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GENERAL ASPECTS OF DIGITAL TRANSMISSION SYSTEMS

SYNCHRONOUS DIGITAL HIERARCHY (SDH) PERFORMANCE MONITORING FOR THE NETWORK ELEMENT VIEW

ITU-T Recommendation G.774.01

(Previously "CCITT Recommendation")

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation G.774.01 was prepared by ITU-T Study Group 15 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 1st of November 1994.

NOTE

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

CONTENTS

SUMMARY

This Recommendation provides an information model for the Performance Monitoring of Synchronous Digital hierarchy (SDH) Network. This model describes the managed object classes and their properties for the performance monitoring function, as defined in Recommendation G.784 and as related to SDH Network Elements. These objects are useful to describe information exchanged across interfaces defined in M.3010 Telecommunications Management Network (TMN) architecture for the management of the performance monitoring function.

KEYWORDS

Action, ASN.1, Attribute, GDMO, Information Model, Managed Object Class, Notification, Synchronous Digital Hierarchy.

Recommendation G.774.01

SYNCHRONOUS DIGITAL HIERARCHY (SDH) PERFORMANCE MONITORING FOR THE NETWORK ELEMENT VIEW

(Geneva, 1994)

The ITU-T,

considering

(a) that Recommendations G.707, G.708, and G.709 form a coherent set of specifications for the Synchronous Digital Hierarchy (SDH) and the Network Node Interface (NNI);

(b) that Recommendations G.781, G,782, G.783, and G.784 form a coherent set of specifications for SDH multiplex equipment functions and management;

(c) that Recommendation G.958 specifies the characteristics of digital line systems based on SDH for use on optical fibre cables;

(d) that Recommendation M.3010 defines the principles for a Telecommunications Management Network (TMN);

(e) that Recommendation G.773 defines the protocol suites for Q-interfaces;

(f) that Recommendation M.3100 defines a Generic Network Information Model for the exchange of management information;

(g) that Recommendation G.774 defines an SDH Management Information Model for the Network Element View;

(h) that Recommendation Q.822 defines a Management Information Model for Performance Management,

recommends

that the performance management of SDH equipment be carried out by using the information model defined in accordance with the details contained within this Recommendation.

1 Scope

1.1 Scope of this Recommendation

SDH Performance Monitoring Functions are used to monitor specified performance events of specified Termination Points managed objects and to report these performance data, as well as Quality of Service Alarms to its managing system according to a given schedule.

Recommendation M.2120 defines maintenance of transport network, Recommendation G.784 defines the management of SDH based network element. This Recommendation defines the object model based on Recommendation Q.822 according to the requirements described in Recommendations G.784 and M.2120. This model uses generic mechanism defined in Recommendation Q.822.

1.2 Structure of this Recommendation

Subclause 5.1 provides an overview of the SDH performance monitoring information model. Clauses 6 to 15 describe the information model using the notation mechanisms defined in X.722 Guidelines for the Definition of Managed Objects. Clause 15 contains the syntax definitions of the information carried in the protocol using Abstract Syntax

Notation One (ASN.1) defined in Recommendation X.208. Naming and Inheritance are illustrated in informative Annex A. Diagrams illustrating the Threshold Reset behaviour are provided in informative Annex B. Clauses 5 to 15 are normative; all other text is informative.

2 References

- ITU-T Recommendation G.707 (1993), *Synchronous digital hierarchy bit rates*.
- ITU-T Recommendation G.708 (1993), *Network-node interface for the synchronous digital hierarchy*.
- ITU-T Recommendation G.709 (1993), *Synchronous multiplexing structure*.
- CCITT Recommendation M.3010 (1992), *Principles for a telecommunication management network*.
- CCITT Recommendation M.3100 (1992), *Generic network information model*.
- ITU-T Recommendation G.783 (1994), *Characteristics of Synchronous Digital Hierarchy (SDH) equipment functional blocks*.
- ITU-T Recommendation G.784 (1994), *Synchronous Digital Hierarchy (SDH) management*.
- CCITT Recommendation X.722 (1992), *Information technology – OSI – Structure of management information: Guidelines for the definition of managed objects*.
- CCITT Recommendation X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1)*.
- CCITT Recommendation X.720 (1992), *Information technology – OSI – Structure of Management Information: Management information model*.
- CCITT Recommendation G.774 (1992), *SDH management information model for the network element view*.
- CCITT Recommendation M.2120 (1992), *Digital path, section and transmission system fault detection and localisation procedures*.
- ITU-T Recommendation Q.822 (1993), *Stage 1, Stage 2 and Stage 3 description for the Q3-interface: performance management*.
- CCITT Recommendation X.721 (1992), *Definition of management information*.
- CCITT Recommendation X.701(1992) , *Systems management overview*.
- CCITT Recommendation X.710 (1990), *Common management information service*.
- CCITT Recommendation X.711(1990), *Common management information protocol*.
- CCITT Recommendation X.731 (1992), *State management function*.
- CCITT Recommendation X.730 (1992), *Object management function*.
- CCITT Recommendation X.733 (1992), *Alarm reporting function*
- CCITT Recommendation X.734 (1992), *Event report management function*.
- CCITT Recommendation X.735 (1992), *Log control function*.
- ITU-T Recommendation G.803 (1993), *Architectures of transport networks based on the synchronous digital hierarchy (SDH).*
- ITU-T Recommendation G.831 (1993), *Management capabilities of transport networks based on the synchronous digital hierarchy (SDH).*
- CCITT Recommendation G.773 (1992), *Q-Interface protocols*.
- CCITT Recommendation Q.811 (1990), *Q3-Lower layers protocols*.
- CCITT Recommendation Q.812 (1990), *Q3-Higher layers protocols*.
- ITU-T Recommendation G.958 (1994), *Digital line systems based on SDH for use on optical fibre cables*.
- ITU-T Recommendation M.60, *Maintenance terminology and definitions*.

3 Definitions

None.

4 Abbreviations

For the purposes of this Recommendation, the following abbreviations apply:

AIS	Alarm Indication Signal
BBE	Background Block Error
CSES	Consecutive Severely Errored Second
CTP	Connection Termination Point
EBER	Excessive Bit Error Ratio
ES	Errored Second
FEBBE	Far End Background Block Error
FEEB	Far End Errored Block
FEES	Far End Errored Second
FERF	Far End Receive Failure
FESES	Far End Severely Errored Second
ISO	International Organisation for Standardization
ITU	International Telecommunications Union
LB	Laser Bias
LOF	Loss of Frame
LOS	Loss of Signal
LT	Laser Temperature
MS	Multiplex Section
NCSES	Number of Consecutive Severely Errored Second
NE	Network Element
OFS	Out of Frame Second
OOF	Out of Frame
OS	Operation System
OSI	Open System Interconnection
OSL	Optical Signal Level
PJC	Pointer Justification Count
PJE	Pointer Justification Event
Pkg	Packages
PPI	Plesiochronous Physical Interface
PSC	Protection Switch Count
PSD	Protection Switch Duration
QOS	Quality of Service
RAI	Remote Alarm Indication
RDN	Relative Distinguished Name
RS	Regenerator section
SDH	Synchronous Digital Hierarchy
SES	Severely Errored Second
SPI	Synchronous Physical Interface
STM-N	Synchronous Transport Module N
TMN	Telecommunication Management Network

TP Termination Point

TR Threshold Reset

TTP Trail Termination Point

UAS Unavailable Second

5 Performance Management Model

5.1 Overview

This clause provides Managed Objects required to support management of performance monitoring in SDH Network Elements.

This model defines subclasses of the generic currentData and historyData object classes from Recommendation Q.822, for each kind of monitoring point. For each type of monitoring point two subclasses of currentData are defined. One is defined for either a 15 minute count or 1 day count period, and provides implicit clearing of threshold crossing alarms at the end of each granularity period. The other subclass is only relevant to 15 minute counting and performs explicit clearing of threshold alarms (Threshold Reset) at the end of a clear 15 minute period (refer to 2.3.4.2/M.2120).

Starting and ending of unavailibilty period is reported by the instances of these subclasses that hold the 24-hour counts.

History information could either be collected as part of historyData instances or one of its subclasses or as an eventRecord or one of its subclasses contained in a log. Utilization of a LOG is not mandatory in this Recommendation.

5.2 Requirements

The SDH Performance Monitoring functions shall provide for:

- the ability for a managing system to request the collection of the various Performance events relating to a given monitored entity for a given collection period;
- the ability for a managing system to suspend/resume the performance data collection for a given monitored entity (or set of entities);
- the ability for a managing system to instruct the NE to reset the performance monitoring counters for a given monitored entity (or set of entities);
- the scheduling of performance collection activity within specified time periods, for a given monitored entity (or set of entities);
- the ability for a managing system to request the performance monitoring counters for a given monitored entity (or set of entities);
- the ability for a managed system to send event reports to a managing system to notify the results of the performance data collection, at the end of the collection period;
- the ability for a managing system to instruct the NE to maintain Performance historical data for a specified duration, under specified conditions;
- the ability for a managing system to instruct the NE to remove specific Performance historical data;
- the ability for a managing system to instruct the NE to establish thresholding criteria for a given monitored entity (or set of entities);
- the ability for a managed system to send Quality of Service Alarms upon threshold violation of a performance counter of a monitored entity.

6 Managed Object Class Definitions

6.1 SDH Current Data

sdhCurrentData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation Q.822 : 1993" : currentData;
CHARACTERIZED BY
"Recommendation Q.822 : 1993": zeroSuppressionPkg,
"Recommendation Q.822 : 1993": thresholdPkg,
sdhCurrentDataPackage PACKAGE
BEHAVIOUR sdhCurrentDataBehaviour;
ATTRIBUTES
"Recommendation M.3100:1992": currentProblemListGET;;;
CONDITIONAL PACKAGES
historyPackage PRESENT IF
"an instance does not support flexible assignment of the history length",
unavailableTimeAlarmPackage PRESENT IF
"starting and ending of unavailable period has to be reported and the
granularity period is 24 hours";
REGISTERED AS {g774-01MObjectClass 1};

sdhCurrentDataBehaviour BEHAVIOUR
DEFINED AS

*The **sdhCurrentData** class is used to define generic characteristic for SDH performance monitoring from which subclasses are defined in order to hold performance event counts for a specific monitoring point. Subclasses of this class are used in order to support performance monitoring of SDH **trails** at various layers as described in Recommendation G.803. The performance monitoring events ES, SES and BBE which are monitored by some of the subclasses of this subclass are defined in 4.1.1/G.826. The **granularityPeriod** attribute can only be assigned a value at creation time.

This class can only contain one reference to an instance of the **thresholdData** object class in the **thresholdDataInstance** attribute.

The 15' and 24 hours granularity period must be supported fully. If a threshold is reached or crossed then the **currentProblemList** attribute shall indicate it with the probable cause "Threshold crossed". Subclass of this class is used to monitor the near end of the trail in case of bidirectional trail the far end of the trail shall be supported additionaly. In case of monitoring of a bidirectional trail and Far End unavailability is monitored, an unavailable period starts if either the near end or the far end is in a unavailable condition. In case of monitoring of a unidirectional trail only the near end is considered.

An unavailable condition starts when 10 consecutive severely errored seconds have been detected; these 10 seconds belong to the unavailable time. An unavailable condition ends when 10 consecutive seconds with no severely errored second are detected. These 10 seconds belong to the available time. The unavailable period entry/exit criteria are described in Annex A/G.826.

If the **unavailableTimeAlarmPackage** is present and if an unavailable period starts, then a communication alarm shall be sent with a probable cause of "**Unavailable**" and the presence of this unavailable condition is indicated by the currentProblemList attribute. If an unavailable period is ending, then a communication alarm shall be sent with a probable cause of "**Unavailable**" and a severity of "**Cleared**". An available condition is indicated by the absence of the unavailable condition in the current problem list. The unavailable condition has no effect on the **operationalState**. Each subclass of this class shall define the performance attributes required to hold the mandatory or optional performance events. These performance event counts are inhibited during unavailable time. Attributes which are defined in a subclass of this class shall be included in history information using the **historyData**, or one of its subclass, unless it is explicitly specified in the subclass of this class that a particular attribute be not included. Each subclass of this class shall indicate which subclass of the history data is used for history retention. The following conditional packages are not used in this class: **filterSuppressionPkg**, **observedManagedObjectPkg**.***;**

6.2 Regenerator Section Current Data

rsCurrentData MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
msCurrentDataPackagePACKAGE
BEHAVIOUR rsCurrentDataBehaviour;
ATTRIBUTES
"Recommendation X.739 : 1993": granularityPeriod REQUIRED VALUES
SDHPMASN1.SDHGranularityPeriod,
bBE REPLACE-WITH-DEFAULT GET,
eS REPLACE-WITH-DEFAULT GET,
sES REPLACE-WITH-DEFAULT GET;;;
CONDITIONAL PACKAGES
oFSCurrentDataPackage PRESENT IF
"an instance supports it",
cSESCurrentDataPackage PRESENT IF
"an instance supports it",
uASCurrentDataPackage PRESENT IF
"an instance supports it";
REGISTERED AS {g774-01MObjectClass 2};

rsCurrentDataBehaviour BEHAVIOUR
DEFINED AS

*Instances of the **rsCurrentData** managed object Class are used to hold the current register counts for a regenerator section during a collection period. The following performance primitive is observed:

EB Errored Block

For the EB performance primitive, the following performance events are defined:

BBE Background Block Error

For the EB performance primitive and the following defects: Loss of Signal,

Loss of Frame, the following performance events are defined:

ES Errored Second

SES Severely Errored Second

In addition the following performance primitive is monitored

OOF Out of Frame

For the OOF performance primitive, the following performance events are defined:

OFS Out of Frame Second

This managed object class uses the **rsHistoryData** managed object class for history retention.

A QOS alarm shall be sent as soon as a threshold is reached or crossed. At the end of the granularity period the QOS alarm is implictly cleared, providing there are no other outstanding threshold crossing QOS alarms, "Threshold crossing" removed from the currentProblemList (i.e. No Notification is Sent) and a new QOS alarm shall be sent if the threshold is reached or crossed again during the next granularity period. Only one threshold value per performance counter will be supported.***;**

6.3 Regenerator Section Current Data Threshold Reset

rsCurrentDataTR MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
thresholdResetPackage,
rsCurrentDataTRPackage PACKAGE
BEHAVIOUR rsCurrentDataTRBehaviour;
ATTRIBUTES
"Recommendation X.739 : 1993": granularityPeriod PERMITTED VALUES
SDHPMASN1.SDHPVGranularityPeriod,
bBE REPLACE-WITH-DEFAULT GET,
eS REPLACE-WITH-DEFAULT GET,
sES REPLACE-WITH-DEFAULT GET;;;

CONDITIONAL PACKAGES
oFSCurrentDataPackage PRESENT IF
"an instance supports it",
cSESCurrentDataPackage PRESENT IF
"an instance supports it",
uASCurrentDataPackage PRESENT IF
"an instance supports it";
REGISTERED AS {g774-01MObjectClass 3};

rsCurrentDataTRBehaviour BEHAVIOUR
DEFINED AS

"Instances of the **rsCurrentDataTR** managed object Class are used to hold the current register counts for a regenerator section during a collection period. The following performance primitive is observed:

EB Errored Block

For the EB performance primitive, the following performance events are defined:

BBE Background Block Error

For the EB performance primitive and the following defects: Loss Of Signal, Loss Of Frame, the following performance events are defined:

ES Errored Second

SES Severely Errored Second

In addition the following performance primitive is monitored:

OOF Out of Frame

For the OOF performance primitive, the following performance events are defined:

OFS Out of Frame Second.

This managed object class uses the **rsHistoryData** managedobject class for history retention"**;**

6.4 Electrical Source Synchronous Physical Interface Current Data

electricalSourceSPICurrentData MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
transmitPowerLevelCurrentDataPackage,
electricalSourceSPICurrentDataPackage PACKAGE
BEHAVIOUR electricalSourceSPICurrentDataBehaviour;;;
CONDITIONAL PACKAGES
transmitPowerLevelTideMarkPackage PRESENT IF
"an instance supports it";
REGISTERED AS {g774-01MObjectClass 4};

electricalSourceSPICurrentDataBehaviour BEHAVIOUR
DEFINED AS

"Instances of the **electricalSPICurrentData** managed object Class are used to hold the monitoring of the physical characteristics of the output of an electrical source (**electricalSPITTP**). These characteristics are handled by **gauge attributes**. The following performance event is defined: **transmit Power Level**.

When a Tide Mark Package is used (in conjunction with its associated gauge), the corresponding **Tide Mark** attribute shall be reported in the history data at the end of the granularity period and the values of the tide marks shall be reset to the current values of the associated gauge at the end of the granularity period. The **unavailableTimeAlarmPackage** is not used in this class. This managed object class uses the **electricalSPIHistoryData** managed object class for history retention."**;**

6.5 Optical Source Synchronous Physical Interface CurrentData

opticalSourceSPICurrentData MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
opticalSourceSPICurrentDataPackage PACKAGE
BEHAVIOUR opticalSourceSPICurrentDataBehaviour;;;

CONDITIONAL PACKAGES
transmitPowerLevelCurrentDataPackage PRESENT IF
"an instance supports it",
transmitPowerLevelTideMarkPackage PRESENT IF
"an instance supports it and transmitPowerLevelCurrentDataPackage is present",
laserBiasCurrentDataPackage PRESENT IF
"an instance supports it",
laserBiasTideMarkPackage PRESENT IF
"an instance supports it and laserBiasCurrentDataPackage is present",
laserTemperatureCurrentDataPackage PRESENT IF
"an instance supports it",
laserTemperatureTideMarkPackage PRESENT IF
"an instance supports it and laserTemperatureCurrentDataPackage is present";
REGISTERED AS {g774-01MObjectClass 5};

opticalSourceSPICurrentDataBehaviour BEHAVIOUR
DEFINED AS

"Instances of the **opticalSPICurrentData** managed object Class are used to hold the monitoring of the physical characteristics of the output of an optical source (**opticalSPITTP**). These characteristics are handled by **gauge attributes**. The following performance primitives are observed:

OSL Optical Signal Level

For the OSL performance primitive, the following performance events are defined:

transmit Power Level

LB Laser Bias

For the LB performance primitive, the following performance events are defined:

laser Bias

LT Laser Temperature

For the LT performance primitive, the following performance events are defined:

laserTemperature

These performance event counts are inhibited under certain failure or unavailable conditions as specified in the following list :

Laser Shutdown

When a Tide Mark Package is used (in conjunction with its associated gauge), the corresponding **Tide Mark** attribute shall be reported in the history data at the end of the granularity period and the of the tide marks shall be reset to the current values of the associated gauge at the end of the granularity period. The **unavailableTimeAlarmPackage** is not used in this class. This managed object class uses the **opticalSPIHistoryData** managed object class for history retention."**;**

6.6 Multiplex Section Current Data

msCurrentData MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
msCurrentDataPackage PACKAGE
BEHAVIOUR msCurrentDataBehaviour;
ATTRIBUTES
"Recommendation X.739 : 1993": granularityPeriod REQUIRED VALUES
SDHPMASN1.SDHGranularityPeriod,
bBE REPLACE-WITH-DEFAULT GET,
eS REPLACE-WITH-DEFAULT GET,
sES REPLACE-WITH-DEFAULT GET;;;
CONDITIONAL PACKAGES
cSESCurrentDataPackage PRESENT IF
"an instance supports it",
farEndCSESCurrentDataPackage PRESENT IF
"an instance supports it",
uASCurrentDataPackage PRESENT IF
"an instance supports it",
farEndCurrentDataPackage PRESENT IF
"monitoring of the far end is supported and the monitored point is bidirectional.";
REGISTERED AS {g774-01MObjectClass 6};

msCurrentDataBehaviour BEHAVIOUR
DEFINED AS

*Instances of the **msCurrentData** managed object Class are used to hold the current register counts for a multiplex section trail termination point during a collection period. The following performance primitives are observed:

EB Errored Block

For the EB performance primitive, the following performance events are defined:

BBE Background Block Error

For the EB performance primitive and the following defect: MS-AIS, Excessive-Error, the following performance events are defined:

ES Errored Second

SES Severely Errored Second

This managed object class uses the **msHistoryData** managed object class for history retention.

A QOS alarm shall be sent as soon as a threshold is reached or crossed. At the end of the granularity period the QOS alarm is implictly cleared, providing there are no other outstanding threshold crossing QOS alarms, "Threshold crossing" removed from the currentProblemList (i.e. No Notification is Sent) and a new QOS alarm shall be sent if the threshold is reached or crossed again during the next granularity period. Only one threshold value per performance counter will be supported.***;**

6.7 Multiplex Section Current Data Threshold Reset

```
msCurrentDataTR  MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
thresholdReset Package,
msCurrentDataTRPackage PACKAGE
        BEHAVIOUR
        msCurrentDataTRBehaviour;
        ATTRIBUTES
        "Recommendation X.739 : 1993": granularityPeriod PERMITTED VALUES
            SDHPMASN1.SDHPVGranularityPeriod,
        bBE   REPLACE-WITH-DEFAULT GET,
        eS    REPLACE-WITH-DEFAULT GET,
        sES   REPLACE-WITH-DEFAULT GET;;;
CONDITIONAL PACKAGES
cSESCurrentDataPackage PRESENT IF
    "an instance supports it",
farEndCSESCurrentDataPackage PRESENT IF
    "an instance supports it",
uASCurrentDataPackage PRESENT IF
    "an instance supports it",
farEndCurrentDataPackage PRESENT IF
    "monitoring of the far end is supported and the monitored point is
    bidirectional.";
REGISTERED AS {g774-01MObjectClass 7};
```

msCurrentDataTRBehaviour BEHAVIOUR
DEFINED AS

"Instances of the **msCurrentDataTR** managed object Class are used to hold the current register counts for a multiplex section trail termination point during a collection period.

The following performance primitives are observed:

EB Errored Block

For the EB performance primitive, the following performance events are defined:

BBE Background Block Error

For the EB performance primitive and the following defect: MS-AIS, Excessive-Error,
the following performance events are defined:

ES Errored Second

SES Severely Errored Second

This managed object class uses the **msHistoryData** managed object class for history retention."**;**

6.8 Protection Current Data

NOTE – The use of this class is not meaningful for 1 + 1 non-revertive protection.

```
protectionCurrentData  MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
protectionCurrentDataPackage PACKAGE
        BEHAVIOUR
        protectionCurrentDataBehaviour;
        ATTRIBUTES
        "Recommendation X.739 : 1993": granularityPeriod REQUIRED VALUES
              SDHPMASN1.SDHGranularityPeriod,
        pSC    REPLACE-WITH-DEFAULT GET,
        pSD    REPLACE-WITH-DEFAULT GET;;;
REGISTERED AS {g774-01MObjectClass 8};

protectionCurrentDataBehaviour BEHAVIOUR
DEFINED AS
```

"Instances of the **protectionCurrentData** managed object Class are used to hold the current register counts for a protection during a collection period. The following performance primitives are observed:

PSC Protection Switch Count.

PSD Protection Switch Duration.

This managed object class uses the **protectionHistoryData** managed object class for history retention."**;**

6.9 Path Termination Current Data

```
pathTerminationCurrentData  MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
pathTerminationCurrentDataPackage  PACKAGE
        BEHAVIOUR  pathTerminationCurrentDataBehaviour;
        ATTRIBUTES
        "Recommendation X.739 : 1993": granularityPeriod REQUIRED VALUES
              SDHPMASN1.SDHGranularityPeriod,
        bBE    REPLACE-WITH-DEFAULT GET,
        eS     REPLACE-WITH-DEFAULT GET,
        sES    REPLACE-WITH-DEFAULT GET;;;
CONDITIONAL PACKAGES
cSESCurrentDataPackage PRESENT IF
    "an instance supports it",
farEndCSESCurrentDataPackage PRESENT IF
    "an instance supports it" ,
uASCurrentDataPackage PRESENT IF
    "an instance supports it",
farEndCurrentDataPackage PRESENT IF
    "if monitoring of the far end is supported and the monitored point is Bidirectional";
REGISTERED AS {g774-01MObjectClass 9};

pathTerminationCurrentDataBehaviour  BEHAVIOUR
DEFINED AS
```

*Instances of the **pathTerminationCurrentData** managed object Class are used to hold the current register counts for a High Order Path and or Low Order Path during a collection period. An instance of this object class, for a monitored managed object instance, holds the current register counts of each performance events (BBE, ES, SES, FEBBE, FEES, FESES, UAS).

Near End Monitoring

The following performance primitive are observed:

EB Errored Block

For the EB performance primitive, the following performance events are defined:

BBE Background Block Error

For the EB performance primitive and the following defect: AU-AIS/TU-AIS, **Path Trace Mismatch**, Signal **Label Mismatch**, and Loss of TU Multiframe, the following performance events are defined:

ES Errored Second

SES Severely Errored Second

Far End Monitoring

The following performance primitive are observed:

FEEB Far End Errored Block

For the FEEB performance primitive, the following performance events are defined:

FEBBE Far End Background Block Error

For the FEEB performance primitive and the following defect, Far End Remote Failure the following performance events are defined:

FEES Far End Errored Second

FESES Far End Severely Errored Second

This managed object class uses the pathTerminationHistoryData managed object class for history retention.

A QOS alarm shall be sent as soon as a threshold is reached or crossed. At the end of the granularity period the QOS alarm is implictly cleared and, providing there are no other outstanding threshold crossing QOS alarms, "Threshold crossing" removed from the currentProblemList (i.e. No Notification is Sent) and a new QOS alarm shall be sent if the threshold is reached or crossed again during the next granularity period. Only one threshold value per performance counter will be supported.***;**

6.10 Path Termination Current Data Threshold Reset

```
pathTerminationCurrentDataTR  MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
thresholdResetPackage,
pathTerminationCurrentDataTRPackage  PACKAGE
        BEHAVIOUR  pathTerminationCurrentDataTRBehaviour;
        ATTRIBUTES
        "Recommendation X.739 : 1993": granularityPeriod PERMITTED VALUES
              SDHPMASN1.SDHPVGranularityPeriod,
        bBE    REPLACE-WITH-DEFAULT GET,
        eS     REPLACE-WITH-DEFAULT GET,
        sES    REPLACE-WITH-DEFAULT GET;;;
CONDITIONAL PACKAGES
cSESCurrentDataPackage PRESENT IF
    "an instance supports it",
farEndCSESCurrentDataPackage PRESENT IF
    "an instance supports it",
uASCurrentDataPackage PRESENT IF
    "an instance supports it",
farEndCurrentDataPackage PRESENT IF
    "if monitoring of the far end is supported it and the monitored point is Bidirectional";
REGISTERED AS {g774-01MObjectClass 10};

pathTerminationCurrentDataTRBehaviour BEHAVIOUR
DEFINED AS
```

"Instances of the **pathTerminationCurrentDataTR** managed object Class are used to hold the current register counts for a **High Order Path** and or **Low Order Path** during a collection period. An instance of this object class, for a monitored managed object instance, holds the current register counts of each performance events (BBE, ES, SES, FEBBE , FEES, FESES, UAS).

Near End Monitoring The following performance primitive are observed:

EB Errored Block

For the EB performance primitive, the following performance events are defined:

BBE Background Block Error

For the EB performance primitive and the following defect: AU-AIS/TU-AIS, **Path Trace Mismatch**, Signal **Label Mismatch**, and Loss of TU Multiframe the following performance events are defined:

ES Errored Second

SES Severely Errored Second

Far End Monitoring

The following performance primitive are observed:

FEEB Far End Errored Block

For the FE EB performance primitive, the following performance events are defined:

FEBBE Far End Background Block Error

For the FEEB performance primitive and the following defect:

Far End Remote Failure the following performance events are defined:

FEES Far End Errored Second

FESES Far End Severely Errored Second

This managed object class uses the **pathTerminationHistoryData** managed object class for history retention."**;**

6.11 Multiplex Section Adaptation Current Data

msAdaptationCurrentData MANAGED OBJECT CLASS
DERIVED FROM sdhCurrentData;
CHARACTERIZED BY
msAdaptationCurrentDataPackage PACKAGE
BEHAVIOUR msAdaptationCurrentDataBehaviour;
ATTRIBUTES
pJCHigh GET,
pJCLow GET;;;
REGISTERED AS {g774-01MObjectClass 11};

msAdaptationCurrentDataBehaviour BEHAVIOUR
DEFINED AS

"Instances of this class are used to hold the pointer justification event (PJE) counts.Positive and negative PJEs are counted separately one selectable outgoing AUwithin an STM-N signal after the AU has been resynchronized to the local clock."**;**

6.12 Regenerator Section History Data

rsHistoryData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation Q.822 : 1993": historyData;
CHARACTERIZED BY
rsHistoryDataPackage PACKAGE
BEHAVIOUR rsHistoryDataBehaviour;
ATTRIBUTES
bBE GET,
eS GET,
sES GET ;;;
CONDITIONAL PACKAGES
oFSHistoryDataPackage PRESENT IF
"the containing rsCurrentData or rsCurrentDataTR instance contains the oFSCurrentDataPackage",
uASHistoryDataPackage PRESENT IF
"the containing rsCurrentData contains the uASCurrentDataPackage";
REGISTERED AS {g774-01MObjectClass 12};

rsHistoryDataBehaviour BEHAVIOUR
DEFINED AS

"Instances of this class are used to store the observed events of an **rsCurrentData** or **rsCurrentDataTR** object at the end of an observation interval. An instance of this managed object is contained by an **rsCurrentData** or **rsCurrentDataTR** managed object instance."**;**

6.13 Electrical Synchronous Physical Interface History Data

electricalSPIHistoryData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation Q.822 : 1993": historyData;
CHARACTERIZED BY
transmitPowerLevelCurrentDataPackage,
electricalSPIHistoryDataPackage PACKAGE
BEHAVIOUR opticalSPIHistoryDataBehaviour;;;
CONDITIONAL PACKAGES
transmitPowerLevelTideMarkPackage PRESENT IF
"the containing electricalSPICurrentData instance contains this package";
REGISTERED AS {g774-01MObjectClass 13;

electricalSPIHistoryDataBehaviour BEHAVIOUR
DEFINED AS

"Instances of this class are used to store the observed events of an **electricalSourceSPICurrentData** object at the end of an observation interval. An instance of this managed object is contained by an **electricalSourceSPICurrentData** managed object instance."**;**

6.14 Optical Synchronous Physical Interface History Data

opticalSPIHistoryData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation Q.822 : 1993": historyData;
CHARACTERIZED BY
opticalSPIHistoryDataPackage PACKAGE
BEHAVIOUR opticalSPIHistoryDataBehaviour;;;
CONDITIONAL PACKAGES
transmitPowerLevelCurrentDataPackage PRESENT IF
"the containing opticalSourceSPICurrentData instance contains this package",
transmitPowerLevelTideMarkPackage PRESENT IF
"the containing opticalSourceSPICurrentData instance contains this package",
laserBiasCurrentDataPackage PRESENT IF
"the containing opticalSourceSPICurrentData instance contains this package",
laserBiasTideMarkPackage PRESENT IF
"the containing opticalSourceSPICurrentData instance contains this package",
laserTemperatureCurrentDataPackage PRESENT IF
"the containing opticalSourceSPICurrentData instance contains this package",
laserTemperatureTideMarkPackage PRESENT IF
"the containing opticalSourceSPICurrentData instance contains this package";
REGISTERED AS {g774-01MObjectClass 14};

opticalSPIHistoryDataBehaviour BEHAVIOUR
DEFINED AS

"Instances of this class are used to store the observed events of an **opticalSourceSPICurrentData** object at the end of an observation interval. An instance of this managed object is contained by an **opticalSourceSPICurrentData** managed object instance."**;**

6.15 Multiplex Section History Data

msHistoryData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation Q.822 : 1993": historyData;
CHARACTERIZED BY
msHistoryDataPackage PACKAGE
BEHAVIOUR
msHistoryDataBehaviour;
ATTRIBUTES
bBE GET,
eS GET,
sES GET;;;
CONDITIONAL PACKAGES
uASHistoryDataPackage PRESENT IF
"the containing msCurrentData contains the uASCurrentDataPackage",
farEndHistoryDataPackage PRESENT IF
"the containing msCurrentData or msCurrentDataTR instance contains the farEndCurrentDataPackage";
REGISTERED AS {g774-01MObjectClass 15};

msHistoryDataBehaviour BEHAVIOUR
DEFINED AS

"Instances of this class are used to store the observed events of an **msCurrentData** or **msCurrentDataTR** object at the end of an observation interval. An instance of this managed object is contained by an **msCurrentData** or **msCurrentDataTR** managed object instance."**;**

6.16 Protection History Data

protectionHistoryData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation Q.822 : 1993": historyData;
CHARACTERIZED BY
protectionHistoryDataPackage PACKAGE
BEHAVIOUR protectionHistoryDataBehaviour;
ATTRIBUTES
pSC GET,
pSD GET;;;
REGISTERED AS {g774-01MObjectClass 16};

protectionHistoryDataBehaviour BEHAVIOUR
DEFINED AS

"Instances of this class are used to store the observed events of a **protectionCurrentData** object at the end of an observation interval. An instance of this managed object is contained by a **protectionCurrentData** or subclass managed object instance."**;**

6.17 Path Termination History Data

pathTerminationHistoryData MANAGED OBJECT CLASS
DERIVED FROM "Recommendation Q.822 : 1993": historyData;
CHARACTERIZED BY
pathTerminationHistoryDataPackage PACKAGE
BEHAVIOUR pathTerminationHistoryDataBehaviour;
ATTRIBUTES
bBE GET,
eS GET,
sES GET ;;;
CONDITIONAL PACKAGES
uASHistoryDataPackage PRESENT IF
"the containing pathTerminationCurrentData or contains the uASCurrentDataPackage",

farEndHistoryDataPackage PRESENT IF

"the containing pathTerminationCurrentData or pathTerminationCurrentDataTR instance contains the farEndCurrentDataPackage";

REGISTERED AS {g774-01MObjectClass 17};

pathTerminationHistoryDataBehaviour BEHAVIOUR

DEFINED AS

"Instances of this class are used to store the observed events of a **pathTerminationCurrentData** or **pathTerminationCurrentDataTR** object at the end of an observation interval. An instance of this managed object is contained by a **pathTerminationCurrentData** or **pathTerminationCurrentDataTR** managed object instance."**;**

6.18 Multiplex Section Adaptation History Data

msAdaptationHistoryData MANAGED OBJECT CLASS

DERIVED FROM "Recommendation Q.822 : 1993": historyData;

CHARACTERIZED BY

msAdaptationHistoryDataPackage PACKAGE

BEHAVIOUR msAdaptationHistoryDataBehaviour;

ATTRIBUTES

pJCHigh GET,

pJCLow GET;;;

REGISTERED AS {g774-01MObjectClass 18};

msAdaptationHistoryDataBehaviour BEHAVIOUR

DEFINED AS

"Instances of this class are used to store the observed events of an **msAdaptationCurrentData** object at the end of an observation interval. An instance of this managed object is contained by an **msAdaptationCurrentData** managed object instance."**;**

7 Package Definitions

7.1 Consecutive Severely Errored Second Current Data Package

cSESCurrentDataPackage PACKAGE

BEHAVIOUR

cSESCurrentDataPackageBehaviour;

ATTRIBUTES

cSESEvent GET,

nCSES PERMITTED VALUES SDHPMASN1.NCSESRange GET-REPLACE;

REGISTERED AS {g774-01Package 1};

cSESCurrentDataPackageBehaviour BEHAVIOUR

DEFINED AS

"This package is used to hold Consecutive Severely Errored Second (CSES) events. A CSES is detected each time x consecutive SES appear. The number of consecutive SES that generate a CSES is given by the nCSES attribute, in the range of 2 to 9. The cSES events are not detected during unavailable time. The CSES events are recorded in the **cSESEvent** attribute, this attribute contains the time at which the consecutive severely errored seconds started and the value of the nCSES attribute at the time the event has occured. The **cSESEvent** attribute shall at least support recording of 6 CSES events. When the **cSESEvent** attribute is full, a **wrapping** mechanism is used to discard the oldest CSES event. These attributes are not reset and are not stored in history data objects at the end of the granularity period. The **cSESEvent** attribute is initialized as an empty set when the corresponding object that holds this attribute is created. The CSES event is described in Recommendation G.784."**;**

7.2 Far End Consecutive Severely Errored Second Current Data Package

farEndCSESCurrentDataPackage PACKAGE
BEHAVIOUR
farEndCSESCurrentDataPackageBehaviour;
ATTRIBUTES
fECSESEvent GET,
nCSES PERMITTED VALUES SDHPMASN1.NCSESRange GET-REPLACE ;
REGISTERED AS {g774-01Package 2};

farEndCSESCurrentDataPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to hold Far End Consecutive Severely Errored Second (FECSES) events. A fECSES is detected each time x consecutive fESES appear. The number of consecutive fESES that generate a fECSES is given by the nCSES attribute, in the range of 2 to 9. The fECSES events are not detected during unavailable time. The fECSES events are recorded in the **fECSESEvent** attribute, this attribute contains the time at which the far end consecutive severely errored seconds started and the value of the nCSES attribute at the time the event has occured. The **fECSESEvent** attribute shall at least support recording of 6 fECSES events. When the **fECSESEvent** attribute is full, a **wrapping** mechanism is used to discard the oldest fECSES event . These attributes are not reset and are not stored in history data objects at the end of the granularity period. The **fECSESEvent** attribute is initialized as an empty set when the corresponding object that holds this attribute is created."**;**

7.3 Far End Current Data Package

farEndCurrentDataPackage PACKAGE
BEHAVIOUR
farEndCurrentDataPackageBehaviour;
ATTRIBUTES
fEBBE REPLACE-WITH-DEFAULT GET,
fEES REPLACE-WITH-DEFAULT GET,
fESES REPLACE-WITH-DEFAULT GET;
REGISTERED AS {g774-01Package 3};

farEndCurrentDataPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to record the far end performance event counts."**;**

7.4 Far End History Data Package

farEndHistoryDataPackage PACKAGE
BEHAVIOUR
farEndHistoryDataPackageBehaviour;
ATTRIBUTES
fEBBE GET,
fEES GET,
fESES GET;
REGISTERED AS {g774-01Package 4};

farEndHistoryDataPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to record the corresponding current data attribute values at the end of the granularity period."**;**

7.5 History Package

historyPackage PACKAGE
BEHAVIOUR
historyPackageBehaviour;
REGISTERED AS {g774-01Package 5};

historyPackageBehaviour BEHAVIOUR
DEFINED AS

"At the end of each performance interval an instance of **historyData** or one of its subclass shall be created if history retention was not suppressed by other means such as zero suppression. The values of the **historyData** object or one of its subclass is the copy of the values of the corresponding attributes of the **currentData** or one of its subclass at the end of each performance interval. Once the new **historyData** instance is created or one of its subclass this instance shall be retained in the Network Element at least for 16 periods of 15 minutes for 15' performance interval and 1 period of 1 day for 1 day performance interval. The storing of history data is described in 5.3.2/G.784."**;**

7.6 Laser Bias Current Data Package

laserBiasCurrentDataPackage PACKAGE
BEHAVIOUR
laserBiasCurrentDataPackageBehaviour;
ATTRIBUTES
laserBias GET;
REGISTERED AS {g774-01Package 6};

laserBiasCurrentDataPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to store the gauge of percentage of laser bias of an SDH optical source."**;**

7.7 Laser Bias Tide Mark Package

laserBiasTideMarkPackage PACKAGE
BEHAVIOUR
laserBiasTideMarkPackageBehaviour;
ATTRIBUTES
laserBiasTideMarkMax GET,
laserBiasTideMarkMin GET;
REGISTERED AS {g774-01Package 7};

laserBiasTideMarkPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to store the minimum and maximum values reached by the laser bias gauge during an observation period."**;**

7.8 Laser Temperature Current Data Package

laserTemperatureCurrentDataPackage PACKAGE
BEHAVIOUR
laserTemperatureCurrentDataPackageBehaviour;
ATTRIBUTES
laserTemperature GET;
REGISTERED AS {g774-01Package 8};

laserTemperatureCurrentDataPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to store the gauge of laser temperature value of an SDH optical source."**;**

7.9 Laser Temperature Tide Mark Package

```
laserTemperatureTideMarkPackage PACKAGE
  BEHAVIOUR
    laserTemperatureTideMarkPackageBehaviour;
  ATTRIBUTES
    laserTemperatureTideMarkMax  GET,
    laserTemperatureTideMarkMin  GET;
REGISTERED AS {g774-01Package 9};

laserTemperatureTideMarkPackageBehaviour BEHAVIOUR
DEFINED AS
```

"This package is used to store the minimum and maximum values reached by the laser temperature gauge during an observation period."**;**

7.10 Out of Frame Second Current Data Package

```
oFSCurrentDataPackage PACKAGE
  BEHAVIOUR
    oFSCurrentDataPackageBehaviour;
  ATTRIBUTES
    oFS REPLACE-WITH-DEFAULT GET;
REGISTERED AS {g774-01Package 10};

oFSCurrentDataPackageBehaviour BEHAVIOUR
DEFINED AS
```

"This package is used to store the counter of one second intervals containing one or more Out of Frame."**;**

7.11 Out Of Frame Second History Data Package

```
oFSHistoryDataPackage  PACKAGE
  BEHAVIOUR
    oFSHistoryDataPackageBehaviour;
  ATTRIBUTES
    oFS GET;
REGISTERED AS {g774-01Package 11};

oFSHistoryDataPackageBehaviour BEHAVIOUR
DEFINED AS
```

"This package is used to record the corresponding current data attribute values at the end of the granularity period."**;**

7.12 Transmit Power Level Current Data Package

```
transmitPowerLevelCurrentDataPackage  PACKAGE
  BEHAVIOUR
    transmitPowerLevelCurrentDataPackageBehaviour;
  ATTRIBUTES
    transmitPowerLevel GET;
REGISTERED AS {g774-01Package 12};

transmitPowerLevelCurrentDataPackageBehaviour BEHAVIOUR
DEFINED AS
```

"This package is used to store the gauge of transmit power level value of a physical source."**;**

7.13 Transmit Power Level Tide Mark Package

transmitPowerLevelTideMarkPackage PACKAGE
BEHAVIOUR
transmitPowerLevelTideMarkPackageBehaviour;
ATTRIBUTES
transmitPowerLevelTideMarkMax GET,
transmitPowerLevelTideMarkMin GET;
REGISTERED AS {g774-01Package 13};

transmitPowerLevelTideMarkPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to store the minimum and maximum values reached by the transmit power level gauge during an observation period."**;**

7.14 Threshold Reset Package

thresholdResetPackage PACKAGE
BEHAVIOUR
thresholdResetPackageBehaviour;
REGISTERED AS {g774-01Package 14};

thresholdResetPackageBehaviour BEHAVIOUR
DEFINED AS

* The following rules apply to the thresholds mechanism:

– ES thresholds:

Two thresholds are defined: The upper ES threshold and the low ES threshold – No more than one QOS alarm shall be generated until there has been a 15 minute rectangular fixed window with less ES than the low ES threshold and no unavailable period. At the end of the first 15 minute rectangular period with less ES than the low ES threshold and no unavailable period, if a threshold crossing has been previously generated, then a QOS alarm shall be sent which indicates the clearing of the low ES threshold, and the "Threshold crossing" removed from the currentProblemList. If the upper ES threshold is reached or crossed, after a 15-minute rectangular fixed window with less ES than the low ES threshold, then a QOS alarm shall be sent.

– SES threshold:

One threshold is defined – No more than one QOS alarm shall be generated until there has been a 15-minute rectangular fixed window with zero SES. At the end of the first 15-minute rectangular period with zero SES, a QOS alarm shall be sent which indicates the clearing of a zero threshold. If after a 15-minute rectangular fixed window with zero SES the SES threshold is reached or crossed then a QOS alarm shall be sent.

– BBE threshold: refer to the ES threshold.

For any of the above thresholds, A QOS clear will not be sent if the Performance Monitoring Data is suspect, as defined by the **suspectIntervalFlag** attribute.***;**

7.15 Unavailable Second Current Data Package

uASCurrentDataPackage PACKAGE
BEHAVIOUR
uASCurrentDataPackageBehaviour;
ATTRIBUTES
uAS REPLACE-WITH-DEFAULT GET;
REGISTERED AS {g774-01Package 15};

uASCurrentDataPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to store the counter of one second intervals pertaining to an Unavailable Time."**;**

7.16 Unavailable Second History Data Package

uASHistoryDataPackage PACKAGE
BEHAVIOUR
uASHistoryDataPackageBehaviour;
ATTRIBUTES
uAS GET;
REGISTERED AS {g774-01Package 16};

uASHistoryDataPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used to record the corresponding current data attribute values at the end of the granularity period."**;**

7.17 Unavailable Time Alarm Package

unavailableTimeAlarmPackage PACKAGE
BEHAVIOUR
unavailableTimeAlarmPackageBehaviour;
NOTIFICATIONS
"Recommendation X.733 : 1992": communicationsAlarm;
REGISTERED AS {g774-01Package 17};

unavailableTimeAlarmPackageBehaviour BEHAVIOUR
DEFINED AS

"This package is used when a Communication Alarm Notification with the probable cause. Unavailable is to be emitted to indicate the beginning of an unavailable time period. The end of an unavailable time period shall be indicated by the clearing of this alarm."**;**

8 Attributes definitions

8.1 Consecutive Severely Errored Second Event

cSESEvent ATTRIBUTE
WITH ATTRIBUTE SYNTAX SDHPMASN1.CSES;
BEHAVIOUR
cSESEventBehaviour BEHAVIOUR
DEFINED AS

"The value of the **cSESEvent** attribute represents the recording of at least 6 cSES events. A cSES event is generated each time x consecutive SES appear during the available time of the monitored resource."

;;
REGISTERED AS {g774-01Attribute 1};

8.2 Errored Second

eS ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
eSBeh BEHAVIOUR
DEFINED AS

"The value of the eS attribute represents the count of seconds with one or more errored blocks during the available time of the monitored resource during the corresponding granularity period. The ES performance event is described in 3.1.1/G.826."

;;
REGISTERED AS {g774-01Attribute 2};

8.3 Far End Errored Second

fEES ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
ffEESBeh BEHAVIOUR
DEFINED AS

"The value of the fEES attribute represents the count of seconds with one or more far end errored blocks detected at the remote terminal during the available time of the monitored resource during the corresponding granularity period."

;;
REGISTERED AS {g774-01Attribute 3};

8.4 Far End Background Block Error

fEBBE ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
fEBBEBeh BEHAVIOUR
DEFINED AS

"The value of the fEBBE attribute represents the count of errored blocks (Estimate Errored Block on Bip-n violation) not occuring as part of an fESES."

;;
REGISTERED AS {g774-01Attribute 4};

8.5 Far End Consecutive Severely Errored Second Event

fECSESEvent ATTRIBUTE
WITH ATTRIBUTE SYNTAX SDHPMASN1.CSES;
BEHAVIOUR
fECSESEventBehaviour BEHAVIOUR
DEFINED AS

"The value of the **fECSESEvent** attribute represents the recording of at least 6 fECSES events. A fECSES event is generated each time x consecutive fESES appear during the available time of the monitored resource during the corresponding granularity period."

;;
REGISTERED AS {g774-01Attribute 5};

8.6 Laser Bias

laserBias ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": gauge;
BEHAVIOUR
laserBiasBeh BEHAVIOUR
DEFINED AS

"The value of the **laserBias** attribute represents the percentage of the normalized value of laser bias current at a SDH optical SPI source or a SDH optical SPI bidirectional trail termination point."

;;
REGISTERED AS {g774-01Attribute 6};

8.7 Laser Bias Tide Mark Maximum

laserBiasTideMarkMax ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": tideMark;
BEHAVIOUR
laserBiasTideMarkMaxBeh BEHAVIOUR
DEFINED AS

"The laserBias TideMark Maximum attribute stores the maximum value reached by the laser bias during a granularity period."

;;
REGISTERED AS {g774-01Attribute 7};

8.8 Laser Bias Tide Mark Minimum

laserBiasTideMarkMin ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": tideMark;
BEHAVIOUR
laserBiasTideMarkMinBeh BEHAVIOUR
DEFINED AS

"The laserBias TideMark Minimum attribute stores the minimum value reached by the laser bias during a granularity period."

;;
REGISTERED AS {g774-01Attribute 8};

8.9 Laser Temperature

laserTemperature ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": gauge;
BEHAVIOUR
laserTemperatureBeh BEHAVIOUR
DEFINED AS

"The value of the **laserTemperature** attribute represents the laser temperature of a physical optical source."

;;
REGISTERED AS {g774-01Attribute 9};

8.10 Laser Temperature Tide Mark Maximum

laserTemperatureTideMarkMax ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": tideMark;
BEHAVIOUR
laserTemperatureTideMarkMaxBeh BEHAVIOUR
DEFINED AS

"The laserTemperature TideMark Maximum attribute stores the maximum value reached by the laser temperature during an granularity period."

;;
REGISTERED AS {g774-01Attribute 10};

8.11 Laser Temperature Tide Mark Minimum

laserTemperatureTideMarkMin ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": tideMark;
BEHAVIOUR
laserTemperatureTideMarkMinBeh BEHAVIOUR
DEFINED AS

"The laserTemperature TideMark Minimum attribute stores the minimum value reached by the laser temperature during an granularity period."

;;
REGISTERED AS {g774-01Attribute 11};

8.12 Number of Consecutive Severely Errored Second

nCSES ATTRIBUTE
WITH ATTRIBUTE SYNTAX SDHPMASN1.NCSESRange;
BEHAVIOUR
nCSESBeh BEHAVIOUR
DEFINED AS

"The value of the nCSES attribute represents the number of consecutive (near or far end) SES which will lead to the generation of a (near or far end) cSES event. The nCSES is in the range 2 to 9."

;;
REGISTERED AS {g774-01Attribute 12};

8.13 Background Block Error

bBE ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
bBEBeh BEHAVIOUR
DEFINED AS

"The value of the BBE attribute represents the count of errored blocks (Estimate Errored Block on Bip-n violation) not occuring as part of an SES. The BBE performance event is described in 3.1.1/G.826."

;;
REGISTERED AS {g774-01Attribute 13};

8.14 Out of Frame Second

oFS ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
oFSBeh BEHAVIOUR
DEFINED AS

"The value of the oFS attribute represents the count of seconds with at least one Out Of Frame Event during the available time of the monitored resource during the corresponding granularity period."

;;
REGISTERED AS {g774-01Attribute 14};

8.15 Protection Switch Count

pSC ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
pSCBeh BEHAVIOUR
DEFINED AS

"In the case of a protected unit, the value of the pSC attribute represents the count of switches to the protecting unit. In the case of a protecting unit, this attribute represents the count of switches from any protected unit to that protecting unit. *Editor Note:* This behaviour needs clarification in accordance to protection management."

;;
REGISTERED AS {g774-01Attribute 15};

8.16 Protection Switch Duration

pSD ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
pSDBeh BEHAVIOUR
DEFINED AS

"The value of the pSD attribute represents the count of seconds during which the service was switched from working to protection."

;;
REGISTERED AS {g774-01Attribute 16};

8.17 Severely Errored Seconds

sES ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
sESBeh BEHAVIOUR
DEFINED AS

"The value of the sES attribute represents the count of one second periods containing greater than or equal to 30% of errored blocks, or at least one Severely Disturbed Period (SDP) that is one second containing one or more defects during the available time of the monitored resource during the corresponding granularity period. An SES is also counted as an ES. The SES performance event is described in Recommendation G.826."

;;
REGISTERED AS {g774-01Attribute 17};

8.18 Far End Severely Errored Seconds

fESES ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
fESESBeh BEHAVIOUR
DEFINED AS

"The value of the fESES attribute represents the count of one second periods containing greater than or equal to 30% of far end errored blocks as detected at the remote terminal (fEBC), or at least one Far End Severely Disturbed Period (SDP) that is one second containing one or more far end defects as detected at the remote terminal (FERF) during the available time of the monitored resource during the corresponding granularity period. An fESES is also counted as an fEES."

;;
REGISTERED AS {g774-01Attribute 18};

8.19 Transmit Power Level

transmitPowerLevel ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": gauge;
BEHAVIOUR
transmitPowerLevelBeh BEHAVIOUR
DEFINED AS

"The value of the **transmitPowerLevel gauge** attribute represents the value of the output signal level emitted by a physical (electrical or optical) source."

;;
REGISTERED AS {g774-01Attribute 19};

8.20 Transmit Power Level Tide Mark Maximum

transmitPowerLevelTideMarkMax ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": tideMark;
BEHAVIOUR
transmitPowerLevelTideMarkMaxBeh BEHAVIOUR
DEFINED AS

"The **transmitPowerLevelTideMark Maximum** attribute stores the maximum value reached by the transmit power level during an observation period."

;;
REGISTERED AS {g774-01Attribute 20};

8.21 Transmit Power Level Tide Mark Minimum

transmitPowerLevelTideMarkMin ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": tideMark;
BEHAVIOUR
transmitPowerLevelTideMarkMinBeh BEHAVIOUR
DEFINED AS

"The **transmitPowerLevelTideMark Minimum** attribute stores the minimum value reached by the transmit power level during an observation period."

;;
REGISTERED AS {g774-01Attribute 21};

8.22 Unavailable Seconds

uAS ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
uASBeh BEHAVIOUR
DEFINED AS

"The value of the uAS attribute represents the count of one second intervals pertaining to an UnavailableTime. A period of unavailable time begins when the SES continues for a period of ten consecutive seconds. These seconds are considered to be unavailable time. A new period of available time begins with the first second of ten consecutive non-SES. The unavailable time entry/exit criteria is described in Annex A/G.826."

;;
REGISTERED AS {g774-01Attribute 22};

8.23 Pointer Justification Count High

pJCHigh ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
pJCHighBehaviour BEHAVIOUR
DEFINED AS

"The value of the **pJCHigh** attribute represents the positive PJE count on one selectable outgoing AU within an STM-N signal after the AU has been resynchronized to the local clock."

;;
REGISTERED AS {g774-01Attribute 23};

8.24 Pointer Justification Count Low

pJCLow ATTRIBUTE
DERIVED FROM "Rec. X.721 | ISO/IEC 10165-2 : 1992": counter;
BEHAVIOUR
pJCLowBehaviour BEHAVIOUR
DEFINED AS

"The value of the **pJCLow** attribute represents the negative PJE count on one selectable outgoing AU within an STM-N signal after the AU has been resynchronized to the local clock."

;;
REGISTERED AS {g774-01Attribute 24};

9 Actions

None.

10 Notifications

None.

11 Parameters

None.

12 Name binding definitions

12.1 History Data – SDH Current Data

historyData-sdhCurrentData NAME BINDING
SUBORDINATE OBJECT CLASS "Recommendation Q.822 : 1993": historyData AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS sdhCurrentData AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation Q.822 : 1993": historyDataId;
BEHAVIOUR
historyData-sdhCurrentDataBehaviour BEHAVIOUR
DEFINED AS

"Instance of the **historyData** object class or one of its subclass is created at the end of the granularity period of an instance of the **sdhCurrentData** object or one of its subclass and is directly contained by that instance."

;;
DELETE
DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 1};

12.2 MS Current Data – MS TTP Sink

msCurrentData-msTTPSink NAME BINDING
SUBORDINATE OBJECT CLASS msCurrentData AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": msTTPSink AND SUBCLASSES;
WITH ATTRIBUTE "Recommendation X.739 : 1993": scannerId;
CREATE
WITH-REFERENCE-OBJECT,
WITH-AUTOMATIC-INSTANCE-NAMING;
DELETE
DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 2};

12.3 MS Current Data Threshold Reset – MS TTP Sink

```
msCurrentDataTR-msTTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  msCurrentDataTR  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS "Recommendation G.774 : 1992": msTTPSink AND SUBCLASSES;
    WITH ATTRIBUTE "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 3};
```

12.4 MS Current Data – Protected TTP Sink

```
msCurrentData-protectedTTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  msCurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774.03 : 1993": protectedTTPSink AND SUBCLASSES;
    WITH ATTRIBUTE "Recommendation G.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 4};
```

12.5 MS Current Data Threshold Reset – Protected TTP Sink

```
msCurrentDataTR-protectedTTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  msCurrentDataTR  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774.03 : 1993": protectedTTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation G.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 5};
```

12.6 Protection Current Data – Protection Unit

```
protectionCurrentData-protectionUnit  NAME BINDING
  SUBORDINATE OBJECT CLASS  protectionCurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774.03 : 1993": protectionUnit AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation G.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 6};
```

12.7 RS Current Data – RS TTP Sink

```
rsCurrentData-rsTTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  rsCurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": rsTTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 7};
```

12.8 RS Current Data Threshold Reset – RS TTP Sink

```
rsCurrentDataTR-rsTTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  rsCurrentDataTR  AND SUBCLASSES
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": rsTTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 8};
```

12.9 Path Termination Current Data – VC4 TTP Sink

```
pathTerminationCurrentData-vc4TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc4TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 9};
```

12.10 Path Termination Current Data – VC3 TTP Sink

```
pathTerminationCurrentData-vc3TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc3TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 10};
```

12.11 Path Termination Current Data – VC2 TTP Sink

```
pathTerminationCurrentData-vc2TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992" vc2TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 11};
```

12.12 Path Termination Current Data – VC12 TTP Sink

```
pathTerminationCurrentData-vc12TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc12TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 12};
```

12.13 Path Termination Current Data – VC11 TTP Sink

```
pathTerminationCurrentData-vc11TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentData AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc11TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 13};
```

12.14 Path Termination Current Data Threshold Reset – VC4 TTP Sink

```
pathTerminationCurrentDataTR-vc4TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentDataTR  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc4TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 14};
```

12.15 Path Termination Current Data Threshold Reset - VC3 TTP Sink

```
pathTerminationCurrentDataTR-vc3TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentDataTR  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc3TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 15};
```

12.16 Path Termination Current Data Threshold Reset – VC2 TTP Sink

```
pathTerminationCurrentDataTR-vc2TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentDataTR  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc2TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 16};
```

12.17 Path Termination Current Data Threshold Reset – VC12 TTP Sink

```
pathTerminationCurrentDataTR-vc12TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentDataTR  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc12TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 17};
```

12.18 Path Termination Current Data Threshold Reset – VC11 TTP Sink

```
pathTerminationCurrentDataTR-vc11TTPSink NAME BINDING
  SUBORDINATE OBJECT CLASS  pathTerminationCurrentDataTR AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": vc11TTPSink AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 18};
```

12.19 Electrical Source SPI Current Data – Electrical SPITTP Source

```
electricalSourceSPICurrentData-electricalSPITTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS  electricalSourceSPICurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": electricalSPITTPSource AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 19};
```

12.20 Optical Source SPI Current Data – Optical SPITTP Source

```
opticalSourceSPICurrentData-opticalSPITTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS  opticalSourceSPICurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": opticalSPITTPSource AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 20};
```

12.21 MS Adaptation Current Data – AU4 CTP Source

```
msAdaptationCurrentData-au4CTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS  msAdaptationCurrentData AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": au4CTPSource AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 21};
```

12.22 MS Adaptation Current Data – AU3 CTP Source

```
msAdaptationCurrentData-au3CTPSource NAME BINDING
  SUBORDINATE OBJECT CLASS  msAdaptationCurrentData  AND SUBCLASSES;
  NAMED BY
    SUPERIOR OBJECT CLASS  "Recommendation G.774 : 1992": au3CTPSource AND SUBCLASSES;
    WITH ATTRIBUTE  "Recommendation X.739 : 1993": scannerId;
  CREATE
    WITH-REFERENCE-OBJECT,
    WITH-AUTOMATIC-INSTANCE-NAMING;
  DELETE
    DELETES-CONTAINED-OBJECTS;
REGISTERED AS {g774-01NameBinding 22};
```

13 Subordination Rules

None.

14 Pointer Constraints

None.

15 Supporting ASN.1 Productions

```
SDHPMASN1 { itu(0) recommendation(0) g(7) g774(774) hyphen(127) pm(01) informationModel(0)
asn1Module(2) sdhpm (0) }

DEFINITIONS IMPLICIT TAGS ::=

BEGIN

-- EXPORTS everything

IMPORTS

ProbableCause FROM Attribute-ASN1Module { joint-iso-itu ms(9) smi(3) part2(2) asn1Module(2) 1}

TimePeriod FROM MetricModule {joint-iso-itu ms(9) function(2) part11(11) asn1Module(2) 0};

sdhPM OBJECT IDENTIFIER ::= {itu(0) recommendation(0) g(7) g774(774) hyphen(127) pm(01) informationModel(0) }

g774-01MObjectClass OBJECT IDENTIFIER ::= {sdhPM managedObjectClass(3)}

g774-01Attribute OBJECT IDENTIFIER ::= {sdhPM attribute(7)}

g774-01NameBinding OBJECT IDENTIFIER ::= {sdhPM nameBinding(6)}

g774-01Package OBJECT IDENTIFIER ::= {sdhPM package(4)}

Integer ::= INTEGER

CSES ::= SET OF SEQUENCE {
                                    eventTime   GeneralizedTime
                                    nCSES       NCSESRange
                                   }

NCSESRange ::= Integer(2 .. 9)

SDHGranularityPeriod ::= TimePeriod (WITH COMPONENTS (minutes (15), days(1))

SDHPVGranularityPeriod ::= TimePeriod (WITH COMPONENTS (minutes (15))

END  --  end of SDHPMASN1
```

Annex A

Inheritance and Naming Diagrams

(informative)

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

See Figures A.1 and A.2.

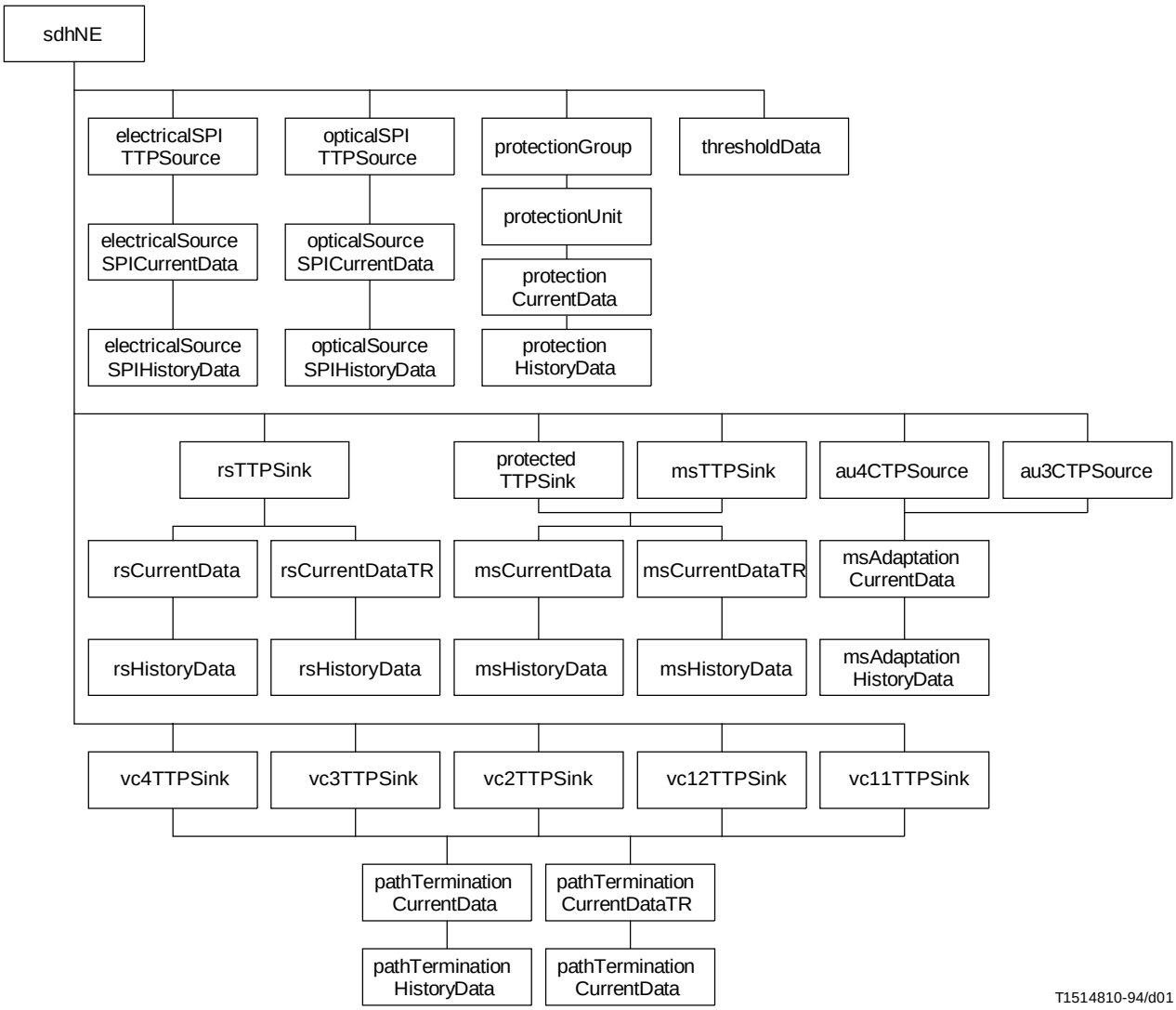
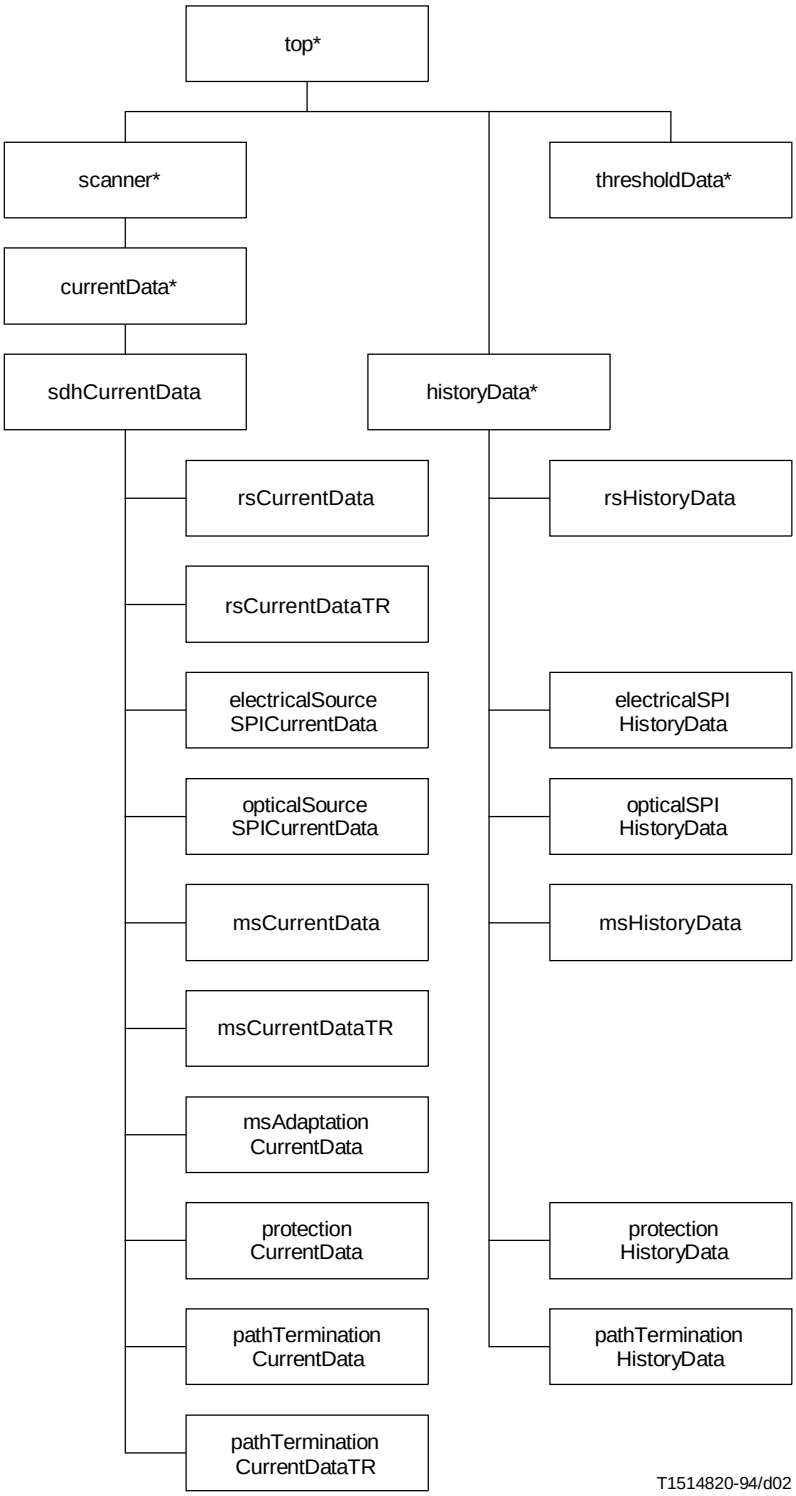


FIGURE A.1/G.774.01

Object Naming for Performance Management Fragment



* Not defined in this Recommendation.

FIGURE A.2/G.774.01

Inheritance Tree for Performance Management Fragment

Annex B

Threshold Reset (TR) Behaviour

(informative)

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

Figure B.1 illustrates the Threshold Reset (TR) behaviour for three possible scenarios.

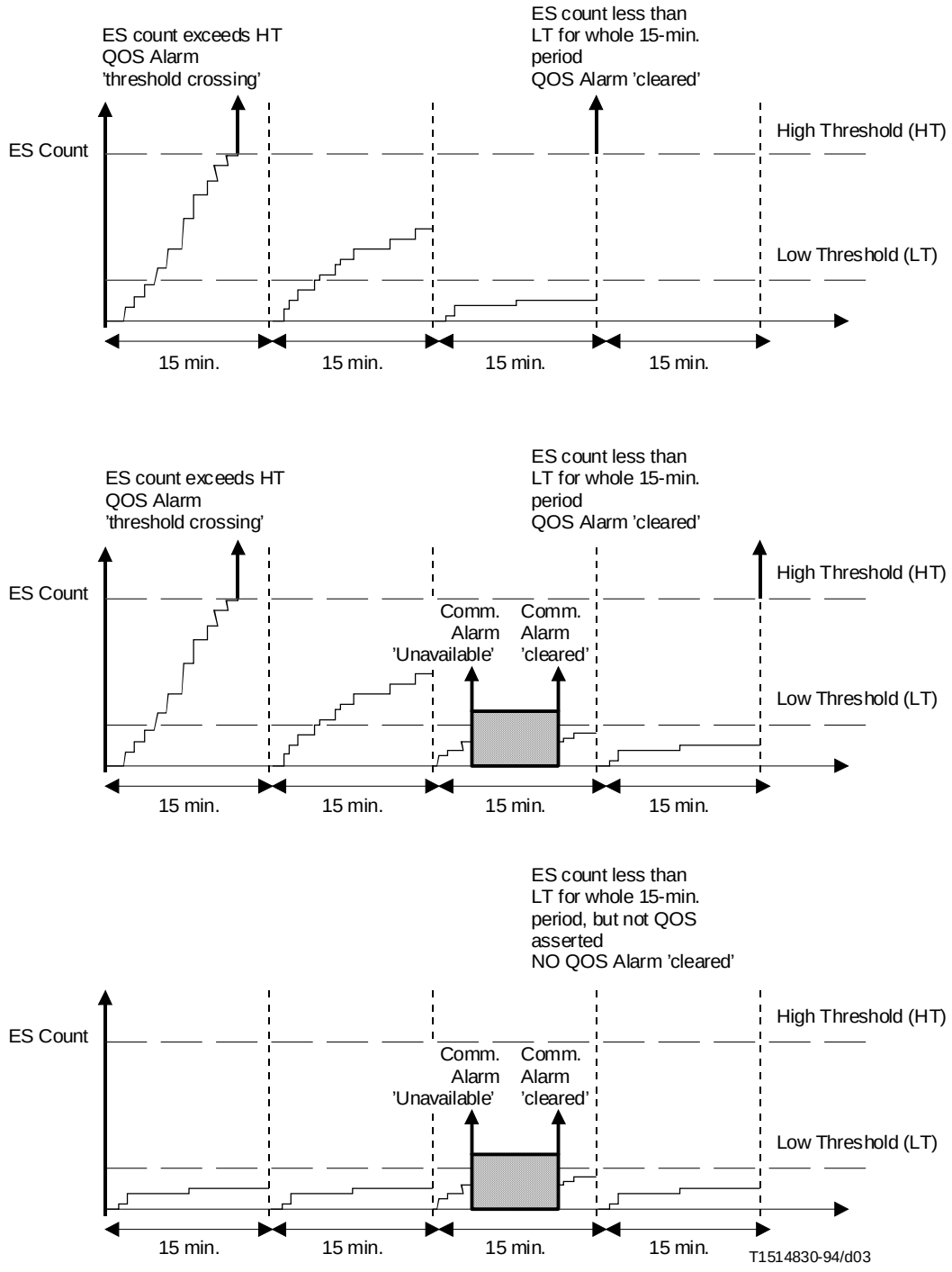


FIGURE B.1/G.774.01

Threshold Reset (TR) Behaviour