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# An SNMP MIB extension to RFC3591 to manage optical interface parameters of DWDM applications

draft-galikunze-ccamp-g-698-2-snmp-mib-01

## Abstract

This memo defines a module of the Management Information Base (MIB) used by Simple Network Management Protocol (SNMP) in TCP/IP- based internets. In particular, it defines objects for managing Optical parameters associated with Dense Wavelength Division Multiplexing (DWDM) interfaces or characterized by the Optical Transport Network (OTN). This is an extension of the RFC3591 to support the optical parameters mainly but not only described in recommendations like ITU-T G.698.2. [ITU.G698.2]

The MIB module defined in this memo can be used for Optical Parameters monitoring and/or configuration of the endpoints of Black Links.



## Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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## 1. Introduction

This memo defines a portion of the Management Information Base (MIB) used by Simple Network Management Protocol (SNMP) in TCP/IP- based internets. In particular, it defines objects for managing Optical parameters associated with Wavelength Division Multiplexing (WDM) systems or characterized by the Optical Transport Network (OTN) in accordance with but not limited to the optical interface defined in G.698.2 [ITU.G698.2]

Black Link approach allows supporting an optical transmitter/receiver pair of one vendor to inject a DWDM channel and run it over an optical network composed of amplifiers, filters, add-drop multiplexers from a different vendor. From architectural point of view, the "Black Link" is a set of pre-configured/qualified network connections between the G.698.2 reference points S and R. The black links will be managed at the edges (i.e. the transmitters and receivers attached to the S and R reference points respectively) for the relevant parameters specified in G.698.2 [ITU.G698.2], G.798 [ITU.G798], G.874 [ITU.G874], and the performance parameters specified G.7710/Y.1701 [ITU-T G.7710] and and G.874.1 [ITU.G874.1].

The G.698.2 [ITU.G698.2] provides optical parameter values for physical layer interfaces of Dense Wavelength Division Multiplexing (DWDM) systems primarily intended for metro applications which include optical amplifiers. Applications are defined in G.698.2 [ITU.G698.2] using optical interface parameters at the single-channel connection points between optical transmitters and the optical multiplexer, as well as between optical receivers and the optical demultiplexer in the DWDM system. This Recommendation uses a methodology which does not specify the details of the optical link, e.g. the maximum fibre length, explicitly. The Recommendation currently includes unidirectional DWDM applications at 2.5 and 10 Gbit/s (with 100 GHz and 50 GHz channel frequency spacing). Work is still underway for 40 and 100 Gbit/s interfaces. There is possibility for extensions to a lower channel frequency spacing.

This draft refers and supports also the draft-kunze-g-698-2-management-control-framework

The building of an SNMP MIB describing the optical parameters defined in G.698.2 [ITU.G698.2] G.798 [ITU.G798], G.874 [ITU.G874], parameters specified G.7710/Y.1701 [ITU-T G.7710] allows the different vendors and operator to retrieve, provision and exchange information related to Optical blak links in a standardized way. This facilitates interworking in case of using optical interfaces from different vendors at the end of the link.

The MIB, reporting the Optical parameters and their values, characterizes the features and the performances of the optical components and allow a reliable black link design in case of multivendor optical networks.

Although RFC 3591 [RFC3591] describes and defines the SNMP MIB of a number of key optical parameters, alarms and Performance Monitoring, a more complete description of optical parameters and processes can be found in the ITU-T Recommendations. Appendix A of this document provides an overview about the extensive ITU-T documentation in this area. The same considerations can be applied to the RFC 4054 [RFC4054]

## 2. The Internet-Standard Management Framework

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

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

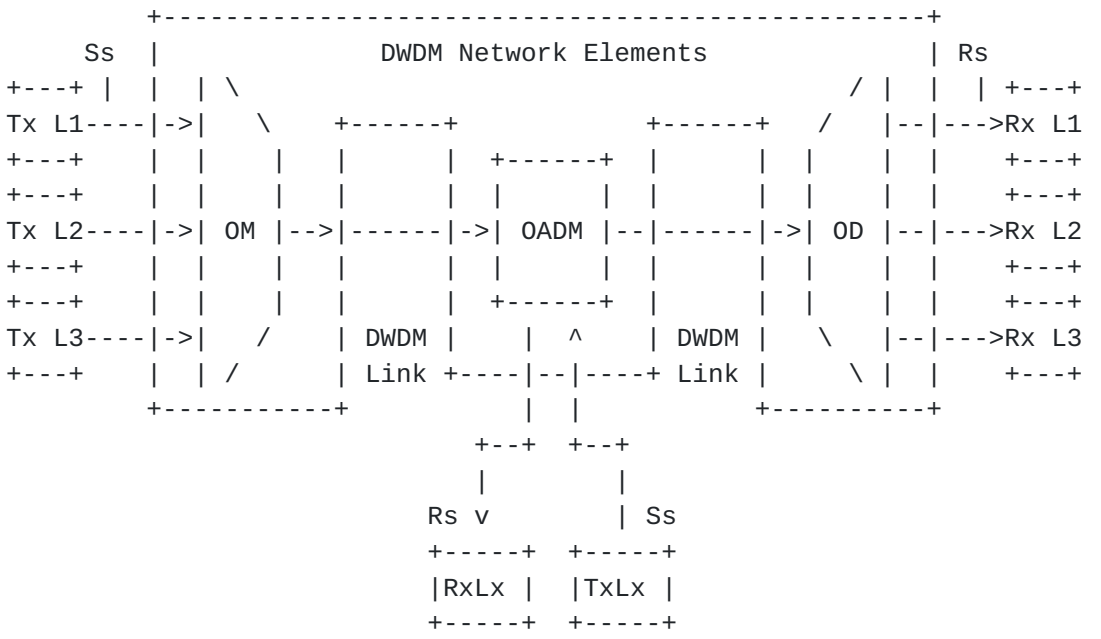
## 3. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119] In the description of OIDs the convention: Set (S) Get (G) and Trap (T) conventions will describe the action allowed by the paramenter.

## 4. Overview

In this document, the term OTN (Optical Transport Network) system is used to describe devices that are compliant with the requirements specified in the ITU-T Recommendations G.872 [ITU.G872], G.709 [ITU.G709] , G.798 [ITU.G798], G.874 [ITU.G874], and G.874.1 [ITU.G874.1] while refers to G.698.2 [ITU.G698.2] for the Black Link and DWDM parameter description.

Figure 1 shows a set of reference points, for the linear "black link" approach, for single-channel connection (Ss and Rs) between transmitters (Tx) and receivers (Rx). Here the DWDM network elements include an OM and an OD (which are used as a pair with the opposing element), one or more optical amplifiers and may also include one or more OADMs.




Ss = reference point at the DWDM network element tributary output
Rs = reference point at the DWDM network element tributary input
Lx = Lambda x
OM = Optical Mux
OD = Optical Demux
OADM = Optical Add Drop Mux

from Fig. 5.1/G.698.2

Figure 1: Linear Black Link

G.698.2 [ITU.G698.2] defines also Ring Black Link configurations [Fig. 5.2/G.698.2] and Bidirectional Black Link configurations [Fig. 5.3/G.698.2]

## 4.1. Optical Parameters Description

The black links are managed at the edges, i.e. at the transmitters (Tx) and receivers (Rx) attached to the S and R reference points respectively. The parameters that could be managed at the black link edges are specified in G.698.2 [ITU.G698.2] for the optical

interface, in G.798 [ITU.G798] for the equipment aspect, and in G.7710/Y.1701 [ITU.G7710] and G.874 [ITU.G874] for fault management and performance monitoring.

The definitions of the optical parameters are provided below to increase the readability of the document, where the definition is ended by (G) the parameter can be retrieve with a GET, when (S) it can be provisioned by a SET, (G,S) can be either GET and SET.

To support the management of these parameters, the SNMP MIB in RFC 3591 [RFC3591] is extended with a new MIB module defined in section 6 of this document. This new MIB module includes the definition of new configuration table of the OCh Layer for the parameters at Tx (S) and Rx (R).

### 4.1.1. General

The following general parameters from G.698.2 [ITU.G698.2] and G.694.1 [ITU.G694.1] provide general information at the optical interface reference points.

Minimum channel spacing:
This is the minimum nominal difference in frequency (in GHz) between two adjacent channels (G).

Bit rate/line coding of optical tributary signals:
Optical tributary signal class NRZ 2.5G (from nominally 622 Mbit/s to nominally 2.67 Gbit/s) or NRZ 10G nominally 2.4 Gbit/s to nominally 10.71 Gbit/s. (nominally 2.4 Gbit/s to nominally 10.71 Gbit/s). 40Gbit/s and 100Gbit/s are under study (G, S).

FEC Coding:
This parameter indicate what Forward Error Correction (FEC) code is used at Ss and Rs (G, S) (not mentioned in G.698). EDITOR NOTE: Need to check whether this parameter is to be put in "vendor specific" parameter or can be a standard paramenter as defined in G.698.2. Is this the various adaptations (FEC encoding types) specified in G.798 clauses 12.3.1.1 (with FEC), 12.3.1.2 (without FEC), and 12.3.1.5 (vendor-specific FEC) .

Maximum bit error ratio (BER):
This parameter indicate the maximum Bit error rate can be supported by the application at the Receiver. In case of FEC applications it is intended after the FEC correction (G) .

Fiber type:
Fiber type as per fibre types are chosen from those defined in ITU-T Recs G.652, G.653, G.654 and G.655 (G,S) .

Wavelength Range (see G.694.1): [ITU.G694.1]
This parameter indicate minimum and maximum wavelength spectrum (G) in a definite wavelength Band (L, C and S).

Wavelength Value (see G.694.1 Table 1):
This parameter indicates the wavelength value that Ss and Rs will be set to work (in THz) se in particular Section 6/G.694.1 (G, S).

Vendor Transceiver Class:
Other than specifying all the Transceiver parameter, it might be convenient for the vendors to summarize a set of parameters in a single proprietary parameter: the Class of transceiver. The Transceiver classification will be based on the Vendor Name and the main TX and RX parameters (i.e. Trunk Mode, Framing, Bit rate, Trunk Type, Channel Band, Channel Grid, Modulation Format, Channel Modulation Format, FEC Coding, Electrical Signal Framing at Tx, Minimum maximum Chromatic Disperion (CD) at Rx, Maximum Polarization Mode Dispersion (PMD) at Rx, Maximum differential group delay at Rx, Loopbacks, TDC, Pre-FEC BER, Q-factor, Q-margin,etc.). If this parameter is used, the MIB parameters specifying the Transceiver characteristics may not be significant and the vendor will be responsible to specify the Class contents and values. The Vendor can publish the parameters of its Classes or declare to be compatible with published Classes.(G) Optional for compliance. (not mentioned in G.698)

Single-channel application codes (see G.698.2):
This parameter indicates the transceiver application code at Ss and Rs as defined in [ITU.G698.2] Chapter 5.4 - this parameter can be called Optical Interface Identifier OII as per [draft-martinelli-wson-interface-class] (G).

| PARAMETERS | Get/Set | Reference |
|---|---|---|
| Minimum channel spacing | G | G.698.2 S.7.1.1 |
| Bit rate/line coding of opt. trib. signals | G,S | G.698.2 S.7.1.2 |
| FEC Coding | G,S | G.975 |
| Maximum bit error ratio (BER) | G | G.698.2 S.7.1.3 |
| Fiber type | G,S | G.698.2 S.7.1.4 |
| Wavelength Range | G | G.694.1 S.6 |
| Wavelength Value | G,S | G.694.1 S.6 |
| Vendor Transceiver Class | G | N.A. |
| Single-channel application codes | G | G.698.2 S.5.3 |

Table 1: General parameters

### 4.1.2. Parameters at Ss

The following parameters for the interface at point S are defined in G.698.2 [ITU.G698.2].

Maximum and minimum mean channel output power:
The mean launched power at Ss is the average power (in dBm) of a pseudo-random data sequence coupled into the DWDM link. It is defined as the rhange (Max and Min ) of the parameter (G, S)

Minimum and maximum central frequency:
The central frequency is the nominal single-channel frequency (in THz) on which the digital coded information of the particular optical channel is modulated by use of the NRZ line code. The central frequencies of all channels within an application lie on the frequency grid for the minimum channel spacing of the application given in ITU-T Rec. G.694.1. This parameter give the Maximum and minimum frequency interval the channel must be modulated (G)

Maximum spectral excursion:
This is the maximum acceptable difference between the nominal central frequency (in GHz) of the channel and the minus 15 dB points of the transmitter spectrum furthest from the nominal central frequency measured at point Ss. (G)

Maximum transmitter (residual) dispersion OSNR penalty (B.3/G.959.1) [ITU.G959.1]
Defines a reference receiver that this penalty is measured with. Lowest OSNR at Ss with worst case (residual) dispersion minus the Lowest OSNR at Ss with no dispersion. Lowest OSNR at Ss with no

dispersion (G)

Minimum side mode suppression ratio, Minimum channel extinction ratio, Eye mask:
Although are defined in G.698.2 are not supported by this draft (G).

Current Laser Output power:
This parameter report the current Transceiver Output power, it can be either a setting and measured value (G, S) NEED TO DISCUSS ON THIS.

| PARAMETERS | Get/Set | Reference |
|---|---|---|
| MAX and min mean channel output power | G,S | G.698.2 S.7.2.1 |
| Min and MAX central frequency | G | G.698.2 S.7.2.2 |
| MAX spectral excursion | G | G.698.2 S.7.2.3 |
| MAX transmitter (residual) disper. | G | G.698.2 S.7.2.7 |
| OSNR penalty | | |
| MAX side mode suppression ratio, min | G | G.698.2 S.7.2.6 |
| channel extinction ratio, Eye mask | | |
| Current Laser Output power | G,S | N.A. |

Table 2: parameters at Ss

### 4.1.3. Optical path from point Ss to Rs

The following parameters for the optical path from point S and R are defined in G.698.2 [ITU.G698.2].

Maximum and minimum (residual) chromatic dispersion:
These parameters define the maximum and minimum value of the optical path "end to end chromatic dispersion" (in ps/nm) that the system shall be able to tolerate. (G)

Minimum optical return loss at Ss:
These parameter defines minimum optical return loss (in dB) of the cable plant at the source reference point (Ss), including any connectors (G)

Maximum discrete reflectance between Ss and Rs:
Optical reflectance is defined to be the ratio of the reflected optical power present at a point, to the optical power incident to that point. Control of reflections is discussed extensively in ITU-T Rec. G.957 (G)

Maximum differential group delay:
Differential group delay (DGD) is the time difference between the fractions of a pulse that are transmitted in the two principal states of polarization of an optical signal. For distances greater than several kilometres, and assuming random (strong) polarization mode coupling, DGD in a fibre can be statistically modelled as having a Maxwellian distribution. (G)

Maximum polarization dependent loss:
The polarization dependent loss (PDL) is the difference (in dB) between the maximum and minimum values of the channel insertion loss (or gain) of the black link from point SS to RS due to a variation of the state of polarization (SOP) over all SOPs. (G)

Maximum inter-channel crosstalk:
Inter-channel crosstalk is defined as the ratio of total power in all of the disturbing channels to that in the wanted channel, where the wanted and disturbing channels are at different wavelengths. The parameter specify the isolation of a link conforming to the "black link" approach such that under the worst-case operating conditions the inter-channel crosstalk at any reference point RS is less than the maximum inter-channel crosstalk value (G)

Maximum interferometric crosstalk:
This parameter places a requirement on the isolation of a link conforming to the "black link" approach such that under the worst case operating conditions the interferometric crosstalk at any reference point RS is less than the maximum interferometric crosstalk value. (G)

Maximum optical path OSNR penalty:
The optical path OSNR penalty is defined as the difference between the Lowest OSNR at Rs and Lowest OSNR at Ss that meets the BER requirement (G)

Maximum ripple:
Although is defined in G.698.2, this parameter is not supported by this draft.

| PARAMETERS | Get/Set | Reference |
|---|---|---|
| MAX and min (residual) chromatic dispersion | G | G.698.2 S.7.3.2 |
| Min optical return loss at Ss | G | G.698.2 S.7.3.3 |
| MAX discrete reflectance between Ss and Rs | G | G.698.2 S.7.3.4 |
| MAX differential group delay | G | G.698.2 S.7.3.5 |
| MAX polarization dependent loss | G | G.698.2 S.7.3.6 |
| MAX inter-channel crosstalk | G | G.698.2 S.7.3.7 |
| MAX interferometric crosstalk | G | G.698.2 S.7.3.8 |
| MAX optical path OSNR penalty | G | G.698.2 S.7.3.9 |
| MAX ripple | G | G.698.2 S.7.3.1 |

Table 3: parameters betweeen Ss and Rs

### 4.1.4. Interface at point Rs

The following parameters for the interface at point R are defined in G.698.2.

#### 4.1.4.1. Mandatory parameters

Maximum and minimum mean input power:
The maximum and minimum values of the average received power (in dBm) at point Rs. (G)

Minimum optical signal-to-noise ratio (OSNR):
The minimum optical signal-to-noise ratio (OSNR) is the minimum value of the ratio of the signal power in the wanted channel to the highest noise power density in the range of the central frequency plus and minus the maximum spectral excursion (G)

Receiver OSNR tolerance:
The receiver OSNR tolerance is defined as the minimum value of OSNR at point Rs that can be tolerated while maintaining the maximum BER of the application. (G)

Maximum reflectance at receiver:
Although is defined in G.698.2, this parameter is not supported by this draft (G).

| PARAMETERS | Get/Set | Reference |
|---|---|---|
| MAX and min mean input power | G | G.698.2 S.7.4.1 |
| Min optical signal-to-noise ratio (OSNR) | G | G.698.2 S.7.4.2 |
| Receiver OSNR tolerance | G | G.698.2 S.7.4.3 |
| MAX reflectance at receiver | G | G.698.2 S.7.4.4 |

Table 4: mandatory parameters

#### 4.1.4.2. Optional parameters

Current Chromatic Dispersion (CD):
Residual Chromatic Dispersion measuread at Rx Transceiver port (G).

Current Optical Signal to Noise Ratio (OSNR):
Current Optical Signal to Noise Ratio (OSNR) estimated at Rx Transceiver port (G).

Current Quality factor (Q):
"Q" factor estimated at Rx Transceiver port (G).

| PARAMETERS | Get/Set | Reference |
|---|---|---|
| Current Chromatic Dispersion (CD) | G | N.A. |
| Current Opt. Signal to Noise Ratio (OSNR) | G | N.A. |
| Current Quality factor (Q) | G | N.A. |

Table 5: optional parameters

### 4.1.5. Alarms and Threshold definition

This section describes the Alarms and the Thresholds at Ss and Rs points according to ITU-T Recommendations G.798 [ITU.G798], G.874 [ITU.G874], and G.874.1 [ITU.G874.1].

OTN alarms defined in RFC3591:

Threshold Crossing Alert (TCA Alarm)

LOW-TXPOWER

HIGH-TXPOWER

LOW-RXPOWER

HIGH-RXPOWER

Loss of Signal (LOS)

Loss of Frame (LOF)

Server Signal Failure-P (SSF-P)

Loss of Multiframe (LOM)

OTN Thresholds (for TCA) defined in RFC3591

LOW-TXPOWER

HIGH-TXPOWER

LOW-RXPOWER

HIGH-RXPOWER

As the above parameters/alarms are already defined in RFC3591, they are out of scope of this document and the RFC3591 will continue to be the only reference for them

The list below reports the new Alarms and Thresholds not managed in RFC3591

### 4.1.6. Performance Monitoring (PM) description

This section describes the Performance Monitoring parameters and their thresholds at Ss and Rs points (Near -End and Far-End)according to ITU-T Recommendations G.826 [ITU.G826], G.8201 [ITU.G8201], G.709 [ITU.G709], G.798 [ITU.G798], G.874 [ITU.G874], and G.874.1 [ITU.G874.1].

Failure Counts (fc) :
Number of Failures occurred in an observation periond (G)

Errored Second (es) :
It is a one-second period in which there is one or more errored blocks or during which a defect (e.g. Loss of Signal (LOS)) is detected. The number of errored seconds is summed over 15-minute and 24-hour intervals. (G)

Severely Errored Seconds (ses) :
It is a one-second period in which the errored block ratio exceeds a threshold or during which a defect is detected. See ITU-T Recommendation G.8201 Table 7-1 for details. The number of severely errored seconds is summed over 15-minute and 24-hour intervals.(G)

Unavailable Seconds (uas) :
It is a one-second period in the unavailable time. A period of unavailable time begins at the onset of ten consecutive SES events. These ten seconds are considered to be part of unavailable time. A new period of available time begins at the onset of ten consecutive non-SES events. These ten seconds are considered to be part of available time. (G)

Background Block Errors (bbe) :
An errored block not occurring as part of an SES(G)

Error Seconds Ratio (esr) :
The ratio of ES in available time to total seconds in available time during a fixed measurement interval(G)

Severely Errored Seconds Ratio (sesr) :
The ratio of SES in available time to total seconds in available time during a fixed measurement interval(G)

Background Block Errored Seconds Ratio (bber) :
The ratio of Background Block Errors (BBE) to total blocks in available time during a fixed measurement interval. The count of total blocks excludes all blocks during SESs.(G)

FEC corrected Bit Error (FECcorrErr):
The number of bits corrected by the FEC are counted over one second (G)

FEC un-corrected Bit Error :
The number of bits un-corrected by the FEC are counted over one second (G)

Pre-FEC Bit Error :
The number of Errored bits at receiving side before the FEC function counted over one second (G)

OTN Valid Intervals :
The number of contiguous 15 minute intervals for which valid OTN performance monitoring data is available for the particular interface (G)

FEC Valid Intervals :
The number of contiguous 15 minute intervals for which valid FEC PM data is available for the particular interface.(G)

### 4.1.7. Generic Parameter description

This section describes the Generic Parameters at Ss and Rs points according to ITU-T Recommendations G.872 [ITU.G872], G.709 [ITU.G709], G.798 [ITU.G798], G.874 [ITU.G874], and G.874.1 [ITU.G874.1].

Interface Admin Status :
The Administrative Status of an Interface: Up/Down - In Service/ Out of Service (can be Automatic in Service) (G/S)

Interface Operational Status :
The Operational Status of an Interface: Up/Down - In Service/Out of Service (G)

## 4.2. Use of ifTable

This section specifies how the MIB II interfaces group, as defined in RFC 2863 [RFC2863], is used for the link ends of a black link. Only the ifGeneralInformationGroup will be supported for the ifTable and the ifStackTable to maintain the relationship between the OCh and OPS layers. The OCh and OPS layers are managed in the ifTable using IfEntries that correlate to the layers depicted in Figure 1.

For example, a device with TX and/or RX will have an Optical Physical Section (OPS) layer, and an Optical Channel (OCh) layer. There is a one to n relationship between the OPS and OCh layers.

EDITOR NOTE: Reason for changing from OChr to OCh: Work on revised G.872 in the SG15 December 2011 meeting agreed to remove OChr from the architecture and to update G.709 to account for this architectural change. The meeting also agreed to consent the revised text of G.872 and G.709 at the September 2012 SG15 meeting.

Figure 2 In the following figures, opticalChannel and opticalPhysicalSection are abbreviated as och and ops respectively.

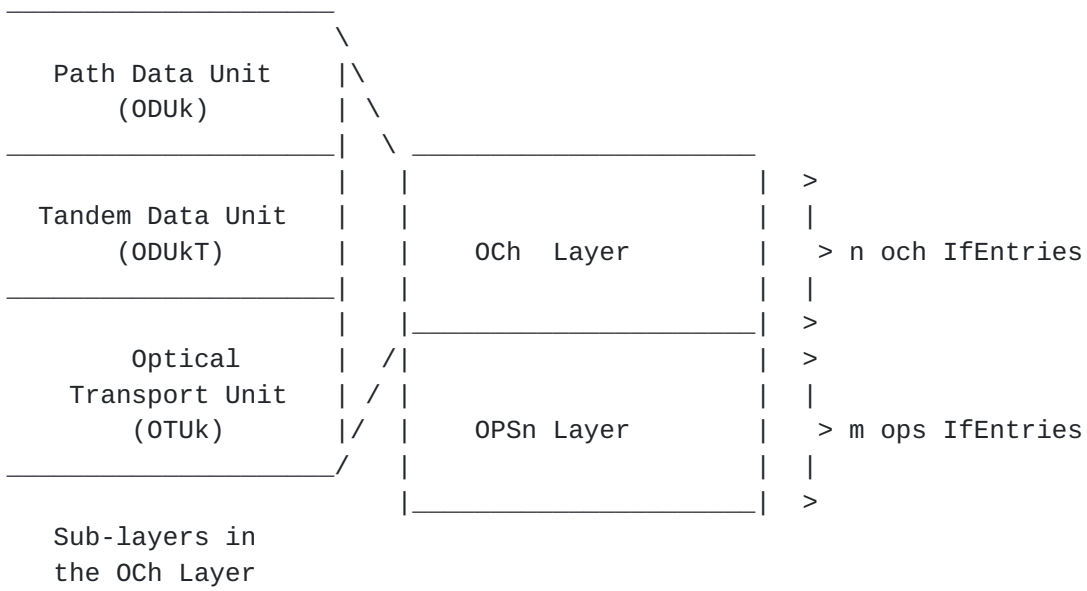



Figure 2: OTN Layers for OPS and OCh

Each opticalChannel IfEntry is mapped to one of the m opticalPhysicalSection IfEntries, where m is greater than or equal to 1. Conversely, each opticalTransPhysicalSection port entry is mapped to one of the n opticalChannel IfEntries, where n is greater than or equal to 1.

The design of the Optical Interface MIB provides the option to model an interface either as a single bidirectional object containing both sink and source functions or as a pair of unidirectional objects, one containing sink functions and the other containing source functions.

If the sink and source for a given protocol layer are to be modelled as separate objects, then there need to be two ifTable entries, one that corresponds to the sink and one that corresponds to the source, where the directionality information is provided in the configuration tables for that layer via the associated Directionality objects. The agent is expected to maintain consistent directionality values between ifStackTable layers (e.g., a sink must not be stacked in a 1:1 manner on top of a source, or vice-versa), and all protocol layers that are represented by a given ifTable entry are expected to have the same directionality.

When separate ifTable entries are used for the source and sink functions of a given physical interface, association between the two uni-directional ifTable entries (one for the source function and the other for the sink functions) should be provided. It is recommended that identical ifName values are used for the two ifTable entries to indicate such association. An implementation shall explicitly state what mechanism is used to indicate the association, if ifName is not used.

#### 4.2.1. Use of ifTable for OPS Layer

Only the ifGeneralInformationGroup needs to be supported.

| ifTable Object | Use for OTN OPS Layer |
|---|---|
| ifIndex | The interface index. |
| ifDescr | Optical Transport Network (OTN) Optical Physical Section (OPS) |
| ifType | opticalPhysicalSection (xxx) |

<<<Editor Note: Need new IANA registration value for xxx. >>>

| | |
|---|---|
| ifSpeed | Actual bandwidth of the interface in bits per second. If the bandwidth of the interface is greater than the maximum value of 4,294,967,295, then the maximum value is reported and ifHighSpeed must be used to report the interface's speed. |
| ifPhysAddress | An octet string with zero length. (There is no specific address associated with the interface.) |
| ifAdminStatus | The desired administrative state of the interface. Supports read-only access. |
| ifOperStatus | The operational state of the interface. The value lowerLayerDown(7) is not used, since there is no lower layer interface. This object is set to notPresent(6) if a component is missing, otherwise it is set to down(2) if either of the objects optIfOPSnCurrentStatus indicates that any defect is present. |

| | |
|---|---|
| ifLastChange | The value of sysUpTime at the last change in ifOperStatus. |
| ifName | Enterprise-specific convention (e.g., TL-1 AID) to identify the physical or data entity associated with this interface or an OCTET STRING of zero length. The enterprise-specific convention is intended to provide the means to reference one or more enterprise-specific tables. |
| ifLinkUpDownTrapEnable | Default value is enabled(1). Supports read-only access. |
| ifHighSpeed | Actual bandwidth of the interface in Mega-bits per second. A value of n represents a range of 'n-0.5' to 'n+0.499999'. |
| ifConnectorPresent | Set to true(1). |
| ifAlias | The (non-volatile) alias name for this interface as assigned by the network manager. |

### 4.2.2. Use of ifTable for OCh Layer

Use of ifTable for OCh Layer See RFC 3591 [RFC3591] section 2.4

### 4.2.3. Use of ifStackTable

Use of the ifStackTable and ifInvStackTable to associate the opticalPhysicalSection and opticalChannel interface entries is best illustrated by the example shown in Figure 3. The example assumes an ops interface with ifIndex i that carries two multiplexed och interfaces with ifIndex values of j and k, respectively. The example shows that j and k are stacked above (i.e., multiplexed into) i. Furthermore, it shows that there is no layer lower than i and no layer higher than j and/or k.

Figure 3

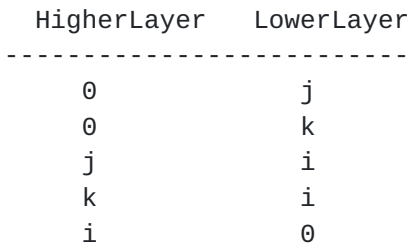



Figure 3: Use of ifStackTable for an OTN port

For the inverse stack table, it provides the same information as the interface stack table, with the order of the Higher and Lower layer interfaces reversed.

## 5. Structure of the MIB Module

EDITOR NOTE:text will be provided based on the MIB module in Section 6

## 6. Object Definitions

EDITOR NOTE: Once the scope in Section 1 and the parameters in Section 4 are finalized, a MIB module will be defined. It could be an extension to the OPT-IF-MIB module of RFC 3591. >>>

```
   OPT-IF-EXT-MIB DEFINITIONS ::= BEGIN

   IMPORTS
           MODULE-IDENTITY,
           OBJECT-TYPE,
           Gauge32,
           Integer32,
           Unsigned32,
           transmission,
           NOTIFICATION-TYPE
                   FROM SNMPv2-SMI
           TEXTUAL-CONVENTION,
           RowPointer,
           RowStatus,
           TruthValue,
           DateAndTime
                   FROM SNMPv2-TC
           SnmpAdminString
                   FROM SNMP-FRAMEWORK-MIB
           MODULE-COMPLIANCE, OBJECT-GROUP
                   FROM SNMPv2-CONF
           ifIndex
                   FROM IF-MIB
           optIfMibModule,
           optIfOChConfigEntry,
           optIfOChSinkCurrentEntry,
           OptIfDirectionality
           FROM OPT-IF-MIB;



   --  This is the MIB module for the optical parameters associated with
   --  the black link end points.




optIfExtMibModule MODULE-IDENTITY
    LAST-UPDATED "201204250000Z"
    ORGANIZATION "IETF OPSAWG/CCAMP Working Group"
    CONTACT-INFO
       "WG charter:
          http://www.ietf.org/html.charters/

        Mailing Lists:
        Editor:  Gabrielle Galimberti
         Email: ggalimbe@cisco.com"
```

```
    DESCRIPTION
       "The MIB module to describe Black Link extension to rfc3591.

        Copyright (C) The Internet Society (2012).  This version
        of this MIB module is part of ;  see the RFC
        itself for full legal notices."
    REVISION  "201204250000Z"
    DESCRIPTION
       "Draft version 1.0"
    ::={ optIfMibModule 3 }


OptIfChannelSpacing ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
     "Channel spacing
        1 -  100 Ghz
        2 -  50GHz
        3 -  25GHz
        4 - 12.5GHz
        5 - 6.25Ghz
     "
    SYNTAX  INTEGER {
        spacing100Ghz(1),
                spacing50Ghz(2),
                spacing25Ghz(3),
                spacing12point5Ghz(4),
                spacing6point25Ghz(5)
        }


OptIfBitRateLineCoding ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
     "Optical tributary signal class
        1 - NRZ 2.5G (from nominally 622 Mbit/s to nominal 2.67 Gbit/s)
        2 - NRZ 10G nominally 2.4 Gbit/s to nominally 10.71 Gbit/s.
        3 - 40Gbits/s
        4 - 100Gbits/s
        5 - 400Gbits/s
     40Gbits/s and above are under study. "
    SYNTAX  INTEGER {
        rate2point5G(1),
        rate10G(2),
        rate40G(3),
        rate100G(4),
        rate400G(5)
        }
```

```
OptIfFiberTypeRecommendation ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
     " Fiber Types - ITU-T Recs G.652, G.653, G.654 and G.655
        One for recommendation and one for category.
        G.652 A, B, C, D
        G.653 A, B
        G.654 A, B, C
        G.655 C, D, E
        G.656
        G.657 A, B
     "
    SYNTAX  INTEGER {
        g652(1),
        g653(2),
        g654(3),
        g655(4),
        g656(5),
        g657(6)
    }

OptIfFiberTypeCategory  ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
     " Fiber Types - ITU-T Recs G.652, G.653, G.654 and G.655
        G.652 A, B, C, D
        G.653 A, B
        G.654 A, B, C
        G.655 C, D, E
        G.656
        G.657 A, B
        Categories - A, B, C, D and E
     "
    SYNTAX  INTEGER {
        categoryA(1),
        categoryB(2),
        categoryC(3),
        categoryD(4),
        categoryE(5)
        }

OptIfPerformanceDataType     ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
    "
     This parameter indicates the parameters for the table are for
         the Near End or Far End performance data.
            1 - Near End
```

```
            2 - Far End
        "
    SYNTAX INTEGER {
        nearEnd(1),
        farEnd(2)
    }

OptIfOTNLayer   ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
     "
     This parameter indicates the parameters for the table are for OTUk,
         ODUk, TCM performance data.
            1 - OTUk
            2 - ODUk
            3 - TCM
     The ODUk layer and TCM sublayer PM is not related to the black
     link PM management, but since this could be a common PM model for
     the ODUk layer and TCM sublayers, they are included here so it may
     be used for simple scenarios where only lower order ODUk or higher
     order ODUk is present. For scenarios where both lower order ODUk
     and higher order ODUk are present, further extension to the MIB
     model is required, in particular for the indexing for these layers.
     "
    SYNTAX INTEGER {
        optIfOTUkLayer(1),
            optIfODUkLayer(2),
            optIfTCMSubLayer(3)
        }

--
-- Alarm for the OCh and OTUk layer
--
OptIfOTNOChAlarms  ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
      " This is the possible alarms from the OCh and OTUk layer."
    SYNTAX INTEGER {
         -- OTN Loss of signal alarm
                        optIfOtnLosAlarm(1),
                        -- OTN Loss of frame alarm
                        optIfOtnLofAlarm(2),
                        -- OTN Loss of multi framealarm
                        optIfOtnLomAlarm(3),
                        -- OTN SSF alarm
                        optIfOtnOtuSsfAlarm(4),
                        -- OTN OTU BDI alarm
                        optIfOtnOtuBdiAlarm(5),
```

```
                        -- OTN OTU Trail Trace mismatch alarm
                        optIfOtnOtuTimAlarm(6),
                        -- OTN OTU IAE alarm
                        optIfOtnOtuIaeAlarm(7),
                        -- OTN OTU Degraded alarm,
                        optIfOtnOtuDegAlarm(8),
                        -- OTN OTU Fec ExcessiveErrors alarm
                        optIfOptIfOtnOtuFecExcessiveErrsAlarm(9),
                        -- OTN OTU BBE Thresholdalarm
                        optIf15MinThreshBBETCA(10),
                        -- OTN OTU ES Thresholdalarm
                        optIf15MinThreshESTCA(11),
                        -- OTN OTU SES Threshold alarm
                        optIf15MinThreshSESTCA(12),
                        -- OTN OTU UAS Threshold alarm
                        optIf15MinThreshUASTCA(13),
                        -- OTN OTU Fcs Thresholdalarm alarm
                        optIf15MinThreshFcsTCA(14),
                        -- OTN  FEC uncorrectedwords TCA
                        optIf15MinThreshFECUnCorrectedWordsTCA(15),
                        -- OTN  Pre FEC BER TCA
                        optIf15MinThreshPreFECBERTCA(16)
                    }

OptIfOTNODUkTcmAlarms  ::= TEXTUAL-CONVENTION
    STATUS current
    DESCRIPTION
      " This is the alarms from the ODUk and TCM layer."
    SYNTAX INTEGER {
                        -- OTN ODU/TCM OCI alarm
                        optIfOTNOdukTcmOciAlarm(1),
                        -- OTN ODU/TCM LCK alarm
                        optIfOTNOdukTcmLckAlarm(2),
                        -- OTN ODU/TCM BDI alarm
                        optIfOTNOdukTcmBdiAlarm(3),
                        -- OTN ODU/TCM Trail Trace mismatch alarm
                        optIfOTNOdukTcmTimAlarm(4),
                        -- OTN ODU/TCM Degraded alarm,
                        optIfOTNOdukTcmDegAlarm(5),
                        -- OTN ODU/TCM SSF alarm,
                        optIfOTNOdukTcmSSfAlarm(6),
                        -- OTN OTU BBE Threshold alarm
                        optIfOTNOdukTcm15MinThreshBBETCA(7),
                        -- OTN OTU ES Threshold alarm
                        optIfOTNOdukTcm15MinThreshESTCA(8),
                        -- OTN OTU SES Threshold alarm
                        optIfOTNOdukTcm15MinThreshSESTCA(9),
                        -- OTN OTU UAS Threshold alarm
```

```
                        optIfOTNOdukTcm15MinThreshUASTCA(10),
                        -- OTN OTU Fcs Threshold alarm
                        optIfOTNOdukTcm15MinThreshFcsTCA(11)
     }

-- Addition to the RFC 3591 objects
optIfOPSmEntry            OBJECT IDENTIFIER ::= { optIfExtMibModule 1 }
optIfOChSrcSinkGroup      OBJECT IDENTIFIER ::= { optIfExtMibModule 2 }
optIfOTNPMGroup           OBJECT IDENTIFIER ::= { optIfExtMibModule 3 }
optIfOTNAlarm             OBJECT IDENTIFIER ::= { optIfExtMibModule 4 }
optIfOTNNotifications     OBJECT IDENTIFIER ::= { optIfExtMibModule 5 }




-- OPS - Optical Phyical Section
optIfOPSmConfigTable  OBJECT-TYPE
    SYNTAX  SEQUENCE OF OptIfOPSmConfigEntry
    MAX-ACCESS  not-accessible
    STATUS  current
    DESCRIPTION
        "A table of OPS General config parameters."
    ::= { optIfObjects 10 }

optIfOPSmConfigEntry OBJECT-TYPE
    SYNTAX      OptIfOPSmConfigEntry
    MAX-ACCESS  not-accessible
    STATUS  current
    DESCRIPTION
       "An conceptual row of OPS General config parameters."
  INDEX  { ifIndex  }
  ::= { optIfOPSmConfigTable 1 }

   OptIfOPSmConfigEntry  ::=
    SEQUENCE {
        optIfOPSmDirectionality           OptIfDirectionality,
        optIfOPSmFiberTypeRecommendation  OptIfFiberTypeRecommendation,
        optIfOPSmFiberTypeCategory        OptIfFiberTypeCategory
    }

optIfOPSmDirectionality  OBJECT-TYPE
  SYNTAX    OptIfDirectionality
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "Indicates the directionality of the entity."
```

```
  ::= { optIfOPSmConfigEntry  1 }

optIfOPSmFiberTypeRecommendation  OBJECT-TYPE
  SYNTAX    OptIfFiberTypeRecommendation
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    "Fiber type as per fibre types are chosen from those defined in
      ITU-T Recs G.652, G.653, G.654, G.655, G.656 and G.657."
  ::= { optIfOPSmConfigEntry  2 }

optIfOPSmFiberTypeCategory  OBJECT-TYPE
  SYNTAX    OptIfFiberTypeCategory
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    "Fiber type as per fibre types are chosen from those defined in
      ITU-T Recs G.652, G.653, and G.655.
      The categories are A, B, C, D and E."
  ::= { optIfOPSmConfigEntry  3 }


-- OCh config table
-- modified the OCh Table group
-- General parameters for the Black Link Ss-Rs will be added to
-- the OchConfigTable

optIfOChConfigExtTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOChConfigExtEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A table of OCh General config extension parameters"
  ::= {  optIfOChSrcSinkGroup 1 }

optIfOChConfigExtEntry OBJECT-TYPE
  SYNTAX      OptIfOChConfigExtEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     " A conceptual row that contains OCh configuration extension
     information of an interface. "
  AUGMENTS { optIfOChConfigEntry }
  ::= { optIfOChConfigExtTable 1 }


OptIfOChConfigExtEntry ::=
   SEQUENCE {
```

```
      optIfOChMiminumChannelSpacing             OptIfChannelSpacing,
      optIfOChBitRateLineCoding                 OptIfBitRateLineCoding,
      optIfOChFEC                               Unsigned32,
      optIfOChSinkMaximumBERMantisa             Unsigned32,
      optIfOChSinkMaximumBERExponent            Unsigned32,
      optIfOChMinWavelength                     Unsigned32,
      optIfOChMaxWavelength                     Unsigned32,
      optIfOChWavelength                        Unsigned32,
      optIfOChVendorTransceiverClass            OCTET STRING,
      optIfOChOpticalInterfaceApplicationCode   OCTET STRING,
      optIfOChLaserAdminState                   INTEGER,
      optIfOChLaserOperationalState             INTEGER,
      optIfOChAdminState                        INTEGER,
      optIfOChOperationalState                  INTEGER

     }

optIfOChMiminumChannelSpacing  OBJECT-TYPE
  SYNTAX      OptIfChannelSpacing
  UNITS       "Gigahertz"
  MAX-ACCESS  read-only
  STATUS      current
  DESCRIPTION
    "A minimum nominal difference in frequency (GHz) between two
    adjacent channels."
  ::= { optIfOChConfigExtEntry 1 }

optIfOChBitRateLineCoding  OBJECT-TYPE
  SYNTAX  OptIfBitRateLineCoding
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
     " Optical tributary signal class
         NRZ 2.5G (from nominally 622 Mbit/s  to nominally  2.67 Gbit/s)
         NRZ 10G  (nominally 2.4 Gbit/s to nominally 10.71 Gbit/s)
      "
  ::= { optIfOChConfigExtEntry 2 }

optIfOChFEC  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
     " This parameter indicates what Forward Error Correction (FEC) code
           is used at Source and Sink.
           GFEC (from G709) and the I.x EFEC's
           (G.975 - Table I.1 super FEC).
           1 - No FEC
```

```
           2 - GFEC
           3 - I.2 EFEC
           4 - I.3 EFEC
           5 - I.4 EFEC
           6 - I.5 EFEC
           7 - I.6 EFEC
           8 - I.7 EFEC
           9 - I.8 EFEC
          10 - I.9 EFEC
          99 - Vendor Specific
     "
  ::= { optIfOChConfigExtEntry 3 }

 optIfOChSinkMaximumBERMantisa  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "   This parameter indicate the maximum Bit(mantisa) error rate
        can be supported by the application at the Receiver. In case
        of FEC applications it is intended after the FEC correction.
      "
  ::= { optIfOChConfigExtEntry  4 }

optIfOChSinkMaximumBERExponent  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "   This parameter indicate the maximum Bit(exponent) error rate
        can be supported by the application at the Receiver. In case
        of FEC applications it is intended after the FEC correction.
      "
  ::= { optIfOChConfigExtEntry  5 }

optIfOChMinWavelength  OBJECT-TYPE
 SYNTAX  Unsigned32
  UNITS "0.01 Ghz"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
         This parameter indicate minimum wavelength spectrum in a
         definite wavelength Band (L, C and S).
     "
  ::= { optIfOChConfigExtEntry  6 }
```

```
optIfOChMaxWavelength  OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS "hertz"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
        This parameter indicate maximum wavelength spectrum in a
        definite wavelength Band (L, C and S)
     "
  ::= { optIfOChConfigExtEntry  7 }

optIfOChWavelength  OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS "hertz"
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    "     This parameter indicates the wavelength value in Hertz
          Specified in Table 1 of G.694.1 e.g. 195.8875
     "
  ::= { optIfOChConfigExtEntry  8 }

optIfOChVendorTransceiverClass  OBJECT-TYPE
  SYNTAX  OCTET STRING
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "   As defined in G.698
        Vendors can summarize a set of parameters in a
        single proprietary parameter: the Class of transceiver.  The
        Transceiver classification will be based on the Vendor Name and
        the main TX and RX parameters (i.e.  Trunk Mode, Framing, Bit
        rate, Trunk Type etc).
        If this parameter is used, the MIB parameters
        specifying the Transceiver characteristics may not be
        significant and the vendor will be responsible to specify the
        Class contents and values. The Vendor can publish the
        parameters of its Classes or declare to be compatible with
        published Classes.(G) Optional for compliance. (not
        mentioned in G.698)
     "
  ::= { optIfOChConfigExtEntry  9 }

  optIfOChOpticalInterfaceApplicationCode  OBJECT-TYPE
  SYNTAX  OCTET STRING
  MAX-ACCESS  read-write
  STATUS  current
```

```
  DESCRIPTION
    "   This parameter indicates the transceiver application code at Ss
        and Rs as defined in [ITU.G698.2] Chapter 5.3
     "
  ::= { optIfOChConfigExtEntry  10 }

optIfOChLaserAdminState  OBJECT-TYPE
  SYNTAX  INTEGER {
                off(0),
                on(1),
                autoInService(2)
          }
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    "
         The configured State of the laser: 0 - Off
         1 - On
         2 - Automatic - Inservice
     "
  ::= { optIfOChConfigExtEntry  11 }

optIfOChLaserOperationalState  OBJECT-TYPE
  SYNTAX  INTEGER {
                off(0),
                on(1)
          }
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
        The Operational Status of Laser : 0 - Off
                                          1 - On
    "
  ::= {  optIfOChConfigExtEntry  12 }

optIfOChAdminState  OBJECT-TYPE
  SYNTAX  INTEGER {
                off(0),
                on(1),
                autoInService(2)
          }
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    "
        The Administrative Status of an Interface:
                0 - Out of Service
```

```
                1 - In Service
        2 - Automatic in Service.
     "
  ::= {  optIfOChConfigExtEntry  13 }

optIfOChOperationalState  OBJECT-TYPE
  SYNTAX   INTEGER {
                off(0),
                on(1)
          }
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
        The Operational Status of an Interface:
                0 - Off
                1 - On
    "
  ::= {  optIfOChConfigExtEntry  14 }



-- Parameters at OCh Src (Ss)
--  OptIfOChSrcConfigEntry

optIfOChSrcConfigTable  OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOChSrcConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A configuration table of OCh Src (Ss) parameters."
  ::= { optIfOChSrcSinkGroup 2 }

optIfOChSrcConfigEntry OBJECT-TYPE
    SYNTAX      OptIfOChSrcConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     " A conceptual row that contains the Src (Ss) configuration
         parameters for a given interface."
  INDEX  { ifIndex  }
  ::= { optIfOChSrcConfigTable 1 }

OptIfOChSrcConfigEntry ::=
   SEQUENCE {
           optIfOChMinimumMeanChannelOutputPower            Integer32,
           optIfOChMaximumMeanChannelOutputPower            Integer32,
           optIfOChMinimumCentralFrequency                  Unsigned32,
```

```
            optIfOChMaximumCentralFrequency                 Unsigned32,
            optIfOChMaximumSpectralExcursion                Unsigned32,
            optIfOChMaximumTxDispersionOSNRPenalty          Integer32
        }

 optIfOChMinimumMeanChannelOutputPower  OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 dbm"
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    "
    The minimum mean launched power at Ss is the average power (in dBm)
    of a pseudo-random data sequence coupled into the DWDM link.
    "
  ::= { optIfOChSrcConfigEntry  1}

optIfOChMaximumMeanChannelOutputPower  OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 dbm"
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    "
    The maximum mean launched power at Ss is the average power (in dBm)
    of a pseudo-random data sequence coupled into the DWDM link.
    "
  ::= { optIfOChSrcConfigEntry  2}

optIfOChMinimumCentralFrequency  OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS      "0.0001 THz"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The minimum central frequency is the nominal single-channel
     frequency (in THz) on which the digital coded information of
     the particular optical channel is modulated by use of the NRZ
     line code. Eg 191.5THz will be represented as 1915000
    "
  ::= { optIfOChSrcConfigEntry  3}

optIfOChMaximumCentralFrequency  OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS      "0.0001 THz"
  MAX-ACCESS  read-only
  STATUS  current
```

```
  DESCRIPTION
    "
     The maximum central frequency is the nominal single-channel
     frequency (in THz) on which the digital coded information of
     the particular optical channel is modulated by use of the NRZ
     line code. Eg 191.5THz will be represented as 1915000.
   "
  ::= { optIfOChSrcConfigEntry  4}

optIfOChMaximumSpectralExcursion  OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS      "0.1 GHz"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This is the maximum acceptable difference between the nominal
      central frequency (in GHz) of the channel and the minus 15 dB
      points of the transmitter spectrum furthest from the nominal
      central frequency measured at point Ss.
   "
  ::= { optIfOChSrcConfigEntry  5}


optIfOChMaximumTxDispersionOSNRPenalty OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 dB"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     Defines a reference receiver that this penalty is measured with.
      Lowest OSNR at Ss with worst case (residual) dispersion minus the
      Lowest OSNR at Ss with no dispersion.  Lowest OSNR at Ss with no
      dispersion
    "
  ::= { optIfOChSrcConfigEntry  6}

-- Optical Path from Point Src (Ss) to Sink (Rs)
--  Alternatively this can be optIfOChSsRsTable

optIfOChSrcSinkConfigTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOChSrcSinkConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A table of paramters for the optical path from Src to Sink
    (Ss to Rs)."
```

```
  ::= { optIfOChSrcSinkGroup 3 }

optIfOChSrcSinkConfigEntry OBJECT-TYPE
    SYNTAX      OptIfOChSrcSinkConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     "A conceptual row that contains the optical path Src-Sink (Ss-Rs)
      configuration parameters for a given interface."
  INDEX  { ifIndex  }
  ::= { optIfOChSrcSinkConfigTable 1 }

OptIfOChSrcSinkConfigEntry ::=
   SEQUENCE {
          optIfOChSrcSinkMinimumChromaticDispersion           Integer32,
          optIfOChSrcSinkMaximumChromaticDispersion           Integer32,
          optIfOChSrcSinkMinimumSrcOpticalReturnLoss          Integer32,
          optIfOChSrcSinkMaximumDiscreteReflectanceSrcToSink  Integer32,
          optIfOChSrcSinkMaximumDifferentialGroupDelay        Integer32,
          optIfOChSrcSinkMaximumPolarizationDependentLoss     Integer32,
          optIfOChSrcSinkMaximumInterChannelCrosstalk         Integer32,
          optIfOChSrcSinkMaximumInterFerometricCrosstalk      Integer32,
          optIfOChSrcSinkMaximumOpticalPathOSNRPenalty        Integer32
      }

optIfOChSrcSinkMinimumChromaticDispersion OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "ps/nm"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     These parameters define the minimum value of the
      optical path 'end to end chromatic dispersion' (in ps/nm) that the
      system shall be able to tolerate."
  ::= { optIfOChSrcSinkConfigEntry  1}

optIfOChSrcSinkMaximumChromaticDispersion OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "ps/nm"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "   These parameters define the maximum value of the
      optical path 'end to end chromatic dispersion' (in ps/nm) that the
      system shall be able to tolerate."
  ::= { optIfOChSrcSinkConfigEntry  2 }
```

```
optIfOChSrcSinkMinimumSrcOpticalReturnLoss    OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      ".1 db"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     These parameter defines minimum optical return loss (in dB) of the
      cable plant at the source reference point (Src/Ss), including any
      connectors."
  ::= { optIfOChSrcSinkConfigEntry  3 }


optIfOChSrcSinkMaximumDiscreteReflectanceSrcToSink   OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      ".1 db"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     Optical reflectance is defined to be the ratio of the reflected
      optical power pre.sent at a point, to the optical power incident
      to that point. Control of reflections is discussed extensively in
      ITU-T Rec. G.957."
  ::= { optIfOChSrcSinkConfigEntry  4}

optIfOChSrcSinkMaximumDifferentialGroupDelay   OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "ps"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     Differential group delay (DGD) is the time difference between the
      fractions of a pulse that are transmitted in the two principal
      states of polarization of an optical signal.  For distances
      greater than several kilometres, and assuming random (strong)
      polarization mode coupling, DGD in a fibre can be statistically
      modelled as having a Maxwellian distribution."
  ::= { optIfOChSrcSinkConfigEntry  5}


optIfOChSrcSinkMaximumPolarizationDependentLoss   OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 db"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
```

```
    "
     The polarization dependent loss (PDL) is the difference (in dB)
      between the maximum and minimum values of the channel insertion
      loss (or gain) of the black link from point SS to RS due to a
      variation of the state of polarization (SOP) over all SOPs."
  ::= { optIfOChSrcSinkConfigEntry  6}

optIfOChSrcSinkMaximumInterChannelCrosstalk   OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 db"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     Inter-channel crosstalk is defined as the ratio of total power in
      all of the disturbing channels to that in the wanted channel,
      where the wanted and disturbing channels are at different
      wavelengths.  The parameter specify the isolation of a link
      conforming to the 'black link' approach such that under the
      worst-case operating conditions the inter-channel crosstalk at
      any reference point RS is less than the maximum inter-channel
      crosstalk value."
  ::= { optIfOChSrcSinkConfigEntry  7}


optIfOChSrcSinkMaximumInterFerometricCrosstalk   OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 db"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter places a requirement on the isolation of a link
      conforming to the 'black link' approach such that under the worst
      case operating conditions the interferometric crosstalk at any
      reference point RS is less than the maximum interferometric
      crosstalk value.."
  ::= { optIfOChSrcSinkConfigEntry  8}

optIfOChSrcSinkMaximumOpticalPathOSNRPenalty  OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 db"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The optical path OSNR penalty is defined as the difference between
      the Lowest OSNR at Rs and Lowest OSNR at Ss that meets the BER
```

```
      requirement."
  ::= { optIfOChSrcSinkConfigEntry  9}

-- Parameters at Sink (Rs)
-- optIfOChSinkConfigTable
  optIfOChSinkConfigTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOChSinkConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A table of OCh Sink (Rs) configuration parameters."
  ::= { optIfOChSrcSinkGroup  4 }

optIfOChSinkConfigEntry OBJECT-TYPE
    SYNTAX      OptIfOChSinkConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     "A conceptual row that contains the Sink (Rs) configuration
      parameters for a given interface."
  INDEX  { ifIndex  }
  ::= { optIfOChSinkConfigTable 1 }

OptIfOChSinkConfigEntry ::=
   SEQUENCE {
          optIfOChSinkMinimumMeanIntputPower            Integer32,
          optIfOChSinkMaximumMeanIntputPower            Integer32,
          optIfOChSinkMinimumOSNR                       Integer32,
          optIfOChSinkOSNRTolerance                     Integer32
    }

optIfOChSinkMinimumMeanIntputPower OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 dBm"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " The minimum values of the average received power (in dBm
      at point the Sink (Rs)."
  ::= { optIfOChSinkConfigEntry  1}

optIfOChSinkMaximumMeanIntputPower OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 dBm"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "  The maximum values of the average received power (in dBm)
```

```
       at point the Sink (Rs)."
  ::= { optIfOChSinkConfigEntry  2}

optIfOChSinkMinimumOSNR OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 dB"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " The minimum optical signal-to-noise ratio (OSNR) is the minimum
      value of the ratio of the signal power in the wanted channel to
      the highest noise power density in the range of the central
      frequency plus and minus the maximum spectral excursion."
  ::= { optIfOChSinkConfigEntry  3}

optIfOChSinkOSNRTolerance OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 dB"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " The receiver OSNR tolerance is defined as the minimum value of
      OSNR at point Sink (Rs) that can be tolerated while maintaining
      the maximum BER of the application. Sink (Rs)."
  ::= { optIfOChSinkConfigEntry  4}




-- Performance Monitoring

-- The OptIfOChSinkCurrentExtEntry table is an extension to the
-- optIfOChSinkCurrentExtEntry
-- following optional parameters for current status
-- OptIfOChSinkCurrentExtEntry

optIfOChSinkCurrentExtTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOChSinkCurrentExtEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A table of OCh sink etxension to the performance monitoring
    information for the current 15-minute interval."
  ::= { optIfOTNPMGroup 1 }


optIfOChSinkCurrentExtEntry OBJECT-TYPE
```

```
  SYNTAX  OptIfOChSinkCurrentExtEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A conceptual row that contains OCh sink performance
     monitoring information for an interface for the current
     15-minute interval."
  AUGMENTS { optIfOChSinkCurrentEntry }
  ::= { optIfOChSinkCurrentExtTable 1 }



OptIfOChSinkCurrentExtEntry ::=
   SEQUENCE {
          optIfOChSinkCurrentChromaticDispersion       Integer32,
          optIfOChSinkCurrentOSNR                      Integer32,
          optIfOChSinkCurrentQ                         Integer32
      }

optIfOChSinkCurrentChromaticDispersion OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "ps/nm"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "   Residual Chromatic Dispersion measured at Rx Transceiver port."
  ::= { optIfOChSinkCurrentExtEntry  1}

optIfOChSinkCurrentOSNR OBJECT-TYPE
  SYNTAX  Integer32
  UNITS      "0.1 db"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "   Current Optical Signal to Noise Ratio (OSNR) estimated at Rx
      Transceiver port ."
  ::= { optIfOChSinkCurrentExtEntry  2}

optIfOChSinkCurrentQ  OBJECT-TYPE
  SYNTAX  Integer32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "   'Q' factor estimated at Rx Transceiver port."
  ::= { optIfOChSinkCurrentExtEntry  3}

-- Performance Monitoring
-- OTN  PM Config Table
```

```
--
optIfOTNPMConfigTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A table of performance monitoring configuration for the type
     'optIfOTNPMConfigLayer' layer."
  ::= { optIfOTNPMGroup 2 }

optIfOTNPMConfigEntry OBJECT-TYPE
  SYNTAX      OptIfOTNPMConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     " A conceptual entry in the performance monitoring configuration
      for the type
     'optIfOTNPMConfigLayer' layer.
     "
  INDEX  { ifIndex, optIfOTNPMConfigType, optIfOTNPMConfigLayer,
  optIfOTNPMConfigTCMLevel  }
  ::= { optIfOTNPMConfigTable 1 }

OptIfOTNPMConfigEntry ::=
   SEQUENCE {
          optIfOTNPMConfigType              OptIfPerformanceDataType,
          optIfOTNPMConfigLayer             OptIfOTNLayer,
          optIfOTNPMConfigTCMLevel          Unsigned32,
          optIfOTNPM15MinFcsThreshold       Unsigned32,
          optIfOTNPM15MinESsThreshold       Unsigned32,
          optIfOTNPM15MinSESsThreshold      Unsigned32,
          optIfOTNPM15MinUASsThreshold      Unsigned32,
          optIfOTNPM15MinBBEsThreshold      Unsigned32
   }

optIfOTNPMConfigType       OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMConfigEntry  1}
```

```
optIfOTNPMConfigLayer   OBJECT-TYPE
  SYNTAX  OptIfOTNLayer
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for OTUk,
     ODUk, TCMn performance data.
     1 - OTUk
     2 - ODUk
     3 - TCM
     The ODUk/TCM Layer PM is not related to the black link PM
     management, but since this is a common PM model for the ODU/TCM
     layer, we may include it here.
    "
  ::= { optIfOTNPMConfigEntry  2}

optIfOTNPMConfigTCMLevel   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
        This parameter indicates the TCM level (1-6)
    if the PM is of the type TCM. This will be 0 for OTUK/ODUK.
    "
  ::= { optIfOTNPMConfigEntry  3}

optIfOTNPM15MinFcsThreshold  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The number of Fcs encountered by the interface within any
      given 15 minutes performance data collection period, which causes
      the SNMP agent to send optIf15MinThreshFcsTCA. One notification
      will be sent per interval per interface. A value of `0' will
      disable the notification.
    "
  ::= { optIfOTNPMConfigEntry  4 }

optIfOTNPM15MinESsThreshold  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
```

```
      The number of ES encountered by the interface within any
      given 15 minutes performance data collection period, which causes
      the SNMP agent to send optIf15MinThreshEsTCA. One notification
      will be sent per interval per interface if the threshold is
      exceeded. A value of `0' will disable the notification.
    "
  ::= { optIfOTNPMConfigEntry 5 }

optIfOTNPM15MinSESsThreshold  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The number of SES encountered by the interface within any
      given 15 minutes performance data collection period, which causes
      the SNMP agent to send optIf15MinThreshSESTCA. One notification
      will be sent per interval per interface if the threshold is
      exceeded. A value of `0' will disable the notification.
    "
  ::= { optIfOTNPMConfigEntry 6 }


optIfOTNPM15MinUASsThreshold  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The number of UAS encountered by the interface within any
      given 15 minutes performance data collection period, which causes
      the SNMP agent to send optIf15MinThreshUASTCA. One notification
      will be sent per interval per interface if the threshold is
      exceeded. A value of `0' will disable the notification.
    "
  ::= { optIfOTNPMConfigEntry  7 }

optIfOTNPM15MinBBEsThreshold  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The number of UAS encountered by the interface within any
      given 15 minutes performance data collection period, which causes
      the SNMP agent to send optIf15MinThreshBBETCA. One notification
      will be sent per interval per interface if the threshold is
      exceeded. A value of `0' will disable the notification.
```

```
    "
  ::= { optIfOTNPMConfigEntry  8 }


--
-- PM Current Entry at either the OTU/ODUk/TCM
--
optIfOTNPMCurrentTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMCurrentEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A table for the Performance monitoring Current Table.
    "
  ::= {optIfOTNPMGroup 3}

optIfOTNPMCurrentEntry OBJECT-TYPE
    SYNTAX      OptIfOTNPMCurrentEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     "A conceptual entry in the Near end or Far End performance
     monitoring Current table for the type 'optIfOTNPMCurrentLayer'
     layer.
     "
  INDEX  { ifIndex, optIfOTNPMCurrentType ,
           optIfOTNPMCurrentLayer, optIfOTNPMCurrentTCMLevel  }
  ::= { optIfOTNPMCurrentTable 1 }

OptIfOTNPMCurrentEntry ::=
   SEQUENCE {
          optIfOTNPMCurrentType              OptIfPerformanceDataType,
          optIfOTNPMCurrentLayer             OptIfOTNLayer,
          optIfOTNPMCurrentTCMLevel          Unsigned32,
          optIfOTNPMCurrentSuspectedFlag     TruthValue,
          optIfOTNPMCurrentInterval          Unsigned32,
          optIfOTNPMCurrentValidIntervals    Unsigned32,
          optIfOTNPMCurrentFcs               Unsigned32,
          optIfOTNPMCurrentESs               Unsigned32,
          optIfOTNPMCurrentSESs              Unsigned32,
          optIfOTNPMCurrentUASs              Unsigned32,
          optIfOTNPMCurrentBBEs              Unsigned32,
          optIfOTNPMCurrentESR               Unsigned32,
          optIfOTNPMCurrentSESR              Unsigned32,
          optIfOTNPMCurrentBBER              Unsigned32
     }

optIfOTNPMCurrentType          OBJECT-TYPE
```

```
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMCurrentEntry  1}

optIfOTNPMCurrentLayer   OBJECT-TYPE
  SYNTAX  OptIfOTNLayer
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for OTUk,
    ODUk, TCMn performance data.
     1 - OTUk (OCh which is used for the black link)
     2 - ODUk
     3 - TCM
     The ODUk/TCM Layer PM is not related to the black link PM
     management, but since this is a common PM model for the ODU/TCM
     layer, we may include it here.
     "
  ::= { optIfOTNPMCurrentEntry  2}

optIfOTNPMCurrentTCMLevel   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the TCM level (1-6)
     if the PM is of the type TCM. This will be 0 for OTUK/ODUK.
    "
  ::= { optIfOTNPMCurrentEntry  3}


optIfOTNPMCurrentSuspectedFlag   OBJECT-TYPE
  SYNTAX  TruthValue
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     If true, the data in this entry may be unreliable.
```

```
     "
  ::= { optIfOTNPMCurrentEntry  4}

optIfOTNPMCurrentInterval OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS "seconds"
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    " This parameter indicates the measurement interval
      for calculation of the ratios.
    "
  ::= { optIfOTNPMCurrentEntry  5}

 optIfOTNPMCurrentValidIntervals OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS "seconds"
  MAX-ACCESS  read-write
  STATUS  current
  DESCRIPTION
    " The number of contiguous 15 minute intervals for which valid
            PM data is available for the particular interface.
    "
  ::= { optIfOTNPMCurrentEntry  6}

optIfOTNPMCurrentFcs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     Number of Failures occurred in an observation period.
    "
  ::= { optIfOTNPMCurrentEntry  7 }

optIfOTNPMCurrentESs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This is the number of seconds in which one or more blocks are in
     error or during which a defect (e.g. Loss of Signal (LOS)) is
         detected.
    "
  ::= { optIfOTNPMCurrentEntry  8 }

optIfOTNPMCurrentSESs   OBJECT-TYPE
```

```
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " The number of seconds which have a severe error.
      This is the number of seconds in which the errored block ratio
          exceeds the threshold or during which a defect (e.g. Loss of
          Signal (LOS)) is detected.
    "
  ::= { optIfOTNPMCurrentEntry  9 }

optIfOTNPMCurrentUASs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " It is the number of unavailable seconds.
      A period of unavailable time begins at the onset of ten
      consecutive SES events.  These ten seconds are considered to be
      part of unavailable time.  A new period of available time begins
      at the onset of ten consecutive non-SES events.  These ten
      seconds are considered to be part of available time.
    "
  ::= { optIfOTNPMCurrentEntry  10 }

optIfOTNPMCurrentBBEs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
    An errored block not occurring as part of an SES.
    "
  ::= { optIfOTNPMCurrentEntry  11 }

optIfOTNPMCurrentESR   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of ES in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMCurrentEntry  12 }
```

```
optIfOTNPMCurrentSESR   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of SES in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMCurrentEntry  13 }

optIfOTNPMCurrentBBER OBJECT-TYPE
  SYNTAX          Unsigned32
  UNITS   ".001"
  MAX-ACCESS      read-only
  STATUS          current
  DESCRIPTION
    "
     The ratio of BER in available time to total seconds in available
     time during a fixed measurement interval.
    "
    ::= { optIfOTNPMCurrentEntry 14 }

--
-- OTN PM Interval Table
-- Upto 96 15-minute intervals
--
optIfOTNPMIntervalTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMIntervalEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A Performance monitoring Interval Table.
    "
  ::= { optIfOTNPMGroup 4 }

optIfOTNPMIntervalEntry OBJECT-TYPE
    SYNTAX      OptIfOTNPMIntervalEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     "A conceptual entry in the Near end or Far End performance
     monitoring Interval table for the type 'optIfOTNPMIntervalLayer'
     layer.
     "
  INDEX  { ifIndex, optIfOTNPMIntervalType, optIfOTNPMIntervalLayer,
           optIfOTNPMIntervalTCMLevel, optIfOTNPMIntervalNumber  }
```

```
  ::= { optIfOTNPMIntervalTable 1 }

OptIfOTNPMIntervalEntry  ::=
   SEQUENCE {
          optIfOTNPMIntervalType             OptIfPerformanceDataType,
          optIfOTNPMIntervalLayer            OptIfOTNLayer,
          optIfOTNPMIntervalTCMLevel         Unsigned32,
          optIfOTNPMIntervalNumber           Unsigned32,
          optIfOTNPMIntervalSuspectedFlag    TruthValue,
          optIfOTNPMIntervalFcs              Unsigned32,
          optIfOTNPMIntervalESs              Unsigned32,
          optIfOTNPMIntervalSESs             Unsigned32,
          optIfOTNPMIntervalUASs             Unsigned32,
          optIfOTNPMIntervalBBEs             Unsigned32,
          optIfOTNPMIntervalESR              Unsigned32,
          optIfOTNPMIntervalSESR             Unsigned32,
          optIfOTNPMIntervalBBER             Unsigned32
     }

optIfOTNPMIntervalType         OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMIntervalEntry  1}

optIfOTNPMIntervalLayer   OBJECT-TYPE
  SYNTAX  OptIfOTNLayer
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for OTUk,
     ODUk, TCMn performance data.
     1 - OTUk
     2 - ODUk
     3 - TCM
     The ODUk/TCM Layer PM is not related to the black link PM
     management, but since this is a common  PM model for the ODU/TCM
     layer, we may include it here."
  ::= { optIfOTNPMIntervalEntry  2}
```

```
optIfOTNPMIntervalTCMLevel   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the TCM level (1-6)
     if the PM is of the type TCM. This will be 0 for OTUK/ODUK.
    "
  ::= { optIfOTNPMIntervalEntry  3}

optIfOTNPMIntervalNumber   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     A number between 1 and 96, where 1 is the most
     recently completed 15 minute interval and 96 is
     the 15 minutes interval completed 23 hours and 45
     minutes prior to interval 1.
    "
  ::= { optIfOTNPMIntervalEntry  4}

optIfOTNPMIntervalSuspectedFlag   OBJECT-TYPE
  SYNTAX  TruthValue
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     If true, the data in this entry may be unreliable.
    "
  ::= { optIfOTNPMIntervalEntry  5}

optIfOTNPMIntervalFcs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     Number of Failures occurred in an observation period.
    "
  ::= { optIfOTNPMIntervalEntry  6}

optIfOTNPMIntervalESs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
```

```
  DESCRIPTION
    "
     It is a one-second period which has one or more errored blocks
     or during which a defect (e.g. Loss of Signal (LOS)) is detected.
    "
  ::= { optIfOTNPMIntervalEntry  7}


optIfOTNPMIntervalSESs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " The number of seconds which have a severe error.
      It is a one-second period in which the errored block ratio exceeds
      the threshold or during which a defect (e.g.Loss of Signal(LOS)
      is detected.
    "
  ::= { optIfOTNPMIntervalEntry  8}

optIfOTNPMIntervalUASs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " It is the number of unavailable seconds in this 15 minute
      interval.
      A period of unavailable time begins at the onset of ten
      consecutive SES events.  These ten seconds are considered to be
      part of unavailable time.  A new period of available time begins
      at the onset of ten consecutive non-SES events.  These ten
      seconds are considered to be part of available time.
    "
  ::= { optIfOTNPMIntervalEntry  9}

optIfOTNPMIntervalBBEs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
    An errored block not occurring as part of an SES.
    "
  ::= { optIfOTNPMIntervalEntry  10}

optIfOTNPMIntervalESR   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
```

```
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of ES in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMIntervalEntry  11}

optIfOTNPMIntervalSESR   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of SES in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMIntervalEntry  12}

optIfOTNPMIntervalBBER   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of BBE in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMIntervalEntry  13}

--
-- PM Current Day Entry
--
optIfOTNPMCurrentDayTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMCurrentDayEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    " A Performance monitoring Current Day Table.
    "
  ::= { optIfOTNPMGroup  5 }

optIfOTNPMCurrentDayEntry OBJECT-TYPE
    SYNTAX      OptIfOTNPMCurrentDayEntry
  MAX-ACCESS  not-accessible
```

```
  STATUS  current
  DESCRIPTION
     "A conceptual entry in the Near end or Far End performance
      monitoring Current day table for the type
      'optIfOTNPMCurrentDayLayer'  layer.
     "
  INDEX { ifIndex, optIfOTNPMCurrentDayType, optIfOTNPMCurrentDayLayer,
          optIfOTNPMCurrentDayTCMLevel  }
  ::= { optIfOTNPMCurrentDayTable 1 }

OptIfOTNPMCurrentDayEntry  ::=
   SEQUENCE {
          optIfOTNPMCurrentDayType           OptIfPerformanceDataType,
          optIfOTNPMCurrentDayLayer          OptIfOTNLayer,
          optIfOTNPMCurrentDayTCMLevel       Unsigned32,
          optIfOTNPMCurrentDaySuspectedFlag  TruthValue,
          optIfOTNPMCurrentDayFcs            Unsigned32,
          optIfOTNPMCurrentDayESs            Unsigned32,
          optIfOTNPMCurrentDaySESs           Unsigned32,
          optIfOTNPMCurrentDayUASs           Unsigned32,
          optIfOTNPMCurrentDayBBEs           Unsigned32,
          optIfOTNPMCurrentDayESR            Unsigned32,
          optIfOTNPMCurrentDaySESR           Unsigned32,
          optIfOTNPMCurrentDayBBER           Unsigned32
     }

optIfOTNPMCurrentDayType        OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for
     the Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMCurrentDayEntry  1}

optIfOTNPMCurrentDayLayer   OBJECT-TYPE
  SYNTAX  OptIfOTNLayer
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for OTUk,
     ODUk, TCMn performance data.
     1 - OTUk
```

```
     2 - ODUk
     3 - TCM
     The ODUk/TCM Layer PM is not related to the black link PM
     management, but since this is a common PM model for the ODU/TCM
     layer, we may include it here."
  ::= { optIfOTNPMCurrentDayEntry  2}

optIfOTNPMCurrentDayTCMLevel   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the TCM level (1-6)
     if the PM is of the type TCM. This will be 0 for OTUK/ODUK.
    "
  ::= { optIfOTNPMCurrentDayEntry  3}


optIfOTNPMCurrentDaySuspectedFlag   OBJECT-TYPE
  SYNTAX  TruthValue
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
    If true, the data in this entry may be unreliable.
     "
  ::= { optIfOTNPMCurrentDayEntry  4}

optIfOTNPMCurrentDayFcs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
    Number of Failures occurred in an observation period.
    "
  ::= { optIfOTNPMCurrentDayEntry  5}



optIfOTNPMCurrentDayESs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " The number of seconds which have an error.
     It is a one-second period which has one or more errored blocks
```

```
     or during which a defect(e.g., Loss of Signal (LOS)) is detected.
    "
  ::= { optIfOTNPMCurrentDayEntry  6}

optIfOTNPMCurrentDaySESs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " The number of seconds which have a severe error.
      A severely errored second, is a one-second period in which the
      errored block ratio exceeds the threshold or during which a
      defect (e.g. Loss of Signal (LOS)) is detected.
    "
  ::= { optIfOTNPMCurrentDayEntry  7}

optIfOTNPMCurrentDayUASs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " It is the number of unavailable seconds in the cunrrent day.
      A period of unavailable time begins at the onset of ten
      consecutive SES events.  These ten seconds are considered to be
      part of unavailable time.  A new period of available time begins
      at the onset of ten consecutive non-SES events. These ten seconds
      are considered to be part of available time.
    "
  ::= { optIfOTNPMCurrentDayEntry  8}

optIfOTNPMCurrentDayBBEs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     An errored block not occurring as part of an SES.
    "
  ::= { optIfOTNPMCurrentDayEntry  9}

optIfOTNPMCurrentDayESR   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS    ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of ES in available time to total seconds in available
```

```
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMCurrentDayEntry  10}

optIfOTNPMCurrentDaySESR   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of SES in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMCurrentDayEntry  11}

optIfOTNPMCurrentDayBBER   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of BBE in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMCurrentDayEntry  12}

--
-- PM Prev Day Entry
--
optIfOTNPMPrevDayTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMPrevDayEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A Performance monitoring Previous Day Table.
    "
  ::= { optIfOTNPMGroup 6 }

optIfOTNPMPrevDayEntry OBJECT-TYPE
    SYNTAX      OptIfOTNPMPrevDayEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     "A conceptual entry in the Near end or Far End performance
      monitoring previous day table for the type
      'optIfOTNPMPrevDayLayer' layer.
```

```
     "
  INDEX  { ifIndex, optIfOTNPMPrevDayType     ,
           optIfOTNPMPrevDayLayer, optIfOTNPMPrevDayTCMLevel  }
  ::= { optIfOTNPMPrevDayTable 1 }

OptIfOTNPMPrevDayEntry  ::=
   SEQUENCE {
          optIfOTNPMPrevDayType              OptIfPerformanceDataType,
          optIfOTNPMPrevDayLayer             OptIfOTNLayer,
          optIfOTNPMPrevDayTCMLevel          Unsigned32,
          optIfOTNPMPrevDaySuspectedFlag     TruthValue,
          optIfOTNPMPrevDayFcs               Unsigned32,
          optIfOTNPMPrevDayESs               Unsigned32,
          optIfOTNPMPrevDaySESs              Unsigned32,
          optIfOTNPMPrevDayUASs              Unsigned32,
          optIfOTNPMPrevDayBBEs              Unsigned32,
          optIfOTNPMPrevDayESR               Unsigned32,
          optIfOTNPMPrevDaySESR              Unsigned32,
          optIfOTNPMPrevDayBBER              Unsigned32
     }

optIfOTNPMPrevDayType        OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMPrevDayEntry  1}

optIfOTNPMPrevDayLayer   OBJECT-TYPE
  SYNTAX  OptIfOTNLayer
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for
     OTUk, ODUk, TCMn performance data.
     1 - OTUk
     2 - ODUk
     3 - TCM
     The ODUk/TCM Layer PM is not related to the black link PM
     management, but since this is a common PM model for the ODU/TCM
     layer, we may include it here."
```

```
  ::= { optIfOTNPMPrevDayEntry  2}

optIfOTNPMPrevDayTCMLevel   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the TCM level (1-6)
     if the PM is of the type TCM.
    "
  ::= { optIfOTNPMPrevDayEntry  3}


optIfOTNPMPrevDaySuspectedFlag   OBJECT-TYPE
  SYNTAX  TruthValue
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     If true, the data in this entry may be unreliable.
     "
  ::= { optIfOTNPMPrevDayEntry  4}

optIfOTNPMPrevDayFcs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     Number of pre FEC failures occurred in an observation period.
    "
  ::= { optIfOTNPMPrevDayEntry  5}

optIfOTNPMPrevDayESs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of seconds which have an error.
     It is a one-second period which has one or more errored block
     or during which a defect (e.g. Loss of Signal (LOS)) is detected.
    "
  ::= { optIfOTNPMPrevDayEntry  6}

optIfOTNPMPrevDaySESs   OBJECT-TYPE
  SYNTAX  Unsigned32
```

```
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " The number of seconds which have a severe error.
      A severely errored second, is a one-second period in which the
      errored block ratio exceeds the threshold or during which a defect
          (e.g. Loss of Signal (LOS)) is detected.
    "
  ::= { optIfOTNPMPrevDayEntry  7}

optIfOTNPMPrevDayUASs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    " It is the number of unavailable seconds in the previous day.
      A period of unavailable time begins at the onset of ten
      consecutive SES events.  These ten seconds are considered to be
      part of unavailable time.  A new period of available time begins
      at the onset of ten consecutive non-SES events.  These ten seconds
      are considered to be part of available time.
    "
  ::= { optIfOTNPMPrevDayEntry  8}

optIfOTNPMPrevDayBBEs   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
    An errored block not occurring as part of an SES.
    "
  ::= { optIfOTNPMPrevDayEntry  9}

optIfOTNPMPrevDayESR   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of ES in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMPrevDayEntry  10}


optIfOTNPMPrevDaySESR   OBJECT-TYPE
```

```
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of SES in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMPrevDayEntry  11}

optIfOTNPMPrevDayBBER   OBJECT-TYPE
  SYNTAX  Unsigned32
  UNITS   ".001"
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The ratio of BBE in available time to total seconds in available
      time during a fixed measurement interval.
    "
  ::= { optIfOTNPMPrevDayEntry  12}

--
-- OTN FEC PM Config Table
--
optIfOTNPMFECConfigTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMFECConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A table of performance monitoring  FEC configuration. "
  ::= { optIfOTNPMGroup 7 }

optIfOTNPMFECConfigEntry OBJECT-TYPE
    SYNTAX      OptIfOTNPMFECConfigEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     " A conceptual entry in the performance monitoring FEC
       configuration layer."
  INDEX  { ifIndex, optIfOTNPMFECConfigType }
  ::= { optIfOTNPMFECConfigTable 1 }

OptIfOTNPMFECConfigEntry  ::=
   SEQUENCE {
          optIfOTNPMFECConfigType    OptIfPerformanceDataType,
          optIfOTNPMFECValidIntervals              Unsigned32,
```

```
          optIfOTNPM15MinFECUnCorrectedWordsThreshold
                                                  Unsigned32,
          optIfOTNPM15MinPreFECBERThresholdMantissa
                                                  Unsigned32,
          optIfOTNPM15MinPreFECBERThresholdExponent
                                                  Unsigned32
     }

optIfOTNPMFECConfigType        OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMFECConfigEntry  1}

optIfOTNPMFECValidIntervals  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The number of contiguous 15 minute intervals for which valid FEC
      PM data is available for the particular interface.
    "
  ::= {optIfOTNPMFECConfigEntry  2}

optIfOTNPM15MinFECUnCorrectedWordsThreshold  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of Uncorrected words encountered by the interface within
     any given 15 minutes performance data collection period, which
     causes the SNMP agent to send
     optIf15MinThreshFECUnCorrectedWordsTCA.
     One notification will be sent per interval per interface if the
     threshols is exceeded.. A value of `0' will disable
     the notification.
    "
  ::= {optIfOTNPMFECConfigEntry  3}
```

```
optIfOTNPM15MinPreFECBERThresholdMantissa  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The Pre FEC BER (mantissa) by the interface within any
      given 15 minutes performance data collection period, which causes
      the SNMP agent to send optIf15MinThreshPreFECBERTCA. One
      notification will be sent per interval per interface. A value of
      `0' will disable the notification.
    "
  ::= {optIfOTNPMFECConfigEntry  4}

optIfOTNPM15MinPreFECBERThresholdExponent  OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The Pre FEC BER (exponent) by the interface within any
     given 15 minutes performance data collection period, which causes
     the SNMP agent to send optIf15MinThreshPreFECBERTCA. One
     notification will be sent per interval per interface. A value of
     `0' will disable the notification.
    "
  ::= {optIfOTNPMFECConfigEntry  5}


--
-- FEC PM Table
--
optIfOTNPMFECCurrentTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMFECCurrentEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A Performance monitoring FEC Current Table.
    "
  ::= { optIfOTNPMGroup 8 }

optIfOTNPMFECCurrentEntry OBJECT-TYPE
    SYNTAX      OptIfOTNPMFECCurrentEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     " A conceptual entry in the Near end or Far End performance
      monitoring FEC current table.
```

```
     "
  INDEX  { ifIndex, optIfOTNPMFECCurrentType}
  ::= { optIfOTNPMFECCurrentTable  1 }

OptIfOTNPMFECCurrentEntry  ::=
   SEQUENCE {
          optIfOTNPMFECCurrentType            OptIfPerformanceDataType,
          optIfOTNPMFECCurrentSuspectedFlag    TruthValue,
          optIfOTNPMCurrentFECCorrectedErr     Unsigned32,
          optIfOTNPMCurrentFECUncorrectedWords Unsigned32,
          optIfOTNPMCurrentFECBERMantissa      Unsigned32,
          optIfOTNPMCurrentFECBERExponent      Unsigned32
    }

optIfOTNPMFECCurrentType        OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMFECCurrentEntry  1}


optIfOTNPMFECCurrentSuspectedFlag   OBJECT-TYPE
  SYNTAX  TruthValue
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     If true, the data in this entry may be unreliable.
     "
  ::= { optIfOTNPMFECCurrentEntry  2}

optIfOTNPMCurrentFECCorrectedErr   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of bits corrected by the FEC are counted in the
     interval.
     "
  ::= { optIfOTNPMFECCurrentEntry  3}
```

```
optIfOTNPMCurrentFECUncorrectedWords   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of un-corrected words by the FEC are counted over the
     interval.
     "
  ::= { optIfOTNPMFECCurrentEntry  4}

optIfOTNPMCurrentFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of Errored bits at receiving side before the FEC
      function counted over one second .. mantisa.
     "
  ::= { optIfOTNPMFECCurrentEntry  5}

optIfOTNPMCurrentFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of Errored bits at receiving side before the FEC
      function counted over one second .. exponent (eg -1).
     "
  ::= { optIfOTNPMFECCurrentEntry  6}

--
-- FEC PM  Interval Table
--
optIfOTNPMFECIntervalTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMFECIntervalEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A Performance monitoring FEC Interval Table.
    "
  ::= { optIfOTNPMGroup 9 }

optIfOTNPMFECIntervalEntry OBJECT-TYPE
    SYNTAX      OptIfOTNPMFECIntervalEntry
  MAX-ACCESS  not-accessible
```

```
  STATUS  current
  DESCRIPTION
     "A conceptual entry in the Near end or Far End performance
      monitoring FEC interval table.
     "
  INDEX { ifIndex, optIfOTNPMIntervalType, optIfOTNPMFECIntervalNumber }
  ::= { optIfOTNPMFECIntervalTable 1 }

OptIfOTNPMFECIntervalEntry ::=
   SEQUENCE {
          optIfOTNPMFECIntervalType           OptIfPerformanceDataType,
          optIfOTNPMFECIntervalNumber         Unsigned32,
          optIfOTNPMFECIntervalSuspectedFlag  TruthValue,
          optIfOTNPMIntervalFECCorrectedErr   Unsigned32,
          optIfOTNPMIntervalFECUncorrectedWords Unsigned32,
          optIfOTNPMIntervalMinFECBERMantissa   Unsigned32,
          optIfOTNPMIntervalMinFECBERExponent   Unsigned32,
          optIfOTNPMIntervalMaxFECBERMantissa   Unsigned32,
          optIfOTNPMIntervalMaxFECBERExponent   Unsigned32,
          optIfOTNPMIntervalAvgFECBERMantissa   Unsigned32,
          optIfOTNPMIntervalAvgFECBERExponent   Unsigned32
    }

optIfOTNPMFECIntervalType        OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMFECIntervalEntry  1}

optIfOTNPMFECIntervalNumber   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     A number between 1 and 96, where 1 is the most
     recently completed 15 minute interval and 96 is
     the 15 minutes interval completed 23 hours and 45
     minutes prior to interval 1.
    "
  ::= { optIfOTNPMFECIntervalEntry  2}
```

```
optIfOTNPMFECIntervalSuspectedFlag   OBJECT-TYPE
  SYNTAX  TruthValue
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     If true, the data in this entry may be unreliable.
     "
  ::= { optIfOTNPMFECIntervalEntry  3}

optIfOTNPMIntervalFECCorrectedErr   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of bits corrected by the FEC are counted in the
     interval.
     "
  ::= { optIfOTNPMFECIntervalEntry  4}

optIfOTNPMIntervalFECUncorrectedWords   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of words un-corrected words by the FEC are counted over
     the interval.
     "
  ::= { optIfOTNPMFECIntervalEntry  5}

optIfOTNPMIntervalMinFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The minimun bit error rate at receiving side before the FEC
     function counted over one second .. mantissa. This is the minimum
     Pre FEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECIntervalEntry  6}

optIfOTNPMIntervalMinFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
```

```
  DESCRIPTION
    "
     The minimun bit error rate at receiving side before the FEC
     function counted over one second .. exponent. This is the minimum
     Pre FEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECIntervalEntry  7}

optIfOTNPMIntervalMaxFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The maximun bit error rate at receiving side before the FEC
     function counted over one second .. mantissa. This is the maximum
     Pre FEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECIntervalEntry  8}

optIfOTNPMIntervalMaxFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The maximun bit error rate at receiving side before the FEC
     function counted over one second .. exponent. This is the maximum
     Pre FEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECIntervalEntry  9}

optIfOTNPMIntervalAvgFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The average bit error rate at receiving side before the FEC
     function counted over one second .. mantissa. This is the average
     Pre FEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECIntervalEntry  10}

optIfOTNPMIntervalAvgFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
```

```
  DESCRIPTION
    "
     The average bit error rate at receiving side before the FEC
     function counted over one second .. exponent. This is the average
     Pre FEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECIntervalEntry  11}

--
-- FEC PM  Current Day day Table
--
optIfOTNPMFECCurrentDayTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMFECCurrentDayEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A Performance monitoring FEC current day table.
    "
  ::= { optIfOTNPMGroup 10 }

optIfOTNPMFECCurrentDayEntry OBJECT-TYPE
  SYNTAX      OptIfOTNPMFECCurrentDayEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     "A conceptual entry in the Near end or Far End performance
      monitoring FEC current day table.
     "
  INDEX  { ifIndex, optIfOTNPMFECCurrentDayType }
  ::= { optIfOTNPMFECCurrentDayTable 1 }

OptIfOTNPMFECCurrentDayEntry ::=
   SEQUENCE {
        optIfOTNPMFECCurrentDayType           OptIfPerformanceDataType,
        optIfOTNPMFECCurrentDaySuspectedFlag    TruthValue,
        optIfOTNPMCurrentDayFECCorrectedErr     Unsigned32,
        optIfOTNPMCurrentDayFECUncorrectedWords Unsigned32,
        optIfOTNPMCurrentDayMinFECBERMantissa   Unsigned32,
        optIfOTNPMCurrentDayMinFECBERExponent   Unsigned32,
        optIfOTNPMCurrentDayMaxFECBERMantissa   Unsigned32,
        optIfOTNPMCurrentDayMaxFECBERExponent   Unsigned32,
        optIfOTNPMCurrentDayAvgFECBERMantissa   Unsigned32,
        optIfOTNPMCurrentDayAvgFECBERExponent   Unsigned32
    }

optIfOTNPMFECCurrentDayType        OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
```

```
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMFECCurrentDayEntry  1}


optIfOTNPMFECCurrentDaySuspectedFlag   OBJECT-TYPE
  SYNTAX  TruthValue
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     If true, the data in this entry may be unreliable.
     "
  ::= { optIfOTNPMFECCurrentDayEntry  2}

optIfOTNPMCurrentDayFECCorrectedErr   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of bits corrected by the FEC are counted in the
     interval.
     "
  ::= { optIfOTNPMFECCurrentDayEntry  3}

optIfOTNPMCurrentDayFECUncorrectedWords   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of words un-corrected by the FEC are counted over the
     Day.
     "
  ::= { optIfOTNPMFECCurrentDayEntry  4}

optIfOTNPMCurrentDayMinFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
```

```
    "
     The minimun bit error rate at receiving side before the FEC
     function counted over one second .. mantissa. This is the minimum
     PreFEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECCurrentDayEntry  5}

optIfOTNPMCurrentDayMinFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The minimun bit error rate at receiving side before the FEC
     function counted over one second .. exponent. This is the minimum
     PreFEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECCurrentDayEntry  6}

optIfOTNPMCurrentDayMaxFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The maximun bit error rate at receiving side before the FEC
     function counted over one second .. mantissa. This is the maximum
     PreFEC BER in the current 24hour period.
     "
  ::= { optIfOTNPMFECCurrentDayEntry  7}

optIfOTNPMCurrentDayMaxFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The maximun bit error rate at receiving side before the FEC
     function counted over one second .. exponent. This is the maximum
     PreFEC BER in the current 24hour period..
     "
  ::= { optIfOTNPMFECCurrentDayEntry  8}

optIfOTNPMCurrentDayAvgFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
```

```
    "
     The average bit error rate at receiving side before the FEC
     function counted over one second .. mantissa. This is the average
     PreFEC BER in the current 24hour period. .
     "
  ::= { optIfOTNPMFECCurrentDayEntry  9}

optIfOTNPMCurrentDayAvgFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The average bit error rate at receiving side before the FEC
     function counted over one second .. exponent. This is the average
     PreFEC BER in the current 24hour period.
    "
  ::= { optIfOTNPMFECCurrentDayEntry  10}
--
-- FEC PM  Prev day Table
--
optIfOTNPMFECPrevDayTable OBJECT-TYPE
  SYNTAX  SEQUENCE OF OptIfOTNPMFECPrevDayEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
    "A Performance monitoring FEC previous day table.
    "
  ::= { optIfOTNPMGroup 11 }

optIfOTNPMFECPrevDayEntry OBJECT-TYPE
    SYNTAX      OptIfOTNPMFECPrevDayEntry
  MAX-ACCESS  not-accessible
  STATUS  current
  DESCRIPTION
     "A conceptual entry in the Near end or Far End performance
      monitoring FEC previous day table
     "
  INDEX  { ifIndex, optIfOTNPMFECPrevDayType }
  ::= { optIfOTNPMFECPrevDayTable 1 }

OptIfOTNPMFECPrevDayEntry ::=
   SEQUENCE {
          optIfOTNPMFECPrevDayType            OptIfPerformanceDataType,
          optIfOTNPMFECPrevDaySuspectedFlag     TruthValue,
          optIfOTNPMPrevDayFECCorrectedErr      Unsigned32,
          optIfOTNPMPrevDayFECUncorrectedWords  Unsigned32,
          optIfOTNPMPrevDayMinFECBERMantissa    Unsigned32,
```

```
          optIfOTNPMPrevDayMinFECBERExponent    Unsigned32,
          optIfOTNPMPrevDayMaxFECBERMantissa    Unsigned32,
          optIfOTNPMPrevDayMaxFECBERExponent    Unsigned32,
          optIfOTNPMPrevDayAvgFECBERMantissa    Unsigned32,
          optIfOTNPMPrevDayAvgFECBERExponent    Unsigned32
    }

optIfOTNPMFECPrevDayType        OBJECT-TYPE
  SYNTAX  OptIfPerformanceDataType
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     This parameter indicates the parameters for the table are for the
     Near End or Far End performance data.
     1 - Near End
     2 - Far End
    "
  ::= { optIfOTNPMFECPrevDayEntry  1}


optIfOTNPMFECPrevDaySuspectedFlag   OBJECT-TYPE
  SYNTAX  TruthValue
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
    If true, the data in this entry may be unreliable.
     "
  ::= { optIfOTNPMFECPrevDayEntry  2}

optIfOTNPMPrevDayFECCorrectedErr   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The number of bits corrected by the FEC are counted in the
     previous day.
     "
  ::= { optIfOTNPMFECPrevDayEntry  3}

optIfOTNPMPrevDayFECUncorrectedWords   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
```

```
      The number of un-corrected words by the FEC are counted over the
      previous Day.
      "
  ::= { optIfOTNPMFECPrevDayEntry  4}

optIfOTNPMPrevDayMinFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The maximun bit error rate at receiving side before the FEC
      function counted over one second .. mantissa. This is the maximum
      Pre FEC BER in the previous 24hour period.
      "
  ::= { optIfOTNPMFECPrevDayEntry  5}

optIfOTNPMPrevDayMinFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The minimun bit error rate at receiving side before the FEC
      function counted over one second .. exponent. This is the maximum
      Pre FEC BER in the previous 24hour period
      "
  ::= { optIfOTNPMFECPrevDayEntry  6}

optIfOTNPMPrevDayMaxFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The maximun bit error rate at receiving side before the FEC
      function counted over one second .. mantissa. This is the maximum
      Pre FEC BER in the previous 24hour period (mantissa).
      "
  ::= { optIfOTNPMFECPrevDayEntry  7}

optIfOTNPMPrevDayMaxFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
      The maximun bit error rate at receiving side before the FEC
```

```
     function counted over one second .. exponent (eg -3).
     This is the maximum Pre FEC BER in the previous 24hour period.
    "
  ::= { optIfOTNPMFECPrevDayEntry  8}

optIfOTNPMPrevDayAvgFECBERMantissa   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The average bit error rate at receiving side before the FEC
     function counted over one second .. mantissa. This is the average
     Pre FEC BER during the previous 24hour period (mantissa).
     "
  ::= { optIfOTNPMFECPrevDayEntry  9}

optIfOTNPMPrevDayAvgFECBERExponent   OBJECT-TYPE
  SYNTAX  Unsigned32
  MAX-ACCESS  read-only
  STATUS  current
  DESCRIPTION
    "
     The average bit error rate at receiving side before the FEC
     function counted over one second .. exponent (eg -3).
     This is the average Pre FEC BER during the previous 24hour period.
     "
  ::= { optIfOTNPMFECPrevDayEntry  10}

--
-- OTN Alarm Table
--
  optIfOTNAlarmTable OBJECT-TYPE
     SYNTAX     SEQUENCE OF OptIfOTNAlarmEntry
     MAX-ACCESS not-accessible
     STATUS     current
     DESCRIPTION
         "A table of alarm entries."

     ::= { optIfOTNAlarm 1 }

 optIfOTNAlarmEntry OBJECT-TYPE
     SYNTAX     OptIfOTNAlarmEntry
     MAX-ACCESS not-accessible
     STATUS     current
     DESCRIPTION
         "A conceptual entry in the alarm table."
     INDEX { ifIndex, optIfOTNAlarmIndex }
```

```
    ::= { optIfOTNAlarmTable 1 }

 OptIfOTNAlarmEntry ::= SEQUENCE {
     optIfOTNAlarmIndex                    Unsigned32,
     optIfOTNAlarmLayer                    OptIfOTNLayer,
     optIfOTNAlarmTCMLevel                 Unsigned32,
     optIfOTNAlarmType                     Unsigned32,
     optIfOTNAlarmDate                     DateAndTime,
     optIfOTNAlarmStatus                   TruthValue
 }

 optIfOTNAlarmIndex OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
        "An index that uniquely identifies an entry in the
         alarm table."
        ::= { optIfOTNAlarmEntry 1 }

optIfOTNAlarmLayer OBJECT-TYPE
        SYNTAX      OptIfOTNLayer
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
        "This specifies which layer this alarm is for."
        ::= { optIfOTNAlarmEntry 2 }

optIfOTNAlarmTCMLevel   OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
        "TCM level 1-6 of the alarm. It will be 0 if alarm layer is
        OCh, OTUk or ODUk."
        ::= { optIfOTNAlarmEntry 3 }

optIfOTNAlarmType OBJECT-TYPE
        SYNTAX      Unsigned32
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
        "This specifies the type of alarm of the layer
        'optIfOTNAlarmLayer' ."
        ::= { optIfOTNAlarmEntry 4 }


optIfOTNAlarmDate OBJECT-TYPE
```

```
        SYNTAX      DateAndTime
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
        "This specifies the date and time when this alarm occurred."
        ::= { optIfOTNAlarmEntry 5 }

optIfOTNAlarmStatus OBJECT-TYPE
        SYNTAX      TruthValue
        MAX-ACCESS  read-only
        STATUS      current
        DESCRIPTION
        "This specifies the state of the alarm -- cleared(0) or set(1)."
        ::= { optIfOTNAlarmEntry 6 }

 --
 -- OTN Notifications
 --

optIfOTNAlarmSet NOTIFICATION-TYPE
       OBJECTS { optIfOTNAlarmLayer,
                 optIfOTNAlarmTCMLevel,
                 optIfOTNAlarmType,
                 optIfOTNAlarmDate }
       STATUS  current
       DESCRIPTION
                "Notification of a recently set OTN alarm of layer
                 and Type."
    ::= { optIfOTNNotifications 1 }

optIfOTNAlarmClear NOTIFICATION-TYPE
       OBJECTS { optIfOTNAlarmLayer,
                 optIfOTNAlarmTCMLevel,
                 optIfOTNAlarmType,
                 optIfOTNAlarmDate }
       STATUS  current
       DESCRIPTION
                "Notification of a recently clear OTN alarm of layer
                 and Type."
    ::= { optIfOTNNotifications 2 }

END
```

## 7. Relationship to Other MIB Modules

### 7.1. Relationship to the [TEMPLATE TODO] MIB

### 7.2. MIB modules required for IMPORTS

## 8. Definitions

[TEMPLATE TODO]: put your valid MIB module here.
A list of tools that can help automate the process of
checking MIB definitions can be found at
http://www.ops.ietf.org/mib-review-tools.html

## 9. Security Considerations

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

o

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

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

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

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to

enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

## 10. IANA Considerations

Option #1:

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

| Descriptor | OBJECT IDENTIFIER value |
|---|---|
| sampleMIB | { mib-2 XXX } |

Option #2:

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

Note well: prior to official assignment by the IANA, an internet draft MUST use placeholders (such as "XXX" above) rather than actual numbers. See RFC4181 Section 4.5 for an example of how this is done in an internet draft MIB module.

Option #3:

This memo includes no request to IANA.

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## 12.2. Informative References

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## Appendix A. Change Log

This optional section should be removed before the internet draft is submitted to the IESG for publication as an RFC.

Note to RFC Editor: please remove this appendix before publication as an RFC.

## Appendix B. Open Issues

Note to RFC Editor: please remove this appendix before publication as an RFC.

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