The ATM Forum
Technical Committee

Loop Emulation Service Using AAL2 CP-IWF MIB Addendum – Rev 1

AF-VMOA-0175.001

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Preface

This specification uses three levels for indicating the degree of compliance necessary for specific functions, procedures, or coding. They are indicated by the use of key words as follows:

- **Requirements:** "Shall" indicates a required function, procedures or coding necessary for compliance. In some cases "shall" used in text indicates a conditional requirement, since the operation described is dependent on whether or not an objective or option is chosen.

- **Objective:** "Should" indicates an objective which is not required for compliance, but which is considered desirable.

- **Option:** "May" indicates an optional operation without implying a desirability of one operation over another. That is, it identifies an operation that is allowed while still maintaining compliance.

Acknowledgments

Contents

1 Introduction

The Loop Emulation Service Using AAL2 (af-vmoa-0145.000) provides a specification for interoperability between a Customer Premises Inter-Working Function (CP-IWF) and a Central Office Inter-Working Function (CO-IWF), for the purpose of providing access to narrowband network services over a broadband access network.

The LES specification defines a method for supporting remote management operations over an Embedded Operations Channel (the LES EOC), using SNMP messages transmitted on the AAL2 VCC that exists between a CP-IWF and a CO-IWF. However, af-vmoa-0145.000 does not define the Management Information Base (MIB) for the CP-IWF that is necessary to achieve management interoperability. This specification defines the MIB for remote management of the CP-IWF, and also defines interactions with other standard MIBs (notably the Interfaces MIB defined in RFC2863) that are relevant to the remote management of the narrowband services delivered at the CP-IWF.

2 References

The following references contain provisions that, through reference in this text, constitute provisions of this specification. At the time of publication, the editions indicated were valid. All references are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the references indicated below.

2.1 Normative

1. ATM Forum af-vmoa-0145.000, "Voice and Multimedia Over ATM - Loop Emulation Service Using AAL2", July 2000.

2. IETF RFC 2863, "The Interfaces Group MIB", IETF, June 2000.

3. IETF RFC 1213, " Management Information Base for Network Management of TCP/IP-based internets: MIB-II", IETF, March 1991.

4. ATM Forum af-ilmi-0065.000, "Integrated Local Management Interface Specification 4.0", September 1996

5. ATM Forum af-nm-0165.000, "Addendum to the ILMI Auto-configuration Extension", July 2001

6. IETF RFC 2495, "Definitions of Managed Objects for the DS1, E1, DS2 and E2 Interface Types", IETF, January 1999

7. IETF RFC 2494, "Definitions of Managed Objects for the DS0 and DS0 Bundle Interface Type", IETF, January 1999

8. ATM Forum af-vmoa-0145.001, "Voice and Multimedia Over ATM - Loop Emulation Service Using AAL2 Revision 1", February 2003.

3 Scope

The scope of the CP-IWF MIB is to support the management of only the Loop Emulation Service within a LES device, as shown in Figure 1. It is important to note that this diagram makes no changes to the reference model described in Figure 1 of af-vmoa-0145.000 but merely serves as clarification on some of the details by providing a further refinement and labeling of the various resources involved in LES, particularly at the CP-IWF.

Figure 1 shows the physical and logical resources that exist within the LES device that provides the CP-IWF. It is possible as defined in af-vmoa-0145.000 that multiple CP-IWFs can exist within a single LES device that peer with different CO-IWFs. Each CP-IWF to CO-IWF relationship represents a single instance of the LES and has a separate AAL2 VCC associated with it. Each instance of the LES is represented by a separate instance of the CP-IWF MIB and is managed through its own LES EOC. It is a requirement that the management of one CP-IWF is independent of the management of another CP-IWF in the same physical LES device and a LES EOC shall only be able to access its own instance of the CP-IWF MIB.

The management areas supported by the CP-IWF MIB shall be as follows (note the list of functions under each management area is not exhaustive and is provided as an example of activities that will take place under each management area).
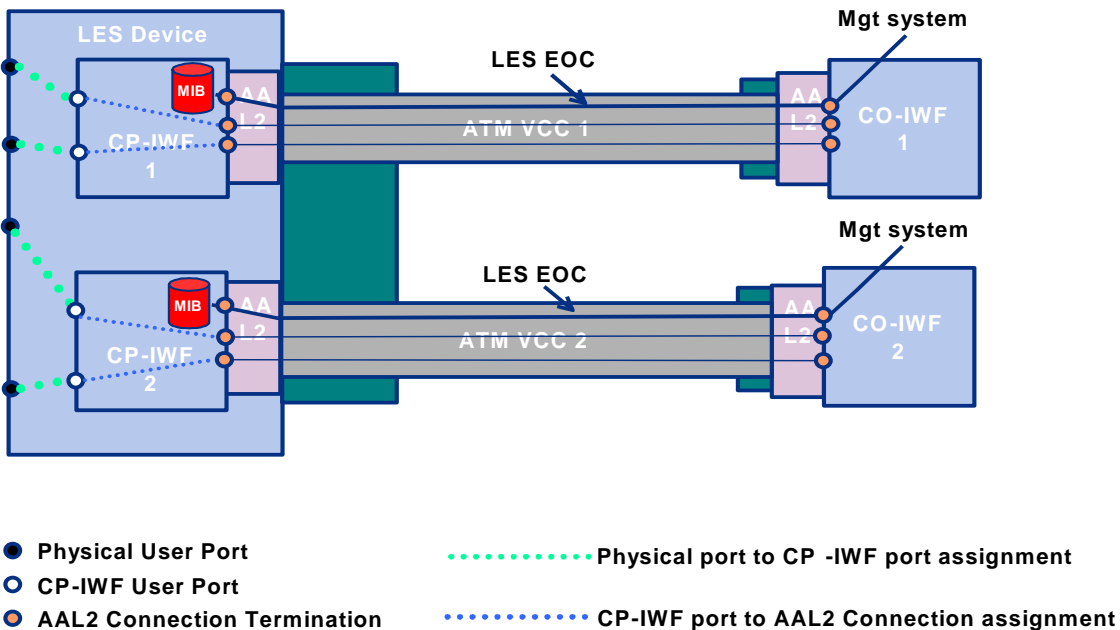
Figure 1. Scope of CP-IWF MIB

3.1   Configuration

It is assumed that the CP-IWF slaves to the CO-IWF in that the CO-IWF can override the configuration in the CP-IWF if appropriate. It is also assumed that configuration management should accomplish all configuration tasks so that no user intervention is required to configure the Loop Emulation Service. The following functions shall be supported by the CP-IWF MIB in terms of configuration:

- The ability to check the capability of the CP-IWF to determine if there is compatibility with the service provided by the CO-IWF. This includes capability of the physical user port, CP-IWF user port, AAL SSCS and AAL CPS layers.

- If necessary the ability to configure the AAL2 CPS and SSCS layers associated with the VCC on the CP-IWF. LES uses both I.366.1 and I.366.2 (SSCS) and I.363.2 (CPS). In addition LES specifies CPS parameters of its own. The CP-IWF MIB shall provide the ability to configure all of these parameters over the LES EOC. In practice, however, the default values for most of these parameters should suffice for interoperability. Furthermore, CPS and SSCS parameters of operation shall be configured at the ATM VCC level. Hence AAL2 connections transported over the VCC will inherit the appropriate parameters specified at the VCC level. Note that the AAL2 MIB defined by ILMI is used as a basis for the CP-IWF AAL2 MIB design to maintain consistency. In the presence of both LES EOC and ILMI, it is the responsibility of the CO-IWF to provision the AAL2 parameters of operation via the LES EOC and not ILMI. In the event that a LES device implements both ILMI auto-configuration and LES EOC, the values of the AAL2 parameters in the CP-IWF MIB shall take precedence over the values of AAL2 parameters in the ILMI auto-configuration MIB for the virtual circuit to which the LES EOC is related.

- The assignment/release of physical user ports to/from a CP-IWF user port respectively.

- The activation/de-activation of physical user ports. In order to provide telephony service to a given user port on a CP-IWF, the ability to maintain proper status of the port in the CP-IWF, CO-IWF, EMS and service node is paramount. The Interfaces MIB, specifically the ifTable, provides objects to control/maintain port status. The objects of interest are ifAdminStatus and ifOperStatus. These objects should be used to represent the status of the port and its ability to provide telephony service. The values that each of these objects may assume are defined by RFC2863. The object ifAdminStatus should normally be controlled exclusively via the LES EOC. The object ifOperStatus is entirely under the control of the CP-IWF. The CP-IWF should set the value of ifOperStatus to follow the status of ifAdminStatus when ifAdminStatus is changed, although internally detected events appropriate to providing telephony service take precedence. For example if the CP-IWF EMS changes the ifAdminStatus from DOWN to UP, the CP-IWF should attempt to set the ifOperStatus to UP unless an internally detected event prevents the user port from becoming active. In order to minimize the LES-EOC traffic at CP-IWF turn-up between CP-IWF EMS and CP-IWF, the following behavior is expected at CP-IWF:

  - When a new CP-IWF is first turned-up, all physical user ports should start with a default setting of ifAdminStatus in the UP state to minimize CO-IWF to CP-IWF management traffic.

  - In order to avoid flooding the network with link level traps, by default, the CP-IWF shall not enable "linkUp" and "linkDown" traps. The 'ifLinkUpDownTrapEnable' MIB object (RFC 2863), for all user ports, shall assume the default value of disabled(2) when a new CP-IWF initializes. To persistently enable per user port link level traps, the CP-IWF EMS

shall selectively set the corresponding 'ifLinkUpDownTrapEnable' object to the value enabled(1)

- In the absence of ELCP (and default values not being suitable) the ability to allocate/deallocate CIDs to POTS and ISDN bearer channels and ISDN D channels, and Digital CAS Trunk Interfaces, within a CP-IWF user port.

- Configuration changes to physical user ports, the CP-IWF, AAL SSCS and AAL CPS layers can be made regardless of the object's operational state. It is the responsibility of the administrator to ensure that changes are not made which might affect existing calls, for example changing the voice encoding profile for a CP-IWF while calls are in progress.

3.2   Performance

Performance management uses counters to capture abnormal conditions, such as lost packets, buffer underrun, and a trap will be generated if a counter exceeds a given threshold in order to detect service degradation.

3.3   Fault

Fault management shall be supported through the application of management states to physical user ports. In addition, fault management provides for fault isolation capabilities, including but not limited to, codec loopback and AAL2 loopback.

Notification of LES-affecting faults shall be provided from the CP-IWF to the CO-IWF over the LES EOC only when these fault notifications are not available through other mechanisms or when the propagation time for the notification of the fault to reach the CO-IWF through another mechanism would be unacceptably long for the LES provider.

3.4   Security

The intended usage of the CP-IWF MIB is for the service provider to configure and manage the service delivered via the CP-IWF. In general, the LES device that implements the CP-IWF should not provide the user of the LES device with write access to objects within the CP-IWF MIB.

4 Management Model

Prior to defining the MIB it is necessary to define a management model which provides a framework for both the static MIB structure and the dynamic behavior of the LES management function. The management model is described using the Unified Modeling Language (UML) syntax and is shown in Figure 2.
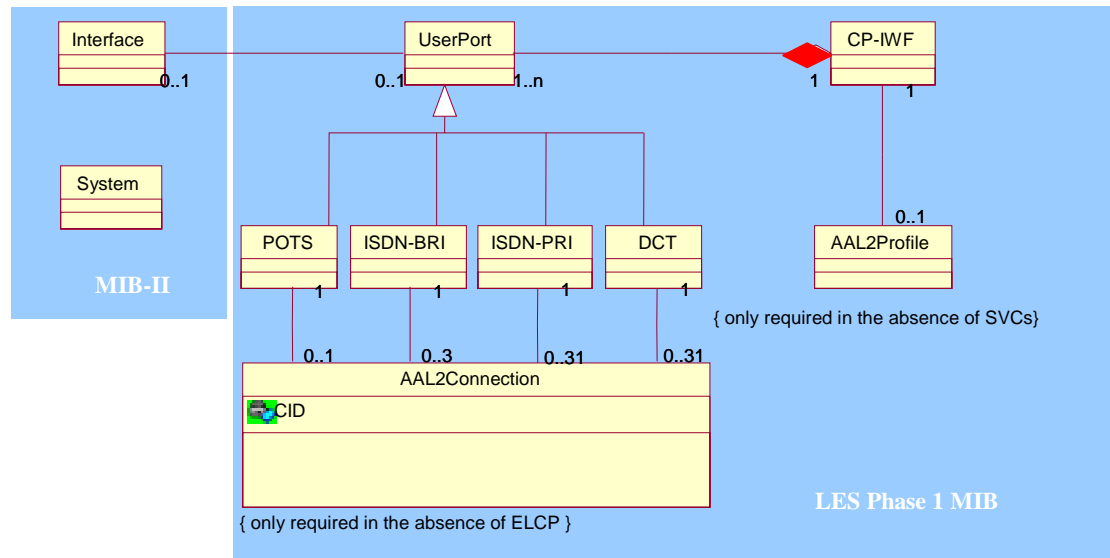
Figure 2: LES Management Model

Figure 2 captures the fundamental components of LES as described in Figure 1 that require to be managed. It also shows the relationship with MIB-II which defines the equipment level classes. The management model explicitly specifies the relationships between these classes and the cardinality of those relationships.

The model reads as follows:

A CP-IWF contains one or more UserPorts. Two types of user ports exist for LES and these include POTS, and ISDN-BRI and ISDN-PRI. Through inheritance the model allows for future extensions to include other types of UserPorts such as ISDN-PRI. The AAL2 connections that transport the POTS and ISDN-BRI and ISDN-PRI bearer and D channels are modeled using AAL2Connections. Observe that AAL2Connections need only be modeled in the absence of ELCP, otherwise they shall be controlled via ELCP and shall not be managed. AAL2 CPS and SSCS parameters of operation to be used by AAL2 Connections of a single VCC are defined using the AAL2Profile. Observe that in the presence of SVCs AAL2 CPS and SSCS parameters of operation shall be negotiated through SVC signaling procedures. Hence when SVCs are used between CP-IWF and CO-IWF the AAL2Profile shall not be used to specify AAL2 parameters of operation for AAL2 connections.

5 SNMP MIB Structure

Based on the management model described in the previous section this section outlines the structure of the MIB for the management of LES. For clarity and grouping, each object defined in the management model (Figure 2) has been divided into two parts in the MIB, one that provides the configuration information and another that provides the statistics information. The resulting structure of the MIB is as follows and a graphical representation is shown in Figure 3.

Note that certain information concerning the physical ports that support CP-IWF user ports is held in the ifTable group of the Interfaces MIB, which is defined by RFC2863.

- **cpIwf**
  This branch incorporates the CP-IWF class's configuration attributes and provides information pertaining to the whole CP-IWF, e.g. the total number of CP-IWF user ports of each type contained in the CP-IWF.

- **cpIwfAal2Profile**
  This branch incorporates both the AAL2Profile and AAL2Connection classes' configuration attributes. Since the AAL2Connection class only contains a single attribute it was not necessary to have a separate table for it in the MIB structure. This branch contains configuration information pertaining to the AAL2 CPS and SSCS layers. The parameters available will be those specified in section 2 under configuration management.

- ~~Cc~~**pIwfPotsPortTable**~~, and~~ ~~Cc~~**pIwfIsdnBriPortTable, cpIwfIsdnPriPortTable cpIwfIsdnPriBChannelTable, cpIwfDCTPortTable and cpIwfDCTChannelTable**
  These tables incorporate the POTS~~, and~~ ISDN-BRI~~,~~ ISDN-PRI and Digital CAS Trunk Interface classes' configuration attributes and contain information on the configuration of the CP-IWF POTS~~, and~~ ISDN-BRI, ISDN-PRI and Digital CAS Trunk Interface user ports. This is in addition to the information contained in the ifTable about the physical POTS~~, and~~ ISDN-BRI, ISDN-PRI and Digital CAS Trunk Interface user ports to which the CP-IWF user ports peer with.

- **cpIwfAal2Stats**
  This branch incorporates the AAL2Profile class's statistics attributes and contains performance statistics applicable to the AAL2 at the VCC granularity, i.e. AAL connection level statistics are not captured individually but aggregated at the VCC level.

- ~~Cc~~**pIwfPotsPortStatsTable**~~, and~~ **cpIwfIsdnBriPortStatsTable, cpIwfIsdnPriBChannelStatsTable, and cpIwfDCTChannelStatsTable**
  These tables incorporate the POTS~~, and~~ ISDN-BRI~~,~~ ISDN-PRI and Digital CAS Trunk Interface classes' statistics attributes and contain performance statistics pertinent to CP-IWF POTS~~, and~~ ISDN-BRI, ISDN-PRI and Digital CAS Trunk Interface user ports respectively. This is in addition to the information contained in the ifTable about the physical POTS~~, and~~ ISDN-BRI, ISDN-PRI and Digital CAS Trunk Interface user ports to which the CP-IWF user ports peer with.

- **cpIwfFileTable**
  This table contains a list of all files that have been downloaded to the CP-IWF using the File Transfer capability on the EOC and are still present on the CP-IWF. If the CP-IWF allows software download, then this table will initially have one entry, the filename for the software load running in the CP-IWF.

iso.org.dod.internet.private.enterprises.atmForum.atmForumNetworkManagement   **(1.3.6.1.4.1.353.5)**

atmfLoopEmulationService   (1.3.6.1.4.1.353.5.10)

cplwfMIB

cplwfMIBObjects

cplwf
CP-IWF parameters

cplwfAal2Profile
AAL2 parameters

cplwfPotsPortTable
cplwfPotsPortEntry
CP-IWF POTS port parameters

cplwfIsdnBriPortTable
cplwfIsdnBriPortEntry
CP-IWF ISDN BRI port parameters

cplwfIsdnPriPortTable
cplwfIsdnPriPortEntry
CP-IWF ISDN PRI port parameters

cplwfIsdnPriBChannelTable
cplwfIsdnPriBChannelEntry
CP-IWF ISDN PRI B Channel parameters

cplwfDCTPortTable
cpDCTPortEntry
CP-IWF Digital CAS Trunk port parameters

cplwfDCTChannelTable
cplwfDCTChannelEntry
CP-IWF Digital CAS Trunk Channel parameters

cplwfStats
IWF Statistics

cplwfAal2Stats
AAL2 Channel Statistics

cplwfPotsPortStatsTable
cplwfpotsPortStatsEntry
POTS User Port Statistics

cplwfIsdnBriPortStatsTable
isdnBriPortStatsEntry
ISDN BRI User Port Statistics

cplwfIsdnPriPortStatsTable
isdnPriPortStatsEntry
ISDN PRI User Port Statistics

cplwfIsdnPriBChannelStatsTable
isdnPriBChannelStatsEntry
ISDN PRI B Channel Statistics

cplwfDCTChannelStatsTable
DCTChannelStatsEntry
Digital CAS Trunk Channel Statistics

cplwfFileTable
Downloaded Files

cplwfMIBNotifications
LES specific Notifications

Figure 3. Structure for Configuration MIB

6 Relation to other MIBs

In order to promote re-use the CP-IWF MIB has been associated with other MIBs where necessary in order to provide complete management of the LES. This section describes the relationships that are required and how these other MIBs are to be used within the context of LES. LES devices shall follow the rules in this section in order to claim conformance to this specification.

6.1 Relation to MIB-II

6.1.1 Relation to the System Group

In the MIB-II specified in RFC1213, the "system" group is defined as being mandatory for all systems such that each managed entity contains one instance of each object in the "system" group. Thus, those objects apply to the entity even if the entity's sole functionality is the support of LES. RFC1213 is the authoritative source for the definition of the objects in the "system" group. For each textual object for which the LES device is not configured with a value, the object's value is a string of length zero.

6.1.2 Relation to the Interfaces MIB

The LES presents no interfaces as defined in the Interfaces Group. However, it is related to one or more physical interfaces in the manner shown in Figure 1. This means that SNMP agents that support LES shall implement the Interfaces MIB RFC2863 which is an evolved part of MIB-II specified in RFC1213. Furthermore, the Interfaces MIB requires that any MIB which is an adjunct of the Interfaces MIB clarify specific areas within the Interfaces MIB. These areas were intentionally left vague in the Interfaces MIB to avoid over-constraining the MIB, thereby precluding management of certain media types.

Section 4 of RFC2863 enumerates several areas which a media-specific MIB must clarify. Each of these areas is addressed in Table 1 for LES devices that implement the Interfaces MIB. The implementer is referred to RFC2863 in order to understand the general intent of these areas.

6.1.2.1 Layering Model

The CP-IWF MIB shall **not** require that the sub-layers of physical interfaces of POTS, and ISDN--BRI, ISDN-PRI and Digital CAS Trunks residing in the LES device be modeled within the Interfaces MIB.

Note: in reality there are sub-layers associated with the ISDN physical interface, i.e. the D + B1 and B2 channels. However, LES transparently transports these sub-layers and hence their management is outside the scope of the CP-IWF MIB, and consequently they are not required to be represented in the Interfaces MIB.

6.1.2.2 Default Port Assignment

If the LES device hosts only a single CP-IWF, then the CP-IWF shall make the physical port to user port assignments at startup using factory defined default settings. The CP-IWF EMS may change these default port assignment settings, e.g., channel Id, testMode, signaling method, port label etc., after startup. If the LES device hosts more than one CP-IWF, then the procedure explained in table 1 of section 6 and section A.2.1 shall should be followed to assign physical user ports to CP-IWF user ports.

Object	Mapping Guideline
ifIndex	Each physical user port within the LES device is represented by an IfEntry.
ifType	The values of this object shall be as follows. Physical POTS user port with FXO signalling - voiceFXO (101) Physical POTS user port with FXS signalling - voiceFXS (102) Physical ISDN BRI user port - isdns (75) Physical DCT user port – ds1(18).
ifAdminStatus	Each user port should have the persistent value retained by CP-IWF. To minimize management traffic at CP-IWF turn-up, the value of up(1) should be used. If persistency is not supported for ifAdminStatus, then the value of up(1) should be used at CP-IWF turn-up.
ifLinkUpDownTrapEnable	When the CP-IWF initializes, each user port shall set the value disabled(2) by default or to follow the previously configured (persistent) value retained by CP-IWF.
ifName	This shall store information on which CP-IWF owns this physical user port. In order to uniquely identify the CP-IWF the ifIndex.VPI.VCI combination is used since this will be different for each instance of the LES. Correspondingly the peering cpIwfXPortEntry will contain the ifIndex of this physical user ports's ifEntry. This object cannot be changed directly by a CO-IWF. A CO-IWF shall follow the following procedures for claiming and releasing physical user ports. Note the 'x' against MIB names below equal 'Pots' for POTS CP-IWF user ports and 'IsdnBri' for ISDN-BRI CP-IWF user ports. The process of claiming a physical user port is as follows. 1. An SNMP SET command is sent to the LES device to set the *x*PhysicalPort of the cpIwf*x*PortEntry in the CP-IWF MIB to the value of **ifIndex** of the physical user port ifEntry in the Interfaces MIB. 2. The SNMP agent on the LES device shall check that the ifName object of the appropriate ifEntry has value of zero length string. If so then it shall compose the string of "ifIndex.VPI.VCI" and write it into ifName, where ifIndex, VPI and VCI refer to the ATM physical port and VCC on the LES device over which the CP-IWF is connected to the CO-IWF. 3. If successful, it shall then set the *x*PhysicalPort value

within the cpIwf*x*PortEntry to the **ifIndex** value of the claimed port.

4. The SNMP agent shall respond with error-status of noError(0) if the assignment was successful or badValue(3) if the physical user port is already assigned to a CP-IWF.

The process for releasing a physical port is as follows.

1. An SNMP Set command is sent to the LES device to set the *x***PhysicalPort** of the cpIwf*x*PortEntry in the CP-IWF MIB to the value of zero (unassigned).

2. The SNMP agent on the LES device shall check that the ifName object of the appropriate ifEntry has a value which is **not** a zero length string. If so then it shall set the value to a zero length string.

3. If successful, it shall then set the *x***PhysicalPort** value within the cpIwf*x*PortEntry to zero.

4. The SNMP agent shall respond with error-status of noError(0) if the release was successful or genErr(5) if the physical user port could not be released, e.g. it was carrying a call.

In order to protect against loss of information regarding to which CP-IWF a physical port is assigned across re-initializations/reboots, ifName should be stored in non-volatile storage. This does not apply if the LES device hosts only a single CP-IWF.

Table 1. ifEntry mappings for physical user ports on the LES device

6.1.3   Relation to DS1-MIB

If the LES device hosts DCT user interfaces, then the CP-IWF shall support the following objects of *dsx1ConfigTable* from DS1-MIB (RFC2495). CP-IWF EMS may use these objects to configure media specific parameters of the DCT user interface at physical port level.

```
- dsx1IfIndex
- dsx1LineType
- dsx1LineCoding
- dsx1SendCode
- dsx1LoopbackConfig
- dsx1LineStatus
- dsx1TransmitClockSource
- dsx1LineLength
```

6.1.4   Relation to DS0-MIB

If the LES device hosts DCT user interfaces, then the CP-IWF has the option of supporting the DS0-MIB (RFC2494). If the CP-IWF provides support for the DS0-MIB, then the dctChannelIfIndex object should be set to the corresponding entry in the ifTable for that channel entry. If the CP-IWF does not provide support for the DS0-MIB, then the two objects dctChannelIfAdminStatus and dctIfOperStatus should be implemented.

7   Protection Against Restart Avalanche

In the event that a large number of CP-IWFs are powered on simultaneously and they were to all send a coldStart Trap to the CO-IWF, it would very likely be swamped, leading to message losses and network congestion during the critical period of service restoration. In order to prevent such avalanches, the following behavior is suggested:

1. When a CP-IWF is powered on, it should initiate a restart timer to a random value, uniformly distributed between 0 and a maximum waiting delay (MWD). Care should be taken to avoid synchronicity of the random number generation between multiple CP-IWFs that would use the same algorithm.

2. The Media Gateway should then wait for either the end of this timer or the detection of a local user activity, such as for example an off-hook transition on an analogue port on the CP-IWF.

3. When the timer elapses, or when an activity is detected, the CP-IWF should generate the coldStart Trap and should initiate the restart procedure.

The restart procedure simply requires the CP-IWF to guarantee that the first message that the CO-IWF sees from this CP-IWF across the LES EOC is a coldStart Trap informing the CO-IWF about the restart.

8 MIB Definition

The text in this section defines the MIB for the remote management of the CP-IWF function as
defined in af-vmoa-0145.001. The MIB is specified in SMIv2 syntax.

```
-- MIB for configuration, performance, and fault management of
-- the Loop Emulation Service (LES).

CPIWF-MIB DEFINITIONS ::= BEGIN

IMPORTS

        MODULE-IDENTITY, OBJECT-TYPE,
        enterprises, Counter32, Integer32,
        NOTIFICATION-TYPE                       FROM SNMPv2-SMI

        MODULE-COMPLIANCE, OBJECT-GROUP,
        NOTIFICATION-GROUP                      FROM SNMPv2-CONF;


-- ------------------------------------------------------------ --
--
--  The following OBJECT IDENTIFIER definition should be moved to
--  some other location, to conform with the statement in RFC 1442
--  that the MODULE-IDENTITY section must appear immediately after
--  any IMPORTs or EXPORTs statements.
--
--  However, some MIB utilities don't like MODULE-IDENTITY OIDs of
--  the form { enterprises atmForum(353) ... 1 }.  Separate OBJECT
--  IDENTIFIER definitions appear to be more widely accepted - so,
--  in the interests of compatibility, it remains.
--
-- ------------------------------------------------------------ --


-- The object identifier subtree for ATM Forum Loop Emulation Service MIBs

atmForum                 OBJECT IDENTIFIER ::= { enterprises 353 }

atmForumNetworkManagement  OBJECT IDENTIFIER ::= { atmForum 5 }

atmfLoopEmulationService   OBJECT IDENTIFIER ::= { atmForumNetworkManagement 10 }

cpIwfMIB MODULE-IDENTITY
        LAST-UPDATED  "200120720426 0000Z"
        ORGANIZATION  "ATM Forum VMOA Working Group"
        CONTACT-INFO
                               "The ATM Forum
                Presidio of San Francisco
                P.O. Box 29920 (mail)
                572B Ruger Street (surface)
                San Francisco, CA 94129-0920
                Tel: +1 314 205 0200
                1000 Executive Parkway, Suite 200
                St. Louis, MO 63141
                United States of America
                Tel: +1 314 205 0200
                E-mail: info@atmforum.com"
        DESCRIPTION
                "This module defines a portion of the management information
                base (MIB) for managing the LES CP-IWFs. It is meant to be
                used in connection with MIB-II System Group and RFC 2863
```

```
                which defines the ifTable."
        ::= { atmfLoopEmulationService 1 }

cpIwfMIBObjects            OBJECT IDENTIFIER ::= { cpIwfMIB 1 }
cpIwfMIBNotifications      OBJECT IDENTIFIER ::= { cpIwfMIB 2 }


-- The cpIwfMIB Group

-- Implementation of this group is mandatory for all
-- systems that implement the LES as defined in af-vmoa-0145.001

-- The cpIwfMIB Group consists of the following:
--      cpIwf Group
--      cpIwfAal2Profile Group
--      cpIwf Pots Port Configuration Table
--      cpIwf ISDN-BRI Port Configuration Table
--      cpIwf ISDN-PRI Port Configuration Table
--      cpIwf Digital CAS Trunk Port Configuration Table

--      cpIwfAal2Stats Group
--      cpIwf Pots Port Statistics Table
--      cpIwf ISDN-BRI Port Statistics Table
--      cpIwf ISDN-PRI Port Statistics Table
--      cpIwf Digital CAS Trunk Port Statistics Table
--      cpIwf File Table


-- ------------------------------------------------------------- --
--
--      cpIwf Group
--

cpIwf              OBJECT IDENTIFIER ::= { cpIwfMIBObjects 1 }

cpIwfVpi OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
              "The VPI of the AAL2 VCC to which this CP-IWF is associated."
        ::= { cpIwf 1 }

cpIwfVci OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
              "The VCI of the AAL2 VCC to which this CP-IWF is associated."
        ::= { cpIwf 2 }

cpIwfEchoCancellationSupport OBJECT-TYPE
        SYNTAX          INTEGER {
                            no (1),
                            yes (2)
                        }
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
              "Specifies whether or not the echo cancellation facility is
              supported or not supported at the CP-IWF."
        ::= { cpIwf 3 }
```

```
cpIwfNumPotsPorts OBJECT-TYPE
      SYNTAX        Integer32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "The total number of POTS user ports on the CP-IWF."
      ::= { cpIwf 4 }

cpIwfNumIsdnBriPorts OBJECT-TYPE
      SYNTAX        Integer32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "The total number of ISDN-BRI user ports on the CP-IWF."
      ::= { cpIwf 5 }

cpIwfTimingReference OBJECT-TYPE
      SYNTAX        INTEGER {
                        ntr(1),
                        adaptiveVoice(2),
                        freeRun(3)
                    }
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "ntr - network timing reference, voice timing derived from
            the local network interface.
            adaptiveVoice - voice timing derived from incoming cell rate.
            freeRun - voice timing derived from an internal free-running
            timing source."
      ::= { cpIwf 6 }

cpIwfPotsPortEncodingSelectionMode OBJECT-TYPE
      SYNTAX        INTEGER {
                        independent(1),
                        masterSlave(2)
                    }
      MAX-ACCESS    read-write
      STATUS        current
      DESCRIPTION
            "This object controls the encoding switching for POTS user
            ports.
            masterSlave - the profile entry used by the CP-IWF is the same
            as that selected by the CO-IWF.
            independent - the CP-IWF can select the profile entry used for
            transmission independently of the CO-IWF."
      DEFVAL { masterSlave }
      ::= { cpIwf 7 }

cpIwfIsdnBriPortEncodingSelectionMode OBJECT-TYPE
      SYNTAX        INTEGER {
                        independent(1),
                        masterSlave(2)
                    }
      MAX-ACCESS    read-write
      STATUS        current
      DESCRIPTION
            "This object controls the encoding switching for ISDN BRI user
            ports.
            masterSlave - the profile entry used by the CP-IWF is the same
            as that selected by the CO-IWF.
            independent - the CP-IWF can select the profile entry used for
            transmission independently of the CO-IWF."
```

```
        DEFVAL { masterSlave }
        ::= { cpIwf 8 }

cpIwfElcpAndPstnChannelBandwidth OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
              "The approximate maximum bandwidth of the aal2 connection with CID=8
              used to transport ELCP and PSTN signalling messages
              specified in bits per second at the physical layer."
        DEFVAL { 64000 }
        ::= { cpIwf 9 }

cpIwfAdminStatus OBJECT-TYPE
        SYNTAX        INTEGER {
                          up (1),
                          down (2),
                          shuttingDown (3),
                          testing (4)
                      }
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
              "This object is used to reflect the desired state of the CP-IWF. The
              actual state of the CP-IWF is given by cpIwfOperStatus. When this
              object is set to 'down', all existing calls on the CP-IWF are
              cleared immediately. If this object is set to 'shuttingDown', no
              further calls shall be accepted either incoming or outgoing on any
              of the CP-IWF user ports. Once all the calls on the CP-IWF have
              cleared gracefully the value of this object moves to 'down'."
        ::= { cpIwf 10 }

cpIwfOperStatus OBJECT-TYPE
        SYNTAX        INTEGER {
                          up (1),
                          down (2),
                          testing (3)
                      }
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
              "Provides the current operational status of the CP-IWF function."
        ::= { cpIwf 11 }

cpIwfRestart OBJECT-TYPE
        SYNTAX        INTEGER {
                          started (1),
                          warmStart (2),
                          coldStart (3)
                      }
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
              "May be used to initiate a re-start of the CP-IWF function.  A Get
              operation performed on this object will always return 'started'.
              Re-start is initiated by performing a Set operation to either
              'warmStart' or 'coldStart'.
              A warmStart means initialising all state variables within the
              CP-IWF to their starting values.  A coldStart means rebooting
              the software process that implements the CP-IWF function.  It is
              desirable that a coldStart should not affect the operation of other
              functions within the LES device, including other CP-IWF instances."
```

```
        ::= { cpIwf 12 }

cpIwfTestType OBJECT-TYPE
        SYNTAX          INTEGER {
                                selfTest (1)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object is used to specify the type of test to run. The
                result of the self test will be stored in cpIwfTestResult.
                In order to run this test, the CO-IWF must first set the
                value of this object to the test that needs to be carried out.
                The CO-IWF must then set the cpIwfAdminStatus to 'testing'
                which will activate the test. To de-activate a test that does
                not self-terminate such as a loopback test, the CO-IWF must
                set the cpIwfAdminStatus to a value other than 'testing'."
        ::= { cpIwf 13 }

cpIwfTestResult OBJECT-TYPE
        SYNTAX          INTEGER {
                                null (1),
                                success (2),
                                failure (3),
                                inProgress (4)
                        }
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Provides the result of the last self-test operation performed on
                the CP-IWF.  If no self-test has been performed, this object
                should return null (1)."
        ::= { cpIwf 14 }

cpIwfTestResultText OBJECT-TYPE
        SYNTAX          OCTET STRING (SIZE(0..64))
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Provides textual information about the result of the last self-test
                operation performed on the CP-IWF, or a zero-length string if no
                tests have been performed since the last reset."
        ::= { cpIwf 15 }

cpIwfPlayoutBufferDepth OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "The amount of packet delay variation to be accommodated on all
                ports of the CP-IWF, in milliseconds."
        DEFVAL { 20 }
        ::= { cpIwf 16 }

cpIwfImpairmentInterval OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "The period over which voice impairments should be counted to
                determine whether a threshold-crossing event has occurred, in
                minutes.  It is recommended that this value be set to an integral
                multiple of 5 minutes."
```

```
        DEFVAL { 15 }
        ::= { cpIwf 17 }

cpIwfImpairmentThreshold OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "If the number of impairment octets, calculated as the sum of
                fillerOctets and droppedOctets, that is observed on any individual
                POTS port or ISDN BRI port/channel during any interval of length
                cpIwfImpairmentInterval minutes is equal to or greater than the
                value of cpIwfImpairmentThreshold, then the trap
                cpIwfExcessImpairment will be sent to the CO-IWF.  A value of zero
                will disable the reporting of excess impairments."
        DEFVAL { 0 }
        ::= { cpIwf 18 }

cpIwfV5PSTNProtocolVariant OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "When the applicationIdentifier indicates the use of PSTN
                signalling for POTS the value of this object shall be set to the
                national PSTN protocol variant to be used, else this object is not
                applicable. The value of this object shall be the 2-digit country
                code, as defined in the E.164 numbering plan, followed by an
                optional carrier code. An SNMP Set operation to a value which is not
                supported shall result in an SNMP Response with error status of
                badValue(3)."
        DEFVAL { 44 }
        ::= { cpIwf 19 }

cpIwfMwdForRestart OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "This object defines the maximum waiting delay (MWD) in seconds
                used during restart. When this CP-IWF is powered on, it shall
                initiate a restart timer to a random value, uniformly distributed
                between 0 and the value of this object. Upon expiry of this timer
                or when activity is detected this CP-IWF shall send a coldStart
                Trap to its peer CO-IWF and initiate the restart procedure. The
                CP-IWF shall guarantee that the first message that the CO-IWF
                sees across the LES EOC after a restart of the CP-IWF is the
                coldStart Trap."
        DEFVAL { 600 }
        ::= { cpIwf 20 }

cpIwfEocBandwidth OBJECT-TYPE
        SYNTAX        INTEGER (300..640000)
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "Provides the approximate maximum bandwidth of the EOC in bits
                per second at the physical layer."
        DEFVAL { 32000 }
        ::= { cpIwf 21 }

cpIwfCurrentConfig OBJECT-TYPE
        SYNTAX        Integer32
```

```
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object provides an efficient mechanism for a
                management entity to maintain synchronization with
                a CP-IWF current level of configuration. The value
                should be persistently stored on the CP-IWF and hence
                retain its previous value following a restart event.
                The CP-IWF EMS is expected to retain a local copy of
                this value. At any time (e.g., upon processing a cold
                start trap), if the CP-IWF EMS detects a mismatch
                between its copy and the value returned by CP-IWF, the
                CP-IWF EMS may initiate configuration synchronization
                operation with the CP-IWF and update this value. The
                CP-IWF shall reset this value to zero, if the configuration
                of the CP-IWF is changed by local management action or when
                it determines that the hardware/software configuration that
                affects the service capability of the CP-IWF has changed.
                This only applies to configuration changes and not other
                changeable objects such as statistics."
        DEFVAL { 0 }
        ::= { cpIwf 22 }

cpIwfTrapGeneration OBJECT-TYPE
        SYNTAX          INTEGER {
                            enabled(1),
                            disabled_all(2),
                            disabled_except_coldStart(3)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "Using this object, the CP-IWF EMS can globally disable all
                trap generation by the CP-IWF. By default, the CP-IWF shall
                be globally enabled to generate any/all traps that have not
                otherwise been selectively disabled. To globally suppress
                all trap generation by CP-IWF, CP-IWF EMS should set this
                object to value: disabled_all(2)."
        DEFVAL { enabled }
        ::= { cpIwf 23 }

cpIwfVendorName OBJECT-TYPE
        SYNTAX          OCTET STRING (SIZE(0..32))
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "The name of the vendor that produced the LES device in which
                this CP-IWF function resides."
        ::= { cpIwf 24 }

cpIwfDeviceType OBJECT-TYPE
        SYNTAX          OCTET STRING (SIZE(0..32))
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "The vendor's designated model number for the LES device in which
                this CP-IWF function resides."
        ::= { cpIwf 25 }

cpIwfHardwareVersion OBJECT-TYPE
        SYNTAX          OCTET STRING (SIZE(0..32))
        MAX-ACCESS      read-only
        STATUS          current
```

```
        DESCRIPTION
                "The vendor's designated hardware revision for the LES device
                in which this CP-IWF function resides."
        ::= { cpIwf 26 }


cpIwfSoftwareVersion OBJECT-TYPE
        SYNTAX          OCTET STRING (SIZE(0..32))
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "The vendor's designated software revision for the software that
                implements the CP-IWF function."
        ::= { cpIwf 27 }


cpIwfNumIsdnPriPorts OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "The total number of ISDN-PRI user ports on the CP-IWF."
        ::= { cpIwf 28 }


cpIwfIsdnPriPortEncodingSelectionMode OBJECT-TYPE
        SYNTAX          INTEGER {
                               independent(1),
                               masterSlave(2)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object controls the encoding switching for ISDN PRI user
                ports.
                masterSlave - the profile entry used by the CP-IWF is the same
                as that selected by the CO-IWF.
                independent - the CP-IWF can select the profile entry used for
                transmission independently of the CO-IWF."
        DEFVAL { masterSlave }
        ::= { cpIwf 29 }


cpIwfPstnHookFlashReporting OBJECT-TYPE
        SYNTAX          INTEGER {
                               pulsedSignal (1),
                               steadySignal (2)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object is only applicable for CP-IWFs that are running PSTN or
                ELCP and cpIwfNumPotsPorts is non-zero.  This attribute specifies
                whether the CP-IWF is to perform hookflash timing directly and
                report it to the CO-IWF or whether the CP-IWF should report the
                onhook and offhook events separately.  If set to pulsed-signal, the
                CP-IWF, upon detection of a hookflash event, will send a SIGNAL
                message with an IE of 'Pulsed-signal' and a pulse coding of
                'Register recall'.  If set to steady-signal, the individual onhook
                and offhook events will be reported to the CO-IWF as SIGNAL messages
                with an IE of 'Steady-signal' and a steady-signal type of 'On hook'
                and 'Off hook' respectively.  This object can only be set to Pulsed-
                signal if the CP-IWF supports hook-flash timing."
        DEFVAL { steadySignal }
        ::= {cpIwf 30 }


cpIwfT200Val OBJECT-TYPE
```

```
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object is only applicable for CP-IWFs running PSTN or ELCP.
                This bject specifies, in msec, the maximum amount of time to wait
                for an cknowledgement of an I-frame message in LAPV5."
        DEFVAL {1000}
        ::= {cpIwf 31}

cpIwfT203Val OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                 "This object is only applicable for CP-IWFs running PSTN or ELCP.
                This object specifies, in msec, the maximum amount of time allowed
                without frames being exchanged in LAPV5.
                Note: Section 5.4.4.2 of af-vmoa-0145 implicitly sets the value of
                Timer TL1 used for restart processing to T203 + 10s, i.e. default of
                20 seconds. This requires the value of T203 to be maintained across
                a restart."
        DEFVAL {10000}
        ::= {cpIwf 32}

cpIwfN200Val OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object is only applicable for CP-IWFs running PSTN or ELCP.
                This object specifies the maximum number of retransmissions of a
                frame in LAPV5."
        DEFVAL {3}
        ::= {cpIwf 33}

cpIwfN201Val OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object is only applicable for CP-IWFs running PSTN or ELCP.
                This object specifies the maximum number of octets in an information
                field in LAPV5."
        DEFVAL {260}
        ::= {cpIwf 34}

cpIwfLoadFile OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object only needs to be supported in CP-IWFs that support
                software download.  The allowed values for this object are
                restricted to existing values of the cpIwfFileIndex entries in the
                cpIwfFileTable.  The value of this object shall be defaulted to the
                value of the current software file that is running in the CP-IWF.
                If the CO-IWF wants to reboot the CP-IWF to a software load other
                than the load that is currently running, the CO-IWF must set this
                object to the cpIwfFileIndex corresponding to the file containing
                the software load to be run.  The CO-IWF then writes the
                cpIwfRestart object to restart the CP-IWF with the new file."
        ::= {cpIwf 35}
```

```
cpIwfNumDCTPorts OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
              "The total number of Digital CAS Trunk Interface (physical) ports on
              the CP-IWF."
        ::= {cpIwf 36}

cpIwfDCTPortEncodingSelectionMode OBJECT-TYPE
        SYNTAX   INTEGER {
                      independent(1),
                      masterSlave(2)
                 }
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
              "This object controls the encoding switching for Digital CAS Trunk
              Interface user ports.
              masterSlave - the profile entry used by the CP-IWF is the same as
              that selected by the CO-IWF.
              independent - the CP-IWF can select the profile entry used for
              transmission independently of the CO-IWF."
        DEFVAL { masterSlave }
        ::= {cpIwf 37}


-- ------------------------------------------------------------ --
--
-- cpIwfAal2Profile Group
-- This group specifies AAL2 CPS and SSCS parameters of operation
-- for AAL2 connections terminated by a CP-IWF. These include
-- I.363.2 (CPS), I.366.1 (SSSAR SSCS), I.366.2 (trunking SSCS) and
-- LES specific CPS parameters. Some of these parameters are implied
-- and are not included in this MIB however their implied values are
-- as follows.
-- - aal2SscsSstedStatus 'selected',
-- - aal2SscsSsadtStatus 'notSelected',
-- - aal2SscsServiceCategory 'audio',
-- - aal2SscsAudioServiceTransport 'enabled',
-- - aal2SscsMfR1DigitPacketTransport n/a,
-- - aal2SscsMfR2DigitPacketTransport n/a,
-- - aal2SscsCircuitModeDataTransport n/a,
-- - aal2SscsCircuitModeDataNumChannels n/a,
-- - aal2SscsFrameModeDataTransport n/a,
-- - aal2SscsFrameModeDataMaxLength n/a,
-- - aal2SscsCasSignallingTransport 'inferred by the AppId'

-- The CO-IWF is responsible for provisioning the AAL2 CPS and SSCS
-- parameters by setting appropriate values in this MIB. In the
-- absence of explicit provisioning of this group, the objects
-- in this group shall take the default values as specified.
--
-- Furthermore, these objects are read-write, however, it is possible
-- that certain AAL2 parameters may not be supported, e.g. an encoding
-- profile (aal2SscsPredefinedProfileIdentifier). In such cases an
-- attempt to set a value for an object that is not supported shall
-- result an SNMP response with an error status of badValue(3).

cpIwfAal2Profile    OBJECT IDENTIFIER ::= { cpIwfMIBObjects 2 }

aal2ApplicationIdentifier OBJECT-TYPE
        SYNTAX       Integer32
```

```
      MAX-ACCESS    read-write
      STATUS        current
      DESCRIPTION
            "This attribute describes the application identifier, which
            describes the type of signaling used. The value of this object
            should be one of those values given in the administered list of
            AppIDs in section 5 of the ATM Forum document of well-known
            addresses and assigned codes which can be located at
            http://www.atmforum.com/pages/aboutatmtech/committees/
            public_assigned_codes.txt"
      DEFVAL { '0000000A'H }
      ::= { cpIwfAal2Profile 1 }


aal2CpsMaxMultiplexedChannels OBJECT-TYPE
      SYNTAX        INTEGER (1..255)
      MAX-ACCESS    read-write
      STATUS        current
      DESCRIPTION
            "Maximum number of multiplexed channels."
      DEFVAL { 255 }
      ::= { cpIwfAal2Profile 2 }


aal2CpsMaxSDULength OBJECT-TYPE
      SYNTAX        INTEGER (45 | 64)
      MAX-ACCESS    read-write
      STATUS        current
      DESCRIPTION
            "Maximum CPS-SDU size given in octets."
      DEFVAL { 45 }
      ::= { cpIwfAal2Profile 3 }


aal2CpsCIDLowerLimit OBJECT-TYPE
      SYNTAX        INTEGER (16..223)
      MAX-ACCESS    read-write
      STATUS        current
      DESCRIPTION
            "The minimum value the CID can take for AAL2 bearer channels and
            ISDN D-channels."
      DEFVAL { 16 }
      ::= { cpIwfAal2Profile 4 }


aal2CpsCIDUpperLimit OBJECT-TYPE
      SYNTAX        INTEGER (16..223)
      MAX-ACCESS    read-write
      STATUS        current
      DESCRIPTION
            "The maximum value the CID can take for AAL2 bearer channels and
            ISDN D-channels."
      DEFVAL { 223 }
      ::= { cpIwfAal2Profile 5 }


aal2CpsOptimisation OBJECT-TYPE
      SYNTAX        INTEGER {
                        singleCpsPacketPerCpsPduNoOverlap(1),
                        multipleCpsPacketsPerCpsPduWithOverlap(2)
                    }
      MAX-ACCESS    read-write
      STATUS        current
      DESCRIPTION
            "This object refers to the mode of operation of the CPS on the
            CP-IWF. The value of this object imposes a restriction on the CPS
            SDU length and hence must override the value of
            aal2CpsMaxSDULength.
```

            singleCpsPacketPerCpsPduNoOverlap - A single CPS Packet is
            contained within a CPS PDU and no overlap can occur into the next
            CPS PDU. If this option is selected, then Timer_CU is not
            applicable. Also the AAL2 payload size must be less than or equal
            to 44 octets.
            multipleCpsPacketsPerCpsPduWithOverlap - Multiple CPS Packets are
            contained within a CPS PDU and overlap can occur into the next CPS
            PDU. If this option is selected, then Timer_CU is applicable. Also
            Max CPS SDU size must be less than or equal to 64."
        DEFVAL { singleCpsPacketPerCpsPduNoOverlap }
        ::= { cpIwfAal2Profile 6 }

aal2CpsTimerCuValue OBJECT-TYPE
        SYNTAX   Integer32
        MAX-ACCESS   read-write
        STATUS   current
        DESCRIPTION
            "This parameter specifies value of the Timer_CU, in msec, for this
            VCC. This parameter has meaning only if the value of the parameter
            aal2CpsOptimisation is set to multipleCpsPacketperCpsPduWithOverlap.
            Although no default value is provided for this parameter, a value
            must be assigned to the parameter during the startup of the
            CP-IWF."
        DEFVAL { 0 }
        ::= { cpIwfAal2Profile 7 }

aal2SscsFaxDemodulationTransport OBJECT-TYPE
        SYNTAX   INTEGER {
                        disabled(1),
                        enabled(2)
                      }
        MAX-ACCESS   read-write
        STATUS   current
        DESCRIPTION
            "This specifies whether fax demodulation is enabled or disabled.
            An SNMP Set to enable(2) when fax demodulation is not supported
            must result in an SNMP response with error status of badValue(3)."
        DEFVAL { disabled }
        ::= { cpIwfAal2Profile 8 }

aal2SscsDtmfDigitPacketTransport OBJECT-TYPE
        SYNTAX   INTEGER {
                        disabled(1),
                        enabled(2)
                      }
        MAX-ACCESS   read-write
        STATUS   current
        DESCRIPTION
            "This attribute describes whether DTMF digit packet transport is
            enabled or disabled. If the parameter value specifies 'enabled',
            then type 3 dialled digit packets are only passed if the encoding
            scheme being used cannot transparently pass DTMF tones. If the
            parameter value specifies 'disabled', then a higher rate encoding
            scheme should be used to transparently pass DTMF tones."
        DEFVAL { disabled }
        ::= { cpIwfAal2Profile 9 }

aal2SscsPcmEncoding OBJECT-TYPE
        SYNTAX   INTEGER {
                        aLaw (1),
                        uLaw (2)
                      }
        MAX-ACCESS   read-write

```
        STATUS          current
        DESCRIPTION
                "This attribute describes the type of PCM encoding used."
        DEFVAL { aLaw }
        ::= { cpIwfAal2Profile 10 }


aal2SscsMaxSssarSduLength OBJECT-TYPE
        SYNTAX          INTEGER (493..65568)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This is the maximum size an SSSAR-SDU can take as defined in
                I.366.1. This parameter only applies to those AAL2 channels using
                I.366.1 SSSAR."
        DEFVAL { 1500 }
        ::= { cpIwfAal2Profile 11 }


aal2SscsProfileSource OBJECT-TYPE
        SYNTAX          INTEGER {
                            ituT (1),
                            other (2)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This attribute describes the source of the profile source. An
                SNMP Set on this object to an unsupported profile source must
                result in an SNMP Response with error status of badValue(3)."
        DEFVAL { other }
        ::= { cpIwfAal2Profile 12 }


aal2SscsPredefinedProfileIdentifier OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This attribute describes the predefined profile identifier. An
                SNMP Set on this object to an unsupported profile must
                result in an SNMP Response with error status of badValue(3)."
        DEFVAL { 9 }
        ::= { cpIwfAal2Profile 13 }


aal2SscsIeeeOui OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This attribute contains the IEEE Organizationally Unique
                Identifier (OUI) of the entity that specified the profile
                being used, if other than ITU-T. For example, if the source
                is the ATM Forum, the value of this object is 00A03E. This
                attribute is only meaningful if aal2SccsProfileSource
                has the value 'other'. An SNMP Set on this object to an
                unsupported profile source must result in an SNMP Response with
                error status of badValue(3)."
        DEFVAL { '00A03E'h }
        ::= { cpIwfAal2Profile 14 }


aal2SscsSsSarAssemblyTimerValue OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
```

```
                "This object specifies the value of the segmentation reassembly
                timer, in msec, for I.366.1 SAR. The default value
                specified for this timer is effectively an infinite value per
                I.366.1."
        DEFVAL { 2147483647 }
        ::= { cpIwfAal2Profile 15 }


-- -------------------------------------------------------------- --
--
--   cpIwfPotsPortTable
--

cpIwfPotsPortTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF CpIwfPotsPortEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "This table contains information on the configuration of the
                POTS ports on the CP-IWF in addition to the information
                contained in the ifTable about the physical interfaces to which
                the CP-IWF POTS ports are peering with currently."
        ::= { cpIwfMIBObjects 3 }

cpIwfPotsPortEntry OBJECT-TYPE
        SYNTAX        CpIwfPotsPortEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "An entry in the cpIwfPotsPortTable that represents a single
                 POTS port."
        INDEX         { potsPortNumber }
        ::= { cpIwfPotsPortTable 1 }

CpIwfPotsPortEntry ::= SEQUENCE {
                potsPortNumber            Integer32,
                potsPhysicalPort          Integer32,
                aal2ChannelId             INTEGER,
                potsPortTestType          INTEGER,
                signalingMethod           INTEGER,
                potsPortLabel             OCTET STRING
        }

potsPortNumber OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "The number identifying the POTS user port on the CP-IWF."
        ::= { cpIwfPotsPortEntry 1 }

potsPhysicalPort OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "This has the value of the ifIndex of the ifEntry of the physical
                POTS port to which this CP-IWF POTS port is connected. The value
                of (0) has the special meaning that this POTS port is not connected
                to any physical port on the LES device."
        ::= { cpIwfPotsPortEntry 2 }

aal2ChannelId OBJECT-TYPE
        SYNTAX        INTEGER (16..255)
```

```
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "The CID of the AAL2 connection transporting this port's traffic
                over the AAL2 VCC.
                When the aal2ApplicationIdentifier indicates the presence of ELCP,
                this object should not be used for CID allocation and the value of
                this object is not applicable.  In addition, if an SNMP operation
                is attempted on this object, an SNMP response with error status of
                badValue (3) should be returned."
        ::= { cpIwfPotsPortEntry 3 }

potsPortTestType OBJECT-TYPE
        SYNTAX        INTEGER {
                        none (1),
                        codecLoopback (2),
                        aal2Loopback (3)
                }
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "This object is used to specify the type of test to run for
                POTS ports. There are no results stored locally for a loopback
                test. The tests involve looping back the media stream at either
                the codec (PCM loopback) or the AAL2 layer (CPS loopback).
                In order to run these tests, the CO-IWF must first set the value of
                this object appropriate to the test that needs to be run. The CO-IWF
                should then set the value of ifAdminStatus in the corresponding
                ifEntry to 'testing'.
                The CO-IWF should verify that the test is in progress by checking
                that the value of ifOperStatus in the corresponding ifEntry is
                equal to 'testing'. Once testing is complete the CO-IWF must set
                the ifAdminStatus to a value other than 'testing'.
                Note that the LES device must not allow a CO-IWF to manipulate
                the ifAdminStatus of physical user ports that do not belong to
                its managed CP-IWF."
        ::= { cpIwfPotsPortEntry 4 }

signalingMethod OBJECT-TYPE
        SYNTAX        INTEGER {
                        loopStart (1),
                        loopReverseBattery (2),
                        groundStart (3),
                        ddiPbxStart (4)
                }
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "The signalling method to use for this user port."
        DEFVAL { loopStart }
        ::= { cpIwfPotsPortEntry 5 }

potsPortLabel OBJECT-TYPE
        SYNTAX        OCTET STRING (SIZE(0..32))
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "Label assigned by service provider to identify this CP-IWF port.
                For example, may be used to hold Directory Number."
        ::= { cpIwfPotsPortEntry 6 }

-- ------------------------------------------------------------- --
--
```

```
--   cpIwfIsdnBriPortTable
--

cpIwfIsdnBriPortTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF CpIwfIsdnBriPortEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "This table contains information on the configuration of the
                ISDN BRI ports on the CP-IWF in addition to the information
                contained in the ifTable about the physical interfaces to which
                the CP-IWF ports are peering with currently."
        ::= { cpIwfMIBObjects 4 }

cpIwfIsdnBriPortEntry OBJECT-TYPE
        SYNTAX        CpIwfIsdnBriPortEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "An entry in the cpIwfIsdnBriPortTable that represents a single
                ISDN BRI port."
        INDEX         { isdnBriPortNumber }
        ::= { cpIwfIsdnBriPortTable 1 }

CpIwfIsdnBriPortEntry ::= SEQUENCE {
                isdnBriPortNumber        Integer32,
                isdnBriPhysicalPort      Integer32,
                aal2ChannelIdD           INTEGER,
                aal2ChannelIdB1          INTEGER,
                aal2ChannelIdB2          INTEGER,
                isdnBriPortLabel         OCTET STRING,
                isdnBriPortTestType      INTEGER
        }

isdnBriPortNumber OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                " The number identifying the ISDN BRI user port on the CP-IWF."
        ::= { cpIwfIsdnBriPortEntry 1 }

isdnBriPhysicalPort OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "This has the value of the ifIndex of the ifEntry of the physical
                ISDN BRI port to which this CP-IWF ISDN BRI port is connected. The
                value of (0) has the special meaning that this ISDN BRI port is
                not connected to any physical port on the LES device."
        ::= { cpIwfIsdnBriPortEntry 2 }

aal2ChannelIdD OBJECT-TYPE
        SYNTAX        INTEGER (16..255)
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "The CID of the AAL2 connection transporting the D channel of this
                ISDN BRI port over the AAL2 VCC. The default value of this object is
                determined by the formula defined in af-vmoa-0145.000 section 4.4.2.
                When the aal2ApplicationIdentifier indicates the presence of ELCP,
                this object should not be used for CID allocation and the value of
```

```
                      this object is not applicable.  In addition, if an SNMP operation
                      is attempted on this object, an SNMP response with error status of
                      badValue (3) should be returned."
               ::= { cpIwfIsdnBriPortEntry 3 }


aal2ChannelIdB1 OBJECT-TYPE
       SYNTAX          INTEGER (16..255)
       MAX-ACCESS      read-write
       STATUS          current
       DESCRIPTION
               "The CID of the AAL2 connection transporting the B1 channel of this
               ISDN BRI port over the AAL2 VCC. The default value of this object is
               determined by the formula defined in af-vmoa-0145.000 section 4.4.2.
               When the aal2ApplicationIdentifier indicates the presence of ELCP,
               this object should not be used for CID allocation and the value of
               this object is not applicable.  In addition, if an SNMP operation
               is attempted on this object, an SNMP response with error status of
               badValue (3) should be returned."
       ::= { cpIwfIsdnBriPortEntry 4 }


aal2ChannelIdB2 OBJECT-TYPE
       SYNTAX          INTEGER (16..255)
       MAX-ACCESS      read-write
       STATUS          current
       DESCRIPTION
               "The CID of the AAL2 connection transporting the B2 channel of this
               ISDN BRI port over the AAL2 VCC. The default value of this object is
               determined by the formula defined in af-vmoa-0145.000 section 4.4.2.
               When the aal2ApplicationIdentifier indicates the presence of ELCP,
               this object should not be used for CID allocation and the value
               this object is not applicable.  In addition, if an SNMP operation
               is attempted on this object, an SNMP response with error status of
               badValue (3) should be returned."
       ::= { cpIwfIsdnBriPortEntry 5 }


isdnBriPortLabel OBJECT-TYPE
       SYNTAX          OCTET STRING (SIZE(0..32))
       MAX-ACCESS      read-write
       STATUS          current
       DESCRIPTION
               "Label assigned by service provider to identify this CP-IWF port.
               For example, may be used to hold Directory Number."
       ::= { cpIwfIsdnBriPortEntry 6 }


isdnBriPortTestType OBJECT-TYPE
       SYNTAX          INTEGER {
                       physicalPortLoopback (1),
                       dChannelPhysicalPortLoopback (2),
                       b1ChannelPhysicalPortLoopback (3),
                       b2ChannelPhysicalPortLoopback (4),
                       dChannelAal2Loopback (5),
                       b1ChannelAal2Loopback (6),
                       b2ChannelAal2Loopback (7)
                       }
       MAX-ACCESS      read-write
       STATUS          current
       DESCRIPTION
               "This object is used to specify the type of test to run for
               ISDN-BRI ports. There are no results stored locally for a
               loopback test. Loopback of the whole ISDN-BRI physical user
               port is supported where all the D, B1 and B2 channels are
               looped back simultaneously, along with individual loopback
               of the D, B1 and B2 channels. AAL2 Loopback is also supported
```

```
                on a per sub-channel basis. In order to run these tests, the
                CO-IWF must first set the value of this object appropriate to
                the test that needs to be run. The CO-IWF should then set the
                value of ifAdminStatus in the corresponding ifEntry to 'testing'.
                The CO-IWF should verify that the test is in progress by checking
                that the value of ifOperStatus in the corresponding ifEntry is
                equal to 'testing'. Once testing is complete the CO-IWF must set
                the ifAdminStatus to a value other than 'testing'.
                Note that the LES device must not allow a CO-IWF to manipulate
                the ifAdminStatus of physical user ports that do not belong to
                its managed CP-IWF."
        ::= { cpIwfIsdnBriPortEntry 7 }


-- ------------------------------------------------------------- --
--
--  cpIwfAal2Stats Group
--

cpIwfAal2Stats      OBJECT IDENTIFIER ::= { cpIwfMIBObjects 6 }

aal2CpsInPkts OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of CPS packets received"
        ::= { cpIwfAal2Stats 1 }

aal2CpsOutPkts OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of CPS packets transmitted"
        ::= { cpIwfAal2Stats 2 }

aal2CpsParityErrors OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of errors encountered as specified in Table 6/I.363.2
                (errnum = 0)"
        ::= { cpIwfAal2Stats 3 }

aal2CpsSeqNumErrors OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of errors encountered as specified in Table 6/I.363.2
                (errnum = 1)"
        ::= { cpIwfAal2Stats 4 }

aal2CpsOsfMismatchErrors OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of errors encountered as specified in Table 6/I.363.2
                (errnum = 2)"
        ::= { cpIwfAal2Stats 5 }
```

```
aal2CpsOsfErrors OBJECT-TYPE
      SYNTAX        Counter32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "Number of errors encountered as specified in Table 6/I.363.2
            (errnum = 3)"
      ::= { cpIwfAal2Stats 6 }

aal2CpsHecErrors OBJECT-TYPE
      SYNTAX        Counter32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "Number of errors encountered as specified in Table 6/I.363.2
            (errnum = 4)"
      ::= { cpIwfAal2Stats 7 }

aal2CpsOversizedSduErrors OBJECT-TYPE
      SYNTAX        Counter32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "Number of errors encountered as specified in Table 6/I.363.2
            (errnum = 5)"
      ::= { cpIwfAal2Stats 8 }

aal2CpsReassemblyErrors OBJECT-TYPE
      SYNTAX        Counter32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "Number of errors encountered as specified in Table 6/I.363.2
            (errnum = 6)"
      ::= { cpIwfAal2Stats 9 }

aal2CpsHecOverlapErrors OBJECT-TYPE
      SYNTAX        Counter32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "Number of errors encountered as specified in Table 6/I.363.2
            (errnum = 7)"
      ::= { cpIwfAal2Stats 10 }

aal2CpsUuiErrors OBJECT-TYPE
      SYNTAX        Counter32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "Number of errors encountered as specified in Table 6/I.363.2
            (errnum = 8)"
      ::= { cpIwfAal2Stats 11 }

aal2CpsCidErrors OBJECT-TYPE
      SYNTAX        Counter32
      MAX-ACCESS    read-only
      STATUS        current
      DESCRIPTION
            "Number of errors encountered as specified in Table 6/I.363.2
            (errnum = 9)"
      ::= { cpIwfAal2Stats 12 }
```

```
aal2SscsOversizedSssarSduErrors OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of errors encountered as specified in Table 3/I.366.1
                (errnum = 10)"
        ::= { cpIwfAal2Stats 13 }

aal2SscsSssarRasTimerExpiryErrors OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of errors encountered as specified in Table 3/I.366.1
                (errnum = 11)"
        ::= { cpIwfAal2Stats 14 }

aal2SscsUndersizedSstedPduErrors OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of errors encountered as specified in Table 5/I.366.1
                (errnum = 20)"
        ::= { cpIwfAal2Stats 15 }

aal2SscsSstedPduLengthMismatchErrors OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of errors encountered as specified in Table 5/I.366.1
                (errnum = 21)"
        ::= { cpIwfAal2Stats 16 }

aal2SscsSstedCrcMismatchErrors OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Number of errors encountered as specified in Table 5/I.366.1
                (errnum = 22)"
        ::= { cpIwfAal2Stats 17 }

-- ------------------------------------------------------------ --
--
--  cpIwfPotsPortStatsTable
--

cpIwfPotsPortStatsTable OBJECT-TYPE
        SYNTAX          SEQUENCE OF CpIwfPotsPortStatsEntry
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
                "This table contains performance statistics pertinent to POTS
                ports respectively in addition to the information contained in the
                ifTable about the physical interfaces to which the CP-IWF ports
                are peering with currently"
        ::= { cpIwfMIBObjects  7}

cpIwfPotsPortStatsEntry OBJECT-TYPE
```

```
        SYNTAX        CpIwfPotsPortStatsEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "An entry in the cpIwfPotsPortStatsTable that represents
                statistics for a single POTS port."
        INDEX         { potsPortNumber }
        ::= { cpIwfPotsPortStatsTable 1 }

CpIwfPotsPortStatsEntry ::= SEQUENCE {
        cpIwfPotsPortActiveSeconds Counter32,
        cpIwfPotsPortFillerOctets  Counter32,
        cpIwfPotsPortDroppedOctets Counter32
        }

cpIwfPotsPortActiveSeconds OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total length of time the AAL2 channel associated with this port
                has been active, in seconds."
        ::= { cpIwfPotsPortStatsEntry 1 }

cpIwfPotsPortFillerOctets OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total number of PCM filler octets injected into active media
                stream on this port due to playout buffer underflow."
        ::= { cpIwfPotsPortStatsEntry 2 }

cpIwfPotsPortDroppedOctets OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total number of PCM payload octets dropped due to buffer overflow
                at this port. Octets that are dropped because they arrived late,
                and which have already been substituted by filler PCM octets,
                shall not be counted."
        ::= { cpIwfPotsPortStatsEntry 3 }

-- ------------------------------------------------------------- --
--
--   cpIwfIsdnBriPortStatsTable
--

cpIwfIsdnBriPortStatsTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF CpIwfIsdnBriPortStatsEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "This table contains performance statistics pertinent to ISDN BRI
                ports respectively in addition to the information contained in the
                ifTable about the physical interfaces to which the CP-IWF ports
                are peering with currently"
        ::= { cpIwfMIBObjects  8}

cpIwfIsdnBriPortStatsEntry OBJECT-TYPE
        SYNTAX        CpIwfIsdnBriPortStatsEntry
        MAX-ACCESS    not-accessible
```

```
        STATUS        current
        DESCRIPTION
                "An entry in the cpIwfIsdnBriPortStatsTable that represents
                statistics for a single ISDN BRI port."
        INDEX         { isdnBriPortNumber }
        ::= { cpIwfIsdnBriPortStatsTable 1 }


CpIwfIsdnBriPortStatsEntry ::= SEQUENCE {
                cpIwfIsdnBriPortB1ActiveSeconds   Counter32,
                cpIwfIsdnBriPortB1FillerOctets    Counter32,
                cpIwfIsdnBriPortB1DroppedOctets   Counter32,
                cpIwfIsdnBriPortB2ActiveSeconds   Counter32,
                cpIwfIsdnBriPortB2FillerOctets    Counter32,
                cpIwfIsdnBriPortB2DroppedOctets   Counter32
        }


cpIwfIsdnBriPortB1ActiveSeconds OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total length of time the AAL2 channel associated with this
                port/channel has been active, in seconds."
        ::= { cpIwfIsdnBriPortStatsEntry 1 }


cpIwfIsdnBriPortB1FillerOctets OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total number of PCM filler octets injected into active media
                stream on this port/channel due to playout buffer underflow."
        ::= { cpIwfIsdnBriPortStatsEntry 2 }


cpIwfIsdnBriPortB1DroppedOctets OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total number of PCM payload octets dropped due to buffer overflow
                on this port/channel.  Octets that are dropped because they
                arrived late, and which have already been substituted by filler
                PCM octets, shall not be counted."
        ::= { cpIwfIsdnBriPortStatsEntry 3 }


cpIwfIsdnBriPortB2ActiveSeconds OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total length of time the AAL2 channel associated with this
                port/channel has been active, in seconds."
        ::= { cpIwfIsdnBriPortStatsEntry 4 }


cpIwfIsdnBriPortB2FillerOctets OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total number of PCM filler octets injected into active media
                stream on this port/channel due to playout buffer underflow."
        ::= { cpIwfIsdnBriPortStatsEntry 5 }
```

```
cpIwfIsdnBriPortB2DroppedOctets OBJECT-TYPE
        SYNTAX        Counter32
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Total number of PCM payload octets dropped due to buffer overflow
                on this port/channel.  Octets that are dropped because they
                arrived late, and which have already been substituted by filler
                PCM octets, shall not be counted."
        ::= { cpIwfIsdnBriPortStatsEntry 6 }

-- ------------------------------------------------------------ --
-- The following section defines Loop Emulation Service specific
-- traps for the CP-IWF as a whole (not port specific).
--
-- CP-IWF enterprise traps group
--

cpIwfMIBNotificationPrefix OBJECT IDENTIFIER ::= { cpIwfMIBNotifications 0 }

cpIwfInsufficientPhysicalBandwidth NOTIFICATION-TYPE
        OBJECTS { cpIwfUpstreamPhysicalBandwidth,
                cpIwfDownstreamPhysicalBandwidth }
        STATUS        current
        DESCRIPTION
                "This trap is generated when the physical layer bandwidth in either
                direction drops below the currently configured AAL2 VCC bandwidth."
        ::= { cpIwfMIBNotificationPrefix 1 }

cpIwfUpstreamPhysicalBandwidth OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
                "This object defines the new physical bandwidth in the upstream
                direction of the CP-IWF."
        ::= { cpIwfMIBObjects 9 }

cpIwfDownstreamPhysicalBandwidth OBJECT-TYPE
        SYNTAX        Integer32
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
                "This object defines the new physical bandwidth in the downstream
                direction of the CP-IWF."
        ::= { cpIwfMIBObjects 10 }

cpIwfExcessImpairment NOTIFICATION-TYPE
        OBJECTS { cpIwfImpairmentPortType, cpIwfPortNumber }
        STATUS        current
        DESCRIPTION
                "This trap is generated when the number of impairments on any POTS
                port, or ISDN BRI or ISDN PRI port/channel, measured as the sum of
                fillerOctets and droppedOctets on that port, in any given interval
                of cpIwfImpairmentInterval minutes, is equal to or greater than the
                value of cpIwfImpairmentThreshold.  If the value of
                cpIwfImpairmentThreshold is zero, then this trap is never
                generated."
        ::= { cpIwfMIBNotificationPrefix 2 }

cpIwfImpairmentPortType OBJECT-TYPE
        SYNTAX        INTEGER {
                            pots (1),
```

```
                        isdnBriB1 (2),
                        isdnBriB2 (3),
                        isdnPriB1 (4),
                        isdnPriB2 (5),
                        isdnPriB3 (6),
                        isdnPriB4 (7),
                        isdnPriB5 (8),
                        isdnPriB6 (9),
                        isdnPriB7 (10),
                        isdnPriB8 (11),
                        isdnPriB9 (12),
                        isdnPriB10 (13),
                        isdnPriB11 (14),
                        isdnPriB12 (15),
                        isdnPriB13 (16),
                        isdnPriB14 (17),
                        isdnPriB15 (18),
                        isdnPriB16 (19),
                        isdnPriB17 (20),
                        isdnPriB18 (21),
                        isdnPriB19 (22),
                        isdnPriB20 (23),
                        isdnPriB21 (24),
                        isdnPriB22 (25),
                        isdnPriB23 (26),
                        isdnPriB24 (27),
                        isdnPriB25 (28),
                        isdnPriB26 (29),
                        isdnPriB27 (30),
                        isdnPriB28 (31),
                        isdnPriB29 (32),
                        isdnPriB30 (33)

                }
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
              "This object is used within the cpIwfExcessImpairment Trap and
              identifies the type of the CP-IWF port on which the excess
              impairments event occurred."
        ::= { cpIwfMIBObjects 11 }

cpIwfPortNumber OBJECT-TYPE
        SYNTAX        INTEGER (1..240)
        MAX-ACCESS    read-create
        STATUS        current
        DESCRIPTION
              "This object is used within traps to identify the port number to
              which the trap refers. The range of values this object can take is
              dependent on port type and is defined in af-vmoa-0145.000 section
              4.4.2"
        ::= { cpIwfMIBObjects 12 }

-- ------------------------------------------------------------- --

--
--   cpIwfIsdnPriPortTable
--

cpIwfIsdnPriPortTable OBJECT-TYPE
        SYNTAX        SEQUENCE OF CpIwfIsdnPriPortEntry
        MAX-ACCESS    not-accessible
        STATUS        current
```

```
        DESCRIPTION
                "This table contains information on the configuration of the
                ISDN PRI ports on the CP-IWF in addition to the information
                contained in the ifTable about the physical interfaces to which
                the CP-IWF ports are peering with currently."
        ::= { cpIwfMIBObjects 13 }


cpIwfIsdnPriPortEntry OBJECT-TYPE
        SYNTAX          CpIwfIsdnPriPortEntry
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
                "An entry in the cpIwfIsdnPriPortTable that represents a single
                ISDN PRI port."
        INDEX           { isdnPriPortNumber }
        ::= { cpIwfIsdnPriPortTable 1 }


CpIwfIsdnPriPortEntry ::= SEQUENCE {
                isdnPriPortNumber          Integer32,
                isdnPriPhysicalPort        Integer32,
                isdnPriNumBChannels        Integer32,
                isdnPriDAal2ChannelId      INTEGER,
                isdnPriPortLabel           OCTET STRING,
                isdnPriPortTestType        INTEGER
        }


isdnPriPortNumber OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
                " The number identifying the ISDN PRI user port on the CP-IWF."
        ::= { cpIwfIsdnPriPortEntry 1 }


isdnPriPhysicalPort OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This has the value of the ifIndex of the ifEntry of the physical
                ISDN PRI port to which this CP-IWF ISDN PRI port is connected. The
                value of (0) has the special meaning that this ISDN PRI port is
                not connected to any physical port on the LES device."
        ::= { cpIwfIsdnPriPortEntry 2 }


isdnPriNumBChannels OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      read-only
        STATUS          current
        DESCRIPTION
                "Maximum number of B channels supported by this ISDN PRI port."
        ::= { cpIwfIsdnPriPortEntry 3 }


isdnPriDAal2ChannelId OBJECT-TYPE
        SYNTAX          INTEGER (16..255)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "The CID of the AAL2 connection transporting the D channel of this
                ISDN PRI port over the AAL2 VCC. The default value of this object
                is determined by the formula defined in revision 1 of af-vmoa-0145
                section 4.4.2.
                When the aal2ApplicationIdentifier indicates the presence of ELCP,
```

```
                this object should not be used for CID allocation and the value of
                this object is not applicable.  In addition, if an SNMP operation
                is attempted on this object, an SNMP response with error status of
                badValue (3) should be returned."
        ::= { cpIwfIsdnPriPortEntry 4 }


isdnPriPortLabel OBJECT-TYPE
        SYNTAX          OCTET STRING (SIZE(0..32))
        MAX-ACCESS    read-write
        STATUS          current
        DESCRIPTION
                "Label assigned by service provider to identify this CP-IWF port."
        ::= { cpIwfIsdnPriPortEntry 5 }


isdnPriPortTestType OBJECT-TYPE
        SYNTAX          INTEGER {
                            physicalPortLoopback (1),
                            dChannelPhysicalPortLoopback (2),
                            dChannelAal2Loopback (3)
                        }
        MAX-ACCESS    read-write
        STATUS          current
        DESCRIPTION
                "This object is used to specify the type of test to run for
                the ISDN-PRI D channel or all channels. There are no results stored
                locally for a loopback test. Loopback of the whole ISDN-PRI physical
                user  port is supported where all the D and B channels are
                looped back simultaneously, along with individual loopback
                of the D channel. AAL2 Loopback is also supported on the D channel.
                In order to run these tests, the CO-IWF must first set the value of
                this object appropriate to the test that needs to be run. The CO-IWF
                should then set the value of ifAdminStatus in the corresponding
                ifEntry to 'testing'.
                The CO-IWF should verify that the test is in progress by checking
                that the value of ifOperStatus in the corresponding ifEntry is
                equal to 'testing'. Once testing is complete the CO-IWF must set
                the ifAdminStatus to a value other than 'testing'.
                Note that the LES device must not allow a CO-IWF to manipulate
                the ifAdminStatus of physical user ports that do not belong to
                its managed CP-IWF."
        ::= { cpIwfIsdnPriPortEntry 6 }


-- ------------------------------------------------------------- --
--
--  cpIwfIsdnPriBChannelTable
--

cpIwfIsdnPriBChannelTable OBJECT-TYPE
        SYNTAX SEQUENCE OF CpIwfIsdnPriBChannelEntry
        MAX-ACCESS    not-accessible
        STATUS          current
        DESCRIPTION
                "This table contains information on the configuration of the
                ISDN PRI B channels for each PRI port. The number of entries is
                given by the value of isdnPriNumBChannels. "
        ::= { cpIwfMIBObjects  14}

cpIwfIsdnPriBChannelEntry OBJECT-TYPE
        SYNTAX          CpIwfIsdnPriBChannelEntry
        MAX-ACCESS    not-accessible
        STATUS          current
        DESCRIPTION
```

```
                "An entry in the cpIwfIsdnPriBChannelTable that represents a single
                ISDN PRI B channel."
        INDEX           { isdnPriPortNumber, isdnPriBChannelNumber }
        ::= { cpIwfIsdnPriBChannelTable 1 }


CpIwfIsdnPriBChannelEntry ::= SEQUENCE {
                isdnPriBChannelNumber       Integer32,
                isdnPriBAal2ChannelId       INTEGER,
                isdnPriBChannelAdminStatus INTEGER,
                isdnPriBChannelOperStatus  INTEGER,
                isdnPriBChannelLabel        OCTET STRING,
                isdnPriBChannelTestType     INTEGER
        }


isdnPriBChannelNumber OBJECT-TYPE
        SYNTAX          Integer32
        MAX-ACCESS      not-accessible
        STATUS          current
        DESCRIPTION
                " The number identifying the ISDN PRI B channel on the CP-IWF."
        ::= { cpIwfIsdnPriBChannelEntry 1 }


isdnPriBAal2ChannelId OBJECT-TYPE
        SYNTAX          INTEGER (16..255)
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "The CID of the AAL2 connection transporting this B channel over the
                AAL2 VCC. The default value of this object is determined by the
                formula defined in revision 1 of af-vmoa-0145 section 4.4.2.
                When the aal2ApplicationIdentifier indicates the presence of ELCP,
                this object should not be used for CID allocation and the value of
                this object is not applicable.  In addition, if an SNMP operation
                is attempted on this object, an SNMP response with error status of
                badValue (3) should be returned."
        ::= { cpIwfIsdnPriBChannelEntry 2 }


isdnPriBChannelAdminStatus OBJECT-TYPE
        SYNTAX          INTEGER {
                                up (1),
                                down (2),
                                shuttingDown (3),
                                testing (4)
                        }
        MAX-ACCESS      read-write
        STATUS          current
        DESCRIPTION
                "This object is used to reflect the desired state of the ISDN PRI B
                Channel. The actual state of the B channel is given by
                isdnPriBChannelOperStatus. When this object is set to 'down', all
                existing calls on the B channel are cleared immediately. If this
                object is set to 'shuttingDown', no further calls shall be accepted
                either incoming or outgoing on the B channel. Once any call on the B
                Channel has cleared gracefully the value of this object moves to
                'down'."
        ::= { cpIwfIsdnPriBChannelEntry 3 }


isdnPriBChannelOperStatus OBJECT-TYPE
        SYNTAX          INTEGER {
                                up (1),
                                down (2),
                                testing (3)
                        }
```

```
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
                "Provides the current operational status of the B channel."
        ::= { cpIwfIsdnPriBChannelEntry 4 }


isdnPriBChannelLabel OBJECT-TYPE
        SYNTAX        OCTET STRING (SIZE(0..32))
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "Label assigned by service provider to identify this B channel.
                For example, may be used to hold Directory Number."
        ::= { cpIwfIsdnPriBChannelEntry 5 }


isdnPriBChannelTestType OBJECT-TYPE
        SYNTAX        INTEGER {
                           bChannelPhysicalPortLoopback (1),
                           bChannelAal2Loopback (2)
                      }
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
                "This object is used to specify the type of test to run for
                the ISDN-PRI B channel. There are no results stored locally for a
                loopback test. Loopback of the individual B channels is supported.
                AAL2 Loopback is also supported on the D channel. In order to run
                these tests, the CO-IWF must first set the value of this object
                appropriate to the test that needs to be run. The CO-IWF should then
                set the value of isdnPriBChannelAdminStatus to 'testing'.
                The CO-IWF should verify that the test is in progress by checking
                that the value of isdnPriBChannelOperStatus is equal to 'testing'.
                Once testing is complete the CO-IWF must set the
                isdnPriBChannelAdminStatus to a value other than 'testing'."
        ::= { cpIwfIsdnPriBChannelEntry 6 }


-- ------------------------------------------------------------ --
--
--  cpIwfIsdnPriBChannelStatsTable
--

cpIwfIsdnPriBChannelStatsTable OBJECT-TYPE
        SYNTAX SEQUENCE OF CpIwfIsdnPriBChannelStatsEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "This table contains performance statistics pertinent to ISDN PRI B
                Channels. The number of entries is given by the value of
                isdnPriNumBChannels multiplied by the number of ISDN PRI ports. "
        ::= { cpIwfMIBObjects 15 }

cpIwfIsdnPriBChannelStatsEntry OBJECT-TYPE
        SYNTAX        CpIwfIsdnPriBChannelStatsEntry
        MAX-ACCESS    not-accessible
        STATUS        current
        DESCRIPTION
                "An entry in the cpIwfIsdnPriBChannelStatsTable that represents a
                single ISDN PRI B channel."
        INDEX         { isdnPriPortNumber, isdnPriBChannelNumber }
        ::= { cpIwfIsdnPriBChannelStatsTable 1 }


CpIwfIsdnPriBChannelStatsEntry ::= SEQUENCE {
                cpIwfIsdnPriPortBChannelActiveSeconds    Counter32,
```

```
                cpIwfIsdnPriPortBChannelFillerOctets    Counter32,
                cpIwfIsdnPriPortBChannelDroppedOctets   Counter32
        }


cpIwfIsdnPriPortBChannelActiveSeconds OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS    read-only
        STATUS          current
        DESCRIPTION
                "Total length of time the AAL2 channel associated with this
                port/channel has been active, in seconds."
        ::= { cpIwfIsdnPriBChannelStatsEntry 1 }


cpIwfIsdnPriPortBChannelFillerOctets OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS    read-only
        STATUS          current
        DESCRIPTION
                "Total number of PCM filler octets injected into active media
                stream on this port/channel due to playout buffer underflow."
        ::= { cpIwfIsdnPriBChannelStatsEntry 2 }


cpIwfIsdnPriPortBChannelDroppedOctets OBJECT-TYPE
        SYNTAX          Counter32
        MAX-ACCESS    read-only
        STATUS          current
        DESCRIPTION
                "Total number of PCM payload octets dropped due to buffer overflow
                on this port/channel.  Octets that are dropped because they
                arrived late, and which have already been substituted by filler
                PCM octets, shall not be counted."
        ::= { cpIwfIsdnPriBChannelStatsEntry 3 }


-- ------------------------------------------------------------ --
--
--   cpIwfFileTable
--

cpIwfFileTable OBJECT-TYPE
        SYNTAX          SEQUENCE OF CpIwfFileEntry
        MAX-ACCESS    not-accessible
        STATUS          current
        DESCRIPTION
                "This table contains, at a minimum, a list of all files that have
                been downloaded to the CP-IWF using the File Transfer capability on
                the EOC and are still present on the CP-IWF.  If the CP-IWF allows
                software download, then this table will initially have one entry,
                the filename for the software load running in the CP-IWF."
        ::= { cpIwfMIBObjects  16}

cpIwfFileEntry OBJECT-TYPE
        SYNTAX          CpIwfFileEntry
        MAX-ACCESS    not-accessible
        STATUS          current
        DESCRIPTION
                "An entry in the cpIwfFileTable that represents one file."
        INDEX  { cpIwfFileIndex }
        ::=    { cpIwfFileTable 1 }

CpIwfFileEntry       ::= SEQUENCE {
                cpIwfFileIndex      Integer32,
                cpIwfFileName       OCTET STRING (SIZE(1..64)),
                cpIwfFileVersion    OCTET STRING(SIZE(1..32))
```

```
        }
cpIwfFileIndex OBJECT-TYPE
        SYNTAX       Integer32
        MAX-ACCESS    read-write
        STATUS        current
        DESCRIPTION
            "This index is assigned by the CP-IWF.  If written to by the CO-IWF,
            the file shall be deleted from the CP-IWF unless it is referenced by
            cpIwfLoadFile."
        ::= { cpIwfFileEntry 1 }


cpIwfFileName OBJECT-TYPE
        SYNTAX        OCTET STRING (SIZE(1..64))
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "For those files that were received via the File Transfer mechanism
            on the EOC, the filename shall be identical to the filename
            specified in the received TFTP header. For other files, the
            filename shall be consistent with the TFTP requirements specified in
            RFC1350."
        ::= { cpIwfFileEntry 2 }

cpIwfFileVersion OBJECT-TYPE
        SYNTAX        OCTET STRING(SIZE(1..32))
        MAX-ACCESS    read-only
        STATUS        current
        DESCRIPTION
            "This object allows a CP-IWF to display file version information
            that may be embedded in the file. Support of this object is
            optional."
        ::= { cpIwfFileEntry 3 }

-- ------------------------------------------------------------ --
--
--   cpIwfDCTPortTable
--

cpIwfDCTPortTable OBJECT-TYPE
        SYNTAX         SEQUENCE OF CpIwfDCTPortEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "This table contains information on the configuration of the Digital
            CAS Trunk Interface ports on the CP-IWF in addition to the
            information contained in the ifTable about the physical interfaces
            to which the CP-IWF Digital CAS Trunk Interface ports are peering
            with currently."
        ::= { cpIwfMIBObjects 17 }

cpIwfDCTPortEntry OBJECT-TYPE
        SYNTAX CpIwfDCTPortEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
            "An entry in the cpIwfDCTPortTable that represents a single DCT
            physical port."
        INDEX { dctPortNumber }
        ::= { cpIwfDCTPortTable 1 }

CpIwfDCTPortEntry   ::= SEQUENCE {
            dctPortNumber Integer32,
            dctPhysicalPort Integer32,
```

```
                    dctPortTestType INTEGER,
                    dctPortLabel OCTET STRING
            }

dctPortNumber OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "The number identifying the DCT user port on the CP-IWF."
        ::= { cpIwfDCTPortEntry 1 }

dctPhysicalPort OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "This has the value of the ifIndex of the ifEntry of the physical
                DCT port to which this CP-IWF DCT port is connected. The value of
                (0) has the special meaning that this DCT port is not connected to
                any physical port on the LES device. The ifType value of the
                corresponding entry in ifEntry determines the type of port "
        ::= { cpIwfDCTPortEntry 2 }

dctPortTestType OBJECT-TYPE
        SYNTAX INTEGER {
                none (1),
                codecLoopback (2),
                aal2Loopback (3)
        }
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "This object is used to specify the type of test to run for DCT
                physical ports."
        ::= { cpIwfDCTPortEntry 3 }

dctPortLabel OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..32))
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "Label assigned by service provider to identify this CP-IWF DCT
                port. For example, this object may be used to hold the
                branch/section information of the customer being served by this
                port."
        ::= { cpIwfDCTPortEntry 4 }

-- ------------------------------------------------------------- --
--
-- cpIwfDCTChannelTable
--

cpIwfDCTChannelTable OBJECT-TYPE
        SYNTAX SEQUENCE OF CpIwfDCTChannelEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "This table contains information on the configuration of the
                channels that are supported by Digital CAS Trunk Interface ports on
                the CP-IWF. "
        ::= { cpIwfMIBObjects 18 }
```

```
cpIwfDCTChannelEntry OBJECT-TYPE
        SYNTAX CpIwfDCTChannelEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "Each entry represents a channel within a DCT physical port"
        INDEX { dctPortNumber, dctChannelNumber }
        ::= { cpIwfDCTChannelTable 1 }

CpIwfDCTChannelEntry        ::= SEQUENCE {
                dctChannelNumber Integer32,
                dctCID INTEGER,
                dctChannelTestType INTEGER,
                dctChannelSignalingMethod INTEGER,
                dctChannelLabel OCTET STRING,
                dctChannelIfIndex Integer32,
                dctChannelIfAdminStatus INTEGER,
                dctChannelIfOperStatus INTEGER,
                dctChannelUsageStatus INTEGER
        }

dctChannelNumber OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "The channel number within the DCT physical port identified by the
                corresponding dctPortNumber."
        ::= { cpIwfDCTChannelEntry 1 }

dctCID OBJECT-TYPE
        SYNTAX INTEGER(160..223)
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "The CID of the AAL2 connection transporting this channel over
                AAL2."
        ::= { cpIwfDCTChannelEntry 2 }

dctChannelTestType OBJECT-TYPE
        SYNTAX INTEGER {
                none(1),
                channelTest(2)
        }
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "This object is used to specify channel level testing to be run on
                this particular channel."
        ::= { cpIwfDCTChannelEntry 3 }

dctChannelSignalingMethod OBJECT-TYPE
        SYNTAX INTEGER {
                loopStart (1),
                loopReverseBattery (2),
                groundStart (3),
                eANDm (4)
        }
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "The signalling method to use for this DCT channel."
        DEFVAL { eANDm }
```

```
        ::= { cpIwfDCTChannelEntry 4 }


dctChannelLabel OBJECT-TYPE
        SYNTAX OCTET STRING (SIZE(0..32))
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "Label assigned by service provider to identify this channel.
                For example, may be used to hold the directory number information of
                the customer being served by this channel."
        ::= { cpIwfDCTChannelEntry 5 }

dctChannelIfIndex OBJECT-TYPE
        SYNTAX Integer32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "dctChannelIfIndex is applicable only if CP-IWF chooses to implement
                RFC2494, in which case this object value is a pointer to the
                corresponding entry in ifTable for that channalization entry.
                Please, refer to Section 2.2 of RFC2494 for more details. However,
                it should be clearly noted that implementation of RFC2494 is
                optional for CP-IWF."
        ::= { cpIwfDCTChannelEntry 6 }

dctChannelIfAdminStatus OBJECT-TYPE
        SYNTAX INTEGER {
                up(1),
                down(2),
                shuttingDown(3),
                testing(4)
        }
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "This object is applicable only if CP-IWF DOES NOT support RFC2494.
                This object is represents the administrative state of the Channel.
                The actual operation state of the channel is given by
                dctChannelOperStatus. When this object is set to 'down', all
                existing calls on this channel are cleared immediately. If this
                object is set to 'shuttingDown', no further calls shall be accepted
                either incoming or outgoing on the channel. Once the call on the
                Channel has been cleared, CP-IWF modified this object value to
                'down'."
        ::= { cpIwfDCTChannelEntry 7 }

dctChannelIfOperStatus OBJECT-TYPE
        SYNTAX INTEGER {
                up(1),
                down(2),
                testing(3)
        }
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "This object is applicable only if CP-IWF DOES NOT support RFC2494.
                This object is represents the current operational status of this
                channel."
        ::= { cpIwfDCTChannelEntry 8 }

dctChannelUsageStatus OBJECT-TYPE
        SYNTAX INTEGER {
```

```
                yes(1),
                no(2)
        }
        MAX-ACCESS read-write
        STATUS current
        DESCRIPTION
                "This object can be used to indicate whether this channel is
                configured for use within the context of this CP-IWF instance. A
                value of yes(1) indicates that this channel is configured for use
                within this CP-IWF instance."
        DEFVAL { yes }
        ::= { cpIwfDCTChannelEntry 9 }


-- ------------------------------------------------------------ --
--
-- cpIwfDCTChannelStatsTable
--

cpIwfDCTChannelStatsTable OBJECT-TYPE
        SYNTAX SEQUENCE OF CpIwfDCTChannelStatsEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "This table contains performance statistics pertinent to a DCT
                channel"
        ::= { cpIwfMIBObjects 19}

cpIwfDCTChannelStatsEntry OBJECT-TYPE
        SYNTAX CpIwfDCTChannelStatsEntry
        MAX-ACCESS not-accessible
        STATUS current
        DESCRIPTION
                "An entry in the cpIwfDCTChannelStatsTable that represents
                statistics for a single DCT channel."
        INDEX { dctPortNumber, dctChannelNumber }
        ::= { cpIwfDCTChannelStatsTable 1 }

CpIwfDCTChannelStatsEntry  ::= SEQUENCE {
                cpIwfDCTChannelActiveSeconds Counter32,
                cpIwfDCTChannelFillerOctets Counter32,
                cpIwfDCTChannelDroppedOctets Counter32
        }

cpIwfDCTChannelActiveSeconds OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "Total length of time the AAL2 channel associated with this DCT
                channel has been active, in seconds."
        ::= { cpIwfDCTChannelStatsEntry 1 }

cpIwfDCTChannelFillerOctets OBJECT-TYPE
        SYNTAX Counter32
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "Total number of PCM filler octets injected into active media stream
                on this DCT channel due to playout buffer underflow."
        ::= { cpIwfDCTChannelStatsEntry 2 }

cpIwfDCTChannelDroppedOctets OBJECT-TYPE
        SYNTAX Counter32
```

```
        MAX-ACCESS read-only
        STATUS current
        DESCRIPTION
                "Total number of PCM payload octets dropped due to buffer overflow
                at this DCT channel. Octets that are dropped because they arrived
                late, and which have already been substituted by filler PCM octets,
                shall not be counted."
        ::= { cpIwfDCTChannelStatsEntry 3 }




-- ------------------------------------------------------------ --
--
-- Conformance information

cpIwfMIBConformance       OBJECT IDENTIFIER ::= { cpIwfMIB 3 }
cpIwfMIBCompliances       OBJECT IDENTIFIER ::= { cpIwfMIBConformance 1 }
cpIwfMIBGroups            OBJECT IDENTIFIER ::= { cpIwfMIBConformance 2 }

-- compliance statements

cpIwfMIBCompliance MODULE-COMPLIANCE
        STATUS        current
        DESCRIPTION
                "The compliance statement for SNMP entities that support LES as
                specified in af-vmoa-0145.000 of the ATM Forum.

                Note the Trap types and associated MIB objects defined in this MIB
                are required implementations to claim conformance to this MIB.

                For a host to conform to this MIB it must also implement:

                        - The System Group from RFC 1213

                        - ifTable and ifXTable from RFC 2863. See section 6 of this
                          specification for interpretations of the ifTable and
                          ifXTable objects as they apply to LES."

        MODULE -- this module
        MANDATORY-GROUPS {
                cpIwfGeneralGroup,
                cpIwfNotificationsGroup
        }

        GROUP         cpIwfAal2ConfigGroup
        DESCRIPTION
                "This group is mandatory only for those CP-IWFs that use PVCs
                between the CP-IWF and CO-IWF. It is not required in the presence of
                SVCs as all AAL2 parameters shall be supplied during SVC setup."

        GROUP         cpIwfAal2StatsGroup
        DESCRIPTION
                "This group is mandatory only for those CP-IWFs that provide AAL2
                statistics."

        GROUP         cpIwfPotsPortConfigGroup
        DESCRIPTION
                "This group is mandatory only for those CP-IWFs
                that host POTS services."

        GROUP         cpIwfPotsPortStatsGroup
```

```
        DESCRIPTION
                "This group is mandatory only if the CP-IWF provides statistics for
                any POTS ports it hosts."

        GROUP           cpIwfIsdnBriPortConfigGroup
        DESCRIPTION
                "This group is mandatory only for those CP-IWFs
                that host ISDN BRI services."

        GROUP           cpIwfIsdnBriPortStatsGroup
        DESCRIPTION
                "This group is mandatory only if the CP-IWF provides statistics for
                any ISDN BRI ports it hosts."

        GROUP           cpIwfPotsPortCidConfigGroup
        DESCRIPTION
                "This group is mandatory for CP-IWFs that host POTS services, only
                in the absence of ELCP as a mechanism for CID allocation."

        GROUP           cpIwfIsdnBriPortCidConfigGroup
        DESCRIPTION
                "This group is mandatory for CP-IWFs that host ISDN BRI services,
                only in the absence of ELCP as a mechanism for CID allocation."

        GROUP           cpIwfElcpPstnGroup
        DESCRIPTION
                "This group is mandatory for those CP-IWFs that implement either
                the CCS signaling option or the ELCP."

        GROUP           cpIwfPlayoutBufferGroup
        DESCRIPTION
                "This group is mandatory only for those CP-IWFs that make the
                playout buffer depth configurable and provide a means to detect
                impairments."

        GROUP           cpIwfImpairmentNotificationsGroup
        DESCRIPTION
                "This group is mandatory if the cpIwfPlayoutBufferGroup is
                implemented."

        GROUP           cpIwfIsdnPriPortConfigGroup
        DESCRIPTION
                "This group is mandatory only for those CP-IWFs
                that host ISDN PRI services."

        GROUP           cpIwfIsdnPriPortStatsGroup
        DESCRIPTION
                "This group is mandatory only if the CP-IWF provides statistics for
                an ISDN PRI port it hosts."

        GROUP           cpIwfLoadFileGroup
        DESCRIPTION
                "This group is mandatory only if the CP-IWF provides file transfer
                capability."

        GROUP           cpIwfDCTPortConfigGroup
        DESCRIPTION
                "This group is mandatory if CP-IWF supports DCT ports."

        GROUP           cpIwfDCTPortStatsGroup
        DESCRIPTION
                "This group is mandatory if CP-IWF supports performance statistics
                for DCT ports."
```

```
::= { cpIwfMIBCompliances 1}

-- Units of Conformance

cpIwfGeneralGroup    OBJECT-GROUP
        OBJECTS {
                cpIwfVpi,
                cpIwfVci,
                cpIwfTimingReference,
                cpIwfEchoCancellationSupport,
                cpIwfAdminStatus,
                cpIwfOperStatus,
                cpIwfRestart,
                cpIwfTestType,
                cpIwfTestResult,
                cpIwfTestResultText,
                cpIwfMwdForRestart,
                cpIwfEocBandwidth,
                cpIwfCurrentConfig,
                cpIwfTrapGeneration,
                cpIwfVendorName,
                cpIwfDeviceType,
                cpIwfHardwareVersion,
                cpIwfSoftwareVersion,
                cpIwfUpstreamPhysicalBandwidth,
                cpIwfDownstreamPhysicalBandwidth,
                cpIwfPortNumber
        }
        STATUS       current
        DESCRIPTION
                "A collection of objects required to manage the
                CP-IWF as a whole"
        ::= { cpIwfMIBGroups 1 }

cpIwfAal2ConfigGroup        OBJECT-GROUP
        OBJECTS {
                aal2ApplicationIdentifier,
                aal2CpsMaxMultiplexedChannels,
                aal2CpsMaxSDULength,
                aal2CpsCIDLowerLimit,
                aal2CpsCIDUpperLimit,
                aal2CpsOptimisation,
                aal2CpsTimerCuValue,
                aal2SscsMaxSssarSduLength,
                aal2SscsFaxDemodulationTransport,
                aal2SscsDtmfDigitPacketTransport,
                aal2SscsPcmEncoding,
                aal2SscsProfileSource,
                aal2SscsPredefinedProfileIdentifier,
                aal2SscsIeeeOui,
                aal2SscsSsSarAssemblyTimerValue
        }
        STATUS       current
        DESCRIPTION
                "A collection of objects describing the configuration of the AAL2
                layer specific to LES"
        ::= { cpIwfMIBGroups 2 }

cpIwfPotsPortConfigGroup   OBJECT-GROUP
        OBJECTS {
                cpIwfNumPotsPorts,
```

```
                cpIwfPotsPortEncodingSelectionMode,
                potsPhysicalPort,
                potsPortTestType,
                signalingMethod,
                potsPortLabel
        }
        STATUS          current
        DESCRIPTION
                "A collection of objects describing the configuration of the POTS
                ports on a CP-IWF."
        ::= { cpIwfMIBGroups 3 }

cpIwfIsdnBriPortConfigGroup        OBJECT-GROUP
        OBJECTS {
                cpIwfNumIsdnBriPorts,
                cpIwfIsdnBriPortEncodingSelectionMode,
                isdnBriPhysicalPort,
                isdnBriPortLabel,
                isdnBriPortTestType
        }
        STATUS          current
        DESCRIPTION
                "A collection of objects describing the configuration of the ISDN
                BRI ports on a CP-IWF."
        ::= { cpIwfMIBGroups 4 }

cpIwfPotsPortCidConfigGroup OBJECT-GROUP
        OBJECTS {
                aal2ChannelId
        }
        STATUS          current
        DESCRIPTION
                "Object describing the static CID allocation to a
                user-side POTS termination. This object is required
                when ELCP is not used as a mechanism for CID allocation."
        ::= { cpIwfMIBGroups 5 }

cpIwfIsdnBriPortCidConfigGroup OBJECT-GROUP
        OBJECTS {
                aal2ChannelIdD,
                aal2ChannelIdB1,
                aal2ChannelIdB2
        }
        STATUS          current
        DESCRIPTION
                "A collection of objects describing the static CID
                allocations to the D, B1 and B2 channels of a user-side
                ISDN-BRI termination. These objects are required when
                ELCP is not used as a mechanism for CID allocation."
        ::= { cpIwfMIBGroups 6 }

cpIwfAal2StatsGroup OBJECT-GROUP
        OBJECTS {
                aal2CpsInPkts,
                aal2CpsOutPkts,
                aal2CpsParityErrors,
                aal2CpsSeqNumErrors,
                aal2CpsOsfMismatchErrors,
                aal2CpsOsfErrors,
                aal2CpsHecOverlapErrors,
                aal2CpsHecErrors,
                aal2CpsOversizedSduErrors,
                aal2CpsReassemblyErrors,
```

```
                aal2CpsUuiErrors,
                aal2CpsCidErrors,
                aal2SscsOversizedSssarSduErrors,
                aal2SscsSssarRasTimerExpiryErrors,
                aal2SscsUndersizedSstedPduErrors,
                aal2SscsSstedPduLengthMismatchErrors,
                aal2SscsSstedCrcMismatchErrors
        }
        STATUS          current
        DESCRIPTION
                "These objects provide statistics on the AAL2 layer"
        ::= { cpIwfMIBGroups 7 }

cpIwfPotsPortStatsGroup      OBJECT-GROUP
        OBJECTS {
                cpIwfPotsPortActiveSeconds,
                cpIwfPotsPortFillerOctets,
                cpIwfPotsPortDroppedOctets
        }
        STATUS          current
        DESCRIPTION
                "These objects provide statistics on the POTS ports"
        ::= { cpIwfMIBGroups 8 }

cpIwfIsdnBriPortStatsGroup OBJECT-GROUP
        OBJECTS {
                cpIwfIsdnBriPortB1ActiveSeconds,
                cpIwfIsdnBriPortB1FillerOctets,
                cpIwfIsdnBriPortB1DroppedOctets,
                cpIwfIsdnBriPortB2ActiveSeconds,
                cpIwfIsdnBriPortB2FillerOctets,
                cpIwfIsdnBriPortB2DroppedOctets
        }
        STATUS          current
        DESCRIPTION
                "These objects provide statistics on the ISDN BRI ports"
        ::= { cpIwfMIBGroups 9 }

cpIwfElcpPstnGroup OBJECT-GROUP
        OBJECTS {
                cpIwfV5PSTNProtocolVariant,
                cpIwfElcpAndPstnChannelBandwidth,
                cpIwfPstnHookFlashReporting,
                cpIwfT200Val,
                cpIwfT203Val,
                cpIwfN200Val,
                cpIwfN201Val
        }
        STATUS          current
        DESCRIPTION
                "Objects for setting the V5 PSTN protocol variant and the
                maximum bandwidth to be used for transmission of PSTN or
                ELCP messages."
        ::= { cpIwfMIBGroups 10 }

cpIwfPlayoutBufferGroup OBJECT-GROUP
        OBJECTS {
                cpIwfPlayoutBufferDepth,
                cpIwfImpairmentInterval,
                cpIwfImpairmentThreshold,
                cpIwfImpairmentPortType
        }
        STATUS          current
```

```
        DESCRIPTION
            "A collection of objects used for configuring the playout
            buffer depth and to detect impairments to do incorrect setting
            of this buffer depth."
        ::= { cpIwfMIBGroups 11 }


cpIwfNotificationsGroup NOTIFICATION-GROUP
        NOTIFICATIONS { cpIwfInsufficientPhysicalBandwidth }
        STATUS        current
        DESCRIPTION
            "The notification(s) which a CP-IWF is required to implement"
        ::= { cpIwfMIBGroups 12 }


cpIwfImpairmentNotificationsGroup NOTIFICATION-GROUP
        NOTIFICATIONS { cpIwfExcessImpairment }
        STATUS        current
        DESCRIPTION
            "This group specifies the notification used to inform the CO-IWF
            of impairments due to incorrect playout buffer depth, or corruption
            or loss of AAL2 packets by the network."
        ::= { cpIwfMIBGroups 13 }


cpIwfIsdnPriPortConfigGroup        OBJECT-GROUP
        OBJECTS {
                cpIwfNumIsdnPriPorts,
                cpIwfIsdnPriPortEncodingSelectionMode,
                isdnPriPhysicalPort,
                isdnPriNumBChannels,
                isdnPriDAal2ChannelId,
                isdnPriPortLabel,
                isdnPriPortTestType,
                isdnPriBChannelAdminStatus,
                isdnPriBChannelOperStatus,
                isdnPriBAal2ChannelId,
                isdnPriBChannelLabel,
                isdnPriBChannelTestType
        }
        STATUS          current
        DESCRIPTION
                "A collection of objects describing the configuration of the ISDN
                PRI ports on a CP-IWF."
        ::= { cpIwfMIBGroups 14 }


cpIwfIsdnPriPortStatsGroup OBJECT-GROUP
        OBJECTS {
                cpIwfIsdnPriPortBChannelActiveSeconds,
                cpIwfIsdnPriPortBChannelFillerOctets,
                cpIwfIsdnPriPortBChannelDroppedOctets
        }
        STATUS          current
        DESCRIPTION
                "These objects provide statistics on the ISDN PRI ports"
        ::= { cpIwfMIBGroups 15 }


cpIwfLoadFileGroup OBJECT-GROUP
        OBJECTS {
                cpIwfLoadFile,
                cpIwfFileIndex,
                cpIwfFileName,
                cpIwfFileVersion
        }
        STATUS          current
        DESCRIPTION
```

```
                    "A collection of objects used for managing file transfer"
            ::= { cpIwfMIBGroups 16 }


cpIwfDCTPortConfigGroup     OBJECT-GROUP
        OBJECTS {
                cpIwfNumDCTPorts,
                cpIwfDCTPortEncodingSelectionMode,
                dctPhysicalPort,
                dctPortTestType,
                dctPortLabel,
                dctCID,
                dctChannelTestType,
                dctChannelSignalingMethod,
                dctChannelLabel,
                dctChannelIfIndex,
                dctChannelIfAdminStatus,
                dctChannelIfOperStatus,
                dctChannelIfUsageStatus
        }
        STATUS current
        DESCRIPTION
                "Collection objects required to support configuration of DCT ports
                on CP-IWF."
        ::= { cpIwfMIBGroups 17 }

cpIwfDCTPortStatsGroup     OBJECT-GROUP
        OBJECTS {
                cpIwfDCTChannelActiveSeconds,
                cpIwfDCTChannelFillerOctets,
                cpIwfDCTChannelDroppedOctets
        }
        STATUS current
        DESCRIPTION
                "Collection objects required to provide performance statistics of
                DCT ports on CP-IWF."
        ::= { cpIwfMIBGroups 18 }

END
```

Appendix A:
Procedures for usage of the CP-IWF MIB

This informative appendix provides a set of procedures for common management tasks that the CP-IWF MIB supports. Procedures have been defined for the following tasks:

1. Startup of CP-IWF - This includes both initial start-up and restart.

2. Physical Port assignment to CP-IWF user port.

3. Release of Physical Port from a CP-IWF user port.

4. Testing of CP-IWF user ports.

The management of the CP-IWF is the responsibility of the CP-IWF Element Management System (EMS) of the provider of the CO-IWF. Although the LES EOC terminates at the CO-IWF, the management flow will not, especially when the CP-IWF EMS is not co-located within the same device as the CO-IWF. Hence the CO-IWF merely acts as a conduit for the management flow between the CP-IWF and CP-IWF EMS.

A.1   CP-IWF Start-up/Restart

This procedure defines what happens during a CP-IWF initial start-up or restart.

A.1.1 Basic Flow with Port Blocking

1. The CP-IWF is powered up or restarted, ATM cell delineation is achieved and the LES EOC is activated.

2. In order to start-up in a well-known state the CP-IWF shall carry out co-ordinated blocking of all relevant user ports using an appropriate mechanism.

3. To avoid a restart avalanche a restart timer shall be initiated with a random value, uniformly distributed between 0 and the Maximum Waiting Delay (cpIwfMwdForRestart).

4. When the timer expires or activity is detected the coldStart Trap shall be sent. The CP-IWF shall interpret the subsequent Get request from the CP-IWF EMS as an acknowledgment to the Trap. If it does not get a Get request within four times the Maximum Waiting Delay then the CP-IWF should restart the random timer and resend the coldStart Trap. The CP-IWF should attempt this a minimum of two times before concluding failure of the LES EOC communications channel. In the event that the LES EOC communications channel fails, the CP-IWF should return the LES EOC channel to service upon receipt of a subsequent SNMP Get or Set request.

5. Upon receipt of the coldStart Trap the CP-IWF EMS shall SNMP Get the cpIwfCurrentConfig object to determine whether the configuration has changed since restart.

6. In this scenario the Get Response indicates that the configuration has changed.

7. The CP-IWF EMS shall initiate a capability discovery phase whereby it shall SNMP Walk the CP-IWF MIB by issuing multiple GetNext requests for MIB objects.

8. The CP-IWF shall respond with a GetResponse containing the MIB objects.

9. Once the complete CP-IWF MIB has been retrieved, the CP-IWF EMS shall check for compatibility in configuration and if necessary shall issue SNMP Set requests to change parameters that are not compatible. This is a conditional phase; if the CP-IWF configuration is already compatible then there is no need to make any modifications.

10. Upon successful configuration alignment, the CP-IWF EMS shall carry out co-ordinated unblocking of all relevant user ports using an appropriate mechanism.
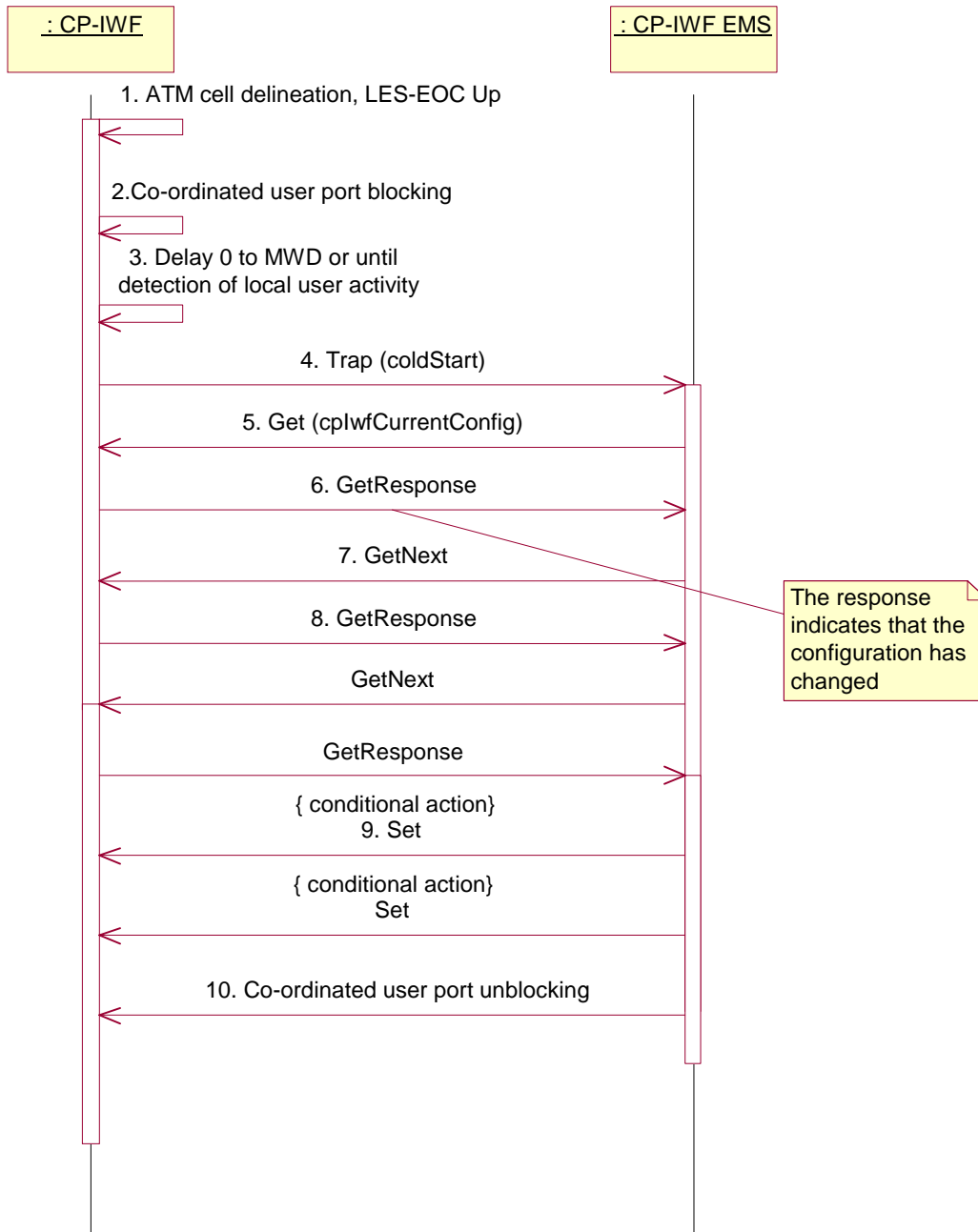
Figure 4: Procedure for CP-IWF Start-up/Restart

A.1.2 Alternative Flows

A.1.2.1 CP-IWF configuration has not changed

If step 6 of the basic flow indicates that the CP-IWF configuration has not changed then steps 7-9 are not applicable and the CP-IWF EMS shall move directly to step 10.

A.1.2.2 Unsupported CP-IWF parameter required for compatibility with CO-IWF

After initial capability discovery of the CP-IWF and detection of mis-aligment of configuration, the CP-IWF EMS shall issue SNMP Set requests to the CP-IWF (Step 9 of the basic flow) in order to re-align the CP-IWF configuration to that which is compatible with the CO-IWF. In certain circumstances the CP-IWF may not support a value of a parameter that is required for compatibility with the CO-IWF, e.g. an AAL2 profile. If this is the case the CP-IWF EMS shall detect this parameter is not supported based on the response it gets to the SNMP Set request. The basic flow shall terminate at step 8 and the CP-IWF EMS having concluded that the CP-IWF is incompatible shall inform its Operational Support System (OSS) appropriately.

A.1.2.3 Basic Flow Without Port Blocking

Applications that do not support user port blocking and unblocking use the same basic flow except that steps 2 and 10 are not required. The CP-IWF shall use the stored ifAdmin Status to control the state of user ports at start up. The CP-IWF EMS and CO-IWF shall ensure that the configuration is compatible before any line state changes are processed.

A.2   Physical Port Assignment to CP-IWF User Port

This procedure defines how physical user ports are assigned to CP-IWF user ports.

Figure 5 shows the assignment of a physical FXS voice port to a CP-IWF POTS user port. The procedure is similar and equally applicable to assignment of FX0 voice ports to CP-IWF POTS user ports and ISDN-BRI physical ports to CP-IWF ISDN-BRI user ports.

A.2.1 Basic Flow

1. The CP-IWF EMS shall go through each entry in the ifTable of the physical interface MIB within the LES device and check each physical port's ifType and ifName.

2. In this scenario the GetResponse to the first request results in an incompatible voice port.

3. The CP-IWF EMS then retrieves the next entry in the ifTable.

4. The GetResponse to this request results in a match and also the ifName contains a zero length string indicating that this FXS voice port is available for use.

5. The CP-IWF EMS shall issue a Set request to the cpIwfPotsPortEntry to which this physical FXS voice port is to be assigned. This shall request that the potsPhysicalPort value be set to the ifIndex of the available FXS voice port.

6. The CP-IWF shall carry out the physical port assignment procedure as defined in Table 1.

7. Once the assignment is complete the CP-IWF EMS shall make any necessary configuration changes to the user port (e.g. changing the signaling method).

8. The CP-IWF EMS shall set the ifAdminStatus of the ifEntry associated with the FXS voice port to 'up' to put the port in-service.
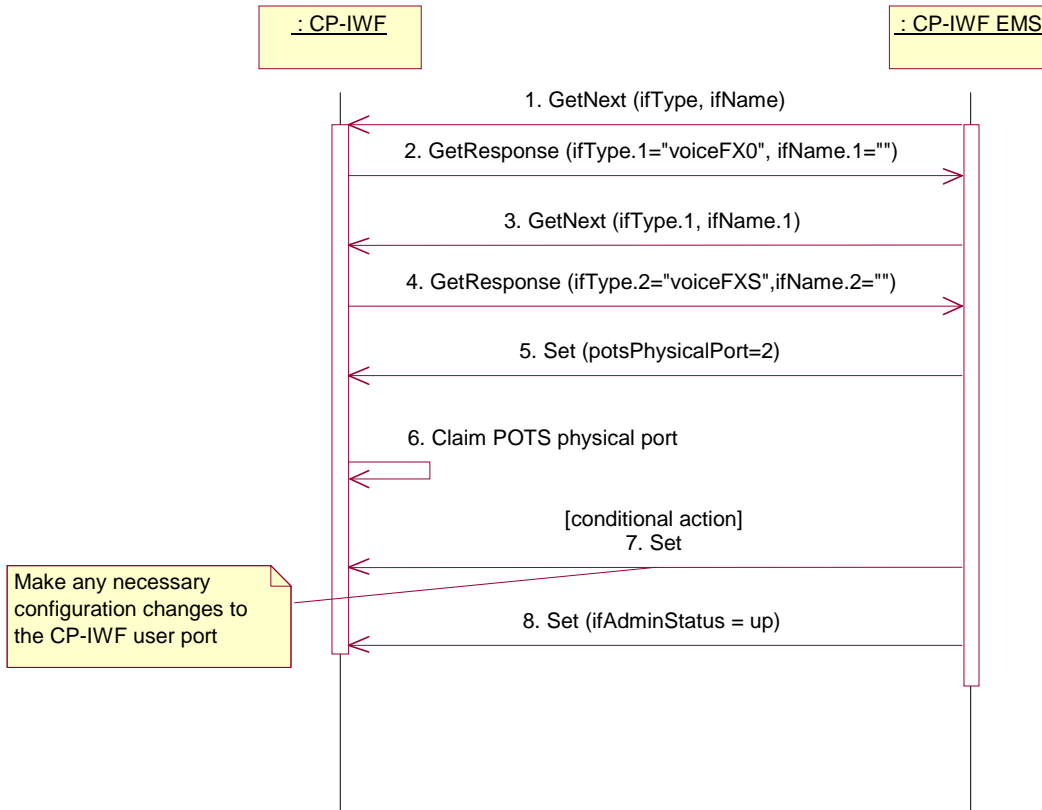

Figure 5: Procedure for assigning a physical port to a CP-IWF user port

A.2.2 Alternative Flows

A.2.2.1 No applicable physical user ports available

If in the basic flow there are no physical user ports available that can be assigned to a CP-IWF user port, the basic flow shall not proceed to step 5 and the CP-IWF EMS shall inform its OSS appropriately.

A.3 Release of a Physical Port assigned to a CP-IWF User Port

This procedure defines how a physical port that is assigned to a CP-IWF is released. Figure 6 shows the release of an ISDN-BRI physical port. The procedure is similar and equally applicable to release of POTS physical ports.

A.3.1 Basic Flow

1. The CP-IWF EMS shall put the ISDN-BRI port out of service by setting the ifAdminStatus of the associated ifEntry to 'down' to put the port out-of-service. This shall result in any active AAL2 channels on that port being deactivated.

2. The CP-IWF EMS shall then issue an SNMP Set request to set the isdnBriPhysicalPort of the relevant cpIwfIsdnBriPortEntry to zero. This has the special meaning that the CP-IWF user port is not connected to a physical port.

3. The CP-IWF shall carry out the physical port release procedure as defined in Table 1.
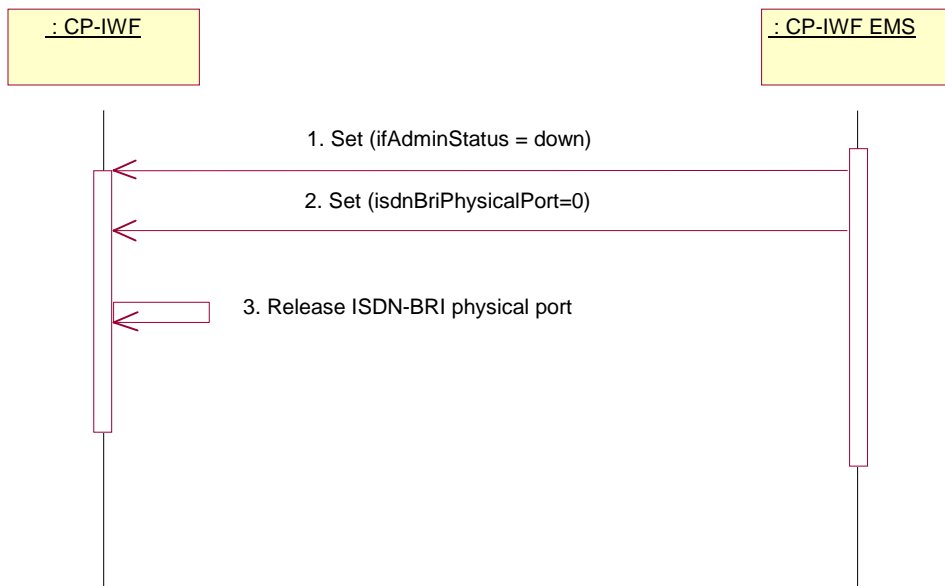

Figure 6: Procedure for releasing a physical port assigned to a CP-IWF user port

A.4 Loopback Testing

This procedure defines how to carry out loopback testing. Figure 7 shows a scenario where loopback testing is carried out for the individual D, B1 and B2 channels of the ISDN-BRI physical

port. The procedure is similar and equally applicable to other types of loopback tests defined for the CP-IWF.

A.4.1 Basic Flow

1. The test type is set to loopback of the ISDN-BRI D-channel.

2. The CP-IWF EMS shall request the CP-IWF to put the ISDN-BRI port into the "testing" state by issuing an SNMP Set on the ifAdminStatus of the associated ISDN-BRI physical port entry in the ifTable. This shall result in any active AAL2 channels on that port being deactivated. If this action is successful the CP-IWF shall activate the appropriate test selected in isdnBriPortTestType on the ISDN-BRI port (in this case the loopback of the ISDN-BRI D-channel).

3. The CP-IWF EMS changes the test type to loopback of the ISDN-BRI B1 channel. If this action is successful then the CP-IWF shall stop the currently active test and shall activate the newly selected test on the port.

4. The CP-IWF EMS changes the test type to loopback of the ISDN-BRI B2 channel. If this action is successful then the CP-IWF shall stop the currently active test and shall activate the newly selected test on the port.

5. The CP-IWF EMS shall change the ifAdminStatus of the ISDN-BRI port back to "up" to put it in-service.
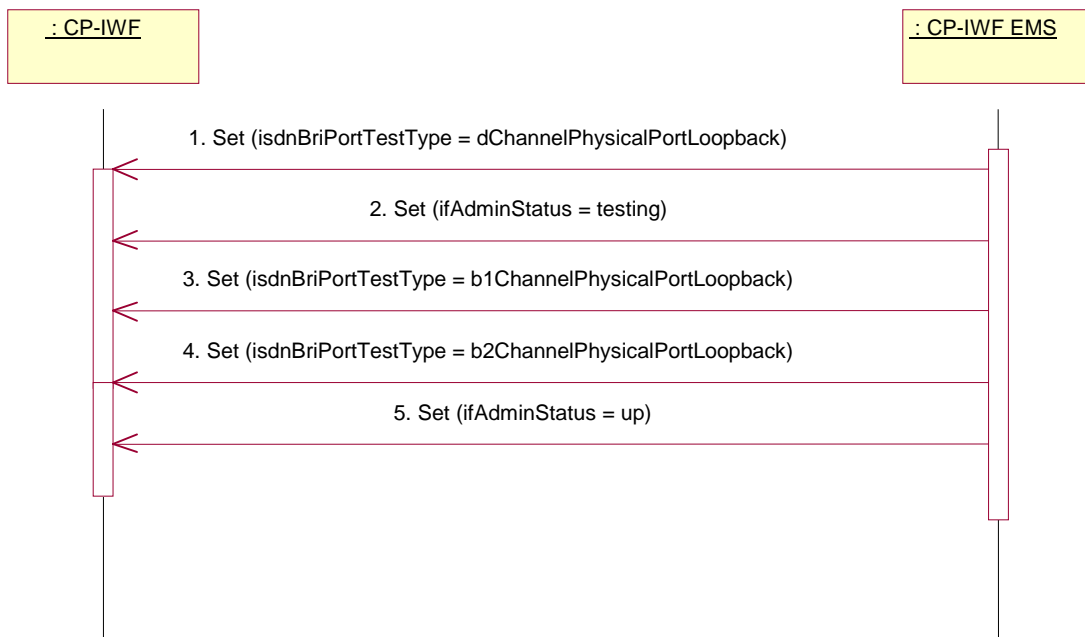
```
  : CP-IWF                                                          : CP-IWF EMS

            1. Set (isdnBriPortTestType = dChannelPhysicalPortLoopback)
         <────────────────────────────────────────────────────────────

                      2. Set (ifAdminStatus = testing)
         <────────────────────────────────────────────────────────────

            3. Set (isdnBriPortTestType = b1ChannelPhysicalPortLoopback)
         <────────────────────────────────────────────────────────────

            4. Set (isdnBriPortTestType = b2ChannelPhysicalPortLoopback)
         <────────────────────────────────────────────────────────────

                       5. Set (ifAdminStatus = up)
         <────────────────────────────────────────────────────────────
```

Figure 7: Procedure for carrying out loopback tests

A.4.2 Alternative Flows

A.4.2.1 A loopback test results in loss of communications over the LES EOC

It is possible that a loopback test results in failure of communications over the LES EOC and the CO-IWF is unable to deactivate the test. The CP-IWF shall autonomously deactivate any applied loopbacks upon detection of failure of communications with the CO-IWF over the LES EOC.