObjects           OBJECT IDENTIFIER ::= { pktcEUEUserMIB 1 }
pktcEUEUsrConformance       OBJECT IDENTIFIER ::= { pktcEUEUserMIB 2 }

pktcEUEUsrCompliances       OBJECT IDENTIFIER ::= { pktcEUEUsrConformance 1 }
pktcEUEUsrGroups            OBJECT IDENTIFIER ::= { pktcEUEUsrConformance 2 }


-- ------------------------------------------------------------------
--  User Profile Information
-- ------------------------------------------------------------------
pktcEUEUsrProfile           OBJECT IDENTIFIER ::= { pktcEUEUsrObjects 1 }

pktcEUEUsrProfileVersion OBJECT-TYPE
    SYNTAX      SnmpAdminString(SIZE(0..6))
    MAX-ACCESS  read-only
```

```
    STATUS      current
    DESCRIPTION
        " This MIB Object represents the User Profile Version for this
          MIB module. The eUE MUST set this MIB Object to value of '1.0'."
    ::= { pktcEUEUsrProfile 1 }


-- ------------------------------------------------------------------
--  User table
-- ------------------------------------------------------------------
pktcEUEUsrIMPUTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEUEUsrIMPUEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This data table represents Users associated with
          the eUE. Specifically it provides information related
          to the IM Public Identity (IMPU) of the User."
    ::= { pktcEUEUsrProfile 2 }

pktcEUEUsrIMPUEntry OBJECT-TYPE
    SYNTAX      PktcEUEUsrIMPUEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " Each entry in this data table describes an association
          of a user IMPU with the eUE, indexed by a IMPU Identifier.

          The eUE uses the entries in this table to register the
          user in a PacketCable Network, provided they are enabled.

          The credentials for registration are obtained using the
          association with an IMPI in the MIB table
          pktcEUEUsrIMPITable, referenced via the MIB Object
          pktcEUEUsrIMPIIndexRef.

          The eUE MAY store pre-configured associations in NVRAM."

    INDEX  { pktcEUEUsrIMPUIndex }
    ::= { pktcEUEUsrIMPUTable 1 }

PktcEUEUsrIMPUEntry ::=
    SEQUENCE {
              pktcEUEUsrIMPUIndex            PktcEUETCUsrElementIndexType,
              pktcEUEUsrIMPUIdType           PktcEUETCIDType,
              pktcEUEUsrIMPUId               PktcEUETCID,
              pktcEUEUsrIMPUIMPIIndexRef     PktcEUETCUsrElementIndexType,
              pktcEUEUsrIMPUDispInfo         SnmpAdminString,
              pktcEUEUsrIMPUOpIndexRefs      SnmpAdminString,
              pktcEUEUsrIMPUNWActStat        PktcEUETCActStatus,
              pktcEUEUsrIMPUNWActStatInfo    SnmpAdminString,
              pktcEUEUsrIMPUUEActStat        PktcEUETCActStatus,
              pktcEUEUsrIMPUUEActStatInfo    SnmpAdminString,
              pktcEUEUsrIMPUSigSecurity      TruthValue,
              pktcEUEUsrIMPUAdditionalInfo   SnmpAdminString,
              pktcEUEUsrIMPURowStatus        RowStatus
              }

pktcEUEUsrIMPUIndex  OBJECT-TYPE
    SYNTAX      PktcEUETCUsrElementIndexType
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This MIB Object provides a user IMPU index.
          When the user IMPU is referenced elsewhere, such as
          to associate the device and a user IMPU, this
          MIB Object MUST be used as an index reference.
          A value of '0' MUST NOT be used."
    ::= { pktcEUEUsrIMPUEntry 1 }
```

```
pktcEUEUsrIMPUIdType  OBJECT-TYPE
    SYNTAX      PktcEUETCIDType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object MUST indicate the 'Identifier
          type' of the data value contained in 'pktcEUEUsrIMPUId'.

          Valid types include other(1), publicIdentity(2) and
          username(6)."
    DEFVAL   { other }
    ::= { pktcEUEUsrIMPUEntry 2 }

pktcEUEUsrIMPUId  OBJECT-TYPE
    SYNTAX      PktcEUETCID
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object MUST identify the User IMPU being
          associated with the eUE.

          The type of Identifier is indicated by the
          MIB Object 'pktcEUEUsrIMPUIdType'."
    DEFVAL   { "" }
    ::= { pktcEUEUsrIMPUEntry 3 }

pktcEUEUsrIMPUIMPIIndexRef  OBJECT-TYPE
    SYNTAX      PktcEUETCUsrElementIndexType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object MUST provide an index reference
          to a IMPI associated with the corresponding IMPU
          specified in this table entry.

          The index reference points to an entry in the MIB
          table 'pktcEUEUsrIMPITable'.


          If this contains a value of '0', it indicates that
          the user IMPU is not yet associated with an IMPI
          and cannot be used in networks requiring
          authentication. "
    DEFVAL {0}
    ::= { pktcEUEUsrIMPUEntry 4 }


pktcEUEUsrIMPUDispInfo  OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This optional MIB Object MAY contain human readable
          text describing User characteristics. Examples include
          User Display Name, Subscriber Identifier etc."
    DEFVAL   { "" }
    ::= { pktcEUEUsrIMPUEntry 5 }

pktcEUEUsrIMPUOpIndexRefs  OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This optional MIB Object MAY contain a list of comma
          separated Operator domain entries where the user specified
          in this entry 'pktcEUEUsrIMPUId' can be used.

          The entries MUST be index references to the operator
          table associated with the eUE.
```

```
          The eUE MAY attempt to use the user entry in a
          domain or sub-domain specified by the operator table,
          corresponding to the entries listed here.

          The eUE MUST NOT attempt to use the user entry in a
          domain that is not specified by this entry.

          If unspecified, the eUE MUST use the domain identified
          by the IMPU."
    DEFVAL   { "" }
    ::= { pktcEUEUsrIMPUEntry 6 }

pktcEUEUsrIMPUNWActStat OBJECT-TYPE
    SYNTAX      PktcEUETCActStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object contains the eUE activation status
          as determined by the network.

          The eUE MUST allow access to the User identified in
          'pktcEUEUsrIMPUId' if the value is set to true(1),
          unless determined otherwise and reported in
          pktcEUEUsrIMPUUEActStat.

          The eUE SHOULD attempt to register a User identified in
          'pktcEUEUsrIMPUId' if the value is set to true(1).
          PacketCable Applications can specify additional
          requirements for registration.

          The eUE MUST disallow access to the User identified in
          'pktcEUEUsrIMPUId' if the value is set to false(2)"
    DEFVAL   { true }
    ::= { pktcEUEUsrIMPUEntry 7 }

pktcEUEUsrIMPUNWActStatInfo OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object MAY contain information that describes
          the activation status indicated in 'pktcEUEIMPUNWActStat'.

          For example 'User temporarily deactivated for
          maintenance'."
    DEFVAL   { "" }
    ::= { pktcEUEUsrIMPUEntry 8 }

pktcEUEUsrIMPUUEActStat OBJECT-TYPE
    SYNTAX      PktcEUETCActStatus
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This MIB Object contains the eUE activation status
          as determined by the UE.

          The eUE MUST allow access to the User identified in
          'pktcEUEUsrIMPUId' if the value is set to true(1).

          The eUE SHOULD attempt to register a User identified in
          'pktcEUEUsrIMPUId' if the value is set to true(1).
          PacketCable Applications can specify additional
          requirements for registration.

          The eUE MUST disallow access to the User identified in
          'pktcEUEUsrIMPUId' if the value is set to false(2)."
    DEFVAL   { true }
    ::= { pktcEUEUsrIMPUEntry 9 }
```

```
pktcEUEUsrIMPUUEActStatInfo OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This MIB Object MAY contain information that describes
          the activation status indicated in 'pktcEUEUsrIMPUUEActStat'.

          For example 'User deactivated based on user interface input."
    DEFVAL   { "" }
    ::= { pktcEUEUsrIMPUEntry 10 }

pktcEUEUsrIMPUSigSecurity OBJECT-TYPE
    SYNTAX      TruthValue
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This element indicates the network requirement for
          SIP signaling with the P-CSCF.

          If set to 'true', the User SHOULD use
          secure SIP signaling with the P-CSCF.

          If set to 'false', the User MAY communicate
          without a secure SIP communication channel
          with the P-CSCF.

          If the actual status of the communication channel differs from
          the value of this element, the UE MUST report the discrepancy,
          on behalf of the User, using the Management Data Element
          error reporting mechanism'."
    DEFVAL      {true}
    ::= { pktcEUEUsrIMPUEntry 11 }


pktcEUEUsrIMPUAdditionalInfo OBJECT-TYPE
    SYNTAX      SnmpAdminString
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object MAY contain information that describes
          additional information defined by PacketCable specifications,
          including those defining PacketCable features.

          PacketCable specifications are expected to use this data
          element to obtain additional information.

          To specify such additional info, the following rules apply:

          - Each specification planning to use this MIB Object
            MUST specify data in the following format:
            '<Keyword>#<value>', # being the delimiter
               e.g. FEATURE_X#ABC
                    FEATURE_Y#<value of XYZ>

          - This MIB Object MUST be a semi-colon separated
            concatenation of such '<keyword>#<value>' pairs. e.g.
            FEATURE_X#ABC;FEATURE_Z#DEF

          - Since the '#' and ';' characters are used as delimiters,
            they SHOULD not be specified in the keyword. If specified, any
            occurrence of these characters in the value field MUST be
            preceded by the escape character '\' (e.g. FEATURE_X#A\#C).
            Occurrences of '\' MUST be preceded by itself
           (e.g. FEATURE_X#A\\C\#).

           The following rules apply on the eUE:

          - The eUE MUST first separate all the keyword value pairs,
            using a '#' that is not preceded by '\' as the delimiter
```

```
          - The eUE MUST, For all recognized keywords, decipher the value
            by interpreting the data after considering the use of '\' as
            defined in this definition

          - The eUE MUST ignore and report all unrecognized keywords
            using PacketCable Management"
    DEFVAL   { "" }
    ::= { pktcEUEUsrIMPUEntry 12 }

pktcEUEUsrIMPURowStatus OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object defines the row status associated with this
          particular User in the pktcEUEUsrIMPUTable.

          An entry in this table is not qualified for activation
          until the object instances of all corresponding columns
          have been initialized, either by default values or via
          explicit SET operations. Until all object instances in
          this row are initialized, the status value for this realm
          must be 'notReady(3)'.

          In particular, two columnar objects must be SET: the
          'pktcEUEUsrIMPUIMPUIdType' and the 'pktcEUEUsrIMPUIMPUId. Once these
          two objects have been set the row status may be SET to 'active(1)'
          The eUE MUST not allow these two objects to be changed while
          the row is 'active'. The value of this object has no effect on
          whether other columnar objects in this row can be modified."
    ::= { pktcEUEUsrIMPUEntry 13 }


-- ------------------------------------------------------------------
-- User IMPI Table
-- ------------------------------------------------------------------
pktcEUEUsrIMPITable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEUEUsrIMPIEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This data table contains the user IMPI information
          associated with users provisioned on the device."

    ::= { pktcEUEUsrProfile 3 }

pktcEUEUsrIMPIEntry OBJECT-TYPE
    SYNTAX      PktcEUEUsrIMPIEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry in this data table contains an instance
         of a user IMPI and associated credentials.

         Each IMPU provisioned in the eUE SHOULD be associated
         with an entry in this table. The exception is in networks
         where certain users are unauthenticated for application
         access."
    INDEX  { pktcEUEUsrIMPIIndex }
    ::= { pktcEUEUsrIMPITable 1 }

PktcEUEUsrIMPIEntry ::=
    SEQUENCE {
              pktcEUEUsrIMPIIndex             PktcEUETCUsrElementIndexType,
              pktcEUEUsrIMPIIdType            PktcEUETCIDType,
              pktcEUEUsrIMPIId                PktcEUETCID,
              pktcEUEUsrIMPICredsType         PktcEUETCCredsType,
              pktcEUEUsrIMPICredentials       PktcEUETCCreds,
              pktcEUEUsrIMPIRowStatus         RowStatus
             }
```

```
pktcEUEUsrIMPIIndex OBJECT-TYPE
    SYNTAX      PktcEUETCUsrElementIndexType
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This MIB Object provides a user IMPI index.
          When the user IMPI is referenced elsewhere, such as
          to associate the IMPU and an IMPI, this
          MIB Object MUST be used as an index reference.
          A value of '0' MUST NOT be used."
    ::= { pktcEUEUsrIMPIEntry 1 }

pktcEUEUsrIMPIIdType  OBJECT-TYPE
    SYNTAX      PktcEUETCIDType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object MUST indicate the 'Identifier
          type' of the data value contained in 'pktcEUEUsrIMPIId'.

          Valid types include other(1), privateIdentity(2) and
          username(6)."
    DEFVAL   { other }
    ::= { pktcEUEUsrIMPIEntry 2 }

pktcEUEUsrIMPIId  OBJECT-TYPE
    SYNTAX      PktcEUETCID
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object MUST identify a User IMPI being
          specified in this table.

          The type of Identifier is indicated by the
          MIB Object 'pktcEUEUsrIMPIIdType'."
    DEFVAL   { "" }
    ::= { pktcEUEUsrIMPIEntry 3 }


pktcEUEUsrIMPICredsType  OBJECT-TYPE
    SYNTAX      PktcEUETCCredsType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object contains the type of credentials
          contained in the MIB Object 'pktcEUEUsrIMPICredentials'.
          Valid types include other(1), privateIdentity(2) and
          username(6)."
    DEFVAL   { none }
    ::= { pktcEUEUsrIMPIEntry 4 }

pktcEUEUsrIMPICredentials  OBJECT-TYPE
    SYNTAX      PktcEUETCCreds
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object allows the Operator to configure credentials
          associated with an IMPI. This value is used with, and must
          be consistent with, the value
          of the associated 'pktcEUEUsrIMPIedsType' object.

          If read this MIB Object MUST always return an empty
          string value for privacy reasons.

          A Operator SHOULD provide this MIB Object only
          over a secured configuration interface to avoid
          security threats due to compromised credentials. "
    DEFVAL   { "" }
    ::= { pktcEUEUsrIMPIEntry 5 }
```

```
pktcEUEUsrIMPIRowStatus  OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object defines the row status associated with this
          entry.

          The value of the 'pktcEUEUsrIMPICredsType' object MUST NOT be
          modified while this object is 'active'.

          The value of 'pktcEUEUsrIMPICredentials' MAY be modified
          while this object is active if the value is consistent with
          the type specified by the 'pktcEUEUsrIMPICredsType' object. "
     ::= { pktcEUEUsrIMPIEntry 6 }

-- ---------------------------------------------------------------------
-- User to Apps Mapping Table
-- ---------------------------------------------------------------------
pktcEUEUsrAppMapTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PktcEUEUsrAppMapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This data table represents Apps associated with
          a User IMPU."
    ::= { pktcEUEUsrProfile 4 }

pktcEUEUsrAppMapEntry OBJECT-TYPE
    SYNTAX      PktcEUEUsrAppMapEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " Each entry in this data table identifies an application
          associated with the user, the application profile index
          reference, the network status and UE status information"
    INDEX   { pktcEUEUsrIMPUIndex, pktcEUEUsrAppMapAppIndex }
    ::= { pktcEUEUsrAppMapTable 1 }

PktcEUEUsrAppMapEntry ::=
    SEQUENCE    {
                 pktcEUEUsrAppMapAppIndex             PktcEUETCUsrAppIndexType,
                 pktcEUEUsrAppMapAppOrgID             PktcEUETCAppOrgIdentifier,
                 pktcEUEUsrAppMapAppIdentifier        PktcEUETCAppIdentifier,
                 pktcEUEUsrAppMapAppIndexRef          PktcEUETCUsrAppIndexType,
                 pktcEUEUsrAppMapAppNWActStat         PktcEUETCActStatus,
                 pktcEUEUsrAppMapAppNWActStatInfo     PktcEUETCActStatusInfo,
                 pktcEUEUsrAppMapAppUEActStat         PktcEUETCActStatus,
                 pktcEUEUsrAppMapAppUEActStatInfo     PktcEUETCActStatusInfo,
                 pktcEUEUsrAppMapRowStatus            RowStatus
                }

pktcEUEUsrAppMapAppIndex OBJECT-TYPE
    SYNTAX      PktcEUETCUsrAppIndexType
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        " This MIB Object represents an index to map
          an Application instance associated with the User
          IMPU."
    ::= { pktcEUEUsrAppMapEntry 1 }



pktcEUEUsrAppMapAppOrgID OBJECT-TYPE
    SYNTAX      PktcEUETCAppOrgIdentifier
    MAX-ACCESS  read-create
    STATUS      current
```

```
    DESCRIPTION
        " This MIB Object identifies the Organization
          specifying the app identifier contained in
          the MIB Object 'pktcEUEUsrAppMapAppIdentifier'."
    ::= { pktcEUEUsrAppMapEntry 2 }


pktcEUEUsrAppMapAppIdentifier OBJECT-TYPE
    SYNTAX      PktcEUETCAppIdentifier
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object represents the identifier
          for a Application associated with the User.
          The application identifier MUST represent
          an application specified by the organization
          specified in 'pktcEUEUsrAppMapAppOrgID'."
    ::= { pktcEUEUsrAppMapEntry 3 }


pktcEUEUsrAppMapAppIndexRef OBJECT-TYPE
    SYNTAX      PktcEUETCUsrAppIndexType
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object represents the index reference
          to an application profile for the application
          identified by the MIB Object
          'pktcEUEUsrAppMapAppIDentifier'.
          If this value is set to a value of '0' then
          the following conditions apply:
          - If the application has no specific configuration
          data, the network activation status MUST be
          considered by the eUE
          - If the application has configuration data elements
          the eUE MUST deactivate the application and ignore
          the network activation status. The deactivation
          is accomplished using the MIB Object
          'pktcEUEUsrAppMapAppUEActStat'."
    DEFVAL {0}
    ::= { pktcEUEUsrAppMapEntry 4 }


pktcEUEUsrAppMapAppNWActStat OBJECT-TYPE
    SYNTAX      PktcEUETCActStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object represents the network
          activation status for the application
          specified in 'pktcEUEUsrAppMapAppOrgID'."
    DEFVAL {true}
    ::= { pktcEUEUsrAppMapEntry 5 }


pktcEUEUsrAppMapAppNWActStatInfo OBJECT-TYPE
    SYNTAX      PktcEUETCActStatusInfo
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object represents additional
          information for the status information
          represented by 'pktcEUEUsrAppMapAppNWActStat'."
    ::= { pktcEUEUsrAppMapEntry 6 }


pktcEUEUsrAppMapAppUEActStat OBJECT-TYPE
    SYNTAX      PktcEUETCActStatus
    MAX-ACCESS  read-only
    STATUS      current
```

```
    DESCRIPTION
        " This MIB Object represents the UE
          activation status for the application
          specified in 'pktcEUEUsrAppMapAppOrgID'."
    DEFVAL {true}
    ::= { pktcEUEUsrAppMapEntry 7 }

pktcEUEUsrAppMapAppUEActStatInfo OBJECT-TYPE
    SYNTAX      PktcEUETCActStatusInfo
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This MIB Object represents additional
          information for the status information
          represented by 'pktcEUEUsrAppMapAppUEActStat'.

          For example 'UE does not support this
          application.'"
    ::= { pktcEUEUsrAppMapEntry 8 }

pktcEUEUsrAppMapRowStatus  OBJECT-TYPE
    SYNTAX      RowStatus
    MAX-ACCESS  read-create
    STATUS      current
    DESCRIPTION
        " This MIB Object defines the row status associated with this
          particular User in the pktcEUEUsrAppMapTable.

          An entry in this table is not qualified for activation
          until the object instances of all corresponding columns
          have been initialized, either by default values or via
          explicit SET operations. Until all object instances in
          this row are initialized, the status value for this realm
          must be 'notReady(3)'.

          In particular, two columnar objects must be SET: the
          'pktcEUEUsrAppMapAppOrgID' and 'pktcEUEUsrAppMapAppIdentifier.
          Once these two objects have been set the row status may be SET
          to 'active(1)'.

          The eUE MUST not allow these two objects to be changed while
          the row is 'active'. The value of this object has no effect on
          whether other columnar objects in this row can be modified."

     ::= { pktcEUEUsrAppMapEntry 9 }


-- ------------------------------------------------------------------
-- Conformance Information
-- ------------------------------------------------------------------

pktcEUEUsrMIBCompliances  OBJECT IDENTIFIER ::= { pktcEUEUsrConformance 1 }
pktcEUEUsrMIBGroups       OBJECT IDENTIFIER ::= { pktcEUEUsrConformance 2 }

-- ----------------------
-- Compliance Statements
-- ----------------------
pktcEUEUsrMIBCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
            "The compliance statement for implementations of the User Mib "
    MODULE   -- this module
        MANDATORY-GROUPS {
                 pktcEUEUsrProfileGroup,
                 pktcEUEUsrIMPUGroup,
                 pktcEUEUsrIMPIGroup,
                 pktcEUEUsrAppMapGroup
                 }
    ::= { pktcEUEUsrMIBCompliances 1 }
```

```
pktcEUEUsrProfileGroup OBJECT-GROUP
      OBJECTS {
         pktcEUEUsrProfileVersion
      }
      STATUS  current
      DESCRIPTION
            "The eUE Usr Profile Group."
      ::= { pktcEUEUsrMIBGroups 1 }

pktcEUEUsrIMPUGroup OBJECT-GROUP
      OBJECTS {
         pktcEUEUsrIMPUIdType,
         pktcEUEUsrIMPUId,
         pktcEUEUsrIMPUIMPIIndexRef,
         pktcEUEUsrIMPUDispInfo,
         pktcEUEUsrIMPUOpIndexRefs,
         pktcEUEUsrIMPUNWActStat,
         pktcEUEUsrIMPUNWActStatInfo,
         pktcEUEUsrIMPUUEActStat,
         pktcEUEUsrIMPUUEActStatInfo,
         pktcEUEUsrIMPUSigSecurity,
         pktcEUEUsrIMPUAdditionalInfo,
         pktcEUEUsrIMPURowStatus
      }
      STATUS  current
      DESCRIPTION
            "The user IMPU Group."
      ::= { pktcEUEUsrMIBCompliances 2}


pktcEUEUsrIMPIGroup OBJECT-GROUP
      OBJECTS {
          pktcEUEUsrIMPICredsType,
          pktcEUEUsrIMPICredentials,
          pktcEUEUsrIMPIIdType,
          pktcEUEUsrIMPIId,
          pktcEUEUsrIMPIRowStatus
      }
      STATUS  current
      DESCRIPTION
            "The user IMPI Group."
      ::= { pktcEUEUsrMIBCompliances 3}

pktcEUEUsrAppMapGroup OBJECT-GROUP
      OBJECTS {
           pktcEUEUsrAppMapAppOrgID,
           pktcEUEUsrAppMapAppIdentifier,
           pktcEUEUsrAppMapAppIndexRef,
           pktcEUEUsrAppMapAppNWActStat,
           pktcEUEUsrAppMapAppNWActStatInfo,
           pktcEUEUsrAppMapAppUEActStat,
           pktcEUEUsrAppMapAppUEActStatInfo,
           pktcEUEUsrAppMapRowStatus
      }
      STATUS  current
      DESCRIPTION
            "The User to Applications Mapping Group."
      ::= { pktcEUEUsrMIBCompliances 4}

END
```

Annex C

IPCablecom eUE Provisioning and Management Modules

(This annex forms an integral part of this Recommendation)

C.1 Provisioning and Management MIB Module

```
CL-PKTC-EUE-PROV-MGMT-MIB DEFINITIONS ::= BEGIN

IMPORTS
    OBJECT-TYPE,
    MODULE-IDENTITY
                        FROM SNMPv2-SMI
    OBJECT-GROUP,
    MODULE-COMPLIANCE   FROM SNMPv2-CONF
    SnmpAdminString
                        FROM SNMP-FRAMEWORK-MIB
    InetAddressType,
    InetAddress
                        FROM INET-ADDRESS-MIB
    pktcEUEMibs         FROM CLAB-DEF-MIB;


pktcEUEProvMgmtMIB MODULE-IDENTITY
    LAST-UPDATED "200711060000Z"
    ORGANIZATION "Cable Television Laboratories, Inc."
    CONTACT-INFO
            "Sumanth Channabasappa
             Postal: Cable Television Laboratories, Inc
             858 Coal Creek Circle
             Louisville, CO 80027
             U.S.A.
             Phone: +1 303 661 9100
             Fax: +1 303 661 9199
             E-mail:mibs@cablelabs.com

             Acknowledgements:
             Eugene Nechamkin, Broadcom
             Thomas Clack, Broadcom  - Primary author
             Josh Littlefield, Cisco,
             and members of the PacketCable PACM Focus Team. "

    DESCRIPTION
            "This MIB module provides the provisioning and management
            MIB module for the E-UE Provisioning Framework."
    ::= { pktcEUEMibs 5 }

-- Administrative assignments
pktcEUEProvMgmtNotifications     OBJECT IDENTIFIER ::= { pktcEUEProvMgmtMIB 0 }
pktcEUEProvMgmtObjects           OBJECT IDENTIFIER ::= { pktcEUEProvMgmtMIB 1 }
pktcEUEProvMgmtConformance       OBJECT IDENTIFIER ::= { pktcEUEProvMgmtMIB 2 }



pktcEUEProvMgmtVersion OBJECT-TYPE
    SYNTAX      SnmpAdminString(SIZE(0..6))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This MIB Object represents the Provisioning and Management Module
          version. The eUE MUST set this MIB Object to value of '1.0'."
    ::= { pktcEUEProvMgmtObjects  1 }
```

```
-- DHCP Servers for IPv6
pktcEUEDhcpv6ServerId1   OBJECT-TYPE
       SYNTAX      OCTET STRING(SIZE(0..31))
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
           " This MIB Object contains the primary DHCP Server identifier
             the EUE was provided with, during provisioning.

             The eUE MUST populate this MIB Object with the first
             thirty-two bytes of the DHCPv6 Server identifier
             provided within the eCM's CL_OPTION_CCCV6 or CL_V4OPTION_CCCV6,
             sub-option 1."
       ::= { pktcEUEProvMgmtObjects 2 }

pktcEUEDhcpv6ServerId2  OBJECT-TYPE
       SYNTAX      InetAddress
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
           " This MIB Object contains the secondary DHCP Server identifier
             the EUE was provided with, during provisioning.

             The eUE MUST populate this MIB Object with the first
             thirty-two bytes of the DHCPv6 Server identifier
             provided within the eCM's CL_OPTION_CCCV6 or CL_V4OPTION_CCCV6,
             sub-option 2."
             ::= { pktcEUEProvMgmtObjects 3 }


pktcEUEDhcpv6ServerAddressType  OBJECT-TYPE
       SYNTAX      InetAddressType
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
           "This MIB Object contains the DHCP Server Address type
            contained in the MIB Object 'pktcEUEDhcpv6ServerAddress'.
            Valid values are 'ipv6(2)' and 'unknown(0)'."
             ::= { pktcEUEProvMgmtObjects 4 }


pktcEUEDhcpv6ServerAddress  OBJECT-TYPE
       SYNTAX      InetAddress
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
           "This MIB Object contains the DHCPv6 Server address from
            which the eUE obtained its IPv6 address, if the eUE
            is in IPv6 mode, and can obtain the information."
             ::= { pktcEUEProvMgmtObjects 5 }

-- DNS Servers for IPv6
pktcEUEDnsv6ServerAddressType  OBJECT-TYPE
       SYNTAX      InetAddressType
       MAX-ACCESS  read-only
       STATUS      current
       DESCRIPTION
           "This MIB Object contains the DHCP Server Address type
            contained in the MIB Object 'pktcEUEDhcpv6ServerAddress'.
            Valid values are 'ipv6(2)' and 'unknown(0)'."
       ::= { pktcEUEProvMgmtObjects 6}

pktcEUEDnsv6ServerAddress1  OBJECT-TYPE
       SYNTAX      InetAddress
       MAX-ACCESS  read-write
       STATUS      current
       DESCRIPTION
           "This MIB Object contains the primary DNSv6 Server address
            which the eUE obtained via DHCPv6, when the eUE
            is in IPv6 mode."
       ::= { pktcEUEProvMgmtObjects 7 }
```

```
pktcEUEDnsv6ServerAddress2  OBJECT-TYPE
       SYNTAX      InetAddress
       MAX-ACCESS  read-write
       STATUS      current
       DESCRIPTION
           "This MIB Object contains the secondary DNSv6 Server address
            which the eUE obtained via DHCPv6, when the eUE
            is in IPv6 mode."
       ::= { pktcEUEProvMgmtObjects 8 }

-- Object Groups
-- The object groups used in this MIB module are imported from
-- the PKTC-IETF-MTA-MIB MIB (RFC4682).

-- Conformance Statements
pktcEUEProvMgmtCompliances  OBJECT IDENTIFIER ::= { pktcEUEProvMgmtConformance 1 }
pktcEUEProvMgmtGroups       OBJECT IDENTIFIER ::= { pktcEUEProvMgmtConformance 2 }

-- Compliance Statements
pktcEUEProvMgmtCompliance MODULE-COMPLIANCE
    STATUS  current
    DESCRIPTION
        "The compliance statement for PacketCable eUE devices
        that implement the PacketCable eUE Provisioning Framework.

        This compliance statement specifies, for the PacketCable
        eUE Provisioning framework, the required objects from the 'Multimedia
        Terminal Adapter(MTA)Management Information Base for
        PacketCable and IPCablecom-Compliant Devices'(RFC 4682)MIB.

        Some objects from RFC4682 have been enhanced for applicability
        to eUEs. Similarly, inapplicable objects are clearly indicated.

        As indicated in the eUE Provisioning specification, references
        to E-MTA and eMTA in RFC4682 are to be understood to be applicable
        to E-UE and eUE, respectively. "
    REFERENCE
        "PacketCable E-UE Provisioning Framework Specification"

    MODULE   PKTC-IETF-MTA-MIB
        MANDATORY-GROUPS {
               pktcMtaGroup,
               pktcMtaNotificationGroup
        }


-- The following pktcEUEDevBase group describes the base eUE objects

  OBJECT  pktcMtaDevResetNow
  DESCRIPTION
      " This MIB Object controls the eUE software reset.
        The eUE MUST return a value of 'false' upon an Object read.
        The eUE MUST reset itself when this object is set to a value of
        'false', and perform the following actions:
          - All Services (if present) are immediately terminated.
          - Any sessions (even on the behalf of Users) are gracefully
            terminated.
          - The provisioning flow is started at step eUE-1.

        If a value is written into an instance of 'pktcMtaDevResetNow',
        the agent MUST NOT retain the supplied value across eUE
        re-initializations or reboots. "

  --  OBJECT  pktcMtaDevSerialNumber                - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevSwCurrentVers               - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevFQDN                        - Same as PKTC-IETF-MTA-MIB

  OBJECT  pktcMtaDevEndPntCount
  MIN-ACCESS  not-accessible
```

```
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevEnabled
  DESCRIPTION
      " This MIB Object contains the eUE Admin Status of this device.
        If this object is set to 'true', the eUE is
        administratively enabled, and the eUE MUST be able to
        interact with the PacketCable entities, such as the
        Provisioning Server, KDC, and other eUEs on all
        PacketCable interfaces.

        If this object is set to 'false', the eUE is
        administratively disabled and MUST do the following:
        - Deregister any users;
        - Stop any applications.

        Additionally, the eUE MUST maintain the SNMP Interface
        for management and also the SNMP Key management interface.
        Also, the eUE MUST NOT continue Kerberized key management
        with any devices, except with the Provisioning server,until
        this object is set to 'true'.

        If a value is written into an instance of
        pktcMtaDevEnabled, the agent MUST NOT retain the supplied
        value across eUE re-initializations or reboots."
  --  OBJECT  pktcMtaDevTypeIdentifier                - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvisioningState             - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevHttpAccess                    - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvisioningTimer             - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvisioningCounter           - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevErrorOidIndex                 - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevErrorOid                      - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevErrorValue                    - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevErrorReason                   - Same as PKTC-IETF-MTA-MIB


-- The following object group describes server access and parameters used

  OBJECT  pktcMtaDevDhcpServerAddressType
  DESCRIPTION
      " This MIB Object is only required to support the DHCPv4 address type. "

-- NOTE: pktcMtaDevServerDhcp1 and pktcMtaDevServerDhcp2 are intended for
--       IPv4 DHCP Servers per RFC 4682. IPv6 DHCP information is contained
--       in the prov-mgmt extension MIB module.
  --  OBJECT  pktcMtaDevServerDhcp1                   - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevServerDhcp2                   - Same as PKTC-IETF-MTA-MIB


  OBJECT  pktcMtaDevDnsServerAddressType
  DESCRIPTION
      " This MIB Object is only required to support the DHCPv4 address type. "

-- NOTE: pktcMtaDevServerDns1 and pktcMtaDevServerDns2 are intended for
--       IPv4 DNS Servers per RFC 4682. IPv6 DNS information is contained
--       in the prov-mgmt extension MIB module.

  --  OBJECT  pktcMtaDevServerDns1                    - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevServerDns2                    - Same as PKTC-IETF-MTA-MIB

  OBJECT  pktcMtaDevTimeServerAddressType
  MIN-ACCESS  not-accessible
  DESCRIPTION
      " This MIB Object is not applicable for the eUE."

  OBJECT  pktcMtaDevTimeServer
  MIN-ACCESS  not-accessible
```

```
  DESCRIPTION
      " This MIB Object not applicable for the eUE."

  --  OBJECT  pktcMtaDevConfigFile                    - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevSnmpEntity                    - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvConfigHash                - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvConfigKey                 - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvConfigEncryptAlg          - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvSolicitedKeyTimeout       - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvUnsolicitedKeyMaxTimeout  - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvUnsolicitedKeyNomTimeout  - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvUnsolicitedKeyMaxRetries  - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvKerbRealmName             - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevProvState                     - Same as PKTC-IETF-MTA-MIB


-- The following object group describes the security objects.

  --  OBJECT  pktcMtaDevManufacturerCertificate       - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevCertificate                   - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevCorrelationId                 - Same as PKTC-IETF-MTA-MIB
  --  OBJECT  pktcMtaDevTelephonyRootCertificate      - Same as PKTC-IETF-MTA-MIB

  OBJECT  pktcMtaDevRealmAvailSlot
  MIN-ACCESS  not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevRealmName
  MIN-ACCESS  read-only
  DESCRIPTION
      " eUE will only have one row entry for this object."

  OBJECT  pktcMtaDevRealmPkinitGracePeriod
  MIN-ACCESS  read-write
  DESCRIPTION
      " eUE will only have one row entry for this object."

  OBJECT  pktcMtaDevRealmTgsGracePeriod
  MIN-ACCESS  read-write
  DESCRIPTION
      " eUE will only have one row entry for this object."

  OBJECT  pktcMtaDevRealmOrgName
  MIN-ACCESS  read-write
  DESCRIPTION
      " eUE will only have one row entry for this object."

  OBJECT  pktcMtaDevRealmUnsolicitedKeyMaxTimeout
  MIN-ACCESS  read-write
  DESCRIPTION
      " eUE will only have one row entry for this object."

  OBJECT  pktcMtaDevRealmUnsolicitedKeyNomTimeout
  MIN-ACCESS  read-write
  DESCRIPTION
      " eUE will only have one row entry for this object."

  OBJECT  pktcMtaDevRealmUnsolicitedKeyMaxRetries
  MIN-ACCESS  read-write
  DESCRIPTION
      " eUE will only have one row entry for this object"

  OBJECT  pktcMtaDevRealmStatus
  MIN-ACCESS  read-write
  DESCRIPTION
      " Support for the values notInService(2), notReady(3), createAndGo(4),
        createAndWait(5), and destroy(6) is not required.

        This table only has one row."
```

```
  OBJECT  pktcMtaDevCmsAvailSlot
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsFqdn
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsKerbRealmName
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsMaxClockSkew
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsSolicitedKeyTimeout
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsUnsolicitedKeyMaxTimeout
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsUnsolicitedKeyNomTimeout
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsUnsolicitedKeyMaxRetries
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsIpsecCtrl
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevCmsStatus
  MIN-ACCESS   not-accessible
  DESCRIPTION
      " Object not applicable for the eUE."

  OBJECT  pktcMtaDevResetKrbTickets
  SYNTAX  BITS {
                invalidateProvOnReboot   (0)
              }
  DESCRIPTION
      " the eUE only support the
        invalidateProvOnReboot bit (bit 0) for this object. The
        invalidateAllCmsOnReboot bit (bit 1) is not supported."


  MODULE
        MANDATORY-GROUPS {
               pktcEUEProvMgmtGroup
        }
    ::= { pktcEUEProvMgmtCompliances 1 }

pktcEUEProvMgmtGroup OBJECT-GROUP
      OBJECTS {
          pktcEUEProvMgmtVersion,
          pktcEUEDhcpv6ServerId1,
          pktcEUEDhcpv6ServerId2,
```

```
          pktcEUEDhcpv6ServerAddressType,
          pktcEUEDhcpv6ServerAddress,
          pktcEUEDnsv6ServerAddressType,
          pktcEUEDnsv6ServerAddress1,
          pktcEUEDnsv6ServerAddress2
      }
      STATUS  current
      DESCRIPTION
            "The eUE Operator Group."
      ::= { pktcEUEProvMgmtGroups 1}

-- Notifications
  --  pktcMtaDevProvisioningEnrollment  NOTIFICATION-TYPE     - Same as PKTC-IETF-MTA-MIB
  --  pktcMtaDevProvisioningStatus      NOTIFICATION-TYPE     - Same as PKTC-IETF-MTA-MIB

 END
```

C.2 Management Event MIB Module

```
CL-PKTC-EUE-EVENT-MIB DEFINITIONS ::= BEGIN

IMPORTS

    OBJECT-TYPE,
    MODULE-IDENTITY    FROM SNMPv2-SMI
    OBJECT-GROUP,
    MODULE-COMPLIANCE  FROM SNMPv2-CONF
    SnmpAdminString
                       FROM SNMP-FRAMEWORK-MIB
    pktcEUEMibs        FROM CLAB-DEF-MIB;


pktcEUEEventMIB MODULE-IDENTITY
    LAST-UPDATED "200711060000Z"
    ORGANIZATION "Cable Television Laboratories, Inc."
    CONTACT-INFO
            "Sumanth Channabasappa
             Postal: Cable Television Laboratories, Inc
             858 Coal Creek Circle
             Louisville, CO 80027
             U.S.A.
             Phone: +1 303 661 9100
             Fax: +1 303 661 9199
             E-mail:mibs@cablelabs.com

             Acknowledgements:
             Thomas Clack, Broadcom - Primary author,
             and members of the PacketCable PACM Focus Team."

    DESCRIPTION
            "This MIB module provides the management objects for the
            Management Event mechanism as specified by the PacketCable
            E-UE Provisioning Framework."
    ::= { pktcEUEMibs 6 }

-- Administrative assignments
pktcEUEEventNotifications     OBJECT IDENTIFIER ::= { pktcEUEEventMIB 0 }
pktcEUEEventObjects           OBJECT IDENTIFIER ::= { pktcEUEEventMIB 1 }
pktcEUEEventConformance       OBJECT IDENTIFIER ::= { pktcEUEEventMIB 2 }

pktcEUEMEMVersion OBJECT-TYPE
    SYNTAX      SnmpAdminString(SIZE(0..6))
    MAX-ACCESS  read-only
    STATUS      current
    DESCRIPTION
        " This MIB Object represents the Management Event Reporting Module
          version. The eUE MUST set this MIB Object to value of '1.0'."
    ::= { pktcEUEEventObjects  1 }
```

```
-- Object Groups
--    The object groups used in this MIB module are imported from
--    the PKTC-EVENT-MIB (PKT-SP-EVEMIB1.5).

-- Conformance Statements
pktcEUEEventCompliances  OBJECT IDENTIFIER ::= { pktcEUEEventConformance 1 }
pktcEUEEventGroups       OBJECT IDENTIFIER ::= { pktcEUEEventConformance 2 }

-- Compliance Statements
pktcEUEEventCompliance MODULE-COMPLIANCE
    STATUS      current
    DESCRIPTION
        "The compliance statement for CableLabs compliant eUE devices
        that implement the PacketCable E-UE Provisioning Framework.

        This compliance statement specifies, for PacketCable
        E-UE Provisioning, the required objects from the PKTC-EVENT-MIB
        defined in the PacketCable 1.5 Specifications Management Event
        MIB Specification, PKT-SP-EVEMIB1.5-I02-050812.

        Some objects from RFC4682 have been enhanced for applicability
        to eUEs. Similarly, inapplicable objects are clearly indicated."

    REFERENCE
        "PacketCable Embedded UE Provisioning Framework Specification"

    MODULE   PKTC-EVENT-MIB
        MANDATORY-GROUPS {
                 pktcEventGroup,
                 pktcEventNotificationGroup
                 }


--  Event Reporting control objects

  --  OBJECT  pktcDevEvControl                  - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvSyslogAddressType        - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvSyslogAddress            - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvSyslogUdpPort            - Same as PKTC-EVENT-MIB


--  Event throttling control

  --  OBJECT  pktcDevEvThrottleAdminStatus
  --  OBJECT  pktcDevEvThrottleThreshold        - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvThrottleInterval         - Same as PKTC-EVENT-MIB


--  Status Reporting

  --  OBJECT  pktcDevEvTransmissionStatus       - Same as PKTC-EVENT-MIB


-- Event Descriptions

  --  OBJECT  pktcDevEventDescrId               - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEventDescrEnterprise       - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEventDescrFacility         - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEventDescrLevel            - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEventDescrReporting        - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEventDescrText             - Same as PKTC-EVENT-MIB


--  Events generated

  --  OBJECT  pktcDevEvLogIndex                 - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvLogTime                  - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvLogEnterprise            - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvLogId                    - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvLogText                  - Same as PKTC-EVENT-MIB
```

```
  --  OBJECT  pktcDevEvLogEndpointName           - Same as PKTC-EVENT-MIB
  --  OBJECT  pktcDevEvLogType                   - Same as PKTC-EVENT-MIB

  OBJECT  pktcDevEvLogTargetInfo
  DESCRIPTION
            "This MIB Object contains a comma separated list of the
            actions taken for external notifications, along with the
            target IP address for the generated events. Locally
            stored events must not be recorded in this MIB Object.

            The syntax is as:
            <action-1/IP>,<action-2/IP>,<action-3/IP>

            Where <action-n/IP> is to be denoted as follows:
              For syslog events:
                     syslog/<IP address of the syslog Server>
              For SNMP traps:
                     snmpTrap/<IP address of the SNMP Server>
              For SNMP INFORMS:
                     snmpInform/<IP address of the SNMP Server>

             If there are multiple targets for the same type (SNMP
             Traps sent to multiple IP addresses) or if there are
             multiple messages sent to the same IP (syslog and SNMP
             sent to the same IP address) they need to be reported
             individually."

   --  OBJECT  pktcDevEvLogCorrelationId      - Same as PKTC-EVENT-MIB
   --  OBJECT  pktcDevEvLogAdditionalInfo     - Same as PKTC-EVENT-MIB


  MODULE
        MANDATORY-GROUPS {
               pktcEUEMEMGroup
        }
    ::= { pktcEUEEventCompliances 1 }

pktcEUEMEMGroup OBJECT-GROUP
      OBJECTS {
          pktcEUEMEMVersion
      }
      STATUS  current
      DESCRIPTION
            "The eUE Operator Group."
      ::= { pktcEUEEventGroups 1}


--  Notifications

  --  pktcDevEvInform NOTIFICATION-TYPE          - Same as PKTC-EVENT-MIB
  --   OBJECTS {pktcDevEvLogIndex, pktcDevEvLogTime,
  --   pktcDevEvLogEnterprise,pktcDevEvLogId,
  --   pktcDevEvLogEndpointName,pktcDevEvLogCorrelationId,ifPhysAddress}

  -- pktcDevEvTrap NOTIFICATION-TYPE             - Same as PKTC-EVENT-MIB
  --  OBJECTS {pktcDevEvLogIndex, pktcDevEvLogTime,
  --  pktcDevEvLogEnterprise,pktcDevEvLogId,
  --  pktcDevEvLogEndpointName,pktcDevEvLogCorrelationId,ifPhysAddress}

 END
```

Annex D

IPCablecom eUE Additional Modules

(This annex forms an integral part of this Recommendation)

D.1 Certificate Bootstrapping XML Schema

```
<?xml version="1.0"?>
<!--(C) 2007 CableLabs. All rights reserved -->
<!--PacketCable E-UE Provisioning Certificate Bootstrapping XML Schema -->
<xsd:schema xmlns="http://www.cablelabs.com/namespaces/PacketCable/2.0/XSD/v1/CL-PKTC-CB"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
targetNamespace="http://www.cablelabs.com/namespaces/PacketCable/2.0/XSD/v1/CL-PKTC-CB"
elementFormDefault="qualified" attributeFormDefault="unqualified" xml:lang="en">

  <xsd:annotation>
    <xsd:documentation>
       This XML Schema corresponds to the list of Private Identifiers (IMPIs)
       as specified in the User Configuration. Please refer to the MIB
       CL-PKTC-EUE-User for more information. The requirements specified in
       the MIB table are also applicable to the data elements specified
       in this XML Schema.

       In addition:
       - If 'pktcEUEUsrIMPIClearAllCredentials' is set to a value of 'true',
       then the eUE MUST clear all the current IMPI entries in the IMPI table
       and add the new entries provided, in any.
       - If 'pktcEUEUsrIMPIClearAllCredentials' is set to a value of 'false',
         then the eUE MUST modify any existing entries (identified by the
         IMPIId) and add any new entries to the IMPI table.
       </xsd:documentation>
  </xsd:annotation>

  <!-- List of credentials-->
  <xsd:element name="pktcEUEUsrCredentials" type="pktcEUEUsrIMPICredentialList"/>



  <!-- pktcEUEUsrIMPICredentialList: Credentials list and clear
       credentials directive -->
  <xsd:complexType name="pktcEUEUsrIMPICredentialList">
    <xsd:sequence maxOccurs="unbounded">
      <xsd:element name="pktcEUEClearCurrentUsrCredentials" type="xsd:boolean"/>
      <xsd:element name="pktcEUEUsrCredentialsList"
                   type="pktcEUEUsrIMPICredentialsList"/>
      <xsd:any namespace="##other" processContents="lax"
               minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
  </xsd:complexType>


  <!-- pktcEUEUsrIMPICredentialsList: Credentials list -->
  <xsd:complexType name="pktcEUEUsrIMPICredentialsList">
    <xsd:complexContent>
      <xsd:extension base="pktcEUEUsrIMPICredentialListType">
      <xsd:attribute name="pktcEUEUsrIMPICredentialInstanceID"
                     type="xsd:integer"/>
      </xsd:extension>
    </xsd:complexContent>
  </xsd:complexType>


  <!-- pktcEUEUsrIMPICredentialListType: Credential contents -->
  <xsd:complexType name="pktcEUEUsrIMPICredentialListType">
    <xsd:sequence minOccurs="0">
      <xsd:element name="pktcEUEUsrIMPIType" type="pktcEUEIdType"/>
      <xsd:element name="pktcEUEUsrIMPIId" type="pktcEUEId"/>
```

```
      <xsd:element name="pktcEUEUsrIMPICredsType" type="pktcEUEUsrCredsType"/>
      <xsd:element name="pktcEUEUsrIMPICreds" type="pktcEUEUsrCreds"/>
      <xsd:any namespace="##other" processContents="lax"
               minOccurs="0" maxOccurs="unbounded"/>
    </xsd:sequence>
  </xsd:complexType>


  <!-- Definitions required for credential elements -->
  <xsd:simpleType name="pktcEUEIdType">
    <xsd:restriction base="xsd:NMTOKEN">
      <xsd:enumeration value="other"/>
      <xsd:enumeration value="gruu"/>
      <xsd:enumeration value="publicIdentity"/>
      <xsd:enumeration value="privateIdentity"/>
      <xsd:enumeration value="publicPrivatePair"/>
      <xsd:enumeration value="username"/>
      <xsd:enumeration value="macaddress"/>
      <xsd:enumeration value="packetcableIdentity"/>
    </xsd:restriction>
  </xsd:simpleType>


  <xsd:simpleType name="pktcEUEId">
    <xsd:restriction base="xsd:hexBinary">
      <xsd:minLength value="0"/>
      <xsd:maxLength value="1023"/>
    </xsd:restriction>
  </xsd:simpleType>


  <xsd:simpleType name="pktcEUEUsrCredsType">
    <xsd:annotation>
      <xsd:documentation>
        </xsd:documentation>
    </xsd:annotation>
    <xsd:restriction base="xsd:NMTOKEN">
      <xsd:enumeration value="other"/>
      <xsd:enumeration value="none"/>
      <xsd:enumeration value="password"/>
      <xsd:enumeration value="presharedkey"/>
      <xsd:enumeration value="certificate"/>
    </xsd:restriction>
  </xsd:simpleType>


  <xsd:simpleType name="pktcEUEUsrCreds">
    <xsd:restriction base="xsd:hexBinary">
      <xsd:minLength value="0"/>
      <xsd:maxLength value="8192"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:schema>
```

Appendix I

Illustrative IPCablecom Deployment Examples

(This appendix does not form an integral part of this Recommendation)

I.1 Example 1: Deployment with multiple Users, and one IPCablecom Application

An example of an eUE associated with two users, each associated with the same application, is illustrated in Figure I.1. As a note, the use of Video On Demand (VOD) as an application is only an illustrative example, not an actual IPCablecom application.

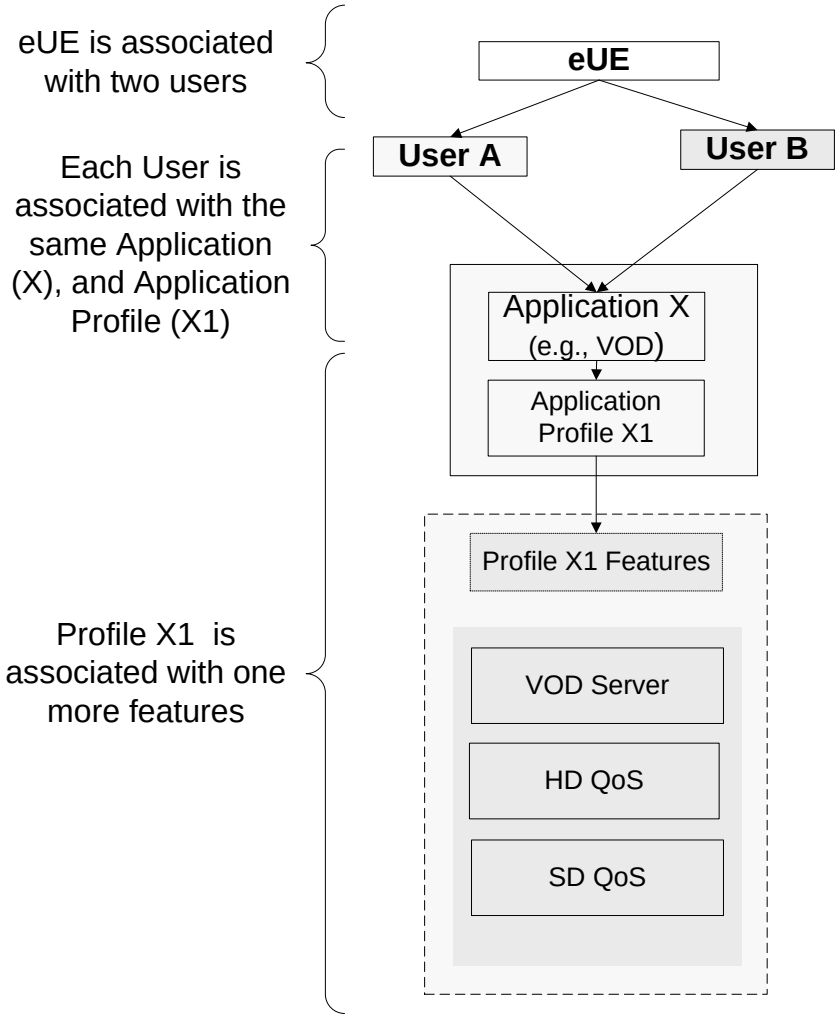

Figure I.1 – Deployment with multiple users and one IPCablecom Application

The MIB table assignments for the illustration in Figure I.1 is given below, with the following assumptions:

- Application X has specified the Application Profile to Features Mapping Table, and Feature Tables.
- User identifiers 1 and 2 represent Users A and B, respectively.
- Application identifier 1 identifies Application X (VOD).

- Feature identifiers 1, 2, and 3 identify features VOD Server, HD QoS, and SD QoS, respectively.

User to Application Profile Mapping Table

```
(Mapping of User A to an application profile)
UsrAppMapTable.1.1.3(AppOrgID)               = 4491 (CableLabs)
UsrAppMapTable.1.1.4(AppIdentifier)          = 1    (App X, VOD)
UsrAppMapTable.1.1.5(AppIndexRef)            = 10   (Profile X1)

(Mapping of User B to an application profile)
UsrAppMapTable.2.1.3(AppOrgID)               = 4491 (CableLabs)
UsrAppMapTable.2.1.4(AppIdentifier)          = 1    (App X, VOD)
UsrAppMapTable.2.1.5(AppIndexRef)            = 10   (Profile X1)
```

Application Profile to Features Mapping Table (Application X)

```
(Profile X1)
XAppProfileToFeatureMapTable.10.1.3 (AppFeatureIdentifier)   =1(VOD Server)
XAppProfileToFeatureMapTable.10.1.4 (AppFeatureTableIndexRef)=5

XAppProfileToFeatureMapTable.10.2.3 (AppFeatureIdentifier)   =2(HD QoS)
XAppProfileToFeatureMapTable.10.2.4 (AppFeatureTableIndexRef)=5

XAppProfileToFeatureMapTable.10.3.3 (AppFeatureIdentifier)   =3(SD QoS)
XAppProfileToFeatureMapTable.10.3.4 (AppFeatureTableIndexRef)=5
```

Feature Tables

```
(VOD Server Table).5="vod.example.com"
(HD QoS Table).5="VIDEOCODEC=VX; AUDIOCODEC=AX; BANDWITH=XMBPS"
(SD QoS Table).5="VIDEOCODEC=VY; AUDIOCODEC=AY; BANDWITH=YMBPS"
```

I.2 Example 2: Deployment with multiple Users, and multiple IPCablecom Applications

An example of an eUE associated with multiple users, each with one or more applications, is illustrated in Figure I.2. As a note, the use of voice as an application is only an illustrative example, not an actual IPCablecom application.

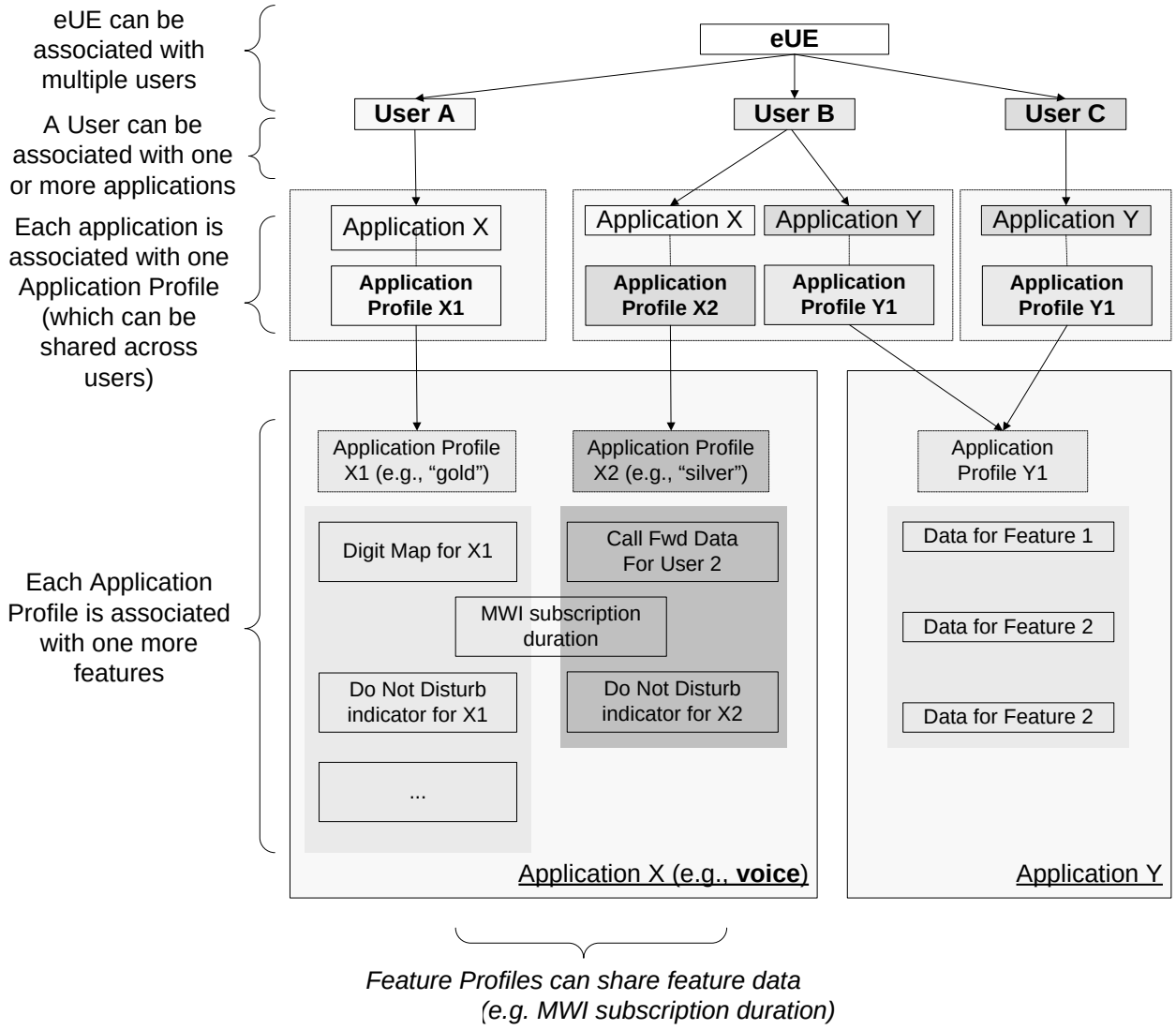

Figure I.2 – Deployment with multiple users and multiple IPCablecom Applications

The MIB table assignments for the illustration in Figure I.2 is given below, with the following assumptions:

- Applications X and Y have specified the Application Profile to Features Mapping Table, as required by this Recommendation
- User identifiers 1, 2 and 3 represent Users A, B and C, respectively
- Application identifiers 1 and 99 identify Applications X and Y, respectively
- Feature identifiers 1, 2, and 3 identify features Digit Map, MWI and DND, respectively

User to Application Profile Mapping Table:

```
(Mapping of User A to an application profile)
UsrAppMapTable.1.1.3(AppOrgID)              = 4491 (CableLabs)
UsrAppMapTable.1.1.4(AppIdentifier)         = 1  (App X)
UsrAppMapTable.1.1.5(AppIndexRef)           = 11  (Profile X1)

(Mapping of User B to an application profile)
UsrAppMapTable.2.1.3(AppOrgID)              = 4491 (CableLabs)
UsrAppMapTable.2.1.4(AppIdentifier)         = 1  (App X)
UsrAppMapTable.2.1.5(AppIndexRef)           = 12  (Profile X2)
```

```
UsrAppMapTable.2.2.3(AppOrgID)              = 4491 (CableLabs)
UsrAppMapTable.2.2.4(AppIdentifier)         = 99 (App Y)
UsrAppMapTable.2.2.5(AppIndexRef)           = 20  (Profile Y1)

(Mapping of User C to an application profile)
UsrAppMapTable.3.1.3(AppOrgID)              = 4491 (CableLabs)
UsrAppMapTable.3.1.4(AppIdentifier)         = 99 (App Y)
UsrAppMapTable.3.1.5(AppIndexRef)           = 20  (Profile Y1)
```

Application Profile to Features Mapping Table (Application X):

```
(Profile X1)
XAppProfileToFeatureMapTable.11.1.3 (AppFeatureIdentifier)   = 1(DIGIT MAP)
XAppProfileToFeatureMapTable.11.1.4 (AppFeatureTableIndexRef)= 1

XAppProfileToFeatureMapTable.11.2.3 (AppFeatureIdentifier)   = 2(MWI SUB)
XAppProfileToFeatureMapTable.11.2.4 (AppFeatureTableIndexRef)= 11

XAppProfileToFeatureMapTable.11.3.3 (AppFeatureIdentifier)   = 3(DND)
XAppProfileToFeatureMapTable.11.3.4 (AppFeatureTableIndexRef)= 3

(Profile X2)
XAppProfileToFeatureMapTable.12.1.3 (AppFeatureIdentifier)   = 1(DIGIT MAP)
XAppProfileToFeatureMapTable.12.1.4 (AppFeatureTableIndexRef)= 2

XAppProfileToFeatureMapTable.12.2.3 (AppFeatureIdentifier)   = 2(MWI SUB)
XAppProfileToFeatureMapTable.12.2.4 (AppFeatureTableIndexRef)= 11

XAppProfileToFeatureMapTable.12.3.3 (AppFeatureIdentifier)   = 3(DND)
XAppProfileToFeatureMapTable.12.3.4 (AppFeatureTableIndexRef)= 4
```

Application Profile to Features Mapping Table (Application Y):

```
(Profile Y1)
YAppProfileToFeatureMapTable.20.1.3 (AppFeatureIdentifier)   = 1
YAppProfileToFeatureMapTable.20.1.4 (AppFeatureTableIndexRef)= 25

YAppProfileToFeatureMapTable.20.2.3 (AppFeatureIdentifier)   = 2
YAppProfileToFeatureMapTable.20.2.4 (AppFeatureTableIndexRef)= 0
YAppProfileToFeatureMapTable.20.2.5 (AppNWFeatureStatus)     = False
Note: An IndexRef of 0 can indicate that there are only activation controls for the
feature; see also additional note for the next feature

YAppProfileToFeatureMapTable.20.1.3 (AppFeatureIdentifier)   = 3
YAppProfileToFeatureMapTable.20.1.4 (AppFeatureTableIndexRef)= 0
Note: An IndexRef of 0 can also indicate other settings such as per Operator data
```

Application X Feature Tables

```
(DIGIT MAP).1="<<DIGIT MAP ABC>>"
(DIGIT MAP).2="<<DIGIT MAP XYZ>>"
(MWI SUB).11="60 secs"
(DND).3="True"
(DND).4="False"
```

Application Y Feature Tables

```
(Feature 1 has a Feature Table)
(Feature 1).25="<<Feature 1 data>>"

(Feature 2 has no configuration data)

(Feature 3 is per Operator configuration)
(Feature 3).Operator="<<Feature 3 data>>
```

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	**Cable networks and transmission of television, sound programme and other multimedia signals**
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	Telecommunication management, including TMN and network maintenance
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks, open system communications and security
Series Y	Global information infrastructure, Internet protocol aspects and next-generation networks
Series Z	Languages and general software aspects for telecommunication systems

Printed in Switzerland
Geneva, 2009