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European Standard (Telecommunications series)

**Telecommunications Management Network (TMN);
Plesiochronous Digital Hierarchy (PDH) information model
for the Network Element (NE) view**



Reference

REN/TMN-00049

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Telecommunications Management Network (TMN), and is now submitted for the ETSI standards One-step Approval Procedure.

The present document describes the information model for Network Elements (NEs), which use the Plesiochronous Digital Hierarchy (PDH) multiplexing structure.

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Date of latest announcement of this EN (doa):	3 months after ETSI publication
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Introduction

Network Operators have extensive deployments of PDH and SDH equipments in their Networks. Some are flexible and/or monitorable and do possess a standard management interface. A suitable PDH information model is required for such equipment to take advantage of the management capability provided by functional standards related to PDH interfaces of those equipments and enable it to be part of an overall managed network.

The model presented in the present document represents 4 major functional requirements:

- 1) Fixed PDH structures.
- 2) Flexible PDH structures.
- 3) SDH Transport over PDH bearers.
- 4) The monitoring of PDH Ports.

Fixed PDH Structures utilize the inheritance tree given in figure 1 and the naming tree in figure 3. As can be seen this can be used to model the rigid multiplexing structure from 64 kbits/sec to 140 Mbits/sec interfaces in line systems. An example is given in figure 7 of a 140 Mbit/s line signal multiplexed through the 34 Mbit/s and 8 Mbit/s levels to a 2 Mbit/s tributary signal which is mapped in a VC12 by a transmission system.

Flexible PDH structures use the same inheritance structure but the naming tree as in figure 2. This represents the flexible structures that may be encountered in PDH crossconnects with ports at all data rates. An example is given in figure 6.

The transport of SDH (VC12) and ATM traffic is represented by the Objects e3INTTTP and e4INTTTP for 34 Mbits/sec bearers and 140 Mbits/sec bearers respectively.

The reporting control of failures of PDH signals at the different path layers is modelled by reusing techniques specified in ITU-T Recommendation M.3100 [3] (flexible assignment of severities to a failure).

The monitoring of the PDH ports is represented by the portMode Package that defines the behaviour. This package models a port that may be enabled for monitoring or may be disabled for monitoring. In addition the port may be set for auto monitoring providing no valid signal is present on the port. The port is then automatically enabled for monitoring when a valid signal is applied for the first time.

It should also be noted that the behaviour of the operationalState is as defined by the ETSI community (different from the SDH environment) and this only applies to this PDH model. This is apparent from the notes that remain in the document. Only equipment failures, and not transmission failures, affect the attribute value.

1 Scope

The present document defines the information model to be used at the interface between Network Elements (NEs) and management systems, for the management of equipment which use the Plesiochronous Digital Hierarchy (PDH).

The present document defines:

- the information model for network elements using PDH multiplexing, including PDH interfaces of Synchronous Digital Hierarchy (SDH) network elements.

The present document does not define:

- the protocol stack to be used for message communication;
- the network level management processes;
- the application contexts;
- the conformance requirements to be met by an implementation of this information model;
- information models for other systems or equipment.

The information model defined in the present document (and the corresponding message set) is concerned with the management of NEs, the equipment by which they are implemented and the functions contained within them. More precisely, it applies to an equipment domain visible at the element manager to element interface and is only concerned with information available within that domain. Information proper to the domain of a network level management process is not included within this model.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
 - For a specific reference, subsequent revisions do not apply.
 - For a non-specific reference, the latest version applies.
- [1] ETSI ETS 300 337 (1995): "Transmission and Multiplexing (TM); Generic frame structures for the transport of various signals (including Asynchronous Transfer Mode (ATM) cells and Synchronous Digital Hierarchy (SDH) elements) at the ITU-T Recommendation G.702 hierarchical rates of 2 048 kbit/s, 34 368 kbit/s and 139 264 kbit/s".
 - [2] ITU-T Recommendation G.702 (1988): "Digital hierarchy bit rates".
 - [3] ITU-T Recommendation M.3100 (1995): "Generic network information model".
 - [4] ITU-T Recommendation X.721 (1992): "Information technology; Open Systems Interconnection; Structure of management information: Definition of management information".
 - [5] ITU-T Recommendation G.704 (1995): "Synchronous frame structures used at 1 544 kbit/s, 6 312 kbit/s, 2 048 kbit/s, 8 488 kbit/s and 44 736 kbit/s hierarchical levels".
 - [6] ITU-T Recommendation G.706 (1991): "Frame alignment and Cyclic Redundancy Check (CRC) procedures relating to basic frame structures defined in Recommendation G.704".
 - [7] ETSI ETS 300 167 (1993): "Transmission and Multiplexing (TM); Functional characteristics of 2 048 kbit/s interfaces".

- [8] ETSI ETS 300 417-5-1 (1998): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 5-1: Plesiochronous Digital Hierarchy (PDH) path layer functions".
- [9] ETSI ETS 300 417-1-1 (1996): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 1-1: Generic processes and performance".
- [10] ETSI ETS 300 417-2-1 (1997): "Transmission and Multiplexing (TM); Generic requirements of transport functionality of equipment; Part 2-1: Synchronous Digital Hierarchy (SDH) and Plesiochronous Digital Hierarchy (PDH) physical section layer functions".

3 Abbreviations

For the purposes of the present document, the following abbreviations apply.

AIS	Alarm Indication Signal
ASN.1	Abstract Syntax Notation No. 1
ATM	Asynchronous Transfer Mode
CTP	Connection Termination Point
EBER	Excessive Bit Error Ratio
FERF	Far End Receive Failure
LOF	Loss Of Frame
LOS	Loss Of Signal
NE	Network Element
PDH	Plesiochronous Digital Hierarchy
Pkg	Package
PPA	Plesiochronous Physical Adaptation
PPI	Plesiochronous Physical Interface
PPT	Plesiochronous Physical Termination
RDN	Relative Distinguished Name
SDH	Synchronous Digital Hierarchy
TMN	Telecommunications Management Network
TP	Termination Point
TTP	Trail Termination Point
VC-n	Virtual Container n

4 Registration supporting Abstract Syntax Notation No. 1 (ASN.1) for EN 300 371

```
ASN1TypeModule {ccitt(0) identified-organization(4) etsi(0) ets371(371) informationModel(0)
asn1Module(2) asn1TypeModule(0)}
DEFINITIONS IMPLICIT TAGS ::= BEGIN
-- EXPORT Everything
en371 OBJECT IDENTIFIER ::= {ccitt(0) identified-organization(4) etsi(0) ets371(371)
informationModel(0)}
en371ObjectClass OBJECT IDENTIFIER ::= {en371 managedObjectClass(3)}
en371Package OBJECT IDENTIFIER ::= {en371 package(4)}
en371NameBinding OBJECT IDENTIFIER ::= {en371 nameBinding(6)}
en371Attribute OBJECT IDENTIFIER ::= {en371 attribute(7)}
en371Action OBJECT IDENTIFIER ::= {en371 action(9)}
en371Notification OBJECT IDENTIFIER ::= {en371 notification(10)}
END
```

5 PDH fragment

This clause provides managed objects required to model PDH interfaces.

In this context, the IMPORTS clause specifies the object classes which can be instantiated in the scope of the present document. The IMPORT clause does not include uninstantiated super classes.

```
BEGIN
IMPORTS
alarmSeverityAssignmentProfile
FROM ASN1DefinedTypesModule {itu(0) recommendation(0) m(13) gnm(3100) informationModel(0)
                           managedObjectClass (3)};
END
```

5.1 Object classes definitions

5.1.1 Electrical PDH physical interface

This clause describes the object classes required to model the PDH physical interface.

NOTE 1: Whether these require attributes to model more features (e.g. PDH level, line code, etc.) are for further study.

```
pPITTPBidirectionalR1    MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100: 1995":trailTerminationPointBidirectional,
              pPITTPSinkR1,
              pPITTPSource;
REGISTERED AS {en371ObjectClass 100};
```

```
pPITTPSinkR1            MANAGED OBJECT CLASS
DERIVED FROM "Recommendation M.3100: 1995":trailTerminationPointSink;
CHARACTERIZED BY
  "Recommendation X.721: 1992":administrativeStatePackage,
  "Recommendation M.3100: 1995":createDeleteNotificationsPackage,
  "Recommendation M.3100: 1995":stateChangeNotificationPackage,
  "Recommendation M.3100: 1995":tmnCommunicationsAlarmInformationPackage,
  "Recommendation M.3100: 1995":userLabelPackage,
  "Recommendation M.3100: 1995":alarmSeverityAssignmentPointerPackage,
pPITTPSinkR1Pkg PACKAGE
  BEHAVIOUR
  alarmReportingControlBehaviour,
  pPITTPSinkR1BehaviourPkg BEHAVIOUR
```

DEFINED AS

"This managed object class represents the point where the incoming interface signal is converted into an internal logic level and the timing is recovered from the line signal. The upStream connectivity pointer is NULL for an instance of this class.

A communicationsAlarm notification shall be issued if a Loss of Signal (LOS) is detected. The probableCause parameter of the notification shall indicate lossOfSignal [3].

The operational state is disabled if a failure of the equipment affecting an instance of this class prevents the resource from operation";

```
  ATTRIBUTES
  pPITTPID                GET;;;
  CONDITIONAL PACKAGES
  tpSpecificPersistenceTimePkg    PRESENT IF
```

"the persistancy time for raising / clearing alarms can be set specifically for an instance of this class thus superseding the values which are in effect for all termination points of a NE",

```
  portModePkg                PRESENT IF
```

"an instance supports it"

```
;
```

```
REGISTERED AS {en371ObjectClass 101};
```

```

pPITTPSource          MANAGED OBJECT CLASS
DERIVED FROM          "Recommendation M.3100: 1995":trailTerminationPointSource;
CHARACTERIZED BY
  "Recommendation M.3100: 1995":createDeleteNotificationsPackage,
  "Recommendation M.3100: 1995":userLabelPackage,
  pPITTPSourcePkg PACKAGE
  BEHAVIOUR
  pPITTPSourceBehaviourPkg BEHAVIOUR

```

DEFINED AS

"This managed object class represents the point where the internal logic level and the timing is converted into a line signal.

The operational state is disabled if a failure of the equipment affecting an instance of this class prevents the resource from operation.

The downstream connectivity pointer is NULL for an instance of this class.";;

```

ATTRIBUTES
  pPITTPId          GET;;;

```

REGISTERED AS { en371ObjectClass 3 };

NOTE 2: As for the attribute operationalState the decision has been taken in the ETSI/TM2 Meeting Dublin (Oct.97) that no transmission failures but equipment failures will impact the value of that attribute. This behaviour is applicable in general for the PDH TP fragment. No re-registration is considered to be necessary in the pPITTPSource class definition.

5.1.2 European PDH Alarm Indication Signal (AIS) trail termination point

This generic object class represents a particular case of termination point used in a managed element where no connectivity at respective level is provided. Instances of this object class are used when, in one layer, no flexibility is provided, but a direct adaptation to client is present.

The sink object class includes the AIS and LOF monitoring function of a respective Connection Termination Point (CTP) which is not instantiated where no connectivity on the respective level is provided.

Object classes inherited from this class are labelled according to the European PDH hierarchy (exATTP, where x = 0 stands for 64 kbit/s, x = 1 for 2 Mbit/s, x = 2 for 8 Mbit/s, x = 3 for 34 Mbit/s and x = 4 for 140 Mbit/s.)

NOTE: The possibility of adding conditional packages (present if the equipment supports the features) in order to model the capability to reveal Excessive Bit Error Ratio (EBER) is for further study.

The subclasses represent two types of combined functions:

1) En/Pne_A [10] and Pne_TT [8]

The function En/Pne_A is the adaptation from physical section layer to the client PDH path layer (Pne) and the function Pne_TT terminates the trail in that path layer.

2) Pme/Pne_A and Pne_TT [8]

The function Pme/Pne_A adapts from the server PDH path layer (Pme) to a framed, client PDH path layer (Pne) characteristic information (P31e_CI, P22e_CI, P12s_CI). The function Pne_TT terminates the trail in that path layers.

In both cases the management information exchanged with the combined functions is identical. As a consequence one object exATTP reflects the management view for the particular PDH path (x=1,2,3,4). Using the objects exATTP a PDH interface can be represented by a fewer number of instances than is obtained if objects are used which do not represent combined functions. These alternative representations are shown in figure 5 and figure 4, respectively.

```

ePDHATTPbidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM
  ePDHTTPbidirectionalR1,
  ePDHATTPSinkR1,
  ePDHATTPSource;

```

REGISTERED AS {en371ObjectClass 102 };

```
ePDHATTPSinkR1      MANAGED OBJECT CLASS
DERIVED FROM        ePDHTTPSinkR1;
CHARACTERIZED BY
ePDHATTPSinkR1Pkg  PACKAGE
BEHAVIOUR
ePDHATTPSinkR1Behaviour  BEHAVIOUR
```

DEFINED AS

"This object class includes the AIS and LOF monitoring function of a respective CTP which is not instantiated where no connectivity on the respective level is provided.

A communicationsAlarm notification shall be issued if an AIS is detected. The probableCause parameter of the notification shall indicate aIS.

A communicationsAlarm notification shall be issued if a LOF is detected. The probableCause parameter of the notification shall indicate lossOfFrame.

An instance of this object class is used when, in one layer, no flexibility is provided, but a direct adaptation to client is present.

The upStream connectivity pointer attribute value of an instance of this object class is equal to NULL";;;;

REGISTERED AS {en371ObjectClass 103};

```
ePDHATTPSource      MANAGED OBJECT CLASS
DERIVED FROM        ePDHTTPSource;
CHARACTERIZED BY
ePDHTTPSourcePkg  PACKAGE
BEHAVIOUR
ePDHATTPSourceBehaviourPkg  BEHAVIOUR
```

DEFINED AS

"The downStream connectivity pointer attribute value of an instance of this object class is equal to NULL."";;;;

REGISTERED AS {en371ObjectClass 5};

5.1.3 European PDH connection termination point

This clause describes an object class (sink, source or bi-directional) which represents the model for a generic PDH connection termination point (2, 8, 34 and 140 Mbit/s).

Object classes inherited from this class are labelled according to the European PDH hierarchy (exCTP, where x = 0 stands for 64 kbit/s, x = 1 for 2 Mbit/s, x = 2 for 8 Mbit/s, x = 3 for 34 Mbit/s and x = 4 for 140 Mbit/s).

The subclasses represent two types of adaptation functions:

1) En/Pne_A or En/Pnx_A [10]

The function En/Pne_A adapts from physical section layer (En) to a framed PDH path layer characteristic information (P4e_CI, P31e_CI, P22e_CI, P12s_CI).

The function En/Pnx_A adapts from physical section layer (En) to an unframed PDH path layer characteristic information (Pnx_CI), which is a signal of non-specified content [10].

2) Pme/Pne_A or Pme/Pnx_A [8]

The function Pme/Pne_A adapts from the server PDH path layer (Pme) to a framed, client PDH path layer (Pne) characteristic information (P31e_CI, P22e_CI, P12s_CI). The function Pme/Pnx_A adapts from the server PDH path layer (Pme) to an unframed PDH path layer characteristic information (Pnx_CI), which is a signal of non-specified content [8].

```
ePDHCTPSinkR1      MANAGED OBJECT CLASS
DERIVED FROM        "Recommendation M.3100: 1995":connectionTerminationPointSink;
CHARACTERIZED BY
"Recommendation M.3100: 1995":createDeleteNotificationsPackage,
"Recommendation M.3100: 1995":operationalStatePackage,
"Recommendation M.3100: 1995":stateChangeNotificationPackage,
"Recommendation M.3100: 1995":tmnCommunicationsAlarmInformationPackage,
"Recommendation M.3100: 1995":alarmSeverityAssignmentPointerPackage,
ePDHCTPSinkR1Pkg  PACKAGE
```

```

BEHAVIOUR
alarmReportingControlBehaviour,
ePDHCTPSinkR1Behaviour BEHAVIOUR

```

DEFINED AS

"This object class represents the termination of a PDH connection and models the adaptation sink function in different PDH path layers represented by subclasses of this class.

An instance of this object class shall be used when, in one layer, flexibility is available or when there is no termination of a client characteristic information (Pnx-CI).

The attribute framedSignalMode may have the values 'active' and 'inactive'. An attributeValueChange notification is issued when the value is modified and the inherited conditional package attributeValueChangeNotificationPackage is instantiated.

If the value is set 'active', then the adaptation processing of a framed signal is provisioned and the detection of the defects LOF and AIS is enabled. A communicationsAlarm notification shall be issued if an AIS is detected. The probableCause parameter of the notification shall indicate aIS [3]. A communicationsAlarm notification shall be issued if an LOF is detected. The probableCause parameter of the notification shall indicate lossOfFrame [3]. In case of defect detection the consequent action aSSF (all-ONES) is performed.

If the value is set 'inactive', then this adaptation function is deactivated assuming the reception of an unframed signal (characteristic information Pnx_CI).

An attributeValueChange notification is issued when the value of the attribute frameStatus is changed and the inherited conditional package attributeValueChangeNotificationPackage is instantiated.

The operational state is disabled if a failure of the equipment affecting an instance of this class prevents the resource from operation.";;

ATTRIBUTES

```

ePDHCTPId          GET,
framedSignalMode  GET-REPLACE,
frameStatus       GET;
;;

```

CONDITIONAL PACKAGES

```

tpSpecificPersistenceTimePkg  PRESENT IF

```

"the persistency time for raising / clearing alarms can be set specifically for an instance of this class thus superseding the values which are in effect for all termination points of a NE";

REGISTERED AS {en371ObjectClass 104 };

```

ePDHCTPSource  MANAGED OBJECT CLASS
DERIVED FROM   "Recommendation M.3100: 1995":connectionTerminationPointSource;
CHARACTERIZED BY
"Recommendation M.3100: 1995":createDeleteNotificationsPackage,
ePDHCTPSourcePkg  PACKAGE
BEHAVIOUR
ePDHCTPSourceBehaviourPkg BEHAVIOUR

```

DEFINED AS

"This object class originates a PDH hierarchy connection.

The operational state is disabled if a failure of the equipment affecting an instance of this class prevents the resource from operation.";;

ATTRIBUTES

```

ePDHCTPId  GET;;;

```

REGISTERED AS {en371ObjectClass 8};

NOTE 1: As for the attribute operationalState, no transmission failures but equipment failures will impact the value of that attribute. This behaviour is applicable in general for the PDH TP fragment. No re-registration is considered to be necessary in the ePDHCTPSource class definition.

NOTE 2: The superclass ePDHCTPBidirectionalR1 (not instantiated) needs not to be defined since the instantiable bidirectional subclasses e*CTPBidirectionalR1 should inherit from ePDHCTPSinkR1 and / Source only. Note that the superclass CTPBidirectional inherits from cTPSink / Source without special properties added.

5.1.3.1 Monitoring European PDH connection termination point

```
eMonitoringCTPSink          MANAGED OBJECT CLASS
DERIVED FROM                ePDHCTPSinkR1;
CHARACTERIZED BY
    eMonitoringCTPSinkPkg    PACKAGE
    BEHAVIOUR
    pathTerminationMonitoringBehavior,
    eMonitoringCTPSinkBeh    BEHAVIOUR
```

DEFINED AS

"An instance incorporates the monitoring capabilities of the trail termination sink function (TTm-Sk) defined at the path layer represented by the subclass of this class. The monitoring capabilities do not apply in case of unframed signals expected when the inherited attribute framedSignalMode is set to value 'inactive'";

;;

REGISTERED AS {en371ObjectClass 105};

NOTE: No eMonitoringCTPSource class is introduced since the existing definition of the eCTPSource class is equivalent.

5.1.4 European PDH trail termination point

This clause describes an object class (sink, source or bidirectional) which represents the model for a generic PDH trail termination point (2, 8, 34 and 140 Mbit/s).

Object classes inherited from this class are labelled according to the European PDH hierarchy (exTTP, where x = 1 stands for 2 Mbit/s, x = 2 for 8 Mbit/s, x = 3 for 34 Mbit/s and x = 4 for 140 Mbit/s).

These subclasses represent the trail termination functions P_{ne}_TT [8] which terminate the trails at the corresponding PDH path layers 2/8/34/140 Mbit/s (n=12, 22, 31, 4, respectively).

```
ePDHTTPSinkR1              MANAGED OBJECT CLASS
DERIVED FROM                "Recommendation M.3100: 1995":trailTerminationPointSink;
CHARACTERIZED BY
    "Recommendation X.721: 1992":administrativeStatePackage,
    "Recommendation M.3100: 1995":createDeleteNotificationsPackage,
    "Recommendation M.3100: 1995":stateChangeNotificationPackage,
    "Recommendation M.3100: 1995":tmnCommunicationsAlarmInformationPackage,
    "Recommendation M.3100: 1995":alarmSeverityAssignmentPointerPackage,

    ePDHTTPSinkR1Pkg        PACKAGE
    BEHAVIOUR
    alarmReportingControlBehaviour,
    pathTerminationMonitoringBehavior,
    ePDHTTPSinkR1Behaviour BEHAVIOUR
```

DEFINED AS

"This object class represents the termination sink of a PDH trail.

The operationalState is disabled when a failure of the equipment affecting an instance of this class prevents the resource from operation.";

```
ATTRIBUTES
    ePDHTTPId              GET;;;
CONDITIONAL PACKAGES
```

```
    tpSpecificPersistenceTimePkg    PRESENT IF
```

"the persistancy time for raising / clearing alarms can be set specifically for an instance of this class thus superseding the values which are in effect for all termination points of a NE";

REGISTERED AS {en371ObjectClass 106 };

```
ePDHTTPSource      MANAGED OBJECT CLASS
DERIVED FROM      "Recommendation M.3100: 1995":trailTerminationPointSource;
CHARACTERIZED BY
  "Recommendation M.3100: 1995":createDeleteNotificationsPackage,
  ePDHTTPSourcePkg PACKAGE
  BEHAVIOUR
  ePDHTTPSourceBehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class originates a PDH hierarchy trail.

The operational state is disabled if a failure of the equipment affecting an instance of this class prevents the resource from operation.";;

```
ATTRIBUTES
  ePDHTTPId      GET;;;
```

REGISTERED AS {en371ObjectClass 11};

NOTE: As for the attribute operationalState the decision has been taken in the ETSI/TM2 Meeting Dublin (Oct.97) that no transmission failures but equipment failures will impact the value of that attribute. This behaviour is applicable in general for the PDH TP fragment. No re-registration is considered to be necessary in the ePDHTTPSource class definition.

```
ePDHTTPBidirectionalR1      MANAGED OBJECT CLASS
DERIVED FROM
  "Recommendation M.3100: 1995":trailTerminationPointBidirectional,
  ePDHTTPSinkR1,
  ePDHTTPSource;
CHARACTERIZED BY
  ePDHTTPBidirectionalR1Pkg PACKAGE
  BEHAVIOUR
  ePDHTTPBidirectionalR1Behaviour BEHAVIOUR
```

DEFINED AS

"The Far End Receiver Failure is signalized by a bidirectional trail termination that is represented by an instance of this (sub-)class if a Server Signal Fail condition is detected.";;;

REGISTERED AS {en371ObjectClass 107};

5.1.5 European PDH TTP's for transport SDH VC's and ATM cells

This generic object class models the PDH trail used to transport SDH VC's and ATM cells and the label Int stands for **interworking**.

The subclasses represent the combined functions En/Pns_A [10] and Pns_TT [8].

The function En/Pns_A is the adaptation from physical section layer to the client PDH path layer (Pns) and the function Pns_TT terminates the trail in that path layer (n=31,4).

```
ePDHIntTTPSinkR1      MANAGED OBJECT CLASS
DERIVED FROM          ePDHATTPSinkR1;
CHARACTERIZED BY
  ePDHIntTTPSinkR1Pkg PACKAGE
  BEHAVIOUR
  ePDHIntTTPSinkR1BehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class terminates a ETS 300 337 [1] trail transporting ATM cells or SDH elements.

A communicationsAlarm notification shall be issued if the trail trace received (TR byte) does not match the trail trace expected. The probableCause parameter of the notification shall indicate trail trace mismatch.

A communicationsAlarm notification shall be issued if the signal label received contains the all'0' code. The probableCause parameter of the notification shall indicate 'unequipped'.";;

```
ATTRIBUTES
  trTrailTraceExpected      GET-REPLACE,
  trTrailTraceReceived      GET;;;
```

REGISTERED AS {en371ObjectClass 108 };

```

ePDHIntTTPSource          MANAGED OBJECT CLASS
DERIVED FROM              ePDHATTPSource;
CHARACTERIZED BY
  ePDHIntTTPSourcePkg     PACKAGE
  BEHAVIOUR
  ePDHIntTTPSourceBehaviourPkg BEHAVIOUR

DEFINED AS

"This object class originates a ETS 300 337 [1] trail transporting ATM cells or SDH elements.;;;
  ATTRIBUTES
  trTrailTraceSend          GET-REPLACE;;;

REGISTERED AS { en371ObjectClass 14 };

```

```

ePDHIntTTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM              ePDHATTPBidirectionalR1,
                          ePDHIntTTPSinkR1,
                          ePDHIntTTPSource;

REGISTERED AS {en371ObjectClass 109 };

```

5.1.6 140 Mbit/s object classes

```

e4ATTPSinkR1             MANAGED OBJECT CLASS
DERIVED FROM             ePDHATTPSinkR1;
CHARACTERIZED BY
  e4ATTPSinkR1Pkg       PACKAGE
  BEHAVIOUR
  e4ATTPSinkR1BehaviourPkg BEHAVIOUR

```

DEFINED AS

```

"This object class terminates a CCITT Recommendation G.702 [2] 140 Mbit/s trail.;;;;
REGISTERED AS {en371ObjectClass 110 };

```

```

e4ATTPSource             MANAGED OBJECT CLASS
DERIVED FROM             ePDHATTPSource;
CHARACTERIZED BY
  e4ATTPSourcePkg       PACKAGE
  BEHAVIOUR
  e4ATTPSourceBehaviourPkg BEHAVIOUR

```

DEFINED AS

```

"This object class originates a CCITT Recommendation G.702 [2] 140 Mbit/s trail.;;;;
REGISTERED AS {en371ObjectClass 17};

```

```

e4ATTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM
  ePDHATTPBidirectionalR1,
  e4ATTPSinkR1,
  e4ATTPSource;

```

REGISTERED AS {en371ObjectClass 111 };

```

e4CTPSinkR1             MANAGED OBJECT CLASS
DERIVED FROM             ePDHCTPSinkR1;
CHARACTERIZED BY
  e4CTPSinkR1Pkg       PACKAGE
  BEHAVIOUR
  e4CTPSinkR1BehaviourPkg BEHAVIOUR

```

DEFINED AS

```

"This object class terminates a CCITT Recommendation G.702 [2] 140 Mbit/s connection.;;;;
REGISTERED AS {en371ObjectClass 112 };

```

```
e4CTPSource          MANAGED OBJECT CLASS
DERIVED FROM        ePDHCTPSource;
CHARACTERIZED BY
  e4CTPSourcePkg    PACKAGE
                   BEHAVIOUR
  e4CTPSourceBehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class originates a CCITT Recommendation G.702 [2] 140 Mbit/s connection.";;;

REGISTERED AS {en371ObjectClass 20};

```
e4CTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
  e4CTPSinkR1,
  e4CTPSource;
```

REGISTERED AS {en371ObjectClass 113 };

```
e4MonitoringCTPSink MANAGED OBJECT CLASS
DERIVED FROM          eMonitoringCTPSink;
CHARACTERIZED BY
  e4MonitoringCTPSinkPkg    PACKAGE
                           BEHAVIOUR
  e4MonitoringCTPSinkBeh    BEHAVIOUR
```

DEFINED AS

"An instance of this class represents the adaptation sink function but incorporates the monitoring capabilities of a 140Mbit/s path termination sink function";;;

REGISTERED AS {en371ObjectClass 114 };

```
e4MonitoringCTPBidirectional          MANAGED OBJECT CLASS
DERIVED FROM                          e4MonitoringCTPSink,
e4CTPSource;
```

REGISTERED AS {en371ObjectClass 115 };

```
e4TTPSinkR1          MANAGED OBJECT CLASS
DERIVED FROM        ePDHTTPSinkR1;
CHARACTERIZED BY
  e4TTPSinkR1Pkg    PACKAGE
                   BEHAVIOUR
  e4TTPSinkR1BehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class terminates a CCITT Recommendation G.702 [2] 140 Mbit/s trail.";;;

REGISTERED AS {en371ObjectClass 116 };

```
e4TTPSource          MANAGED OBJECT CLASS
DERIVED FROM        ePDHTTPSource;
CHARACTERIZED BY
  e4TTPSourcePkg    PACKAGE
                   BEHAVIOUR
  e4TTPSourceBehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class originates a CCITT Recommendation G.702 [2] 140 Mbit/s trail.";;;

REGISTERED AS {en371ObjectClass 23};

```
e4TTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHTTPBidirectionalR1,
    e4TTPSinkR1,
    e4TTPSource;
```

```
REGISTERED AS {en371ObjectClass 117 };
```

```
e4IntTTPSinkR1          MANAGED OBJECT CLASS
DERIVED FROM            ePDHIntTTPSinkR1;
CHARACTERIZED BY
    e4IntTTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e4IntTTPSinkR1BehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class terminates a ETS 300 337 [1] 140 Mbit/s trail transporting ATM cells or SDH
elements.";;;
```

```
REGISTERED AS {en371ObjectClass 118 };
```

```
e4IntTTPSource          MANAGED OBJECT CLASS
DERIVED FROM            ePDHIntTTPSource;
CHARACTERIZED BY
    e4IntTTPSourcePkg PACKAGE
    BEHAVIOUR
    e4IntTTPSourceBehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class originates a ETS 300 337 [1] 140 Mbit/s trail transporting ATM cells or SDH
elements.";;;
```

```
REGISTERED AS { en371ObjectClass 26};
```

```
e4IntTTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
    ePDHIntTTPBidirectionalR1,
    e4IntTTPSinkR1,
    e4IntTTPSource;
```

```
REGISTERED AS {en371ObjectClass 119 };
```

5.1.7 34 Mbit/s object classes

```
e3ATTPSinkR1          MANAGED OBJECT CLASS
DERIVED FROM          ePDHATTPSinkR1;
CHARACTERIZED BY
    e3ATTPSinkR1Pkg PACKAGE
    BEHAVIOUR
    e3ATTPSinkR1BehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class terminates a CCITT Recommendation G.702 [2] 34 Mbit/s trail.";;;
```

```
REGISTERED AS {en371ObjectClass 120 };
```

```
e3ATTPSource          MANAGED OBJECT CLASS
DERIVED FROM          ePDHATTPSource;
CHARACTERIZED BY
    e3ATTPSourcePkg PACKAGE
    BEHAVIOUR
    e3ATTPSourceBehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class originates a CCITT Recommendation G.702 [2] 34 Mbit/s trail.";;;
```

```
REGISTERED AS {en371ObjectClass 29};
```

```
e3ATTPBidirectionalR1    MANAGED OBJECT CLASS
DERIVED FROM
    ePDHATTPBidirectionalR1,
    e3ATTPSinkR1,
    e3ATTPSource;
```

```
REGISTERED AS {en371ObjectClass 121 };
```

```
e3CTPSinkR1              MANAGED OBJECT CLASS
DERIVED FROM             ePDHCTPSinkR1;
CHARACTERIZED BY
    e3CTPSinkR1Pkg PACKAGE
        BEHAVIOUR
    e3CTPSinkR1BehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class terminates a CCITT Recommendation G.702 [2] 34 Mbit/s connection.";;;
```

```
REGISTERED AS {en371ObjectClass 122 };
```

```
e3CTPSource              MANAGED OBJECT CLASS
DERIVED FROM             ePDHCTPSource;
CHARACTERIZED BY
    e3CTPSourcePkg PACKAGE
        BEHAVIOUR
    e3CTPSourceBehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class originates a CCITT Recommendation G.702 [2] 34 Mbit/s connection.";;;
```

```
REGISTERED AS {en371ObjectClass 32};
```

```
e3CTPBidirectionalR1    MANAGED OBJECT CLASS
DERIVED FROM
    e3CTPSinkR1,
    e3CTPSource;
```

```
REGISTERED AS {en371ObjectClass 123 };
```

```
e3MonitoringCTPSink     MANAGED OBJECT CLASS
DERIVED FROM             eMonitoringCTPSink;
CHARACTERIZED BY
    e3MonitoringCTPSinkPkg    PACKAGE
        BEHAVIOUR
    e3MonitoringCTPSinkBeh    BEHAVIOUR
```

```
DEFINED AS
```

```
"An instance of this class represents the adaptation sink function but incorporates the monitoring capabilities of a 34Mbit/s path termination sink function";;;
```

```
REGISTERED AS {en371ObjectClass 124 };
```

```
e3MonitoringCTPBidirectional    MANAGED OBJECT CLASS
DERIVED FROM                     e3MonitoringCTPSink,
                                e3CTPSource;
```

```
REGISTERED AS {en371ObjectClass 125 };
```

```
e3TTPSinkR1              MANAGED OBJECT CLASS
DERIVED FROM             ePDHTTPSinkR1;
CHARACTERIZED BY
    e3TTPSinkR1Pkg PACKAGE
        BEHAVIOUR
    e3TTPSinkR1BehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class terminates a CCITT Recommendation G.702 [2] 34 Mbit/s trail.";;;
```

```
REGISTERED AS {en371ObjectClass 126 };
```

```
e3TTPSource          MANAGED OBJECT CLASS
DERIVED FROM        ePDHTTPSource;
CHARACTERIZED BY
  e3TTPSourcePkg PACKAGE
  BEHAVIOUR
  e3TTPSourceBehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class originates a CCITT Recommendation G.702 [2] 34 Mbit/s trail.";;;

REGISTERED AS {en371ObjectClass 35};

```
e3TTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
  ePDHTTPBidirectionalR1,
  e3TTPSinkR1,
  e3TTPSource;
```

REGISTERED AS {en371ObjectClass 127 };

```
e3IntTTPSinkR1      MANAGED OBJECT CLASS
DERIVED FROM        ePDHIntTTPSinkR1;
CHARACTERIZED BY
  e3IntTTPSinkR1Pkg PACKAGE
  BEHAVIOUR
  e3IntTTPSinkR1BehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class terminates a ETS 300 337 [1] 34 Mbit/s trail transporting ATM cells or SDH elements.";;;

REGISTERED AS {en371ObjectClass 128 };

```
e3IntTTPSource      MANAGED OBJECT CLASS
DERIVED FROM        ePDHIntTTPSource;
CHARACTERIZED BY
  e3IntTTPSourcePkg PACKAGE
  BEHAVIOUR
  e3IntTTPSourceBehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class originates a ETS 300 337 [1] 34 Mbit/s trail transporting ATM cells or SDH elements.";;;

REGISTERED AS { en371ObjectClass 38};

```
e3IntTTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
  ePDHIntTTPBidirectionalR1,
  e3IntTTPSinkR1,
  e3IntTTPSource;
```

REGISTERED AS {en371ObjectClass 129 };

5.1.8 8 Mbit/s object classes

```
e2ATTPSinkR1        MANAGED OBJECT CLASS
DERIVED FROM        ePDHATTPSinkR1;
CHARACTERIZED BY
  e2ATTPSinkR1Pkg PACKAGE
  BEHAVIOUR
  e2ATTPSinkR1BehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class terminates a CCITT Recommendation G.702 [2] 8 Mbit/s trail.";;;

REGISTERED AS {en371ObjectClass 130 };

```
e2ATTPSource          MANAGED OBJECT CLASS
DERIVED FROM          ePDHATTPSource;
CHARACTERIZED BY
    e2ATTPSourcePkg  PACKAGE
                     BEHAVIOUR
    e2ATTPSourceBehaviourPkg  BEHAVIOUR
```

DEFINED AS

"This object class originates a CCITT Recommendation G.702 [2] 8 Mbit/s trail.";;;

REGISTERED AS {en371ObjectClass 41};

```
e2ATTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM
    ePDHATTPBidirectionalR1,
    e2ATTPSinkR1,
    e2ATTPSource;
```

REGISTERED AS {en371ObjectClass 131 };

```
e2CTPSinkR1           MANAGED OBJECT CLASS
DERIVED FROM          ePDHCTPSinkR1;
CHARACTERIZED BY
    e2CTPSinkR1Pkg    PACKAGE
                     BEHAVIOUR
    e2CTPSinkR1BehaviourPkg  BEHAVIOUR
```

DEFINED AS

"This object class terminates a CCITT Recommendation G.702 [2] 8 Mbit/s connection.";;;

REGISTERED AS {en371ObjectClass 132 };

```
e2CTPSource           MANAGED OBJECT CLASS
DERIVED FROM          ePDHCTPSource;
CHARACTERIZED BY
    e2CTPSourcePkg    PACKAGE
                     BEHAVIOUR
    e2CTPSourceBehaviourPkg  BEHAVIOUR
```

DEFINED AS

"This object class originates a CCITT Recommendation G.702 [2] 8 Mbit/s connection.";;;

REGISTERED AS {en371ObjectClass 44};

```
e2CTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM
    e2CTPSinkR1,
    e2CTPSource;
```

REGISTERED AS {en371ObjectClass 133 };

```
e2MonitoringCTPSink  MANAGED OBJECT CLASS
DERIVED FROM          eMonitoringCTPSink;
CHARACTERIZED BY
    e2MonitoringCTPSinkPkg    PACKAGE
                     BEHAVIOUR
    e2MonitoringCTPSinkBeh    BEHAVIOUR
```

DEFINED AS

"An instance of this class represents the adaptation sink function but incorporates the monitoring capabilities of a 8Mbit/s path termination sink function";;;

REGISTERED AS {en371ObjectClass 134 };

```
e2MonitoringCTPBidirectional    MANAGED OBJECT CLASS
DERIVED FROM                    e2MonitoringCTPSink,
e2CTPSource;
```

```
REGISTERED AS {en371ObjectClass 135 };
```

```
e2TTPSinkR1                    MANAGED OBJECT CLASS
DERIVED FROM                    ePDHTTPSinkR1;
CHARACTERIZED BY
  e2TTPSinkR1Pkg PACKAGE
  BEHAVIOUR
  e2TTPSinkR1BehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class terminates a CCITT Recommendation G.702 [2] 8 Mbit/s trail.";;;
```

```
REGISTERED AS {en371ObjectClass 136 };
```

```
e2TTPSource                    MANAGED OBJECT CLASS
DERIVED FROM                    ePDHTTPSource;
CHARACTERIZED BY
  e2TTPSourcePkg PACKAGE
  BEHAVIOUR
  e2TTPSourceBehaviourPkg BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class originates a CCITT Recommendation G.702 [2] 8 Mbit/s trail.";;;
```

```
REGISTERED AS {en371ObjectClass 47};
```

```
e2TTPBidirectionalR1 MANAGED OBJECT CLASS
DERIVED FROM
  ePDHTTPBidirectionalR1,
  e2TTPSinkR1,
  e2TTPSource;
```

```
REGISTERED AS {en371ObjectClass 137 };
```

5.1.9 2 Mbit/s object classes

```
e1ATTPSinkR1                  MANAGED OBJECT CLASS
DERIVED FROM                    ePDHATTPSinkR1;
CHARACTERIZED BY
  e1ATTPSinkR1Pkg PACKAGE
  BEHAVIOUR
  e1ATTPSinkR1Behaviour BEHAVIOUR
```

```
DEFINED AS
```

```
"This object class terminates a CCITT Recommendation G.702 [2] 2 Mbit/s trail.";;
```

```
  ATTRIBUTES
  frameStatus    GET;
  ;;
```

```
CONDITIONAL PACKAGES
  crcMonitoringPkg          PRESENT IF
```

```
"an instance supports CRC-4 procedures [6] and [7]";
```

```
REGISTERED AS {en371ObjectClass 138 };
```

```
e1ATTPSourceR1                MANAGED OBJECT CLASS
DERIVED FROM                    ePDHATTPSource;
CHARACTERIZED BY
  e1ATTPSourceR1Pkg PACKAGE
  BEHAVIOUR
  e1ATTPSourceR1BehaviourPkg BEHAVIOUR
```

DEFINED AS

"This object class originates a CCITT Recommendation G.702 [2] 2 Mbit/s trail.

The attribute `crcOperationMode` contained in the conditional package `crcOperationPkg` determines the operation of the 2 Mbit/s trail termination source. The value 'disabled' sets the transmitted Si-bits (bit 1 of the frame) to the binary '1' state [5].

The value 'forced' configures CRC-4 procedure. The value 'automatic' triggers the modified CRC-4 multiframe algorithm in order to allow interworking of equipments with and without a CRC-4 capability [6].";

;;

CONDITIONAL PACKAGES

`crcOperationPkg` PRESENT IF

"an instance supports CRC-4 procedures [6] and [7]";

REGISTERED AS {en371ObjectClass 139 };

`eLATTPBidirectionalR1` MANAGED OBJECT CLASS

DERIVED FROM

`ePDHATTPBidirectionalR1`,

`eLATTPSinkR1`,

`eLATTPSourceR1`;

CHARACTERIZED BY

`eLATTPBidirectionalR1Pkg` PACKAGE

BEHAVIOUR

`eLATTPBidirectionalR1Beh` BEHAVIOUR

DEFINED AS

"Either both or none of the inherited conditional packages `crcMonitoringPkg` and `crcOperationPkg` should be instantiated.

The attribute `crcOperationMode` contained in the conditional package `crcOperationPkg` determines the operation of the 2 Mbit/s trail termination. The value 'disabled' sets the transmitted Si-bits (bit 1 of the frame) to the binary '1' state and disables processing of the Si-bits in the receive signal [5].

The value 'forced' configures CRC-4 procedure with consequent actions [6]: in case of loss of CRC4-submultiframe all-ONES (aTSF) is inserted downstream and Far End Receiver Failure (FERF) is signaled upstream (as in case of LOF). A `communicationsAlarm` notification is emitted with `probableCause` 'lossOfMultiFrame' [3].

The value 'automatic' triggers the modified CRC-4 multiframe algorithm in order to allow interworking of equipments with and without a CRC-4 capability [6]. If this procedure fails then further CRC-4 processing is inhibited and transmitted E-bits are kept in binary state '0'.";

REGISTERED AS {en371ObjectClass 140 };

`eLCTPSinkR1` MANAGED OBJECT CLASS

DERIVED FROM `ePDHCTPSinkR1`;

CHARACTERIZED BY

`eLCTPSinkR1Pkg` PACKAGE

BEHAVIOUR

`eLCTPSinkR1BehaviourPkg` BEHAVIOUR

DEFINED AS

"This object class terminates a CCITT Recommendation G.702 [2] 2 Mbit/s connection..";

REGISTERED AS {en371ObjectClass 141 };

```

e1CTPSource          MANAGED OBJECT CLASS
DERIVED FROM        ePDHCTPSource;
CHARACTERIZED BY
    e1CTPSourcePkg  PACKAGE
                    BEHAVIOUR
    e1CTPSourceBehaviourPkg  BEHAVIOUR

DEFINED AS

"This object class originates a CCITT Recommendation G.702 [2] 2 Mbit/s connection.";;;

REGISTERED AS {en371ObjectClass 53};

e1CTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM
    e1CTPSinkR1,
    e1CTPSource;

REGISTERED AS {en371ObjectClass 142 };

e1MonitoringCTPSink  MANAGED OBJECT CLASS
DERIVED FROM          eMonitoringCTPSink;
CHARACTERIZED BY
    e1MonitoringCTPSinkPkg      PACKAGE
    e1MonitoringCTPSinkBeh      BEHAVIOUR
    e1MonitoringCTPSinkBeh      BEHAVIOUR

DEFINED AS

"An instance of this class represents the adaptation sink function but incorporates the monitoring
capabilities of a 2Mbit/s path termination sink function. The conditional package crcMonitoring (if
instantiated) is in effect when the inherited attribute framedSignalMode is set to value
'active'.";;

;;

CONDITIONAL PACKAGES
crcMonitoringPkg      PRESENT IF
    "an instance supports CRC-4 procedures [6] and [7]";

REGISTERED AS {en371ObjectClass 143 };

e1MonitoringCTPBidirectional  MANAGED OBJECT CLASS
DERIVED FROM                  e1MonitoringCTPSink,
                              e1CTPSource;
CONDITIONAL PACKAGES
    iSDNPackage PRESENT IF

"The 2 Mbit/s PDH port is configured as ISDN.";

REGISTERED AS {en371ObjectClass 144 };

e1TTPSinkR1          MANAGED OBJECT CLASS
DERIVED FROM        ePDHTTPSinkR1;
CHARACTERIZED BY
    e1TTPSinkR1Pkg  PACKAGE
                    BEHAVIOUR
    e1TTPSinkR1Behaviour  BEHAVIOUR

DEFINED AS

"This object class terminates a CCITT Recommendation G.702 [2] 2 Mbit/s trail.";;;

;
CONDITIONAL PACKAGES
    crcMonitoringPkg      PRESENT IF

"an instance supports CRC-4 procedures [6] and [7]";

REGISTERED AS {en371ObjectClass 145 };

```

```
e1TTPSourceR1      MANAGED OBJECT CLASS
DERIVED FROM      ePDHTTPSource;
CHARACTERIZED BY
  e1TTPSourceR1Pkg  PACKAGE
  BEHAVIOUR
  e1TTPSourceR1Behaviour BEHAVIOUR
```

DEFINED AS

"This object class originates a CCITT Recommendation G.702 [2] 2 Mbit/s trail.

The attribute crcOperationMode contained in the conditional package crcOperationPkg determines the operation of the 2 Mbit/s trail termination source. The value 'disabled' sets the transmitted Si-bits (bit 1 of the frame) to the binary '1' state [5].

The value 'forced' configures CRC-4 procedure. The value 'automatic' triggers the modified CRC-4 multiframe algorithm in order to allow interworking of equipments with and without a CRC-4 capability [6].";

;;

```
CONDITIONAL PACKAGES
  crcOperationPkg  PRESENT IF
```

"an instance supports CRC-4 procedures [6] and [7]";

REGISTERED AS {en371ObjectClass 146 };

```
e1TTPBidirectionalR1  MANAGED OBJECT CLASS
DERIVED FROM          ePDHTTPBidirectionalR1,
                     e1TTPSinkR1,
                     e1TTPSourceR1;
```

```
CHARACTERIZED BY
  e1TTPBidirectionalR1Pkg PACKAGE
  BEHAVIOUR
  e1TTPBidirectionalR1Beh BEHAVIOUR
```

DEFINED AS

"Either both or none of the inherited conditional packages crcMonitoringPkg and crcOperationPkg should be instantiated.

The attribute crcOperationMode contained in the conditional package crcOperationPkg determines the operation of the 2 Mbit/s trail termination. The value 'disabled' sets the transmitted Si-bits (bit 1 of the frame) to the binary '1' state and disables processing of the Si-bits in the receive signal [5].

The value 'forced' configures CRC-4 procedure with consequent actions [6]: in case of loss of CRC4-submultiframe all-ONES (aTSF) is inserted downstream and Far End Receiver Failure (FERF) is signalized upstream (as in case of LOF). A communicationsAlarm notification is emitted with probableCause 'lossOfMultiFrame' [3].

The value 'automatic' triggers the modified CRC-4 multiframe algorithm in order to allow interworking of equipments with and without a CRC-4 capability [6]. If this procedure fails then further CRC-4 processing is inhibited and transmitted E-bits are kept in binary state '0'.";

REGISTERED AS {en371ObjectClass 147 };

5.1.10 64 kbit/s object classes

```
e0CTPSink          MANAGED OBJECT CLASS
DERIVED FROM      "Recommendation M.3100: 1995":connectionTerminationPointSink;
CHARACTERIZED BY
  "Recommendation M.3100: 1995":createDeleteNotificationsPackage,
  "Recommendation M.3100: 1995":operationalStatePackage,
  "Recommendation M.3100: 1995":stateChangeNotificationPackage,
  e0CTPSinkPkg    PACKAGE
  BEHAVIOUR
  e0CTPSinkBehaviourPkg BEHAVIOUR
```

DEFINED AS

"An instance of this object class terminates a 64 kbit/s connection. Where additional features are requested and supported by the equipment, appropriate subclassing is recommended (e.g. where monitoring is required, the tmnCommunicationsAlarmInformationPkg should be included)";

```

    ATTRIBUTES
    eOCTPId          GET;;;

REGISTERED AS {en371ObjectClass 58};

eOCTPSource        MANAGED OBJECT CLASS
DERIVED FROM       "Recommendation M.3100: 1995":connectionTerminationPointSource;
CHARACTERIZED BY
"Recommendation M.3100: 1995":createDeleteNotificationsPackage,
    eOCTPSourcePkg PACKAGE
    BEHAVIOUR
    eOCTPSourceBehaviourPkg BEHAVIOUR

DEFINED AS

"An instance of this object class originates a 64 kbit/s connection.";;

    ATTRIBUTES
    eOCTPId          GET;;;

REGISTERED AS {en371ObjectClass 59};

eOCTPBidirectional MANAGED OBJECT CLASS
DERIVED FROM       "Recommendation M.3100: 1995":connectionTerminationPointBidirectional,
                    eOCTPSink,
                    eOCTPSource;

REGISTERED AS {en371ObjectClass 60};

```

5.2 Attributes definitions

```

pPITTPId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.NameType;
MATCHES FOR EQUALITY;
    BEHAVIOUR
    pPITTPIdBehaviour BEHAVIOUR

DEFINED AS

"This attribute is used as a Relative Distinguished Name (RDN) for naming instances of the

pPITTP object classes.";;

REGISTERED AS {en371Attribute 1};

ePDHCTPId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.NameType;
MATCHES FOR EQUALITY;
    BEHAVIOUR
    ePDHCTPIdBehaviour BEHAVIOUR

DEFINED AS

"This attribute is used as a RDN for naming instances of the ePDHCTP object classes.";;

REGISTERED AS {en371Attribute 2};

ePDHTTPId ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.NameType;
MATCHES FOR EQUALITY;
    BEHAVIOUR
    ePDHTTPIdBehaviour BEHAVIOUR

DEFINED AS

"This attribute is used as a RDN for naming instances of the ePDHTTP object classes.";;

REGISTERED AS {en371Attribute 3};

```

```
trTrailTraceExpected ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.TrailTrace;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  trTrailTraceExpectedBehaviour BEHAVIOUR
```

DEFINED AS

"This attribute is used to specify the value of the expected TR byte PDH trail trace 16 bytes message for instances of the e3IntTTP and e4IntTTP object class.";;

REGISTERED AS {en371Attribute 4};

```
trTrailTraceReceived ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.TrailTrace;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  trTrailTraceReceivedBehaviour BEHAVIOUR
```

DEFINED AS

"This attribute is used to know the value of the incoming TR byte PDH trail trace 16 bytes message for instances of the e3IntTTP and e4IntTTP object class.";;

REGISTERED AS {en371Attribute 5};

```
trTrailTraceSend ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.TrailTrace;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  trTrailTraceSendBehaviour BEHAVIOUR
```

DEFINED AS

"This attribute is used to specify the value of the outgoing TR byte PDH trail trace 16 bytes message for instances of the e3IntTTP and eg4IntTTP object class.";;

REGISTERED AS {en371Attribute 6};

```
eOCTPid ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.NameType;
MATCHES FOR EQUALITY;
  BEHAVIOUR
  eOCTPidBehaviour BEHAVIOUR
```

DEFINED AS

"This attribute is used as a RDN for naming instances of the eOCTP object classes.";;

REGISTERED AS {en371Attribute 7};

5.2.1 Additional attributes

The following attributes definitions have to be added:

```
availableTimeSlots ATTRIBUTE
WITH ATTRIBUTE SYNTAX ASN1DefinedTypesModule1.AvailableTimeSlots;
MATCHES FOR EQUALITY;
  BEHAVIOUR availableTimeSlotsBeh BEHAVIOUR
```

DEFINED AS

*This attribute is used to indicate the available Time Slots.

If a TS is set to TRUE, the corresponding Time Slot is available and vice versa.*;;

REGISTERED AS {en371Attribute 10};

```

burstyDegradeConsecutive      ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModule1.NCSBSRange;
  MATCHES FOR                EQUALITY;
  BEHAVIOUR                  burstyDegradeConsecutiveBehaviour;

```

```
REGISTERED AS {en371Attribute 11}
```

```
;
```

```
burstyDegradeConsecutiveBehaviour      BEHAVIOUR
```

```
DEFINED AS
```

"The attribute burstyDegradeConsecutive indicates the number of consecutive BAD seconds that should be counted before the declaration of degradedSignal. It indicates also number of consecutive GOOD seconds that are necessary for the degradedSignal clearing.";

```

burstyDegradeThreshold        ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModule1.CapThreshold;
  MATCHES FOR                EQUALITY;
  BEHAVIOUR                  burstyDegradeThresholdBehaviour;

```

```
REGISTERED AS {en371Attribute 12}
```

```
;
```

```
burstyDegradeThresholdBehaviour      BEHAVIOUR
```

```
DEFINED AS
```

"The attribute burstyDegradeThreshold contains the value that should be compared with errored blocks in that second in order to consider that second as a GOOD one or a BAD one.";

```

clearingTime                  ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModule1.PersistanceTime;
  MATCHES FOR                EQUALITY,
                              ORDERING;

```

```
REGISTERED AS {en371Attribute 13};
```

```

crcOperationMode             ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModule1.CRCOperationMode;
  MATCHES FOR                EQUALITY;

```

```
REGISTERED AS {en371Attribute 14 };
```

```

enableCRCMode                ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModule1.Activation;
  MATCHES FOR                EQUALITY;

```

```
REGISTERED AS {en371Attribute 15 };
```

```

framedSignalMode            ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModule1.FramedSignalMode;
  MATCHES FOR                EQUALITY;

```

```
REGISTERED AS {en371Attribute 16 };
```

```

frameStatus                  ATTRIBUTE
  WITH ATTRIBUTE SYNTAX      ASN1DefinedTypesModule1.FrameStatus;
  MATCHES FOR                EQUALITY;
  BEHAVIOUR                  frameStatusBehaviour;

```

```
REGISTERED AS {en371Attribute 17}
```

```
;
```

```
frameStatusBehaviour      BEHAVIOUR
```

DEFINED AS

The attribute indicates the detected framing properties of the characteristic information at the corresponding PDH path layer. If the detection process is not activated or pending then the value is 0 (noIndication);

```
portMode                ATTRIBUTE
  WITH ATTRIBUTE SYNTAX  ASN1DefinedTypesModule1.PortMode;
  MATCHES FOR           EQUALITY, ORDERING;
  BEHAVIOUR
  portModeBehaviour    BEHAVIOUR
```

DEFINED AS

"This attribute indicates the current state of the port mode for the containing managed object instance. The states indicated are:

```
0 - Port Mode is in the MON state.
1 - Port Mode is in the NMON state.
2 - Port Mode is in the AUTO state.";
```

REGISTERED AS {en371Attribute 18};

```
raisingTime            ATTRIBUTE
  WITH ATTRIBUTE SYNTAX  ASN1DefinedTypesModule1.PersistanceTime;
  MATCHES FOR           EQUALITY,
                        ORDERING;
```

REGISTERED AS {en371Attribute 19};

```
remoteCRCIndication    ATTRIBUTE
  WITH ATTRIBUTE SYNTAX  ASN1DefinedTypesModule1.Activation;
  MATCHES FOR           EQUALITY;
```

REGISTERED AS { en371Attribute 20 };

5.3 Name bindings definitions

```
pPITTPSinkR1-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS pPITTPSinkR1 AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE pPITTPid;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;

REGISTERED AS {en371NameBinding 50 };
```

```
pPITTPSource-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS pPITTPSource AND SUBCLASSES;
  NAMED BY SUPERIOR OBJECT CLASS "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE pPITTPid;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;

REGISTERED AS { en371NameBinding 2 };
```

```
ePDHTTPSinkR1-managedElement NAME BINDING
  SUBORDINATE OBJECT CLASS ePDHTTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
  WITH ATTRIBUTE
    ePDHTTPid;
  BEHAVIOUR ePDHTTPSinkR1-managedElementBehaviour BEHAVIOUR
```

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 51 };

ePDHTTPSource-managedElement NAME BINDING
 SUBORDINATE OBJECT CLASS ePDHTTPSource AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS "Recommendation M.3100: 1995":managedElement AND SUBCLASSES;
 WITH ATTRIBUTE ePDHTTPId;
 BEHAVIOUR ePDHTTPSource-managedElementBehaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 4};

ePDHCTPSinkR1-pPITTPSinkR1 NAME BINDING
 SUBORDINATE OBJECT CLASS ePDHCTPSinkR1 AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS pPITTPSinkR1 AND SUBCLASSES;
 WITH ATTRIBUTE ePDHCTPId;
 BEHAVIOUR
 ePDHCTPSinkR1-pPITTPSinkR1Behaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 52 };

ePDHCTPSource-pPITTPSource NAME BINDING
 SUBORDINATE OBJECT CLASS ePDHCTPSource AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS pPITTPSource AND SUBCLASSES;
 WITH ATTRIBUTE ePDHCTPId;
 BEHAVIOUR
 ePDHCTPSource-pPITTPSourceBehaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 6};

e0CTPSink-pPITTPSinkR1 NAME BINDING
 SUBORDINATE OBJECT CLASS e0CTPSink AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS pPITTPSinkR1 AND SUBCLASSES;
 WITH ATTRIBUTE e0CTPId;
 BEHAVIOUR
 e0CTPSink-pPITTPSinkR1Behaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 53 };

e0CTPSource-pPITTPSource NAME BINDING
 SUBORDINATE OBJECT CLASS e0CTPSource AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS pPITTPSource AND SUBCLASSES;
 WITH ATTRIBUTE e0CTPId;
 BEHAVIOUR
 e0CTPSource-pPITTPSourceBehaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 8};

ePDHCTPSinkR1-ePDHTTTPSinkR1 NAME BINDING
 SUBORDINATE OBJECT CLASS ePDHCTPSinkR1 AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS ePDHTTTPSinkR1 AND SUBCLASSES;
 WITH ATTRIBUTE ePDHCTPId;
 BEHAVIOUR
 ePDHCTPSinkR1-ePDHTTTPSinkR1Behaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 54 };

ePDHCTPSource-ePDHTTTPSource NAME BINDING
 SUBORDINATE OBJECT CLASS ePDHCTPSource AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS ePDHTTTPSource AND SUBCLASSES;
 WITH ATTRIBUTE ePDHCTPID;
 BEHAVIOUR
 ePDHCTPSource-ePDHTTTPSourceBehaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 10};

eOCTPSink-e1TTPSinkR1 NAME BINDING
 SUBORDINATE OBJECT CLASS eOCTPSink AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS e1TTPSinkR1 AND SUBCLASSES;
 WITH ATTRIBUTE eOCTPId;
 BEHAVIOUR
 eOCTPSink-e1TTPSinkR1Behaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 55 };

eOCTPSource-e1TTPSourceR1 NAME BINDING
 SUBORDINATE OBJECT CLASS eOCTPSource AND SUBCLASSES;
 NAMED BY
 SUPERIOR OBJECT CLASS e1TTPSourceR1 AND SUBCLASSES;
 WITH ATTRIBUTE eOCTPId;
 BEHAVIOUR
 eOCTPSource-e1TTPSourceR1Behaviour BEHAVIOUR

DEFINED AS

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

REGISTERED AS {en371NameBinding 12};

```
ePDHATTPSinkR1-pPITTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS ePDHATTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    pPITTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIid;
  BEHAVIOUR
    ePDHATTPSinkR1-pPITTPSinkR1Behaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 56 };
```

```
ePDHATTPSource-pPITTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS ePDHATTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    pPITTPSource AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIid;
  BEHAVIOUR
    ePDHATTPSinkR1-pPITTPSourceBehaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 14};
```

```
eOCTPSink-e1ATTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS eOCTPSink AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e1ATTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           eOCTPIid;
  BEHAVIOUR
    eOCTPSink-e1ATTPSinkR1Behaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 57 };
```

```
eOCTPSource-e1ATTPSourceR1 NAME BINDING
  SUBORDINATE OBJECT CLASS eOCTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e1ATTPSourceR1 AND SUBCLASSES;
  WITH ATTRIBUTE           eOCTPIid;
  BEHAVIOUR
    eOCTPSource-e1ATTPSourceR1Behaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 16};
```

```
e3ATTPSinkR1-e4ATTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS e3ATTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e4ATTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIid;
  BEHAVIOUR
    e3ATTPSinkR1-e4ATTPSinkR1Behaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 58 };
```

```
e3ATTPSource-e4ATTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS e3ATTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e4ATTPSource AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIid;
  BEHAVIOUR
    e3ATTPSource-e4ATTPSourceBehaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 18};
```

```
e2ATTPSinkR1-e3ATTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS e2ATTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e3ATTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIid;
  BEHAVIOUR
    e2ATTPSinkR1-e3ATTPSinkR1Behaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 59 };
```

```
e2ATTPSource-e3ATTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS e2ATTPSource AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e3ATTPSource AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIid;
  BEHAVIOUR
    e2ATTPSource-e3ATTPSourceBehaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 20};
```

```
e1ATTPSinkR1-e2ATTPSinkR1 NAME BINDING
  SUBORDINATE OBJECT CLASS e1ATTPSinkR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e2ATTPSinkR1 AND SUBCLASSES;
  WITH ATTRIBUTE           ePDHTTPIid;
  BEHAVIOUR
    e1ATTPSinkR1-e2ATTPSinkR1Behaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 60 };
```

```
e1ATTPSourceR1-e2ATTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS e1ATTPSourceR1 AND SUBCLASSES;
  NAMED BY
  SUPERIOR OBJECT CLASS    e2ATTPSource;
  WITH ATTRIBUTE           ePDHTTPIid;
  BEHAVIOUR
    e1ATTPSourceR1-e2ATTPSourceBehaviour BEHAVIOUR

  DEFINED AS
```

"The subordinate managed object may be automatically instantiated when the superior managed object is instantiated, according to the make-up and mode of operation of the equipment.";;

```
REGISTERED AS {en371NameBinding 22};
```

5.3.1 Additional name bindings

```
defaultNMONAlarmSeverityAssignment-managedElement  NAME BINDING
SUBORDINATE OBJECT CLASS
"Recommendation M.3100: 1995":alarmSeverityAssignmentProfile  AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS
"Recommendation M.3100: 1995":managedElement  AND SUBCLASSES;
WITH ATTRIBUTE
"Recommendation M.3100: 1995":alarmSeverityAssignmentProfileId;
BEHAVIOUR
defaultNMONAlarmSeverityAssignment-managedElementBeh  BEHAVIOUR
```

DEFINED AS

*One instance of the subordinate class is auto created by the node.

The default values of this object instance shall always map all possible alarms which the node can generate to the "non-alarmed" severity code.*;;

REGISTERED AS {en371NameBinding 61 };

5.4 ASN.1 definitions

```
ASN1DefinedTypesModule1 {ccitt(0) identified-organization(4) etsi(0) ets371(371) informationModel(0)
asn1Module(2) asn1DefinedTypesModule1(1)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
-- EXPORTS everything
IMPORTS

NameType FROM ASN1DefinedTypesModule {ccitt(0) recommendation(0) m(13) m3100(3100)
informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)};

TrailTrace ::= CHOICE {
    null          NULL,
    pathtrace     [1] GraphicString
}
Activation ::= BOOLEAN
AvailableTimeSlots ::= SEQUENCE SIZE (1..31) OF TS
CapThreshold ::= INTEGER
CRCOperationMode ::= ENUMERATED {disabled(0), forced(1), automatic(2)}
FramedSignalMode ::= ENUMERATED {inactive(0), active(1)}
FrameStatus ::= INTEGER
    --0: noIndication
    --1: edcMF
NCSBSRange ::= INTEGER(2..10)
    degradeConsecutiveDefault  NCSBSRange ::= 6
PersistenceTime ::= INTEGER(1..300)
    defaultRaisingPersistence  PersistenceTime ::= 25
    defaultClearingPersistence PersistenceTime ::= 100
PortMode ::= INTEGER
TS ::= BOOLEAN

END -- end of ASN1DefinedTypesModule
```

5.5 Packages

```
crcMonitoringPkg          PACKAGE
  BEHAVIOUR
  crcMonitoringPkgBeh BEHAVIOUR
```

DEFINED AS

"This packages defines the monitoring capabilities applied to signals with a CRC submultiframe structure.

The attribute enableCRCMode set to TRUE selects the near/far-end performance processing of the receive signal based on CRC-4 block errors.

During this mode of operation the degraded signal criteria are in effect dependent on the setting of the attributes burstyDegradConsecutive and burstyDegradThreshold. A communicationsAlarm notification shall be issued if the account for the detection of the degraded defect is encountered. The probableCause parameter of the notification shall indicate 'degradedSignal' [3].

The attribute remoteCRCIndication reflects the CRC-4 multiframe generator / detector status at the far-end NE [8].

The value of burstyDegradConsecutive attribute represents the number of consecutive seconds that should be taken into account for the detection or clearing of the degraded defect. The attribute burstyDegradThreshold contains the value that should be compared with errored blocks in that second in order to consider that second as a GOOD one or a BAD one [9].";;

```
ATTRIBUTES
burstyDegradConsecutive  DEFAULT VALUE
                        ASN1DefinedTypesModule1.degradeConsecutiveDefault
                        GET-REPLACE,
burstyDegradThreshold   GET-REPLACE,
enableCRCMode           GET-REPLACE,
remoteCRCIndication     GET;
```

REGISTERED AS {en371Package 1 };

```
crcOperationPkg          PACKAGE
  BEHAVIOUR
  crcOperationPkgBeh BEHAVIOUR
```

DEFINED AS

"This packages enables to control the operation modes defined for interworking with equipment which may or may not incorporate CRC procedure";;

```
ATTRIBUTES
crcOperationMode        GET-REPLACE;
```

REGISTERED AS {en371Package 2 };

```
iSDNPackage PACKAGE
  BEHAVIOUR iSDNPackageBehaviour BEHAVIOUR
```

DEFINED AS

This package permits to blank n (1=<n=<31) time slots on a 2 Mbit/s signal, by setting the attribute availableTimeSlots. The default value of availableTimeSlots is all TS="FALSE", that is all time slots are written with 'all ones'.;;

```
ATTRIBUTES
availableTimeSlots      GET-REPLACE;
```

REGISTERED AS {en371Package 3};

```

tpSpecificPersistenceTimePkg    PACKAGE
    BEHAVIOUR                    tpSpecificPersistenceTimePkgBehaviour;
    ATTRIBUTES
        raisingTime              REPLACE-WITH-DEFAULT
                                DEFAULT VALUE ASN1DefinedTypesModule1.defaultRaisingPersistancy
                                GET-REPLACE,
        clearingTime             REPLACE-WITH-DEFAULT
                                DEFAULT VALUE ASN1DefinedTypesModule1.defaultClearingPersistancy
                                GET-REPLACE;

```

```
REGISTERED AS {en371Package 4 }
```

```
;
```

```
tpSpecificPersistenceTimePkgBehaviour BEHAVIOUR
```

```
DEFINED AS
```

"This package models the filter (f4) applied for correlated fault causes in order to indicate failures. The integer values (p) of the contained attributes raisingTime and clearingTime define intervals of persistence time (Tp). The nominal values Tp are associated to the integer value p by the equation

$Tp = px0.1 \text{ sec.}$

The range and the default intervals of activating and clearing a failure are specified in ETS 300 417-1 [9].";

```

portModePkg PACKAGE
    BEHAVIOUR
        portModePkgBehaviour    BEHAVIOUR

```

```
DEFINED AS
```

"Any object supporting this package can support the portMode function. It has three states: AUTO, NMON and MON. The AUTO shall be the default.

In the AUTO state the value of the portMode attribute is AUTO and the containing managed object's alarmSeverityAssignmentProfilePointer attribute shall point at the instance of the AlarmSeverityAssignmentProfile managed object class which has a nameBinding value of defaultNMONAlarmSeverityAssignmentProfile-managedElement.

In the NMON state the value of the portMode is NMON and the containing managed object's alarmSeverityProfilePointer attribute shall point at the same instance as in AUTO mode, i.e. it points to the AlarmSeverityAssignmentProfile managed object class which has a nameBinding value of defaultNMONAlarmSeverityAssignment-managedElement.

In the MON state the value of the portMode is MON and the containing managed object's alarmSeverityAssignmentProfilePointer attribute shall have a value indicating some other AlarmSeverityAssignmentProfile instance than the one used in NMON/AUTO state or it should be NULL. When portMode changes from AUTO or NMON to MON the alarmSeverityAssignmentProfilePointer shall revert to the value as stated above.

The MON, NMON or AUTO state is entered via M-Set of the portMode attribute by a managing system. In addition, the containing object leaves the AUTO state when a valid signal is detected (i.e. LOS is cleared) by the containing object, and in this case an attributeValueChange notification is emitted. An attempt from management system to change the portMode attribute from either MON or NMON to AUTO is rejected, when there is a valid signal.

When the portMode attribute changes, the alarmSeverityAssignmentProfilePointer attribute of the containing object changes automatically by NE according to the behaviour specified in this package. In NMON or AUTO state the alarmSeverityAssignmentProfilePointer should always point to the alarmSeverityAssignmentProfile instance with nameBinding defaultNMONAlarmSeverityAssignmentProfile-managedElement."

```
;;
```

```

ATTRIBUTES
    portMode                    GET-REPLACE;
NOTIFICATIONS
    "Recommendation X.721 [4]: 1992":attributeValueChange;

```

```
REGISTERED AS {en371Package 5 };
```

5.6 Behaviour definitions

alarmReportingControlBehaviour BEHAVIOUR

DEFINED AS

"If the attribute alarmSeverityProfilePointer points to an instance of the MOC alarmSeverityAssignmentProfile then the perceivedSeverity associated with the probableCause in the communicationsAlarm is determined by the assignment given in the attribute alarmSeverityAssignmentList of that instance. The value 'non-alarmed' of the severity assigned to a problem inhibits the emission of the potential communicationsAlarm notification of that problem. This behaviour meets the ability to configure the defect correlation filter not to report selected fault causes (i.e. problems) and hence no associated failures will be alerted by communicationsAlarm notifications.

The alarmSeverityProfilePointer may point to an instance of alarmSeverityAssignmentProfile which is auto-created by the NE according the name-binding label 'defaultNMONAlarmSeverityAssignment-managedElement'. This relationship of the termination point reflects the NMON state during which no communicationsAlarm is reported at all.

When the severity changes to a value 'non-alarmed' for a problem which has been notified by an instance of this class then a communicationsAlarm notification with the perceivedSeverity 'cleared' is issued and the corresponding entry in the attributes currentProblemList and alarmStatus is removed. When the severity changes from 'non-alarmed' to a value other than 'non-alarmed' then a pending, persistent defect will be notified.

If the alarm severity cannot be assigned by the way of an alarmSeverityAssignmentProfile object (e.g. the attribute alarmSeverityProfilePointer has the value NULL or no assignment is given in the attribute alarmSeverityAssignmentList) then one of the two choices applies when reporting alarms:

- a) agent assigns the severity,
- b) the value 'indeterminate' is used.";

pathTerminationMonitoringBehavior BEHAVIOUR

DEFINED AS

"A communicationsAlarm notification shall be issued if a Server Signal Fail (SSF) is detected. The probableCause parameter of the notification shall indicate serverSignalFailure.

A communicationsAlarm notification shall be issued if a Far End Receiver Failure is detected. The probableCause parameter of the notification shall indicate farEndReceiverFailure (fERF) [3]. Detection of a fERF has no effect on the operationalState.

Instances of the subclasses of this class may be used at the different PDH path layers to provide with performance data monitoring capabilities based on Frame Alignment Signal Errors (FASE) [8].";

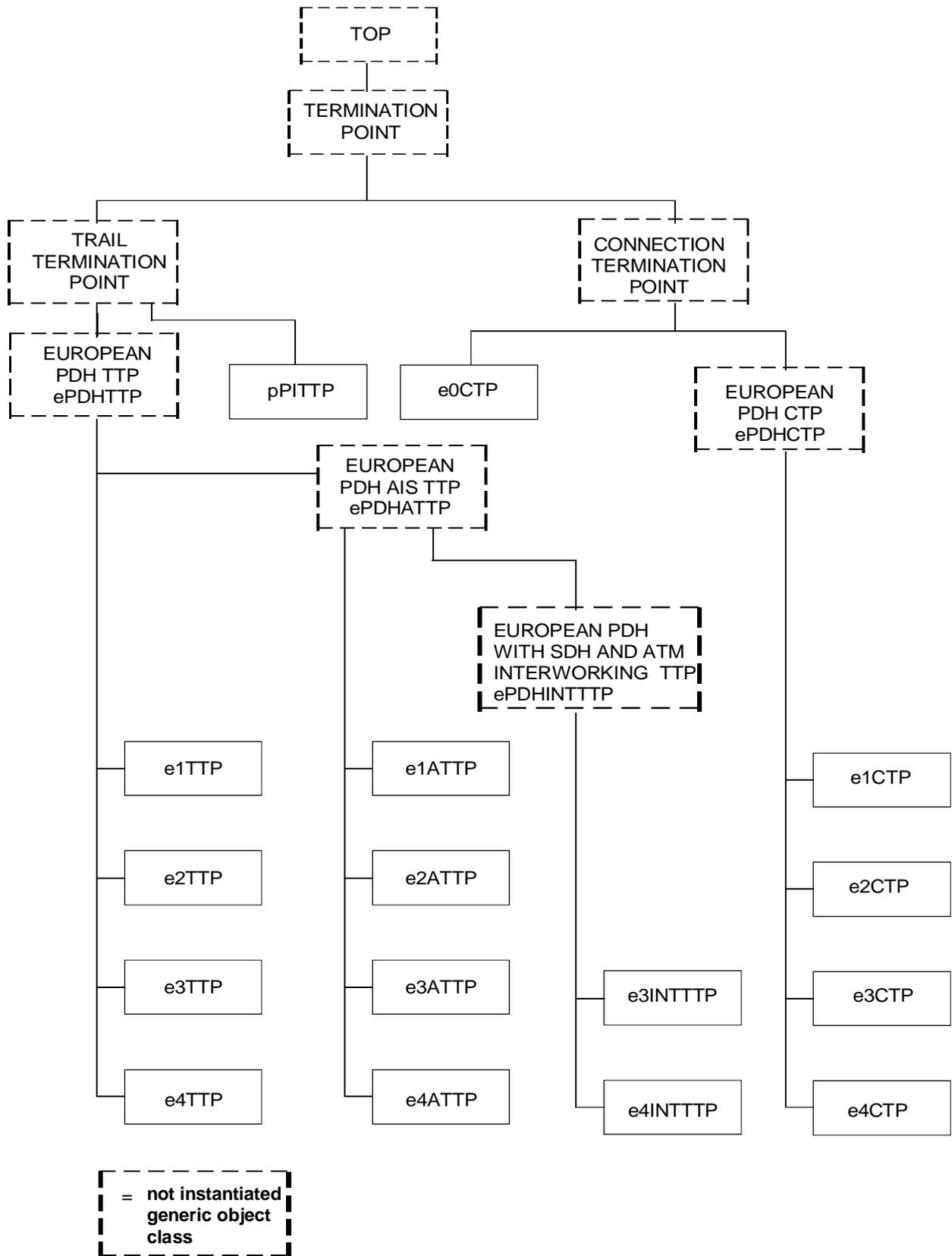


Figure 1: PDH transport object inheritance (all PDH objects may be source, sink or bidirectional)

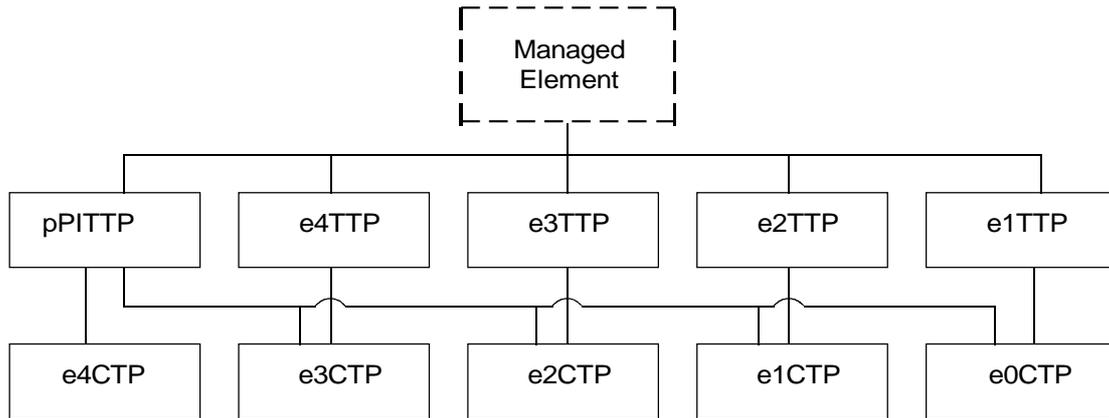


Figure 2: PDH object naming when PDH cross connectivity is available

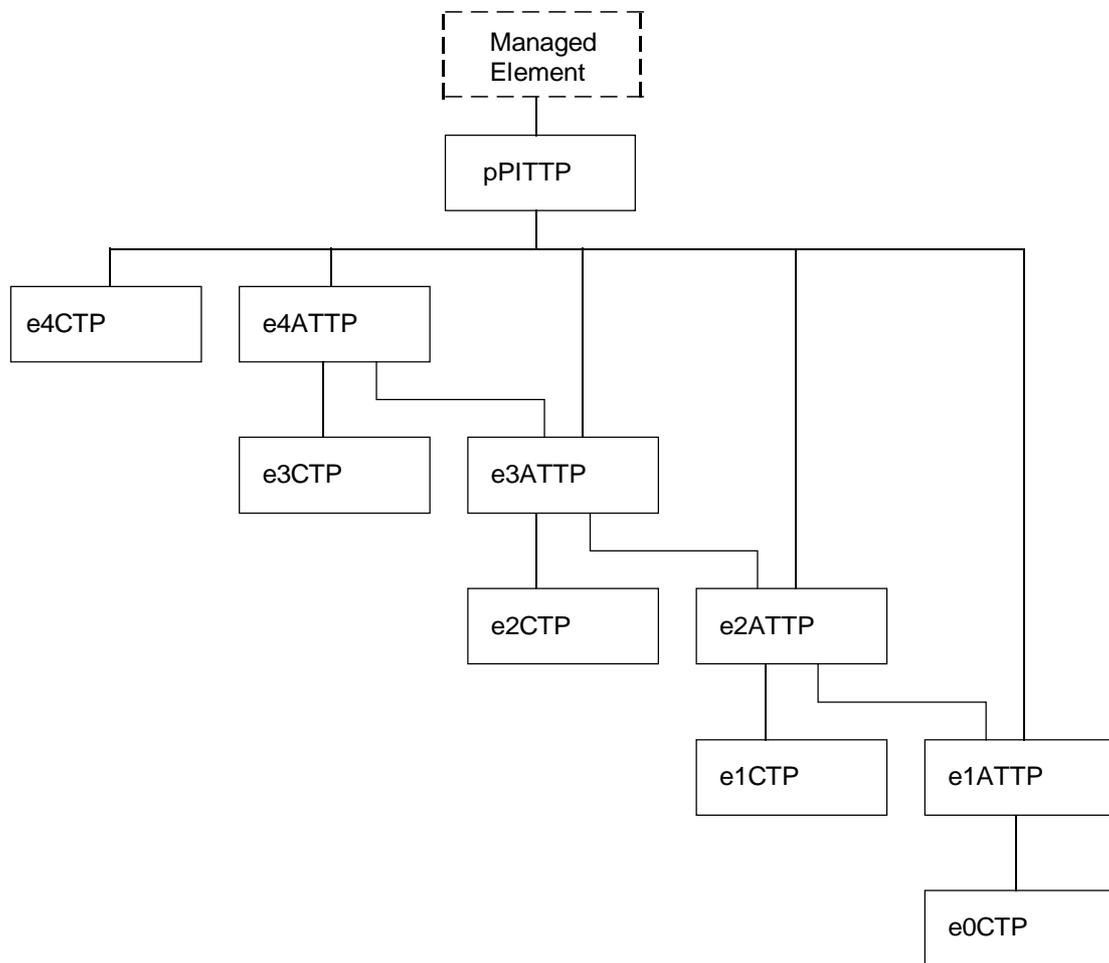


Figure 3: PDH object naming when no PDH cross connectivity is available

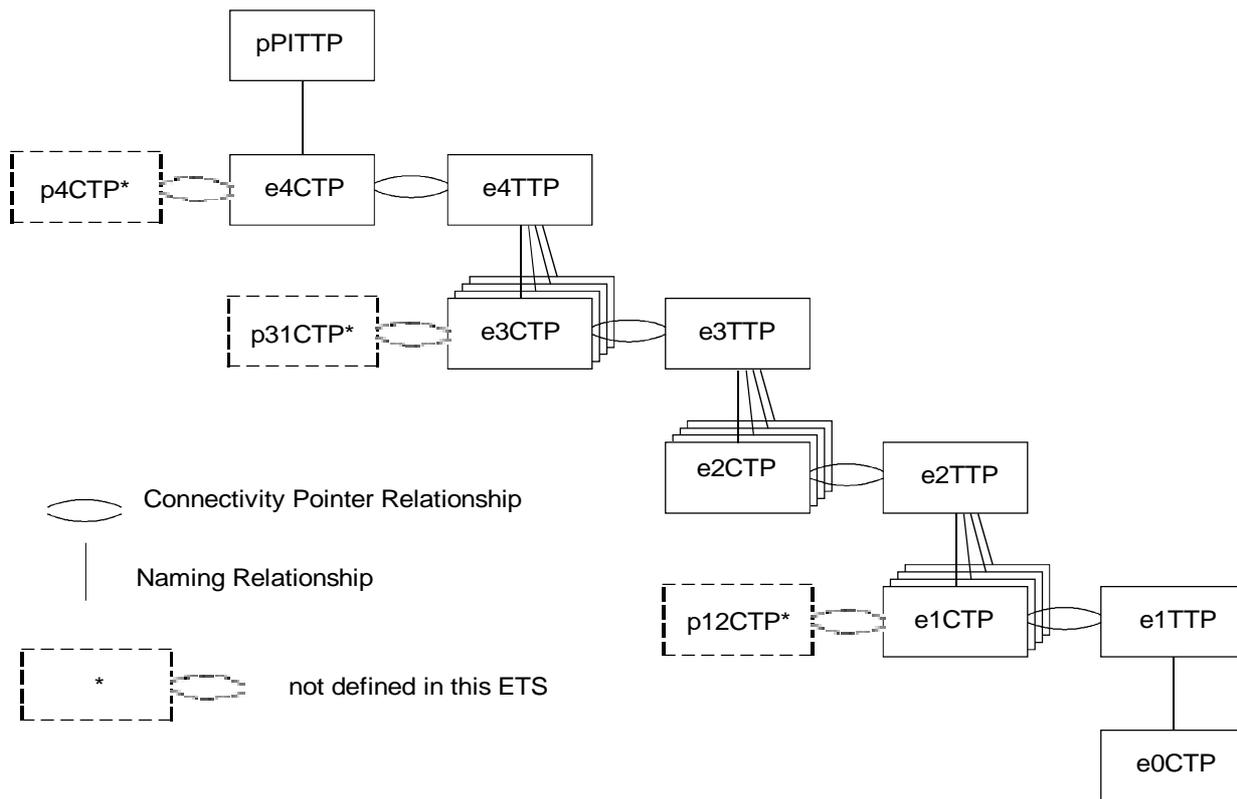


Figure 4: Naming and pointer relationships for PDH and relationship with SDH object classes

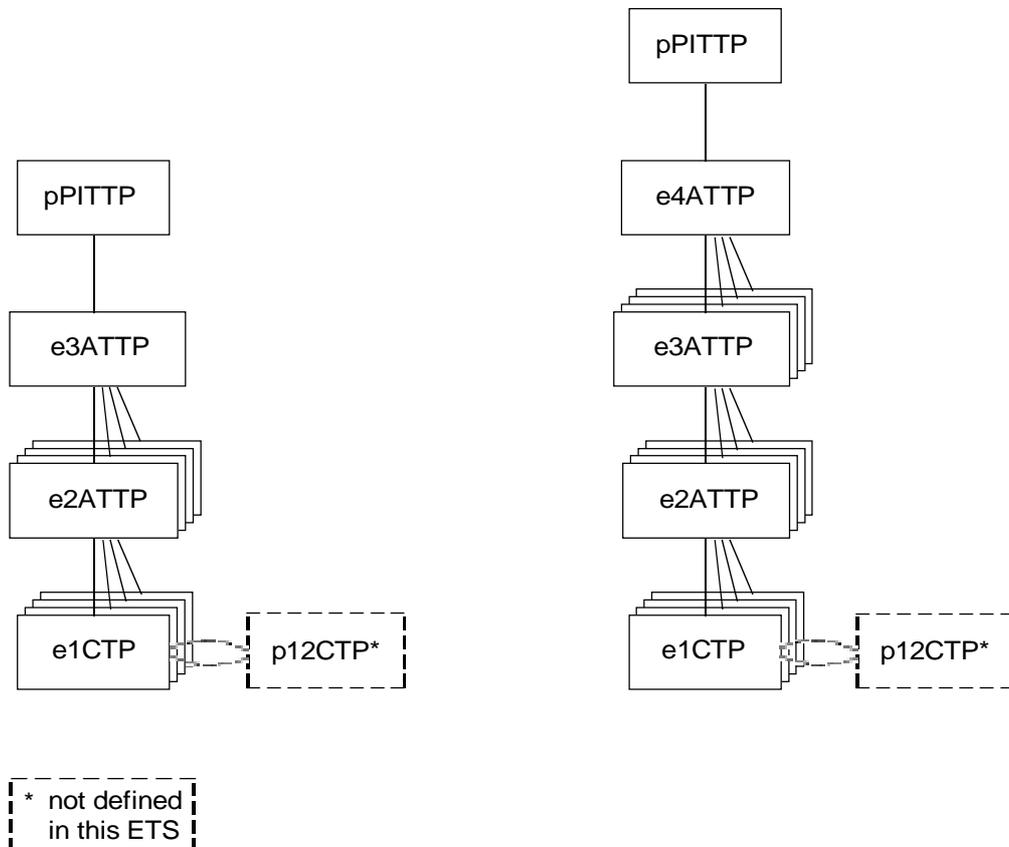


Figure 5: Naming and pointer relationships examples for short version 34/vc12 and 140/vc12 transmultiplexer

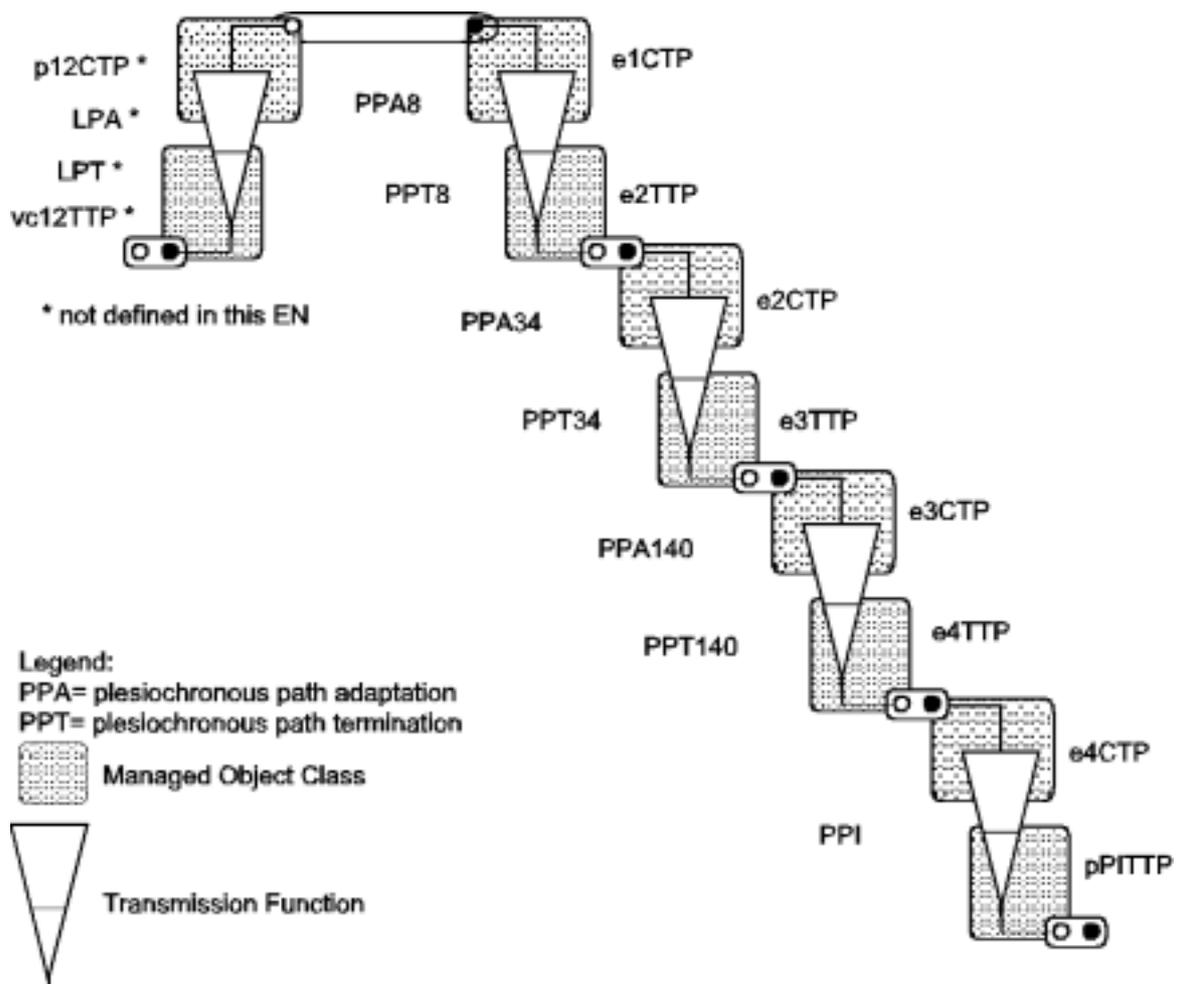


Figure 6: Example for relationship between object classes and transmission functions

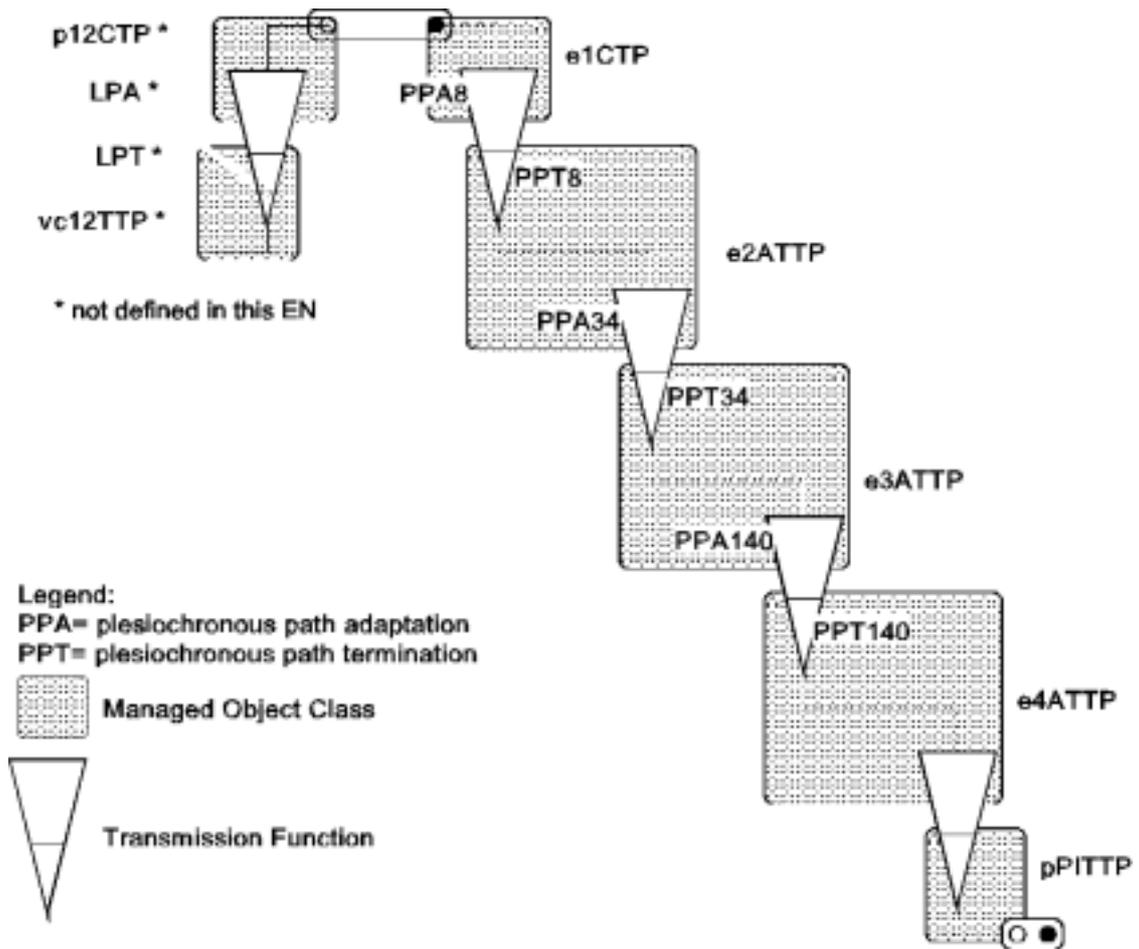


Figure 7: Example for relationship between object classes and transmission functions short version without PDH cross connectivity

History

Document history		
Edition 1	November 1994	Publication as ETS 300 371
Edition 2	October 1996	Publication as ETS 300 371
V1.3.1	March 1999	Publication
V1.3.2	October 2000	One-step Approval Procedure OAP 20010223: 2000-10-25 to 2001-02-23